Ritual Animal Killing and Burial Customs

in Viking Age Iceland

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Synopsis

In this thesis the ritual killing and burial of animals on grave-fields in Viking Age Iceland is critically re-evaluated, on a site-by-site basis, in order to characterize these customs and place them in a social and historical context. The foundation for this work is the zooarchaeological analysis of all available animal bone from burials excavated before 2012 in Iceland. Horses were very commonly buried on grave-fields in Viking Age Iceland, both with men and women. Dogs, more variable than the modern Icelandic breed, were sometimes interred with humans as well, but apart from single pig bones recorded in a handful of burials, no other animal species have been confirmed in a secure burial context. A comparative study of the ratio of horses in burials in Viking Age Norway, based on prevalence of harnesses, bridles and saddles in late Iron Age burials, revealed that horse burial was at its height of popularity in Norway during the short period of time the custom was practiced in Iceland and equally common. The zooarchaeological analysis of the Icelandic animal remains contextualised with other archaeological data illustrates many aspects of the rituals. They were part of a structured burial tradition reserved for certain groups of people, including both men and women, and as such must have carried a message of identity and status. The killing methods and the arrangement of the carcasses followed set protocols. Most horses were in their prime when killed, but curiously a third of them was young at the time of death and not fully grown. It was customary to bury horses harnessed and bridled, even those too young to have been ridden, and there was a preference for killing males. This indicates that the horses were essentially symbolic representatives of their species and not necessarily killed because of their individuality or because they were favourite animals. Horses were always buried whole, sometimes more than one in a grave and occasionally without human remains. The killing and deposition of dogs was less common and less structured. Dogs always shared burial with a human but sometimes only parts of them were interred. Osteological signs that the dogs were cared for in life suggest that some of them may have been the respective human's companion.

Horse graves, as a prominent component of the *kuml* burial tradition, represent a specific rite that was not practiced in equal measure around Iceland. It is proposed that a portion of the second and third generations of settlers along with new immigrants of higher social status appropriated and re-interpreted ancient burial traditions, which were at the time popular in Norway, to claim status and structure identity based on traditional values. Horse burials were popular from the mid- to late 10^{th} century, in a time when Icelandic society was taking shape

following the end of the settlement phase. This was a period of shifting power relations and the burial rituals were promoted by specific groups, revealing socio-political fault lines and competing identities. The ritual killing's theatrical elements, bloody and dramatic, likely helped to increase the popularity of the tradition and may have had cathartic connotations. The custom nonetheless only held out for a few decades until it was replaced by the more unifying Christian burial rite.

Ágrip

Þessi doktorsritgerð fjallar um dráp og greftrun dýra á kumlateigum víkingaaldar á Íslandi. Gögn frá hverjum einasta kumlateig eru endurskoðuð á gagnrýnin hátt með það fyrir augum að draga fram einkenni þessara siða og setja þá í félagslegt og sögulegt samhengi. Verkið grundvallast á greiningu allra tiltækra dýrabeina úr íslenskum víkingaaldarkumlum sem fundist hafa allt til ársins 2012. Mjög algengt var að grafa hross á kumlateigum á Íslandi, bæði með körlum og konum. Hundar þessa tíma voru ólíkari innbyrðis en íslenska kynið í dag og voru stundum einnig grafnir með fólki. Fyrir utan stök svínabein sem fundist hafa í örfáum kumlum hafa leifar annarra dýra ekki fundist í gröfum svo vissa sé fyrir. Samanburðarrannsókn á hlutfalli hrossa í víkingaaldargröfum í Noregi, byggð á algengi reiðtygja, leiðir í ljós að hrossgreftranir voru í hámarki vinsælda í Noregi á sama tíma og á Íslandi og jafnalgengur þar sem hér. Með því að setja dýrabeinafræðilegar greiningar á leifum kumldýranna í samhengi við önnur fornleifafræðileg gögn er dregin upp mynd af ýmsum hliðum drápssiðanna. Þeir voru hluti vel mótaðs grafrsiðar sem var einkenni ákveðins þjóðfélagshóps, skipuðum bæði körlum og konum, og hefur sem slíkur verið táknrænn fyrir ímynd og þjóðfélagsstöðu. Drápsaðferðir fylgdu vissum reglum sem og hvernig skrokkum var komið fyrir í gröfunum. Flest hrossin voru á besta aldri þegqar þau voru felld, en forvitnilegt er að þriðjungur þeirra var ungur og ekki fullvaxin. Það var venja að grafa hrossin með hnakki og beisli, jafnvel þau sem voru of ung til reiðar, og oftar voru kumlhestarnir karlkyns. Þetta bendir til að hrossin hafi verið álitin táknrænir fulltrúar sinnar tegundar og ekki endilega verið valin til dráps vegna eigin verðleika eða vegna þess að þau hafi verið uppáhald hins látna. Hross voru ávallt grafin í heilu lagi, stundum fleiri en eitt í gröf og einstaka sinnum án sýnilegra tengsla við mannsgröf. Sjaldgæfara var að drepa og grafa hunda og var sá siður ekki jafn fastmótaður og hrossdrápin. Hundarnir deildu alltaf gröf með manneskju en stundum var einungis hluti skrokks þeirra grafinn. Ummerki á beinum sumra hundanna benda til að þeir hafi notið atlætis í lifanda lífi sem styrkir þá túlkun að þeir hafi verið grafnir með eiganda sínum.

Hrossgrafir eru áberandi hluti íslenskra kumla en dreifast ójafnt um landið. Lagt er til að hluti annarrar og þriðju kynslóðar landnámsfólks ásamt nýjum innflytjendum í efra lagi samfélagsins hafi tekið upp og endurtúlkað forna grafsiði, sem jafnframt nutu vinsælda í Noregi á sama tíma, til að styrkja ímynd sína og félagslega stöðu með tilvísun í hefðbundin gildi. Hrossgrafir nutu mestra vinsælda hérlendis um og eftir miðja 10. öld þegar íslenskt

samfélag var að setjast í fastar skorður eftir umbrot landnámsaldar. Á þessu tímabili sköpuðust valdatengsl og –hlutföll og það að þessir grafsiðir öðluðust vinsældir hjá tilteknum hópi leiðir í ljós félagspólitískar og ímyndarlegar andstæður. Leikrænar hliðar dýradrápsins, með blóðugum sviðsetningum, hafa líklega aukið vinsældir grafsiðarins og jafnvel haft kaþarsískar tengingar. Siðurinn var þó einungis við lýði í nokkra áratugi eða þar til fólk sameinaðist um kristna helgisiði um land allt.

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1 Introduction

No ritual stands by itself—it sits within 'thick' context (Insoll 2004:12)

This is a thesis about the remains of ritually killed animals recovered from Viking Age burials in Iceland. The high frequency of horses in Icelandic Viking Age burials was noted a long time ago and has traditionally been seen as a defining characteristic of Viking Age burial customs on the island, setting them apart from contemporary traditions in other Norse societies. This is the first work on this topic in which a comprehensive analysis of the animal remains *themselves* is used as a basis for interpretation. The aim is to use a comprehensive analysis of the entire animal bone assemblage from Icelandic Viking Age burials to throw new light on developments in Icelandic Viking Age society. The focus is not just on the 'meaning' of animal burials or on religion as is traditional, but rather on the traditions themselves, to analyse the ritual of animal killing and burial practices as closely as possible based on the material remains and to illustrate how (and why) this tradition was utilised in the early society of Iceland.

The entire burial collection stored at the National Museum, complemented by material from recent excavations by the Institute of Archaeology, Iceland (FSI) was analysed by the author, in addition to a broad range of other Icelandic archaeological material and a new study of comparative data from Norway. Each individual Viking Age burial ground in Iceland, where animal remains have been recorded, is discussed in light of the new zooarchaeological data resulting in significant re-interpretations of some sites. Each animal is discussed in detail, providing information on species, the number of individuals, their stature and sex, the age and cause of death of the animals, their treatment in life and pathological conditions. By discussing in detail the entire corpus of surviving animal bone, and by contextualising it with other archaeological data both from Iceland and neighbouring countries, a picture of the animal ritual killing tradition is painted. This in turn corrects some misconceptions about Viking Age burial customs in Iceland which previous interpretations have been based on.

The present study confirms that the animals killed during burial rituals in Iceland were mostly horses, along with a few dogs. Some disarticulated bone from other species is recorded, but with a handful of exceptions, the context in those instances is insecure. The animal killing rituals were practiced in a highly structured way, based on norms most closely paralleled in

Norway and adapted to circumstances in the colony. This ritual killing tradition is used here to shed light on Viking Age society in Iceland and how it developed in the course of the 10^{th} century. It is argued that the rituals were actively used in the developing society to affirm identity and to construct status. The archaeological remains of the buried animals can thus be seen as materialised expressions of cultural politics in a new society under formation.

1.1 Ritual killings, sacrifices and traditions

Humans kill animals and have been doing so for millennia. Food requirements and the need for warm skins are basic reasons for this. Animals are also occasionally killed in self-defence and in seemingly more culture specific reasons, such as for sport. But humans have through history also killed animals, and indeed other humans, for other less obvious reasons. The remains of these animals and humans seem often to have been treated in 'unusual' ways and are found in specific contexts. Instances of this can be human bodies disposed of in bogs and seemingly specifically killed for that purpose (Glob 1965) or animals killed for burial in human grave fields (Müller-Wille 1972). These killings, which usually do not have an obvious economic premise, are often termed sacrifices, offerings, or ritual killings.

It is not uncommon for archaeologists to interpret unusual, apparently non-functional or out-of-place phenomena in the archaeological record as 'ritual' (Brück 1999:317). Hence there is no lack of talk of offerings and sacrifices in the archaeological literature (Bradley 2005:31-32). Archaeologists often feel they known what ritual is, but things tend to become less clear upon closer inspection (Brück 1999:314) and even within religious studies definitions of the concept tend to be varied and confusing (Insoll 2004:10-13; Zeusse 1987:405). There is a great need for archaeologists to articulate clearly what they mean when using terms like this to describe elements of the material culture and when archaeological deposits are defined as being 'sacrificial' or 'ritual' in nature. A good example of this is the debate about so-called special deposits (Grant 1984) also known as assorted bone groups or ABGs (Hill 1995) in England. Morris (2008) discussed in a recent doctoral thesis the changing attitudes towards ABGs in Southern England and Yorkshire. He found after reviewing previous literature that the interpretation of these deposits is highly varied, depending upon which period the deposit is from and developments in archaeological paradigms. ABG deposits from prehistoric contexts are commonly viewed as the results of ritual activities, while deposits of more recent date are more often considered to be the result of mundane actions (Morris 2008:iii).

Some concepts carry heavy etymological baggage and are laden with all sorts of connotations. For instance, when archaeological deposits are described as offerings or sacrifices they are imbued with meanings that run deep in Western culture but which might have been quite alien to the people creating the deposits. The two words, ‘offering’ and ‘sacrifice’, are often used interchangeably and are usually taken to describe interaction between humans and supernatural beings via a gift or a ‘victim’ of some sort (Carter 2003). As such they may not always be applicable as a description of ‘ritualised’ animal killing in general in the Viking Age. Carter (2003:4) identifies three basic features of sacrifice; ‘making holy’, ‘gift giving’ and ‘exchange’. This then further entails the participation of three entities, one who gives, one who is given (made holy and sometimes killed) and one who receives and (hopefully) reciprocates. The societal basis for this sort of activities is generally one of hierarchy, both social and religious (Testart 1993: 27–9). Some of the aspects of ‘sacrifice’ may apply to some of the animal remains discussed in this thesis, but in order to avoid the many connotations involved which do not apply, the term ‘ritual killing’ will be used instead. ‘Ritual kill’ is a very broad definition which encompasses varied traditions and activities through time. Brück (1999) astutely notes that the conception of the ‘ritual’ versus ‘practical’ (or secular) duality in archaeology is a culturally constructed western notion and a product of post-Enlightenment rationalism. Symbolic action and practical action should not be differentiated because “ritual is often considered an essentially practical activity by the actors themselves” (Brück 1999:325). So the term ‘ritual kill’ implies here a killing as part of a ceremony, presumably performed on specific occasions, where the actors involved were aware of the special nature and purpose of the act. In other words it is the context that justifies the ritual stamp. Some instances of ritual killing could justifiably be called sacrifices based on the criteria discussed above, whereas others might not. For instance the killing and deposition of animals in bogs or lakes (Boessneck *et al.* 1968) might warrant a sacrificial label. But the deposition of a ritually killed horse in a human grave might not fit the sacrifical criteria, because it is not clear whether the act is aimed at a supernatural being (e.g. Testart 1993:27-9; Janes 2000:8), or even, as Ucko (1969:264-5) pointed out, if there was an implication of a perceived ‘afterlife’. This distinction has been categorised as ‘votive’ as opposed to ‘burial’ depositions and is argued against by Crawford (2004:88). She points out that the main difference between the two is usually the presence of a dead human, while both types of deposits are often found in pits or holes in the ground. This is an important observation which has significance later in this thesis, regarding horses buried by themselves and without human remains. In some instances there may be overlaps in ideological reasons behind, for example, killing an animal for a burial and killing an animal for deposition in a bog, but that need not necessarily be so (Ucko 1969). In other words; all sacrificial killing is ritual killing, but not all ritual killing is sacrificial.

In this thesis, the ritual animal killing and burial that took place in Viking Age Iceland is viewed as a *tradition*. It is recognised here as a set of practices that were observed and adopted by succeeding generations. This is highly important to understand if these practices are to be used as informants on the nature and developement of Viking Age society itself in Iceland. As is discussed in chapter 2, previous writings have often treated animal burials on a site by site basis or at least in an insular way, and with little concern for chronology (except for broad references to the date of settlement of the island). Also, horse inhumations have usually been seen as being a quintessentially *Icelandic* type of burial, while other grave forms or goods might exemplify neighbouring countries. It is of course recognised as well in the same literature that horse burials were not invented in Iceland. The idea for this form of burial was imported from abroad. Traditions can both be selected for and changed by people, but they are still for the most part limited by heritage constraint and they are drawn from a reservoir of older ideas (Cullen 1996, 133). So it follows that the traditions brought to Iceland by the Viking Age inhabitants originated in previous experiences, but were selected and adapted to new situations and to the changing needs of a society under formation. People chose to adopt the ritual killing and burial traditions at the specific time and place in early Icelandic society because it probably served to reproduce and reinforce a specific social memory (Hedeager 2011:15-16, 50-51). Thus, the great emphasis laid upon animal burial is particularly noteworthy. In order to illustrate this more clearly, the ritual killing traditions are sometimes referred to here as *memes* (Dawkins 2006:189-201). This implies that the tradition can be seen as a vessel of ideas which is replicated (or imitated) in order to be maintained. If there is fertile ground for these ideas, the tradition survives and can spread rapidly, but it can also easily disappear when it gets outdated.

1.2 The structure of the thesis

The thesis is organised into seven chapters of varying length and the appendices contain the raw zooarchaeological data collected for the work and a list of burial grounds with no recorded animal bone.

Chapter 2 describes the 'state of the art'. Animals in Icelandic Viking Age burials have been discussed before by other authors, but usually from an insular perspective and without the benefit of detailed osteological information. Previous authors have approached the subject from various angles, both theoretically and methodologically, and the discussion spans roughly two centuries, even though the contributors are relatively few.

Chapter 3 is concerned with horse burials in Norway. Traditionally, Iceland is thought to have been mostly settled from Norway and from the Norse colonies in the British Isles. It has often been assumed that horse burials were relatively more common in Viking Age Iceland than elsewhere, and this has been an important basis for past interpretations. Here a new light is cast on horse burials in Late Iron Age Norway and it follows that some previous interpretations are rejected and new interpretations are suggested.

In chapter 4 every single burial ground around Iceland, where animal bone has been recorded before the year 2012 is discussed. This format is inspired by Kristján Eldjárn’s catalogue, *Kuml og haugfé*, but with a perspective focused on the animal remains rather than on humans or artefacts. New zooarchaeological analysis of data from each burial ground, collected specifically for the present thesis, is contextualised with other archaeological information. Thus, significant new information is added about each site, which is in turn critically re-evaluated. In a handful of instances previous interpretations are significantly altered.

Chapter 5 comprehensively analyses the entire corpus of animal remains from Icelandic Viking burials. Various zooarchaeological trends in the data are investigated, such as age at death, pathological changes to bone and cause of death. Some clear patterns in the assemblage are identified, which serve as a basis for further discussion. The second half of chapter 5 concerns burial traditions in Viking Age Iceland, where the animal remains are placed in context with other archaeological information. Various aspects of the burial traditions are discussed, such as the geographical distribution of burials, internal layout of graves, horses buried without humans, sequence of events during funeral ceremonies and site specific ritual performance.

In chapter 6 the results of analyses in previous chapters are used to throw light on Viking Age society in Iceland and especially on cultural developments in the 10^{th} century. It is argued here that explanations that focus especially on the ‘meaning’ of ritually killing animals during burials are not feasible. Some archaeologists view religion as being primary, seeing rituals as means of enacting embedded meanings of religious belief, while others see the ritual as primary where the specifics of religious belief may often adapt to the ritual practices themselves (Fogelin 2007:66). A form of the latter point of view is maintained in this discussion. Interpretations of the rituals cannot be too insular, in the sense that these traditions were clearly not invented in Iceland but adopted and modified to suit local needs. The animal killing rituals adopted in Viking Age Iceland were both influenced by the surrounding society, and were actively used to influence it.

1.3 A note on vocabulary

1.3.1 Kuml, burials and graves

The term *kuml* stands for an Icelandic pre-Christian Viking Age burial as defined by Kristján Eldjárn in his thesis *Kuml og haugfé*. He defined *kuml* as a burial with associated grave goods. The grave goods might be the remains of a horse or dog or artefacts, such as weapons and jewellery, tools etc. He noted though that the simple presence of nondescript items such as small knives does not warrant a *kuml* designation (Kristján Eldjárn 2016:41). This is quite important for the present thesis, as it has implications for discussions about burial traditions and distribution in chapter 5.4.

There is a slight difference between a *burial* and a *grave* in this work. A grave refers to a single cut or pit which might contain human remains, animal remains, or both. A burial refers to the complete funerary construction, and might include more than one grave. For example, the grave of a man and an adjacent grave of a horse, both under one mound, represent a single burial.

1.3.2 Periodization

When Norwegian archaeology is discussed in this thesis, traditional Norwegian periodization is used. Traditionally the Viking Age is regarded as the last phase of the Late Iron Age in Scandinavia. In Norway the Late Iron Age is roughly sub-divided into the Migration Period (following the collapse of the Roman Empire) from about 400 – 600 AD, the Merovingian Period from about 600 – 800 AD and lastly the Viking Age from about 800 – 1050 AD. In Norway the Merovingian Period roughly corresponds to the Vendel Period in Sweden.

1.3.3 Referencing Icelandic authors

In keeping with Icelandic tradition Icelandic authors are referenced to by their first name followed by their patronym or surname, for example: Kristján Eldjárn 2016. All other authors are referenced to by their surname, for example: Shetelig 1912.

1.3.4 Radiocarbon results

All results from 14C analyses are quoted from publications by other authors and as such are shown here as expressed in different papers.

2 Animal ritual killing and burial in Iceland – history of research

Viking Age burials in Iceland have been a topic of antiquarian and archaeological discussion for over 200 years, though both authors and published works are few in number. Most of these mention that animals, principally the remains of horses and dogs, are found in some of the graves. Despite the long history of research, animals received much less attention than other aspects of the burials until the late 20th century. Most frequently only a passing mention is made of the presence of this material in the grave and any interpretations have usually been off-hand remarks based on common sense. For example, that the horse was placed in the grave to bring the human to the afterlife or that the dog had been a favourite pet. Kristján Eldjárn addressed another possible factor involved in the deposition of horses: the high number of horses which he associated with the lack of other material wealth in Viking Age Iceland. As is discussed below, this has since been both supported and criticised. Subsequently the most in-depth accounts on horse graves have been written by Thomas Amorosi (1996), Maeve Sikora (2004), Ulla Loumand (2006), Þóra Pétursdóttir (2007; 2010), and myself (Rúnar Leifsson 2012a). All of these are limited by the fact that they are not based on the study of the actual remains of the animals themselves. Only once prior to the work done for the present thesis has there been systematic analysis of horse remains from Icelandic burials. Günther Nobis (1961) analysed the remains of a number of horses after the middle of the 20th century, but his work has had little influence on subsequent interpretations apart from a theory postulated by Kristján Eldjárn about culling , where he used ‘age at death’ estimations by Nobis as a criterion (page 20).

The ritual killing and burial of animals is not a unique characteristic of the Viking Age nor is it geographically limited to Scandinavia or the Norse world. Animals buried with humans or on human burial grounds have been recorded from Mesoamerica to China (e.g. Pluskowski 2012; Russell 2012:263-266) and date from the paleolithic (Germonpré *et al.* 2012) and into modern times (Ngubane 2012; Jennbert 2003). Interpretations of animal burials are varied and do not follow a general theory, but rather seem to depend on their respective cultural context, geographical location and chronology. In line with this, Icelandic Viking Age burial archaeology has traditionally been viewed in light of contemporary Norwegian burial archaeology (Þóra Pétursdóttir 2007:13). Thus it is important to begin here by noting the similarities and differences between Icelandic and Norwegian research on the animal component of Viking Age burials.

In modern scholarship core ideas about the animal component of late Iron Age burials have been broadly similar in Iceland and Scandinavia. These include ideas about a favourite animal following a person to the grave or of comradeship between man and animal (Gjessing 1943) and also about horses being means to enter the afterlife (Gräslund 1980). There are notable differences however. In general the archaeological material in Scandinavia is more varied, it has a deeper chronology and in Norway in particular bone preservation in graves is often quite poor. Iceland, on the other hand and unlike the Scandinavian countries, boasts a good overview of all known Viking Age burials (Kristján Eldjárn 2016). This, in conjunction with the narrow chronology of the Icelandic grave material and the strong influence of the sagas on Icelandic archaeology until the middle of the 20th century (Adolf Friðriksson 1994) has set Icelandic scholarship on Viking Age burial apart from the Norwegian. Perhaps due to the relatively bad bone preservation early writings in Norway focused on artifacts connected with horse riding but not on the remains of the animals themselves (e.g. Shetelig 1912). A notable exception is of course the publication of the Oseberg excavation where preservation was good, allowing for a description of the bone material, the number of animals and their placing in the grave mound (Brøgger *et al.* 1917). As a result the magnificent Oseberg burial mound, along with Gokstad, has played a central role in scholarship about animal remains in burials in Norway. This has greatly influenced research on the Icelandic burial material because Norwegian burials have traditionally been the benchmark for Icelandic Viking Age burials and used to define their character (Þóra Pétursdóttir 2007:13). Perhaps the most striking difference between Scandinavian and Icelandic research on Viking and late Iron Age burials is a much greater tendency in the Scandinavian tradition to explicitly link ritual animal killing and burial with Norse mythology. For example, links between burial rituals and cults (e.g. of Freyr or Óðinn) along with the accompanying sacrificial interpretations which in some instances involve sacrificed horses or dogs as mediums to Hel or Valhöll. This is interesting because the cult links are invariably substantiated by reference to Icelandic medieval literature (e.g. Gjessing 1943, Ellis-Davidson 1982; Ingstad 1992; Sikora 2004; Gräslund 2004). There may also be a connection here with the focus on royal burial mounds in Scandinavian archaeology as well as the deeper chronology of the archaeological record in general which gives an opportunity to associate Viking Age archaeology with earlier examples of ritual animal killing (for example in Skedemosse, Hagberg 1967). This association with power and prehistory has given more opportunity for mythological associations for some of the Scandinavian burial material relative to the simpler and chronologically narrower Icelandic burials.

Researchers interested in the political landscape of late Iron Age Norway have moved away from focusing only on particular, exceptional horse graves – as expressions of ancient beliefs or examples of ideological and cultural phenomena – constructing instead an overview of all known burials with horses and/or horse equipment within a defined area in order to reconstruct socio-political patterns. Meling's (2000) thesis on horse burials in western Norway during the Merovingian Period is particularly noteworthy in this context as well as Braathen's (1989) work from the seventies, although it more strictly concerns burials with riding gear. Meling noted that horses and horse equipment seem to enter the burial record of western Norway at the beginning of the Merovingian Period (start of the late Iron Age) but are very rare in the preceding Age of Migrations. He argues that horse burials reflect warrior idealism which in turn is a statement of a change in the political landscape from the preceding era. In a similar way Braathen argued that so called *ryttergraver* (burials containing stirrups and spurs) in the Viking Age of southern and eastern Norway and of Denmark reflect specific political developments. Braathen notes that these burials are especially common in the 10th century and are mainly found on large farms that are central in their surrounding landscape. Further, the *ryttergraver* farms seem to be strategically distributed as if they reflected political organization. Braathen's hypothesis is that the men buried in the *ryttergraver* and the farms at which these graves are located had an administrative and military function in Viking Age society, supported by royal authority. This in turn reflects the consolidation of power during the Viking Age when larger kingdoms were being forged. Similar to these previous authors who have dealt with Norwegian burials, I rely on riding gear discovered in the graves. My research goals concerning Norwegian burials are nonetheless different from those of Braathen and Meling since I use the presence of riding gear as proxy for the presence of a horse (chapter 3), whereas the previous authors do not discuss animal or human bone in their work. Anne Pedersen (2014) has more recently written in a similar vein as Braathen and Meling regarding equestrian graves in Denmark, where she argues that the ostentatious burials of the 10th century had socio-political connotations. The present thesis is related to these previous works in the way that burials are used here to describe the political atmosphere in Viking Age Iceland.

The writings of Kristin Oma (2000; 2001; 2004) have been theoretically influential in recent years. Oma writes about the symbolic role of horses in prehistoric Scandinavia. For this she utilises not only the ritually killed animals but also art and literature. Oma approaches her subject under the influence of Maurice Bloch and his concept of the irreducible core of the ritual process. Oma sets out to trace a cord streching over millennia where the *symbolic role of horse as transport and messenger between supernatural realms was constant*. In this view the horse was used in rituals to break down boundaries. Drawing also on the Annales School approach of *longue durée* Oma maintains that there is a symbolic core related to the notion of the horse in Scandinavian societies which originates in the Bronze Age and is present through the Iron Age up to Viking times. She says there was a fundamental structure behind the horse symbolism which she terms *seige struktur* (Eng. enduring structure). This core was nonetheless expressed in different ways through time and reflected by changes in material culture. In this way Oma identifies horse symbolism in burials from the Pre-Roman Iron Age and onwards through the Viking Age. Even though neither the remains of horses, saddlery or harnesses are found in graves during certain periods within this timeframe, Oma argues that spurs in graves during the Roman Iron Age and jackets with inclusions of string made from horsetail hair discovered in graves dating from the Migration Period are evidence of horse symbolism being maintained.

In her work Oma deals with a vast geographical area and a very broad timeframe. It is unconvincing that such a symbolic core could be maintained unchanged over all this expanse of time and place and countless generations. Well argued reasons for this uniformity are lacking. Rather a very disparate set of evidence, from ancient rock carvings to the medieval writings of Snorri Sturluson, is forced to conform with the hypothesis. This thesis presents a contrasting view on ritual animal killing and burial (more akin to views expressed by Andrén 2005:107); the timeframe is much narrower and the focus is on the act itself of killing and burying, on the physical, material and social impact of the performance rather than on a single inherent meaning, and how this tradition was actively utilised in Viking Age Iceland.

Stylegar (2005; 2006) gives a good overview of available sources for the ritual killing and burial of horses in Norway. Stylegar suggests that the horses found in Viking Age graves in Norway were selected through horse-fighting rituals, so called *skeið*. He uses among other examples horses from the royal burial mounds in Vestfold. Stylegar‘s theory has resonance with at least a couple of individual burials presented in this work, but does in general not fit well with the Icelandic dataset.

2.1 A history of research in Iceland

The earliest antiquarian literature in Iceland dates from the 18th and early 19th centuries and largely concerns pre-Christian burial mounds. The earliest is an essay written around 1753 by the scholar Jón Ólafsson from Grunnavík. Jón Ólafsson (unpublished; 1815) described pre-Christian burial mounds around Iceland based on various accounts. Alas, his manuscript is of little or no value as an archaeological study as it is not based on actual field observations but rather attests 18th century ideas and interpretations of ancient monuments (Adolf Friðriksson 1994:76). Between 1817 and 1823 the 'Danish Royal Commission for the Preservation of Antiquities' commissioned a survey of all known archaeological sites in Iceland, which was to be undertaken by pastors in their respective parishes. Among the sites recorded are a few Viking Age burials excavated in living memory at the time of reporting. Most of these seem to have been dug into in the late 18th century and some are reported to have contained animal bone and artefacts along with human remains (*Frásögur um fornaldarleifar* 1983:213, 315, 596). One of the accounts involving animal bone is only reported second hand, but the description of human and dog bone along with a boat does sound like a real Icelandic Viking Age burial (*Frásögur um fornaldarleifar* 1983:217). These earliest accounts do little more than record that animal bones were discovered, sometimes providing the species (horses and dogs), but there was no theorising or further discussions, for example about the significance of the animals as grave goods.

Antiquarianism in Iceland developed after the middle of the 19th century with the foundation of the National Museum in 1863 and the Icelandic Archaeological Society (Hið íslenzka fornleifafélag) in 1879, which led research and excavation around the country. The work undertaken until the turn of the century was mostly saga driven, in that people were searching for burials of named characters from the medieval literature and interpretations rarely ventured beyond that horizon (Adolf Friðriksson 1994:78-82). Burials containing horses and dogs were excavated in this period, but little was made of the animal bones except to note their existence (e.g. Sigurður Vigfússon 1882). This lack of interest may have resulted in an underestimation of the relative frequency of animal burials, since burials from the 19th and early 20th centuries were sometimes poorly recorded by non-professionals and the bone material was often not retrieved or curated. Thus, horses get *more common* in more recent investigations (Adolf Friðriksson 2013:108).

People have nonetheless theorised about animal remains discovered in Viking Age burials right from the beginning of systematic antiquarian research in Iceland. One of the first graves to be properly excavated and recorded was at the Viking Age grave field of Hafurbjarnarstaðir in southwest Iceland in 1868 (pages 78-82). The burial was laden with grave goods, including a horse, dog and weapons and possibly a boat. A single pig molar was retrieved from the burial which caused the excavator, Reverend Sigurður Brynjólfsson Sívertsen, to speculate about what today would be called taphonomy and human-animal interaction. His speculations were entered in the catalogue of the National Museum that same year (entry 642):

Stór kinntönn, 1 þuml. á breidd um ræturnar: að laginu til er hún líkust því, að hún væri úr einhverju stóru selakyni, máske rostúngi(?) heldur en bjarndýri(?). Hér er mest undir því komið, að vita, hvort tönn þessi hefir verið látin í dysið með manninum með vilja, eða hvort hún hefir fallið þar í óvart: þar um er ekkert hægt að segja með nokkurri vissu. Eg vil að eins benda mönnum á, að það er þó undarlegt, ef það er einúngis tilviljun, að allar þessar tennur finnast svo opt í fornum dysjum hér á landi og eins í Danmörk … Mér kemur til hugar, að fornmenn hafi, ef til vill, bæði geymt tennur úr dýrum og mönnum, til minníngar um að þeir höfðu sigrað menn eða hættuleg dýr, því hvorttveggja töldu menn sér jafnan til gildis: þetta kemur vel heim við það, þegar Skarphéðinn hjó tennur úr Þráni og geymdi í pússi sínum: og eins þegar Þorbjörn Þjóðreksson hjó tennur úr Ólafi Hávarðssyni og batt í skauta og geymdi: þetta er líkt og þegar sumar hálfviltar þjóðir skera hártopp með skinninu úr hvirflinum á öllum þeim mönnum, er þeir sigra, og geyma þá sem sigurmark (Sigurður Guðmundsson 1874:95).

A large cheek tooth, 1 inch in width by the roots: from its shape it looks like it is from some large seal species, perhaps a walrus(?) rather than a bear(?). Here it is most important to know, whether the tooth was placed in the grave purposefully, or if it fell in by accident: it cannot be known with certainty. I would still like to point out, that it is peculiar if it is only by chance that all these teeth are so often found in ancient burials in this country as well as in Denmark … I imagine that the ancients [people in the Viking Age] *may possibly have stored teeth from animals and humans, as mementos of victories over men or dangerous animals, because both could be cause for esteem: this corresponds* *with when Skarphéðinn chopped teeth from Þráinn and kept in his pouch: and when Þorbjörn Þjóðreksson chopped teeth from Ólafur Hávarðarson and tied in a kerchief for safe-keeping: this is comparable to half-wild nations who scalp all men they defeat and keep as trophies* (translation by author).

Although he does identify the tooth wrongly as probably seal, walrus or bear, Sigurður Brynjólfsson Sívertsen raises several interesting points in his short discussion and was in many ways ahead of his time. This is perhaps the first time that the importance of taphonomy is articulated in Iceland. The Reverend wonders if the tooth was placed in the burial on purpose or if it might have derived from outside the burial context, i.e. if it fell in by chance. He concludes that this cannot be resolved, but opines that it would be strange if the tooth was there by accident, because teeth are often found in ancient burials both in Iceland and in Denmark. He then further speculates what the purpose or meaning of these depositions could have been and argues that finds of isolated teeth could be a sort of amulet with mnemonic purposes. Sívertsen speculates that teeth could have been kept as trophies, from wild beasts or enemies. As a reference to these ideas, Sivertsen quotes medieval saga literature, both *Brennu-Njáls saga* (1947:219-220, 309) and *Hávarðar saga Ísfirðings* (1946:141). He also discussed ‘ethnographic’ analogies where ‘half-wild’ peoples scalp defeated enemies and keep as trophies.

The first comprehensive catalogue of Icelandic Viking Age burials was compiled by Kristian Kålund and published in 1882 in the Danish journal *Aarbøger for Nordisk Oldkyndighed og historie*. Kålund discussed all burials recorded at the time and listed the associated grave goods of each one. He noted that only inhumation seems to have been practiced, and inferred that the absence of cremation might be explained by insufficient fire-wood from Iceland’s sparse forests. When describing Icelandic Viking Age burial customs Kålund (1882:78) noted that animal remains had been recorded in fourteen of the 34 burials known at the time. He writes that the number of horse burials was at least twelve and that they might have been more numerous but the context was not always secure. In three instances dogs were also present with the horse (or horses) and in two burials only a dog followed the human in death. Concerning the context of deposition, Kålund noted that horses were usually *buried complete and harnessed* but that in some instances, with the reservation that it might be due to preservation, only the severed head seemed to have been interred. As is seen in chapter 5 (pages 229-230), Kålund was correct in his assumption about taphonomy having an impact on possible body part distribution and there is no indication that partial horse remains were buried. When discussing the act itself of burying horses and dogs as part of funeral practices, Kålund (1882:78) sees it as being an essentially pagan custom (Dan.: "sådan gravlægning var tegn på argt hedenskab") incompatible to Christianity. To illustrate this point he quotes *Svaða þáttur og Arnórs kerlingarnefs* where the burial of a horse and dog with the corpse of Svaði is used as a motif to underline his evil nature and pagan beliefs. In light of this Kålund finds it surprising that the ritual killing custom was practiced in Iceland so late in the Viking Age when Christian influences were in his estimation bound to be strong (Kålund 1882:78-81). Kålund does not address directly the possible meaning of the ritual, but when describing individual burials his routine phrase is that a horse was buried with its master, which seems to imply that he thought a favourite animal was selected for burial.

While Kålund wrote about ritual animal killing in burial customs in terms of pagan identity, another early researcher of Icelandic archaeology saw the custom as being a status symbol. Daniel Bruun excavated a number of Viking Age burials in the first years of the 20th century. Bruun not only employed better methods for excavating and recording burials than any of his predecessors or contemporaries working in Iceland, but was also more theoretically advanced. Bruun mostly avoided direct references to saga literature when discussing individual sites. Rather, he aspired to derive knowledge about Icelandic Viking Age burial practices from the archaeological remains themselves (Adolf Friðriksson 1994:82). In order to achieve this he used specialists to analyse both human and animal bone as well as wood remains. Thus, Bruun was the first researcher to utilise zooarchaeology in Icelandic Viking Age archaeology. When excavating a burial at Sturluflötur in eastern Iceland, Bruun was faced with an almost complete skeleton of a horse, which had been buried bridled and saddled, while the human remains were both wind eroded and scant (Bruun 1903:19-20). Realising that there might be potential in investigating further the animal remains he sent the bones to Herluf Winge at the Zoological Museum in Copenhagen. Winge concluded that the horse had been similar in stature to the contemporary breed of Icelandic horses and that it resembled both known Iron Age horses remains from Denmark and even much older remains found at Solutré in France (Bruun 1903 and 1987:145-146). Later, Winge would analyse also both dog and horse bone from burial XII from the Dalvík (Brimnes) burial ground (Bruun 1910:99-100). The first comprehensive description of the horse burial tradition in Iceland, based on contemporary state of knowledge, is found in Bruun's and Finnur Jónsson's (1910) publication of the Dalvík (Brimnes) burial ground. Their overview, although based on a limited dataset, is still largely valid. They noted that horses had been buried with both sexes and that horses sometimes shared the grave with a human, but sometimes they rested in their own grave cut adjacent to the human's. They also observed that horses in Iceland are always buried complete, but in some instances their heads had been removed and deposited on the carcass. The horses were generally deposited into the grave lying on their side with their head facing away from the human body. They even made the insightful observation, based on an analysis of burial II at Dalvík (Brimnes), that the horses were killed by (or in) the grave and only after the human had been laid to rest. Concerning the dogs, Bruun and Finnur Jónsson (1910:94) inferred that they had always been placed in the same grave cut as the human and buried as a complete carcass, except in one instance (burial XII at Dalvík (Brimnes)) where only the head might have been buried. While Bruun did not discuss at length the 'meaning' of animal burials, focusing rather on the physical and material aspects of the rituals, he nonetheless had fairly set ideas about the matter. An impression of his theories can be assembled through a close reading of his work. Bruun (e.g. 1903; 1910; 1928) routinely refers to horses and dogs following their master to the grave, indicating that a favourite animal was chosen as a companion in death. He perhaps thought this so self-evident that it needed no further articulation. But Bruun's ideas did have a deeper social dimension as well, perhaps best articulated in this example:

Þessi fundur virðist sýna það, að hér hafi verið greftruð ríkborin kona í hinum bezta búnaði sínum; hrossbeinin munu vera úr vildarhesti hennar, sem drepinn hefir verið við gröfina og dysjaður við fætur henni, svo sem títt var í fornöld, þá er heygðir voru göfgir menn og ættstórir, og enn eimir eftir af, þá er þjóðhöfðingjar og hershöfðingar eru grafnir, því að þá er skrúðfákur þeirra teymdur á eftir kistunni og munu fæstir ætla, að sá siður sé endurminning frá svo fornum tímum (Bruun 1903:19).

This discovery seems to illustrate, that a wealthy woman was buried in her best outfit; the horse bone being from her favourite horse, which was killed by the grave and buried at her feet, as was common in ancient times when noble men and highbred were interred, and [this custom] still lingers, when sovereigns and generals are buried, because then their steed is led after the casket and few realise, that this tradition is a remembrance from such ancient times (translation by author).

This is Bruun's interpretation of a double grave of a woman and horse discovered at Reykjasel in Jökuldalur. Here Bruun states clearly that not only was the horse the deceased's favourite but that the custom was reserved for people of the highest class. As such, having a horse in the grave marked high status.

After Bruun and until the publication of Kristján Eldjárn's doctoral thesis shortly after the middle of the 20th entury, only two people touched upon the subject of animal remains in Icelandic Viking Age burials. They are Matthías Þórðarson, Iceland's National Antiquarian from 1907 till 1947, and Haakon Shetelig, the well-known Norwegian archaeologist. During his time in office, Matthías recorded over 20 Viking Age burial sites. Among them was a burial ground on the farm Miklibær in Skagafjarðarsýsla, where he reported a grave that apparently contained joints of horse meat and not a complete animal. This interpretation has been repeated by most authors mentioned in this overview, but it is refuted in chapter 4 (pages 110-112). Matthías' approach to burial archaeology was simply to report on new finds in the Yearbook of the Archaeological Society (*Árbók hins íslenska fornleifafélags*) (e.g. Matthías Þórðarson 1926; 1932; 1936). Matthías described the burials on a site by site basis but never wrote a synthesis of the burial customs nor did he delve into theory. That said, his description of the Kápa burial in southern Iceland does reveal an idea about travelling to the afterlife, namely that the horse must have been incorporated in the grave as means for the deceased human to travel to Hel (Icel. *til helfarar*) (Matthías Þórðarson 1926:51). Haakon Shetelig discussed Icelandic Viking burials, and the associated grave goods, in more general terms than Matthías and was the first scholar to view the material in a wider (non-insular) context. He visited Iceland in 1936 to conduct his research and subsequently published an article on the subject (Shetelig 1937a & 1939). Shetelig arranged artefacts found in burials in a typological sequence in order to construct a chronology and compared both artefacts and burial customs with Viking Age archaeology in Scandinavia and in the British Isles. He concluded that the chronology derived from artefact typology corresponded well with the traditional dating, based on medieval literature, of the settlement of Iceland and of the Conversion to Christianity. Shetelig also noted great similarities between the Icelandic burial record and that of Viking areas in the British Isles, for example the lack of cremations, and also that both British and Icelandic burial customs clearly derived from older traditions in Norway (Shetelig 1939:7-11). Nonetheless, he noted and found curious that some of the Icelandic material culture was more similar to eastern Scandinavia than to western Norway, for example the relatively common sword chapes. This was a sign, thought Shetelig, that

Iceland had early on developed trade contacts that circumvented the old homelands in Norway, *which indicated the early development of a specific Icelandic identity* (Shetelig 1939:11-13). Shetelig noted that horses and dogs had been very commonly buried in Viking Age Iceland, with women and men alike. He saw this as part of a pagan heritage, derived from Norway and adopted in the colonies in the North Atlantic. Shetelig briefly described Icelandic animal burials; how sometimes horses rested in a separate grave close to the human one, and that the horses had often been decapitated, similar to what was seen in the Oseberg burial mound. He further noted that sometimes only the heads of horses and dogs were buried. Shetelig deduced that the horses in Icelandic Viking Age burials had been specifically riding animals, because of bridle-bits, saddle remains and buckles often found in association with the horse bone. He thought that this indicated that the horse was meant to take part in a journey to the afterlife (Shetelig 1939:9).

Similar to Shetelig but in a more detailed way, Kristján Eldjárn made an effort in his doctoral thesis, *Kuml og haugfé í heiðnum sið á Íslandi*, to synthesise knowledge about Viking Age burial customs. This work is essentially a catalogue of all Viking Age graves recorded in Iceland in the middle of the 20th century. Unlike Matthías Þórðarson and the previous antiquarians, like Sigurður Vigfússon and Brynjúlfur Jónsson, Kristján Eldjárn discussed the burial record without referring to saga literature. Kristján wanted, perhaps in similar spirit as Bruun, to draw conclusions from the archaeology itself (Kristján Eldjárn 1956:9; Adolf Friðriksson 1994:86-88). By so doing, he dated Viking Age burials more closely than previous researchers, with reference to typological schemes developed in Scandinavia and found (like Shetelig before) that most of the weapons and ornaments date from the 10th century (Kristján Eldjárn 1956:428; Adolf Friðriksson 1994:89). A third edition of *Kuml og haugfé* was published in 2016, edited and expanded by Adolf Friðriksson, in which all burials discovered until 2015 are also incorporated. The discussion which summarises the horse finds in the third edition is essentially unchanged from Kristján Eldjárn's in the first edition. The changes made are an upgraded count of graves and horses to account for the later finds, as well as an inclusion of Gísli Gestsson's theorising about the Grímsstaðir horse burial and a short account about Günther Nobis' osteological work on Icelandic Viking Age horses (originally incorporated in the second edition: Kristján Eldjárn 2000:308-311, 525). Similar to Bruun's earlier work, Kristján discusses the nature of horse burials; how they were constructed, the placement of horses in the graves, the method of killing, how commonly they were harnessed, etc. But his main point was that *it had been very common to bury horses with* *humans in pre-Conversion Iceland* and more so than elsewhere in the Norse world (Kristján Eldjárn 2016:308). Based on comparisons with the Scandinavian countries he found that the Icelanders buried the most horses per capita, followed by the Norwegians, then the Swedes and lastly the Danes but the custom had apparently not been common in Denmark (Kristján Eldjárn 2016:311). Kristján further asserted that it was more common to bury horses with males than females in Iceland. He based this on the count of 100 positive male graves, 40 of which contained horse bone, and of 65 positive female graves, 18 of which contained horse bone.[1] It is interesting that in his doctoral thesis, Kristján does not suggest reasons for *why* horse burial customs would be more common in Iceland than elsewhere, nor why they would be more common with males than females. In fact, underlying reasons behind the ritual animal killings in burial customs were not clearly articulated in print by anyone until fairly recently. It was Kristján Eldjárn who in 1981 was the first to tentatively do so, decades after the publication of *Kuml og haugfé*. His thoughts on the matter were not presented in an academic context but in a very short article published in a popular magazine devoted to horsemanship. The article concerns the origins of the Icelandic horse and in the introduction Kristján asserts the disclaimer that it is based upon notes and initial thoughts he had while reading a recent (non-archaeological) doctoral dissertation on the Icelandic horse by Ewald Isenbügel. Kristján suggested that an abundance of horses in Iceland from earliest times might be a reason why the animals were relatively more common in Icelandic Viking Age burials than elsewhere (Kristján Eldjárn 1981:4). They were simply more disposable than other material goods. He does not explain why he thinks horses would have been so numerous but he does use osteological data to underpin his theory. Kristján refers to Günther Nobis' (1961) research on horses from Icelandic graves and takes his age at death determinations as an indication that the selection of individual animals might have been a way of culling (Kristján Eldjárn 1981:4); the otherwise useless male animals could be used for ritual purposes.

Kristján's explanation of cost efficiency in the respect of burial customs has both received support (Orri Vésteinsson 2000:70) and criticism in recent years (Rúnar Leifsson 2012a; Þóra Pétursdóttir 2010). But more important is that the basic premise supporting Kristján's suggestion is false. The traditionally perceived over-abundance of horses in Icelandic burial customs compared to other parts of the Viking world, was both fundamental to Kristján Eldjárn as well as to more recent authors writing on the subject (e.g. Maeve Sikora 2004; Orri

[1] These numbers do in fact not support such an assertion. A Chi-square test shows that there is not a statistically valid difference between the occurrence of horses in these counts of male and female graves (v=1, significance level 0.05, tabulated Chi-square value 3.84).

Vésteinsson 2000; Loumand 2006; Þóra Pétursdóttir 2007; 2009; 2010). But as will be discussed in subsequent chapters (3, 5, 6), *horses were just as common in Norwegian Viking Age burials as in Iceland*. Kristján Eldjárn did not discuss directly what he thought was the 'meaning' of placing a horse in the grave, but at the beginning of his article there are hints to what his thoughts on the matter were (Kristján Eldjárn 1981). He writes that a horse was culled and buried so that it could take part with the deceased human in the journey after death (Kristján Eldjárn 1981:4).

Only once prior to the present work has the entire horse bone assemblage stored at the National Museum in Iceland been analysed. This was done by Günther Nobis (1961:125-185) in the early 1960s. Nobis analysed horse bone from 35 Viking burial sites in Iceland and compared the data with both modern and Viking bone data from Norway and Germany. His work was written within the realm of biology rather than archaeology but the results of course proved to be of benefit for subsequent archaeological work. Nobis noted that *every individual horse which could be sexed was male*. This was the first time this important observation was made (and it has not been rejected by the present visual recording of the burial assemblages, but ongoing aDNA research shows that mares were buried as well (page 243). Other biological data included the withers height of nineteen animals, which proved to range from about 1.24 – 1.43 m, and an estimation of the age at death, which ranged from 5 - 24 years. Of those seven proved to be older than 21 years. As noted above, Kristján Eldjárn (1981:4) utilised Nobis' age at death estimations and interpreted them as indicating the culling of useless animals. In the early 1970s Michael Müller-Wille (1972) compiled a catalogue of early medieval horse graves and horse 'sacrifices' in Europe and included Icelandic Viking Age graves. Müller-Wille based the section on Icelandic graves on the writings of both Günther Nobis and Kristján Eldjárn but did not add any new data or results. Nobis' findings broadly correlate with the present study, although the determination of age at death (pages 236-242) is more cautious here than in Nobis' publication.

Decades after Nobis' work, around the turn of the millennium, a limited part of the horse bone assemblage stored at the National Museum was studied. This was in order to determine the presence of a specific pathology. The veterinary physician Sigríður Björnsdóttir (2002) studied horse bone from 23 burials as part of her PhD work on bone spavin. Bone spavin is an osteoarthrosis of the tarsal joints, which in an advanced state can lead to the fusing of the joints with the metatarsal. This disease is unusually common in the modern Icelandic breed and Sigríður wanted to determine if it could be diagnosed in the Viking Age population as well. She found evidence of spavin in a total of six individual Viking Age animals.

In his doctoral thesis, *Icelandic Zooarchaeology: New data applied to issues of historical ecology, paleoeconomy and global change*, Thomas Amorosi (1996) discussed all archaeological bone assemblages known to him that had been collected in Iceland at the time. As a part of this undertaking he devoted a chapter to the animal grave data where he both discussed a few specific sites and made some general observations about animal burial customs in Iceland. He discusses the age at death of the animals, their relationship with the deceased person and the possible meaning of having a horse or dog in the grave. He also presented new ideas about the context in which the death and burial of the animals took place. Amorosi did not study any of the bone material, apart from a dog from the farm of Vað (pages 219-220). Rather, he summarized what had been published in the journal *Árbók hins íslenska fornleifafélags* from 1955 onwards and in some instances inferred forensic information from field drawings and photographs taken during excavation. By studying photos Amorosi made some insightful comments regarding the treatment of horses during the funerary ritual. For instance that one of the horses at Grímsstaðir in Skútustaðahreppur (pages 172-181) had a hind leg bundled toward the rib cage, which might be due to the animal having been tethered (Amorosi 1996:128). The reason why earlier findings were not discussed is due to often scarce descriptions in the oldest accounts from the late 19th till the early 20th century and to a difficulty in obtaining older volumes of *Árbók hins íslenska fornleifafélags* outside Iceland (Amorosi 1996:123). It is surprising in this context that he does not refer to the prior research done by Nobis (1961). Amorosi notes in his introductory statements that his initial plan had been to provide the “missing forensic detail” of animals found in burials but unfortunately “most of the animal remains were not saved at the time of discovery by the local farmers, or thought impossible to recover due to the state of preservation of the bone” (Amorosi 1996:121). A source of this information is not cited, but fortunately it is wrong. As is revealed by the current thesis, animal bone from most sites was kept for posterity, although in some instances a limited number of elements were retained, and the preservation is mostly quite good. Although Amorosi only analysed animal bone from a single burial, he did try to describe the animal burials in a general way. He estimated that of 304 burials recorded at the time 78 contained animal remains (Amorosi 1996:143), or just under 26%. This ratio is significantly lower than what is known today (page 229). He thought that animals used for burial were mature to senile (Amorosi 1996:147) and based this observation both on his study of the Vað burial and by studying photographs of excavations. By studying photographs and drawings Amorosi tried to infer the state of epiphyseal fusion and thus the relative age at death of the animals. This generalisation about the age at death is wrong as is seen in chapter 5 (pages 236-242). Amorosi also hypothesised that the animals were not necessarily killed specifically for burial, suggesting that some may have died before their human counterpart and that their remains had been saved until the death of the person, the animals in these instances presumably being favourite pets that died before their masters (Amorosi 1996:148). This rather radical reinterpretation of the burial record was based on what Amorosi calls 'bundle burials'. His re-interpretation of many of the reports in *Árbók hins íslenska fornleifafélags* was that the animal remains were not the remains of a buried carcass but rather of a disarticulated bundle of bones interred with a human. However, the idea of bundle burials is not supported by the data presented in this thesis (pages 229-230). But Amorosi (1996:148) also presented another possible explanation for the disarticulated state of some of the animal bone; that it resulted from the re-interment of both human and animal. This would then be part of the mortuary practices, but the resulting taphonomy would make the burial look like it had been looted to the modern researcher. This is an interesting hypothesis which adds a whole new dimension to Viking Age mortuary behaviour. Why Amorosi sees the disturbances of Viking Age burials as part of mortuary behaviour rather than simply looting is not articulated in his thesis, but similar ideas had been articulated before (Myhre 1994) and have also been touched upon in more recent writings on Icelandic Viking Age burials (e.g. Þóra Pétursdóttir 2007:66-68; Hildur Gestsdóttir *et al.* 2015). Amorosi wrote that the presence of animals might be indicative of people's place in society. He observed that dogs seemed to be interred with elderly people rather than young and tentatively suggested that different species might have been buried with different age grades of people (Amorosi 1996:150-151). Horses would then have been buried with "younger and more vital adults", while dogs were interred with the "elderly who have less material wealth". This was an innovative theory concerning the possible social signalling of the animal burial custom, although it does seem to be in contrast with his ideas of animal remains being kept for later burying with their masters. This age grade relative to species is not supported by the data available today (pages 236-242).

The first one to discuss Icelandic horse burials in an international context since Kristján Eldjárn (1981) was Maeve Sikora (2004). While Kristján Eldjárn (2016:308-311) had quite superficially compared the Icelandic horse burial tradition with Norway, Denmark and Sweden, Sikora's work was much more detailed. She explored differences in horse burial between Norway and the Norse colonies of Iceland, Ireland and Scotland. Sikora then used these differences to highlight the distinctive circumstances of colonisation in each area and made inferences about the nature of the respective societies. Sikora's inquiry was entirely based on published material and she did not study any zooarchaeological collections. She raised the important issue that little attention had been given to the study of the actual remains of the animals themselves; that the determination of age, sex or method of killing was mostly unavailable (Sikora 2004:90). She seems not to have been aware of the research done by Nobis (1961) on horse remains from Icelandic graves. Sikora constructed a sample of about 600 burials in Norway to which she compared all the recorded graves in the three other countries. The Norwegian sample was made up of graves from various locations and selected under different criteria in publications spanning a century (Sikora 2004:88). She found that about 7% of Norwegian Viking Age burials contained horse remains and that it was far more common in male than female interments (Sikora 2004:89). A similar ratio was found in Scotland (c. 7%) and slightly less in Ireland (c. 4%) but Sikora (2004:92) found a clear contrast with the relative number of horse graves in Iceland (c. 36%). Further, she noted that while at least 20% of the horse burials in Norway were cremations, all of those studied in Scotland, Ireland and Iceland were inhumations (Sikora 2004:93). Another departure from Norwegian burial customs in Iceland was that seemingly fewer weapons and less equestrian equipment was deposited in graves. She inferred that this, in conjunction with the high number of horses, could then perhaps be seen as reflecting different use of the horse in Iceland (Sikora 2004:94). Also, quoting descriptions of burials at Grímsstaðir (pages 172-181), Miklibær (page 110-112), Eyrarteigur (pages 215-217) and at both Brimnes sites (pages 103-105 and 117-131), Sikora (2004:95) inferred that the treatment of some of the horses in Iceland was unparalleled elsewhere and might reflect a development of the ritual beyond what was practised in Norway. Sikora (2004:95) argued that the Icelandic burial record of the Viking Age reflects a stable, rural and pagan society closely related to that of Norway. The stability was due, among other things, to less Christian influence than in the other colonies. Further, the high ratio of horse graves reveals that distinct characteristics soon developed in Iceland. What all this meant in terms of society, Sikora (2004:95) argued, is that the high ratio of horse graves in Iceland reflects an egalitarian community while the lower ratio in Norway reflects clearly a hierarchical society. Many of Sikora's findings resonate with the earlier writing of Kristján Eldjárn (above), especially concerning the development of an essentially Icelandic horse burial practice, but these ideas are challenged in the present thesis.

Two years after Sikora's publication an article by Ulla Loumand (2006), entitled *The horse and its role in Icelandic burial practices, mythology, and society* appeared, where an all encompassing 'meaning' of Icelandic horse burials was sought. Loumand (2006:130) wanted to explain "why the horse and no other animal was chosen to accompany the dead to the hereafter". This objective is flawed, because although horses did play an important role in some Viking Age burial customs they were not the only animals interred. It was not uncommon to bury dogs as well. Before the publication of Loumand's article, little had been said about the meaning of animals in Icelandic burial customs. When this had been discussed, it was mostly on the grounds of common sense and not explicitly argued (e.g. Bruun, Kålund and Kristján Eldjárn above). Loumand (2006:133) essentially regards the Viking Age horse as a liminal being; "a central, dynamic mediator between different conceptual spheres in the Icelandic society". Similar ideas had been expressed before regarding horses in prehistoric Scandinavia, for instance by Kristin Oma (2000; 2001; 2004), although Loumand does not reference this in her analysis of the Icelandic corpus. Loumand used Kristján Eldjárn's *Kuml og haugfé* for her analysis and constructed a database of 115 burials. The aim was to get information on how the horse was placed, what was buried with it, how a horse was placed relative to the dead person and whether it was normal to bury horses with women (Loumand 2006:131). The emphasis on these research objectives is surprising since they are all discussed in *Kuml og haugfé* with the same set of data (Kristján Eldjárn 2016:308-311). Loumand's interpretation diverges from Kristján Eldjárn concerning the placing of horses in burials relative to human remains. She concludes that in about 33% of the burials the horse was placed adjacent to the human's feet (Loumand 2006:131). This is a misreading of the data, since graves in which the relative positioning was not recorded are included in the total. In the present thesis it is found that placing a horse adjacent to the human's feet was the norm (pages 292-293). Like Sikora before, Loumand highlights 'peculiar finds' where horse remains seem to have been treated differently than usual. But unlike Sikora, Loumand (2006:131) writes that the peculiar finds are so few in number that it is not possible to speak of a specific burial tradition. All in all, Loumand (2006:133) concludes that her attempt to detect a distinct ritual behaviour by processing Icelandic burial data was fruitless and did not create new knowledge. Her theoretical approach in interpreting the burial data was to view it in literary, anthropological and mythological perspectives. She also discussed horses as part of *níðstöng* rituals. As a starting point, Loumand claims that there is an agreement among archaeologists that horses were important in Viking Age burial practices as means of transport to the next world. Her contribution to this interpretation is to explain *why* the horse, above other species, was suitable as a companion in this regard (Loumand 2006:130). She quotes Medieval Icelandic literature to illustrate that eating horse meat was a pagan custom and, although this is not stated in the literature, might have been the food of choice during funeral feasts (2006:131-132). The anthropological perspective is based on the works of Kristen Hastrup (1985; 1990), *Culture and history in medieval Iceland* and *Nature and policy in Iceland 1400-1800*, which Loumand applies to the Viking Age context. She argues for a difference between horses and other domestic animals; that horses were perceived in Old Norse society as belonging in a separate category between domestic and wild. The horse "had dual abilities, namely to assist humans in the social world and to live and survive in the wilderness" and that this equalled to being intermediate to 'Miðgarður' and 'Útgarður' and to being enabled to "mediate in and between all spheres" (Loumand 2006:132). In support of this Loumand (2006:132) lists the mythological horses, with Sleipnir and Hófvarpnir as the prime examples. Lastly she mentions that the possible reason for using a horse-head on a pole for a *níðstöng* is the animal's unique mobility, which could convey the intended message to the appropriate supernatural being (Loumand 2006:133). This in turn could be an interpretation for the decapitations recorded by Bruun at the Dalvík (Brimnes) burial ground; i.e. that "the deceased may have been accompanied by a níðstöng on his last journey" (Loumand 2006:133). Here it must be noted that whether or not horses were generally considered 'liminal beings' in the Viking Age, it is clear that they were the only animals used for riding in real life. In that sense, and *given* that the animal interment was indeed related to a perceived journey to the other world, it would not be surprising that horses would be favoured above sheep, cattle or pigs.

In the article *Bloody Slaughter: Ritual Decapitation and Display at the Viking Settlement of Hofstaðir, Iceland*, another form of ritual killing was hypothesised that was not part of burial customs. This work is included here because of its relevant theoretical standpoint, where ritual killing is brought into a socio-political sphere rather than being interpreted in a narrow religious way. Gavin Lucas and Thomas McGovern (2007) interpreted a collection of cattle skulls, found during excavation of the large Viking Age hall at Hofstaðir, as the remains of a seasonal sacrificial act associated with feasting and a gathering of the wider community. The Hofstaðir hall has been interpreted as the possible site of a pagan cult ever since it was first excavated in 1908. During the last excavation of the site around the turn of the century a minimum of 23 cattle skulls, grouped in two main clusters and buried in roof and wall collapse, were recovered from around the large hall. These faunal remains show evidence of the cattle having been poleaxed and then decapitated with a heavy blow to the base of the skull. Weathering on the skulls suggests that they had been hung for display for a prolonged period of time on the outside of the structure. Another interesting feature is that the horn cores were left attached and not removed for horn craft working, which would otherwise be the norm. Measurement of the horn cores suggests that the animals were large by contemporary standards. Lastly, the age at death does not fit into a dairy economy profile; they were young adult to middle aged animals (Lucas & McGovern 2007:8-14). According to AMS radiocarbon dating the bulls were killed over a period of 50 – 100 radiocarbon years. This suggests that a recurring activity took place which resulted in the accumulation of the cattle skulls rather than this being a single mass killing event (Lucas & McGovern 2007:14). Instead of conflating this ritual behaviour with religion, Lucas and McGovern (2007:8) argue that it was part of the *political nature of the site*. By referring to the works of anthropologists such as Girard (1979) and Bloch (1992) they see the bloody nature of the rituals as a way to release tension in society. Also, with reference to Miller's (1998) idea of sacrifice, they suggest that through a devotional act the non-utilitarian nature of killing and consuming a full grown bull becomes subverted. So given that during certain times of the year, large groups of people were hosted at Hofstaðir, an act of violent and bloody sacrifice may have served to draw attention away from potential tension and interpersonal conflict. They further add that the male sex of the ritually killed animals may have had extra cultural significance (Lucas & McGovern 2007:23-24). Finally, the collection and display of the bull skulls after each gathering over several decades *would have created a long-term memory and established a lineage for the site, each new skull adding to its status as a place with an important history for the community* (Lucas & McGovern 2007:24-25). In their analysis of the cattle skulls at Hofstaðir, Lucas and McGovern have moved away from simplistic and commonsensical religious explanation and towards more multi-layered (and interesting) interpretations with socio-political implications. This approach is to some degree inspirational for the present thesis in the way that ritual horse killing is here viewed in a broader light than just having religious, mythological or cosmological meaning. By removing the dichotomy of ritual vs. functional (Brück 1999) we are able to delve deeper into the impact and use of rituals *vis-à-vis* society and how the traditions both change and are changed by society (see chapter 6).

One of the most critical interpretations of Icelandic horse burials to date is Þóra Pétursdóttir's master's thesis *"Deyr fé, deyja frændr" Re-animating mortuary remains from Viking Age Iceland* submitted at the University of Tromsø in 2007. The thesis is about Icelandic Viking

Age burials in general, not specifically about horses, although they do form a significant part of the discussion. She sought to re-interpret the corpus of Icelandic Viking Age burials; to turn away from questions concerning origins of settlers and timing of settlement to others concerning the personal and social significance of the material. The aim was to emphasise the corpus on its own terms without much comparison to other traditions or areas (Þóra Pétursdóttir 2007:2). Þóra Pétursdóttir (2007:56-57, 72) considered the abundance of horses as the *most striking feature of this material*. She subsequently wrote three articles based on her thesis (Þóra Pétursdóttir 2009; 2010; 2012), one of which is explicitly about horse burials (Þóra Pétursdóttir 2010). It is worth noting that, apart from Loumand's article (above), Þóra's thesis is the first clearly articulated and in-depth interpretation of the animal portion of Icelandic burials (Amorosi and Sikora being more descriptive). For instance, her main criticism of previous work is on Kristján Eldjárn and Orri Vésteinsson (discussed above). The opinion of the former, that the relatively high occurrence of horses was due to a lack of material goods (Kristján Eldjárn 1981). The criticism of the latter is based on a single paragraph in a general chapter about the archaeology of settlement in Iceland, in which Orri Vésteinsson (2000:170) largely concurs with Kristján Eldjárn. But while previous writers had not tried explicitly to interpret horse burials in Iceland, what Þóra's (and Loumand's) work has in common with them is a fundamentally insular approach to the material. This in fact is a professed part of Þóra's theoretical standpoint; to discuss selected Icelandic burials *on their own terms* without much comparison with other areas (Þóra Pétursdóttir 2007:2). This was to distance the discussion from the view that Icelanders in the Viking Age might in material terms be viewed as the 'poor cousins' of Scandinavians and hence that horses could be seen as an alternative to other unavailable grave goods. The fault in her approach is that despite this manifesto of how to view the Icelandic material she still maintains uncritically the traditional notion that horse burials were relatively much more common in Iceland which "distinguish[ed] them from burial customs in other parts of the Viking world" (Þóra Pétursdóttir 2007:72). This major foundation to her argumentation (Þóra Pétursdóttir 2010:185) is false. As is seen in the present thesis, the matter is more complex than first meets the eye. In fact it is argued here that the perceived over-abundance of horses in Icelandic Viking burials is a taphonomic and chronological smoke-screen (chapters 3, 5 and 6). In her work Þóra wanted to move away from issues of origins, chronology and material wealth. Instead she wanted to explore a selection of burials *"as collectives of different elements which through their "agency" brought to them a web of relations involving a multitude of pasts, places and people. Rather than splitting up these enmeshed elements [she wanted] to inquire* *into the significance of each part, the relations between them and how they actually came into being as grave goods"* (Þóra Pétursdóttir 2007:2). In light of this her interpretation of the presence of horses and dogs in burials is based on a perceived individuality of each animal. In her view it was not just any horse or dog which got chosen for burial but renowned animals, known to the audience by name and reputation and recognized in the open grave (Þóra Pétursdóttir 2007:72, 75; 2010:204). She argued that the horses were buried as humans and that they were subjects of the same social cosmos as humans; the horses would have been thought of as persons in themselves or as part of a person, where human and animal are perceived as one (Þóra Pétursdóttir 2007:74-75). In this respect Þóra (Pétursdóttir 2007:73) referenced among other the works of Kristin Oma (2000; 2001; 2004) considering the liminal nature of horses and Kristina Jennbert (2002) considering ambiguous boundaries between humans and horses in Norse pre-Christian mythology. Þóra argues for example that a chieftain's jurisdiction was confined by his horse but not set by himself; his authority extended only as far as his horse carried him. In this way "the chieftain and his horse *were one*, because without the other the institution was incomplete – or rather non-existent" (Þóra Pétursdóttir 2007:77). Further, she saw the close physical proximity of horse and human in single grave cuts at four sites (Traðarholt, Ytra-Garðshorn, Dalvík (Brimnes) and Sílastaðir, all discussed chapter 4) as further proof of human/animal hybridisation; of the human and horse as one (Þóra Pétursdóttir 2007:74), and even argued that this could be seen as 'pictures' not unlike animal ornamentation (Þóra Pétursdóttir 2010:202-203). In a similar way she proposed that the curious horse burial at Grímsstaðir (pages 172-181) might be interpreted as a visual recreation of the mythical eight legged horse (Þóra Pétursdóttir 2010:203)[2]. These interpretations are however not substantiated by the present study (chapter 4). Þóra is right in maintaining the importance of horses for travel in Iceland, but it is a far leap to assume that the many horses recorded on grave fields were in most instances inseparable from their owners or even persons in themselves. Þóra notes that the act of burying horses with riding gear on burial grounds is an indication that human and animal boundaries were less

[2] A peculiar find was reported on in the Archaeological Society's Yearbook of 1967 which was radically different than the general descriptions of horse burials put forth by Bruun (1910) and Kristján Eldjárn (1956). At the farm of Grímsnes on Lake Mývatn in NE Iceland a bulldozer disturbed a rectangular grave during road construction, which contained substantial amounts of animal bone, seemingly the remains of two horses and saddles. Gísli Gestsson investigated the site and reported that the horses and saddles had been arranged in a way never recorded before; namely that both horses had been sectioned in half. The front part of one and the hind part of the other were deposited first. On top of that were the saddles, followed by the remaining front and hind parts of each horse and then the heads (Kristján Eldjárn 1968:99-101). This description has been taken up in later writings as an example of an unusual burial (Kristján Eldjárn 2016:309-310). As is discussed in chapter 4 (pages 172-181), the grave is in many ways unique in the Icelandic Viking Age burial record, but Gísli Gestsson, having been misled by taphonomic factors, was almost certainly wrong in his initial interpretation.

compartmentalised in Viking Age Iceland than in the modern Western world (Þóra Pétursdóttir 2007:75). This is highly probable, but it does not however substantiate the claim that horses inhabited the same ‘social cosmos’ as humans in Viking Age Iceland. Þóra (Pétursdóttir 2007) does not discuss the killing of animals for burial in her thesis, but it is evident from the osteological analysis that both horses and dogs were deliberately killed as part of the funerary ritual. This includes poleaxing, throat cutting and decapitation. It is not obvious how this would fit with the idea of horses being persons just like humans. In a more recent article Þóra (Pétursdóttir 2010:194) does acknowledge that the horses were killed but does not try and incorporate that fact into her theory of ‘horses as persons’. A more balanced view is to acknowledge that individual horses may have had ’personhood’ to a different degree, similar to modern pets. For instance, famous or well known animals often have more personhood than others. This goes for people as well, it can be imagined that some of those who did not receive an elaborate burial in Viking Age Iceland may have had less personhood than those who did (Orri Vésteinsson 2016). Indeed the osteological analysis of the entire assemblage of horse burials (chapter 5) points towards the animals having been symbolic surrogates rather than ‘persons in themselves’, even if that might well have been the case sometimes. It can also be noted in this respect, that it has been argued elsewhere that the practical usefulness of a horse as a transport was not a central issue in Viking Age horse burials. Steven Harrison (2008:158-160) used the tiny island of Colonsay, where horses are not obviously necessary for transport, as an example in that regard, but two horse graves have been recorded there. In her work Þóra addresses interesting topics and approaches the material in an innovative way. Perhaps her greatest contribution to the animal burial discourse was to point out that some horse graves in Iceland are not obviously part of a human burial but could rather represent a separate burial event. However the foundation of her arguments, of studying selected graves independently, is also the basic flaw in her approach. It is argued in the present thesis that by looking at these burial traditions from a wider angle and by incorporating more data (osteological, chronological and geographical) a more balanced and completely different picture emerges.

The most recent publication on Icelandic horse burials was an article written by myself (Rúnar Leifsson 2012a) as initial thoughts and a starting point for the present thesis. There I emphasize the importance of the tradition itself of ritually killing animals in Viking Age burial customs, why it was adopted in Iceland and how it reflects a new society taking shape. The article was submitted before I analysed the entire corpus of animal remains from

Icelandic burials as well as before I obtained the Norwegian data used in the present thesis. In the article I emphasised the complexity of these rituals, that there is no ‘one’ meaning embedded in them. Rather, they are comprised of many strings that are woven widely through society and people’s personal experiences as well. It is not enough to refer only to the relationship between a person and his or her favourite animal, nor is it enough to refer only to religious or cosmological ideas, even if those aspects may play a part (Rúnar Leifsson 2012a:190). These were symbolic structures which people could communicate through, and like all traditions they were not set in stone and their meaning did not necessarily stay the same down generations. To compare the ratio of horse graves between Norway and the settlement colony on Iceland, I used Sikora’s estimation of 7% in Norway and the latest available Icelandic data. From this and based on my statistical calculations that there was not a difference in the occurrence of horses in male and female burials, I argued that the staggering difference between Iceland and Norway reflected certain aspects of the new Icelandic society. Horse burials have traditionally been associated with high status males in Scandinavia but the trend in Iceland, where this tradition is very common and transcends gender and age boundaries quite readily, seemed to be focused on groups of specific standing rather than on individuals. This could then exemplify a less militarised society of homogenous farming communities, where competition between autonomous groups is nonetheless prevalent. The frequent occurrence of horses in graves sheds light on an underdeveloped power structure during the first decades of settlement where groups of settlers used the symbolism of rituals like this to express or negotiate their standing. In such a scenario horses seem more logical than symbolism more directly associated with warfare such as swords. Further, this context gives significance to horses resting in their own graves on burial grounds seemingly unrelated to surrounding human graves (Rúnar Leifsson 2012a:191-192). After acquiring the data presented in this thesis this interpretation has significantly changed and deepened (chapter 6).

2.2 The main milestones collated

2.2.1 Research

- Reverend Sigurður Brynjólfsson Sívertsen noted in 1868 the importance of what we call today ‘taphonomy’ when working with an animal bone assemblage from a Viking Age burial.
- Kålund (1882) later noted that horses were usually buried complete and harnessed but that in some instances, with the reservation that it might be due to preservation, only

the severed head seemed to have been interred. As is seen in chapter 5 (pages 229-230), Kålund was correct in his assumption about taphonomy having impact on possible body part distribution.

- The first comprehensive description of the horse burial tradition in Iceland, based on contemporary state of knowledge, is found in Bruun's and Finnur Jónsson's (1910) publication of the Dalvík (Brimnes) burial ground. Their overview, although based on a limited dataset, is still largely valid.
- The first zooarchaeological research of a horse from a Viking Age burial in Iceland was conducted by Herluf Winge at the Zoological Museum in Copenhagen on behalf of Daniel Bruun. Winge concluded that the horse from Sturluflötur in eastern Iceland had been similar in stature to the modern breed of Icelandic horses and that it resembled both known Iron Age horses remains from Denmark and even much older remains found at Solutré in France (Bruun 1903 and 1987:145-6).
- Shetelig (1939) was first to regard Icelandic burial archaeology in a wider non-insular context. He found that there were great similarities between the material culture of Viking Age Iceland and contemporary settlements in the British Isles, but also that there were some similarities with the material culture of eastern Scandinavia.
- Shetelig (1939) also pointed out that the typology of artefacts found in Icelandic Viking Age burials corresponds well chronologically with the dating of the settlement and conversion as traditionally derived from the medieval literature.
- Kristán Eldjárn dated burials closer in his doctoral thesis than had been done previously. Typologically they mostly belong to the 10th century.
- He also noted in his doctoral thesis that it was more common to bury horses with males than females.
- And further, that it had been very common to bury horses with humans in pre-Conversion Iceland and *more so than elsewhere in the Norse world* (Kristján Eldjárn 2016:308). This was later supported in an article by Sikora (2004).
- Adolf Friðriksson (2013:108) has argued that due to better excavation and recording techniques horses get *more common* in more recent investigations.
- Nobis (1961) was first to do extensive zooarchaeological analysis of horse remains from known Viking Age burials in Iceland.
- He noted that *every individual horse which could be sexed was male*. This remark could have major implications for subsequent interpretations, but ongoing aDNA investigations show that mares were buried as well.
- Nobis also recorded the stature and age at death of horses in burial contexts.

- Amorosi tried to age horse remains from photographs and concluded that most had been mature to senile at the time of death.
- Sigríður Björnsdóttir diagnosed bone spavin in a few horses from Viking Age burials in Iceland.

2.2.2 Theories

- In Kålund's (1882) and Bruun's (1910), early in-depth accounts about the animal component of Icelandic Viking Age burials, the underlying idea is that a favourite animal was buried with its master.
- This idea was much later elaborated by Amorosi (1996) who suggested that animals were perhaps not killed especially for burial, but rather that the remains of favourite pets, that died before their owners, were reburied with their human counterpart when the time came. Amorosi suggested that disarticulated animal bone found in burials might represent what he calls "bundle burials" – reburied animal bone.
- Kålund inferred that the burial of animals in graves was an expression of identity while Bruun looked upon the animals as expression of status.
- Shetelig (1939:11-13) thought that Iceland had early on developed trade contacts that circumvented the old homelands in Norway, which indicated the *early development of a specific Icelandic identity*.
- Shetelig also noted that the inclusion of riding gear with horses in the grave indicated ideas about a journey to the afterlife.
- Matthías Þórðarson noted that horse remains in burials may also represent food deposits. He based this on his excavation of a burial in Miklibær in Skagafjarðarsýsla (pages 110-112).
- Kristján Eldjárn was first to explicitly voice a reason why horses were apparently much more common in graves in Iceland than elsewhere. He thought that this was due to abundance of horses on the island, that the animals were a substitute for other burial goods and that the selection of individuals for burial was a way of culling. Sikora (2004) resonates in many ways with Kristján Eldjárn. She too sees horse burial in Iceland as a distinctive development of ritual beyond Norway.
- Amorosi (1996) introduced to the Icelandic burial discourse an idea previously discussed in Norway by Myhre (1994), that disturbed burials might not be the remains of grave robbery but rather that it was part of the burial ritual to re-open the grave after initial interment.

- He further suggested (Amorosi 1996) that whether a person got a horse or dog in the grave was a form of social signalling. Younger people got horses, while older people got a dog.
- Lucas and McGovern (2007) made a critical theoretical step, when instead of conflating ritual killing at the Viking Age longhouse of Hofstaðir with religion, they argued instead that it was part of the political nature of the site.
- Lucas and McGovern (2007) also highlighted the importance of the bloody theatrics involved in the ritual killing.
- Þóra Pétursdóttir (2007) made the important observation that horses buried by themselves on burial grounds might represent a specific burial event without human remains being involved.
- She also explored new lines of questioning, turning away from questions about origins and chronology to others concerning the personal and social significance of the burial events.
- Further, she argued that horses may have been regarded as persons themselves and in some instances human and animal were perceived as one.
- In an article from 2012 I emphasized the importance of the *tradition itself* of ritually killing animals in Viking Age burial customs, why it was adopted in Iceland and how it reflects the new society in development.
- Based on the number of known Icelandic burials I found it was not statistically more common to bury horses with men than women. This point becomes more important in the current thesis when combined with the new knowledge that the ritual takes hold later and is practised over a shorter period of time in Iceland than previously assumed.
- I further noted that the *kuml* burial practice in Iceland was focused on groups of specific standing (e.g. landowning families) rather than on special individuals and that this signified an underdeveloped power structure.

In the current thesis I analyse the animal component of Viking Age burials in Iceland and correct some previous assumptions. Based on these zooarchaeological findings I in turn discuss what the new data means for our understanding of Viking Age society in Iceland.

3 The ritual killing and burial of horses in Norway

A defining characteristic of Icelandic Viking Age burials is the high frequency of horses. This has traditionally been seen as an element that sets Icelandic burials apart from late Iron Age burials in other Norse societies, where the relative frequency has been thought much lower. It is argued in this chapter that this different incidence of horses in graves, which has been a foundation for various interpretations regarding Viking Age society in Iceland (Rúnar Leifsson 2012a; Þóra Pétursdóttir 2010; Loumand 2006; Sikora 2004; Kristján Eldjárn 1981, see chapter 2), is false. It is important to re-evaluate the frequency in Norway and to account for the chronological distribution of horse graves in both Iceland and Norway. The first person to highlight that horses were more common in Icelandic graves than elsewhere was Kristján Eldjárn, shortly after the middle of the 20th century (Kristján Eldjárn 2016:310-311). He quoted Shetelig's catalogue *Vestlandske graver* and used the count of bridle-bits as a proxy for the minimum number of horse burials in Norway. He found that 16 of 92 female burials and 65 of 264 male burials contained a bridle-bit and thus probably also a horse. Kristján noted that burying horses was most common in Iceland, followed by Norway, then Sweden and lastly Denmark, where this seemed to have been quite rare. Some decades later Kristján (Eldjárn 1981:4) noted that this high relative frequency in Viking Age Iceland could be explained by a shortage of other worldly goods. Subsequent researchers have taken this scenario of relative frequency for granted, in some instances offering very different interpretations but usually concerning how this highlights the special role of the horse in Iceland (e.g. Ulla Loumand and Þóra Pétursdóttir, see chapter 2). Fifty years after Kristján Eldjárn's thesis another quantification of horse burials showed an even greater difference between Iceland and Norway. Maeve Sikora (2004:88) compiled a catalogue of about 600 Norwegian burials based on published data and counted the instances where horse remains were mentioned (not bridle-bits). She estimated that horses had only been deposited into 7% of Viking Age burials in Norway. If Sikora's findings indeed matched the reality then the comparison with the nearly 40% occurrence in Iceland would be staggering. Like other recent authors on the subject, Sikora interpreted this as indicating a special role of the horse in Viking Age Iceland (chapter 2).

As the Icelandic horse burial tradition has been considered to differ markedly from other regions it is imperative to reassess the matter based on a more careful and comprehensive review of the data than before. The Icelandic tradition can subsequently be resituated within a broader perspective and a more balanced view of the ritual killing and burial in Iceland can be gained. In this chapter a new look will be taken at animal burials in Norway. The aim of the study is to determine how common horses are in Norwegian burials of the Late Iron Age, i.e. the ratio between graves with and without horses. To overcome the problem that horse bones rarely survive in Norwegian graves, it is argued that bridle-bits and saddles are useful as proxies for the deposition of a horse in a grave. Based on those findings a picture emerges in which horses are far more common than previously thought. It is also found that there are possible chronological differences in the frequency and even 'meaning' of these sort of burial rituals. This has repercussions for our understanding of burial practices in the western colonies and not least in Iceland. To begin with however, there are three basic premises that must be kept in mind when burial archaeology is discussed simultaneously in Iceland and Norway.

What must first of all be reckoned is the simple fact that Norway has much deeper prehistory than Iceland. Pre-Christian burial grounds in Norway may have been in use over centuries, even millennia, whereas the Icelandic ones can be seen as a snapshot of customs dating within a very narrow time-frame. The Icelandic burials mostly date from the late 10th century, with a few perhaps originating from the earlier half and a handful plausibly as late as the 11th century (page 289-292). Thus while the Icelandic burial record spans a few decades towards the end of the Viking Age, the Norwegian record spans the entire Iron Age and possibly further beyond. The possible variation in burial practices, evolution of traditions, introduction of new practices etc., just within the ca. 300-year span of the Viking Age, can significantly skew any comparison with the much narrower timeframe of the archaeology in Iceland. It follows then that in order to explicitly state that horse burials are much more common in Iceland than in Norway the comparative material would have to be securely dated within a narrow timeframe. If not, the likelihood is that the comparative assemblage would be an amalgamation of Iron Age material, most of which dates to before the settlement of Iceland. Constructing a representative sample of tightly dated burials within restricted geographical areas (see discussion about 'timeframe and study area' below) is difficult, but the possible problems associated with comparing archaeologies between Iceland and Norway need at the very least to be made explicit in order for simple comparisons not to be taken at face value.

The second important factor is taphonomy and, in this instance, taphic processes in particular. The level of preservation after burial can be highly varied depending on the chemical composition and pH level of the soil matrix (Lyman 1994:417-433). The chemical make up of the soil is largely determined by base minerals, which can obviously be different between areas. The soils in western Norway are acidic (Børsheim 2002:188) while the base material of Icelandic soils is mostly basalt (Ólafur Arnalds 2008:409). Acidic soils can dissolve the mineral component of bones and are a defining factor regarding bone preservation or degradation. Because of this it is often only metallic riding gear that survives in western Norway while the bones of horses and other animals disappear (Børsheim 2002:188). Generally the lower the pH value the worse the preservation. The fact that bone material often preserves less well on the western coast of Norway than in Iceland is bound to greatly influence what species have been recorded and the estimated ratio of burials containing animals.

Thirdly it is important to be aware of differences in research history and the varying degree of publication. Publication of burials in Norway is more selective than in Iceland. All Viking Age burials in Iceland recorded up to the year 2015 are found in the catalogue *Kuml og haugfé* (Kristján Eldjárn 2016). No comparable catalogue has been published in Norway. The most comparable catalogues are the century old *Vestlandske graver* by Shetelig (1912) and *Iron Age settlement of arctic Norway* by Sjøvold (1974), but both of those deal with specific regions. There has been no comprehensive research on the occurrence of horses in graves in Norway and, in general, a lot of what has been written concerns the more spectacular aristocratic burials. Due to these differences any comparison between the two countries can be quite difficult. In order for the researcher to build a sample which is representative of Norway (or of specific areas therein), a critical survey must be made of not only published material but also of all the relevant unpublished material as well; excavation reports, field notes and entries in museum catalogues.

3.1.1 Theory and method

Publications concerning pre-Christian burials in Norway rarely discuss bone, neither human nor animal. This is especially evident in the catalogues dating from the 20th century (e.g. Sjövold 1974; Shetelig 1912). The reasons for this are most likely poor preservation of skeletal elements, perhaps in combination with a tradition of recording and publication. But the result is that it is not always obvious from published reports whether an animal shared a grave with a human or not. Descriptions of burials usually deal with the artefacts recovered, whether it is a cremation or inhumation, and perhaps the outer construction. It is often not explicitly discussed whether the grave contained a human body, that point seems to be self-evident due to the association of artefacts such as jewellery, tools or weapons. Conversely, it is generally not assumed nor speculated that an animal might have been present based on artefacts (cf. Kristján Eldjárn 2016:311). Thus, horses would only be noted in the instances when osteological discussions accompanied burial data, while the presence of humans was thought obvious and needed no discussion. It follows that the quantification of animals in Norwegian burials must be negatively skewed.

Horses, like humans but unlike other animal species, regularly have associated artefacts buried with them. Moreover, the artefacts can preserve well in the soil and be subsequently recorded with other grave-goods upon excavation. These are of course harnesses and saddles. Iron parts of these items, such as bridle-bits, buckles and saddle nails, stand a good chance of preserving, while organic components do not. There is a distinction to be made between riding gear associated with horses directly and riding gear associated with humans. The harness and saddle form a part of the horse’s ‘dress’, while spurs are a part of the human’s attire and as such do not necessarily indicate the presence of a horse. Thus, the method applied in this study to quantify the occurrence of horses in Norwegian burials is to use harnesses and saddles as proxy, complementing count of burials with recorded animal bone.

The main concern with using proxy data is of course the risk of inaccuracy; that the measured proxy represents the anticipated variable. Even if the harness and saddle are part of the horse’s attire and not the human’s, that does not directly mean that these items could not have been buried with humans alone in Viking Age Norway. What can be said with certainty is that it is *highly unlikely* that harnesses and saddles were regularly buried with humans only in Viking Age Norway. This claim cannot be substantiated beyond being ‘highly unlikely’ without a great number of new excavations being made with modern recording techniques. A step in that direction was taken in 2003 and 2004 when the grave field at Gulli in eastern Norway was expertly excavated by the Kulturhistorisk Museum in Oslo. What was revealed at Gulli is that horses were present in 35% of the burials and horse equipment was only recorded in graves that contained one or more horses (Gjerpe 2005). While risking the folly of circular argument, an analogue might be sought in Iceland. Bone preservation is generally good in Icelandic Viking Age graves and the presence of human and horse bone is not missed by excavators, unless the bone has been deliberately removed in antiquity. In Iceland the remains of harness or saddle have *never* been recorded in a burial that did not also contain a horse. In other words, there is a hundred percent correlation between the presence of a harness and/or saddle and the presence of a horse. On the other hand, there are a few horses known from burials where no riding equipment was recorded, so in Iceland, horse equipment as a proxy of the presence of horses would give too *low* a count. Without any data pointing explicitly towards the contrary, there is no reason to assume that the correlation between horses and riding gear was different in Norway. So using riding equipment along with bone material can only be seen to give a minimum for the actual occurrence. The strong association between horses and riding equipment has in the past seldom been discussed (although see Børsheim 2002:188) and never argued against.

3.1.2 Timeframe and study area

In order to catalogue a controlled dataset of Norwegian burials, suitable as a reference with the Icelandic material, a framework must be clearly defined. The task of constructing the sample is not straightforward since the number of known Norwegian pre-Christian burials is enormous and covers larger areas with a deeper chronology than the Icelandic corpus. There are three essential criteria which must be maintained when samples are selected:

1) The graves must fall within a certain timeframe.
2) Geographically restricted zones that contain high numbers of graves must be defined.
3) The defined zones must spread quite evenly over the larger geographical area under study.

The first criterion, *the timeframe*, is more of an issue in Norway than it is in Iceland. The Icelandic burials under study should, based on current evidence concerning the *landnám* (Orri Vésteinsson & McGovern 2012), fall between the latter part of the 9th and the beginning of the 11th century. The later boundary is similarly dated in Norway, but the earlier one is obviously more problematic. The question is, should the Norwegian burials under study be restricted to the second half of the 9th century, or should the boundary be pushed further back. A core problem is that a narrow dating of burials is often difficult, with many simply designated as ‘Viking Age’ or ‘late Iron Age’. Another point which must be taken into account is *when* the custom of killing and burying horses as part of funerary rituals began in Norway. This is a tradition older than the settlement of Iceland. The deposition of horses and riding gear became a regular feature of Norwegian burial customs during the Merovingian

Period and was continued throughout the Viking Age. Only a handful of instances have been recorded from the early Iron Age to the Migration Period, so there is a clear change in the burial record from the Merovingian Period onwards (Gjessing 1934; Gaustad 1966; Gudesen 1980; Helgen 1982; Arrehnius 1983; Jørgensen 1990, 1991; Jørgensen, N. 1991, 1992, 1996, 1997a, 1997b; Meling 2000:37). The late Iron Age in Norway, composed of the Merovingian Period and the Viking Age, is quite arbitrarily subdivided. The classic beginning of the Viking Age is set at the attack on Lindisfarne in AD 793, and as such has more relevance to the history of Britain rather than being a benchmark in Scandinavian cultural history. A boundary between the periods is not particularly clear in the Norwegian archaeological record. There is rather a gradual societal, political and religious development occurring through the entire late Iron Age, culminating in the introduction of Norway into the family of European kingdoms at the end of the Viking Age. This is seen archaeologically in the material culture (for example in development of animal styles, e.g Hedeager 2011:61-66), and probably applies as well to actual societal developments (e.g. Myhre 2000:35-47), e.g. in terms of internal power relations and external influence on neighbouring societies. The boundaries of these two periods are obviously modern constructions and the break between them is quite arbitrarily marked. So for the present study the earlier boundary is the 7th century, when horse burials become a notable feature of the Norwegian archaeological record. In the latter part of the Merovingian Period, in the 8th century, horse burials become especially prominent (Meling 2000:37). By incorporating the entire late Iron Age the number of graves increases significantly and the chance to observe a chronological development in the practice of horse rituals is increased.

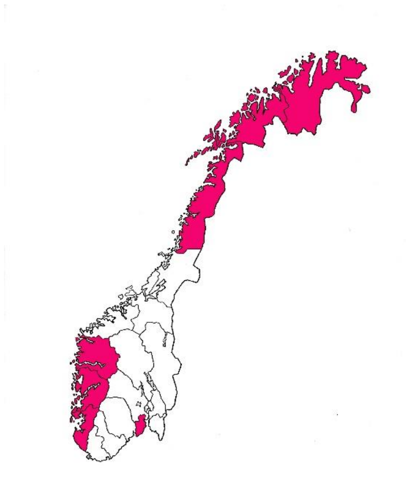
The second criterion, defining restricted sample areas, is highly important when working with Norway. The coastline is extremely long and consists of numerous fjords carved into a mountainous landscape. The thousands of Iron Age burials known in Norway are thus spread out over great distances, each site often only represented by one or a few burials. This can obviously cause great analytical problems, especially if all burials were to be lumped together. Like elsewhere in contemporary Scandinavia (Svanberg 2003) and not least due to the topographical conditions mentioned above, it is highly likely that there were differences in burial practices between areas. Combining all graves into one sample would thus rub out any regional differences that might exist. The best way to ensure that the burials under study are representative and to draw out possible differences between areas is to define geographically small zones which have yielded relatively numerous known burials (e.g. Orton 2000:67-111).

The Vestfold region is easiest to sample. There, larger grave fields are known that have been extensively excavated and the publication record is better than elsewhere. On the western coast however, the grave fields seem to be smaller in general and often single farm based (Dommasnes 1982:71). There are of course exceptions from this, most notably Vang (Farbregd 1980), but those exceptions lack extensive excavations. Thus the samples defined on the west coast are limited to burials found within specific municipalities. Norway is divided into nineteen counties (Norw.: fylker) and each county is further divided into several municipalities (Norw.: kommuner). The municipalities represent areas that are not too large or diverse, although the number of grave fields within each varies significantly. Thus, the municipalities used for the study are the ones that contain the highest number of excavated graves.

This leads to the third criterion. In order to get a picture of how Late Iron Age burial customs were distributed within Norway, the defined sample areas must be spread over different counties and districts. This gives perspective on how homogenous or diverse the burial customs were between areas and adds further resolution to the chronological development of horse rituals.

3.1.3 The sample

The sample constructed for the present study is represented by large grave fields in Vestfold in the southeast of Norway and grave fields and municipalities in counties north along the west coast to the extreme northeast. A total of 682 burials were recorded. The grave fields in Vestfold are Gulli, Lille-Guldkronen and five burial grounds recorded at Kaupang. In Rogaland the burial ground at Gausel was used. Hordaland is represented by the municipalities of Voss and Kvinnherad. Sogn og Fjordane is represented by the municipalities of Gloppen and Vik. The southern part of Nordland, Helgeland, is represented by the municipality of Helgeland, while Salten, the northern part of Nordland is represented by the municipalities of Steigen, Hamarøy and Lødingen. South Troms is represented by Trondenes, Bjarkøy and Lenvik, and North Troms by Tromsøysund and



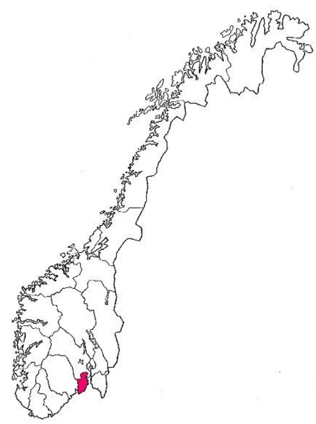
Map 3–1 - Counties in Norway discussed in the chapter.

Karlsøy. Lastly, due to scarcity in material the county of Finnmark is represented by all municipalities with recorded Norse burials from the Iron Age, Loppa Hammerfest, Måsøy, Nordkapp, Nesseby, Vadsø and Vardø. The sample was constructed based on museum reports, published catalogues, journal articles, grey literature and the online *Universitetsmuseenes arkeologisamlinger* (n.d.). All burials from these respective areas dating from the late Iron Age are included and categorised whether they are recorded to have contained horse and/or harness remains or not.

Results

Vestfold:

The sample from Vestfold is composed of 252 burials derived from eight grave fields, five of which are at Kaupang.



Map 3–2 – Vestfold.

Gulli. Twenty burials have been excavated at Gulli (Gjerpe 2005). All of them were inhumations, with a possible exception of one (Gjerpe 2005:14). Seven contained horse remains or 35% of the total. Further, five of the horse burials contained two animals, so the total recorded number of horses is twelve. Two female burials contained two horses each, two male burials contained two horses, one male burial contained one horse and the last two burials were of persons of undetermined sex. Of the five burials that can be dated more securely than being just Viking or Merovingian, four date to the 10th or early 11th century and one to the 9th century. The horseless graves are generally older, one is 8th century, five are 9th century and three are 9th or early 10th century. The rest can only be ascribed generally to the Late Iron Age. The Gulli grave field is well recorded and the results are very reliable. It was excavated in 2003 and 2004 by the Kulturhistorisk Museum in Oslo.

Site	# burials	# w/horse remains	% of total
Gulli	20	7	35%

Date	# burials	# w/horse remains	% of total
8th c.	1	0	0%
9th c.	6	1	17%
9th-early 10th c	3	0	0%
10th c- early 11th.	4	4	100%

Sex	# burials	# w/horse remains	% of total
Male	8	3	38%
Female	7	2	29%

Table 3-1 – The Gulli grave field in Vestfold

Lille-Guldkronen. Twenty burials were recorded at Lille-Guldkronen and of those sixteen were excavated (Grieg 1932:1-41). Eight burials were cremations and six were definite inhumations. Two burials were mostly empty and it is not certain whether they were cremations or inhumations. Six burials, of which four are definite cremations, did not contain any artefacts. Ten burials could be dated based on typology. One cremation dated from the Age of Migrations, the other were all of a Viking Age date. The Viking Age burials all dated from the early or late 10th century, except one that dated from the early 9th century. Horse remains were recorded in three 10th century inhumations, which is 50% of the 10th century inhumation graves. All were recorded as male burials based on the presence of weapons.

Site	# burials	# w/horse or harness	% of total
Lille Guldkronen	16	3	19%

Date	# burials	# w/horse remains	% of total
Migration Period	1	0	0%
9th c.	1	0	0%
10th c	8	3	38%

	# burials	# w/horse remains	% of total
Cremation	8	0	0%
Inhumation	6	3	50%

Sex	# burials	# w/horse remains	% of total
Male & Female	1	0	0%
Female	1	0	0%
Male	7	3	43%

Table 3-2 – The Lille-Guldkronen grave field in Vestfold

Berg. Twelve burials were excavated at Berg, seven cremations and five inhumations (Grieg 1932:42-58). Few artefacts were recorded in the burials. Most of the artefacts came from two graves, number 16 and 20. Only four burials could be dated based on typology and three of those were horse burials. Two are 9th century, a cremation and an inhumation, and both of those contained riding gear. The third, which contained deteriorated horse teeth, is designated Viking Age in the Oslo museum catalogue, but Migration Period to Viking Age in the article by Grieg (1933:49). The only datable burial which did not contain riding gear or horse remains was dated to the Migration Period. No burials from the 10th century were recorded.

Kaupang. A total of 204 graves from about 700 known monuments have been recorded at Kaupang (Stylegar 2007). The burials are distributed between eight different areas surrounding the Viking Age town. The largest ones are Nordre Kaupang, Lamøya and Bikjholberget, while the rest are substantially smaller (Stylegar 2007:65). In this study only graves are used which revealed one or more finds of bone or artefacts, while empty monuments and casual finds are omitted. This is in order to minimise the skew caused by taphonomy and differential preservation and gives a total number of 142 burials. In average about 19% of all burials at Kaupang were horse graves. No separation is seen between cremations and inhumations in regard to horses. The two largest cemeteries, Nordre Kaupang and Bikjholberget, have the same ratio of horse graves or around 21-22%, but Nordre Kaupang is a cremation cemetery while inhumations were practiced at Bikjholberget (Stylegar 2007:104-126). Almost twice as many male graves are recorded at Kaupang as female graves, but both sexes are recorded in horse graves. The percentage is higher with female graves or 28%, while 18% of male graves are horse burials.

Areas	# burials	# w/horse or harness	% of total
N Kaupang	41	9	22%
S Kaupang	15	2	7%
Hagejordet	4	1-2	25-50%
Lamøya	15	1	7%
Bikjholberget	67	14	21%
Total	142	26-27	18-19%

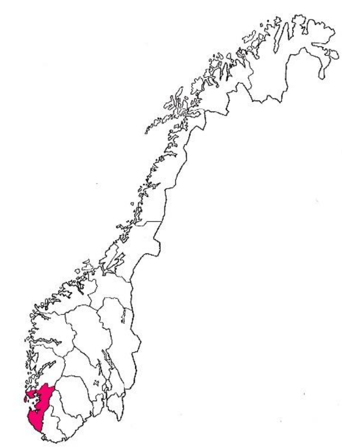
Date	# burials	# w/horse or harness	% of total
9th c.	41	5	12%
9th-10th c.	13	1	8%
10th c.	50	16	32%

Sex based on artefacts	# burials	# w/horse or harness	% of total
Male and female?	3	2	67%
Female?	29	8	28%
Male	56	10	18%

Table 3-3 – The Kaupang grave fields in Vestfold.

Rogaland:

Gausel: At the Gausel grave field a total of eight burials have been excavated. Of those, five were horse graves. Most of the burials are only classified as Late Iron Age or Viking Age, except two which are dateable to the middle or late 9th century. All except one of the burials under study are inhumations, while a single horseless burial is possibly a cremation. Older burials at Gausel, dating from the early Iron Age, are all cremations so there seems to be a change with the Merovingian Period and onwards. Curiously the horse burials at Gausel have been interpreted as though only the



Map 3–3 – Rogaland.

animals' heads were buried (Børsheim 2002:187). This phenomenon was first recorded in the 1860s and again in the late 20th century with the grave of the "Gausel queen" and in a male boat grave. It is by no means certain that it was a real trend at Gausel to bury only horse heads. The only horse bone material recovered from the graves were teeth. It is well recognised that bone preservation is bad at Gausel and it is common in west Norway for teeth being the only skeletal remains to survive in the soil (Børsheim 2002:188). Thus it could very well be that the apparent horse head ritual is only due to the trickery of taphonomy. Nonetheless, it has been noted that the grave cut of the "Gausel queen" was probably too small to have contained an entire horse along with the human body (Børsheim 1997), so the issue is unsolved.

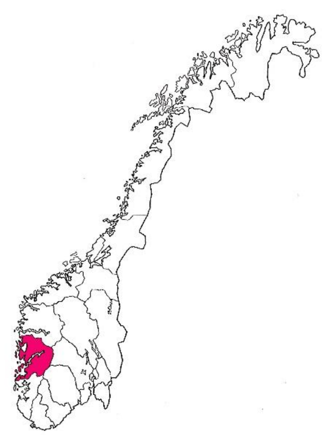
Site	# burials	# w/horse or harness	% of total
Gausel	8	5	63%

Sex	# burials	# w/horse remains	% of total
Female	2	1	50%
Male	4	2	50%

Table 3-4 – The Gausel grave field in Rogaland.

Hordaland:

Instead of specific burial grounds two municipalities from Hordaland are used in the present study. These are Voss and Kvinnherad (Universitetsmuseenes arkeologisamlinger; Meling 2000; Shetelig 1912). The burials were recorded from the 19th and through the 20th century. Some had been disturbed prior to investigation. Given these caveats, the ratio of horse equipment and horse remains must be seen as minimum. The dating of the burials is generally quite broad, with only a small portion attributable to a specific century. Most of the burials can only be assigned as belonging to the late Iron Age, Merovingian or Viking Age.



Map 3–4 – Hordaland.

Voss: The human remains from Voss have not been sexed, so all inferences about gender are based on artefacts. All instances of horse or riding gear were interpreted as deriving from male burials, except in a burial from the farm of Bryn where two sets of harness were recorded in the double burial of a man and woman. In most instances it is not certain whether the Voss burials are inhumations or cremations. This was only noted in 18 instances, but harnesses were recorded in both types. In general it was quite common to bury horses in Late Iron Age burials at Voss. Of the total count, 26% contained riding gear or horse remains. It is difficult to estimate temporal tendencies due to the wide dating and a probable skew in the sample due to many burials only determined to be Late Iron Age, but it is interesting to note how common this seems to have been in the Merovingian Period, where almost half of the burials were associated with horses.

Municipality	# burials	# w/horse or harness	% of total
Voss	94	24	26%

Date	# burials	# w/horse or harness	% of total
Merovingian	13	6	46%
Viking Age	53	9	17%
Late Iron Age	28	9	32%

Table 3-5 – Burials in Voss municipality in Hordaland.

Kvinnherad: In Kvinnherad the form of burials, inhumation or cremation, is generally not noted. The sex of the deceased person is in most instances not noted either. Burials associated with riding are very common in the municipality, with half of the total number of graves recorded to contain horse or harness.

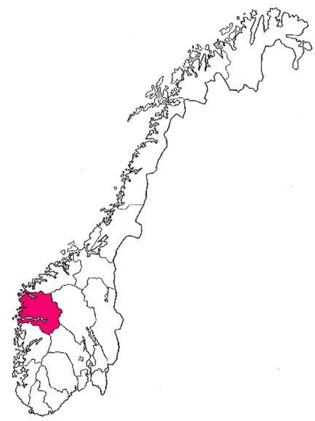
Municipality	# burials	# w/horse or harness	% of total
Kvinnherad	12	6	50%

Date	# burials	# w/horse or harness	% of total
Merovingian	3	2	66%
Viking Age	8	4	50%
Late Iron Age	1	0	0%

Table 3-6 – Burials in Kvinnherad municipality in Hordaland

Sogn og Fjordane:

Two municipalities in Sogn og fjordane are used as a sample, Gloppen and Vik (Dommasnes 2001)



Map 3–5 – Sogn og fjordane.

Gloppen: Over 330 burials dating from the Iron Age, some might possibly be Bronze Age, are known in Gloppen municipality. For the present study only those burials are used that can be narrowly dated to a particular century. This leaves a total of 87 graves dateable from the 8th century and onwards. About a third of the burials under study contained remains of horse or riding gear and this division seems to be constant from the 8th till the 10th century. In only 23 instances is it noted whether a burial is a cremation or inhumation and riding gear is recorded in both types.

Municipality	# burials	# w/horse or harness	% of total
Gloppen	88	27	31%

Date	# burials	# w/horse or harness	% of total
8th c.	22	7	32%
9th c.	34	11	32%
10th c.	31	9	29%

Table 3-7 – Burials in Gloppen municipality in Sogn og fjordane.

Vik: In Vik the total number of burials is 42 and thereof twelve contained horse remains or riding gear. Additionally an older burial, from the Migration Period, contained a bridle-bit along with weaponry and tools. Only in three instances is it specifically noted whether a burial is a cremation and one of those contained a harness. It is never stated whether or not a burial is an inhumation. Some of the burials are dated to a specific century, others only denoted as Merovingian or Viking Age. There is a clear tendency at Vik for horse burials to be a Viking Age phenomenon rather then a Merovingian one, although there is a single older Migration Period horse burial. Similarly, when the distribution is examined by date, they become most common in the 10th century. Dog remains were recorded in two burials, one along with caprine bone from the later part of the 8th century, the other were dog teeth in a 10th century grave along with riding gear.

Municipality	# burials	# w/horse or harness	% of total
Vik	42	12	29%

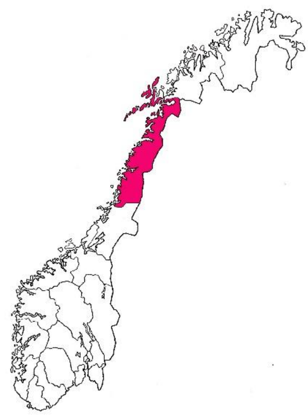
Period	# burials	# w/horse or harness	% of total
Merovingian	4	0	0%
Merovingian/Viking	4	0	0%
Viking	33	10	30%

Date	# burials	# w/horse or harness	% of total
8th c.	4	0	0%
8th – 9th c.	1	0	0%
9th c.	10	1	10%
9th – 10th c.	4	1	25%
10th c.	9	5	56%

Table 3-8 – Burials in Vik municipality in Sogn og fjordane

Nordland:

Nordland covers a large portion of the Norwegian coast and as such the samples derive from four main areas from south to north, Helgeland, Salen, Lofoten and Vesterålen. Each of these is represented in this study by one to three municipalities.



Map 3–6 – Nordland.

Helgeland: A total of 33 Late Iron Age burials have been recorded in Nesna municipality in Helgeland (Sjøvold 1974:25-32). Of those, five are known to have contained horse remains or bridle-bits. Horse skeletons were recorded in two burials and bridle-bits in three burials. One of the burials containing a bridle-bit, a boat burial, had animal bone in both stem and stern. The burials associated with riding are given a Late Iron Age and Viking Age dates. But two of them are said to be 10th century. Eight burials are explicitly stated to have been inhumations, but no cremations are mentioned.

Municipality in Helgeland	# burials	# w/horse or harness	% of total
Nesna	33	5	15%

Table 3-9 – Burials in Nesna municipality in Nordland.

Salten: In Salten, the burials of three municipalities are numerous enough to be used for the present study. These are Steigen, Hamaröy and Lödingen (Sjøvold 1974:63-80, 85-91). The burials date from the 7th till the 10th centuries. In Steigen only two of 27 burials contained bridle-bits. Two other burials are recorded to have contained animal bone, but it is not stated what species or how much bone material. Hamaröy does not have a single horse burial, but dog remains were recorded in one instance. Lödingen has one burial out of 21 with a bridle-bit and also a single burial with a couple of dog teeth.

Municipalities in Salten	# burials	# w/harness	% of total
Steigen	27	2	7%
Hamaröy	18	0	0%
Lödingen	21	1	5%

Table 3-10 – Burials in Steigen, Hamaröy and Lödingen municipalities in Nordland.

Lofoten: In Lofoten a single municipality, Borge, can be used for the present study (Sjøvold 1974:94-98). A total of 13 burials dating from the 7th till the 11th century have been recorded. None of them appears to have contained a horse or riding gear. Although two burials, one from the 7th and the other from the 10th centuries contained dog remains.

Municipality in Lofoten	# burials	# w/horse or harness	% of total
Borge	13	0	0%

Table 3-11 – Burials in Borge municipality in Nordland.

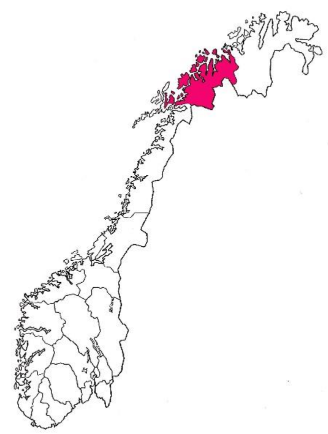
Vesterålen: In Vesterålen, the northern most part of Nordland, two municipalities can be used, Sortland and Hadsel (Sjøvold 1974:105-115, 118-120). The burials date from the 7th till the 11th centuries. In Sortland, two burials of 30 were recorded to contain either a horse or bridle-bit each. The one with the horse also contained a dog. In Hadsel, only one burial of a total of 24 contained an artefact possibly associated with riding. This is a bell, which could derive from a harness, but that is not certain.

Municipalities in Vesterålen	# burials	# w/horse or harness	% of total
Sortland	30	2	7%
Hadsel	24	0 – 1?	0%?

Table 3-12 – Burials in Sortland and Hadsel municipalities in Nordland.

Troms:

The county of Troms is here divided into South Troms with three municipalities used as a sample and North Troms with two municipalities under study.



Map 3–7 – Troms.

South Troms: In South Troms, three municipalities have enough burials to be used for the present study, Trondenes, Bjarkøy and Lenvik (Sjøvold 1974:136-148, 155-163). The burials date from the 7th till the 11th centuries. Between all three municipalities only one grave, in Bjarkøy, contained a bridle-bit. The burial is dated to the Viking Age. One 10th or 11th century burial in Lenvik contained dog remains and a single 7th century burial at Trondenes contained unspecified animal bone.

Municipalities in S Troms	# burials	# w/harness	% of total
Trondenes	18	0	0%
Bjarkøy	19	1	5%
Lenvik	23	0	0%

Table 3-13 – Burials in Trondenes, Bjarkøy and Lenvik municipalities in Troms.

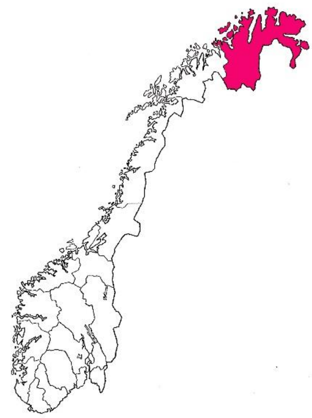
North Troms: In North Troms far fewer burials can be used or fourteen in total. Only the municipalities of Tromsøysund and Karlsøy have recorded burials dating from the 7th till the 10th/11th centuries (Sjøvold 1974:164-169, 170-172). No horse remains or riding gear was recorded.

Municipalities in N Troms	# burials	# w/harness	% of total
Tromsøysund	9	0	0%
Karlsøy	5	0	0%

Table 3-14 – Burials in Tromsøysund and Karlsøy municipalities in Troms.

Finnmark:

Very few Merovingian or Viking burials have been recorded in Finnmark. The entire assemblage compiled by Sjøvold (1974:175-181) is only eight graves, recorded in seven municipalities. Due to this the burials from Finnmark used in the present study are more widely distributed than the burials from the other counties. No horse remains or riding gear has been recorded from burials in Finnmark, but a single grave in Nordkapp contained the remains of a dog.



Map 3–8 – Finnmark.

Municipalities in Finnmark	# burials	# w/horse or harness	% of total
Loppa	1	0	0%
Hammerfest	1	0	0%
Måsøy	1	0	0%
Nordkapp	2	0	0%
Nesseby	1	0	0%
Vadsø	1	0	0%
Vardø	1	0	0%

Table 3 - 15 – All municipalities in Finnmark with recorded Norse burials dating from the Iron Age.

3.1.4 Discussion

This study reveals that horses were significantly more common in Norwegian burials of the late Iron Age than previously thought (cf. Sikora 2004). Further, that there are clear regional differences in the practice of ritually killing and burying horses within the modern boundaries of Norway. Horses were very common in burials in Vestfold and along the southern part of the west coast, but the tradition thins out towards the north and becomes rare or absent in the northernmost counties. In general horses and/or horse equipment is recorded in 19-35% of burials from Vestfold in the southeast and in about 29-63% on the west coast from Rogaland to Sogn og Fjordane. In Nordland the frequencies drop sharply. In the southernmost part of Nordland, the municipality of Nesna, the ratio is 15%, but north of Nesna, from Steigen in Nordland to Bjarkøy in South-Troms, the ratio ranges from 0-7%. Further north still, from

Lenvik municipality in South-Troms and onwards north throughout North-Troms and Finnmark, there are no indications of horse burials.

This variation in distribution, how horse graves become rare and then absent towards north, is likely to reflect social and political realities (e.g. Stylegar 2013). There were no sharp boundaries between the Norse and the Sami in Viking Age Norway (Zachrisson 2008:34) and it is evident in the archaeological record that Viking and Sami cultures did blend to some degree (e.g. Bergstøl 2003; 2008; Price 2002). But the northern limit of the farming settlement at the time was in the historic *Hálogaland* area (home of Othere who in the late 9th century famously sailed from there to the court of Alfred in Wessex). Hálogaland was constricted to the coastline of modern Nordland and Troms as far north as modern Tromsø. It is in Hálogaland where the horse burials thin out and then disappear in the northernmost part. North of this area is today the county of Finnmark, where no horse burials have been recorded. The modern county of Finnmark draws its name from the historic Finnmörk which was much more extensive than its modern namesake county. Finnmörk, in the Viking Age, was a common denominator for all territories outside of the agricultural settlements that were mainly occupied by the Sami. During the Iron Age there were clear differences in Northern Norway between Sami and Norse burial customs (Schanche 2000) and in that light the lack of horse graves (and of the burial of riding gear) in modern Finnmark is not surprising.

The common occurrence of horses and riding equipment in Norse burials of Late Iron Age Norway is a testament to the integral nature of equestrianism and its associated symbolism to the higher strata of these societies. This of course is not bound to Norway alone, but is as well a common theme in neighbouring Germanic, Celtic and Slavic societies of the Iron Age (e.g. Pedersen 2014; Müller-Wille 1972; Bertašius 2009; Bertašius & Daugnora 2001).

A traditional assumption is that horses in Late Iron Age graves in Scandinavia and indeed among the Anglo-Saxons as well are male gendering types of grave goods, even directly relating to warfare (Bond & Worley 2006, Svanberg 2003). In line with this it is generally asserted that prior to the Viking Age in Norway horse graves were almost exclusively associated with male burials (Meling 2000:38; Müller-Wille 1972:146), while in the Viking Age also some female burials with horses or horse equipment enter the archaeological record (Børsheim 2002:188). Determining the ratio of horse burials between females and males is not straightforward. This is due to the fact that osteological analysis of human remains is lacking in almost all instances. The sex is based on artefact context, which in itself can be further confused by the fact that it is not always certain how many individuals were deposited into each burial. That is to say that a burial could very well have contained both the remains of a woman and a man. Due to this the number of burials with contexts secure enough for sexing based on artefacts is diminished. What the survey does reveal is that in Vestfold and Rogaland the occurrence of horses and artefacts associated with riding is very similar between the genders. Sites from the other, more northerly counties did not yield secure enough contexts to be included, although both male and female gendering artefacts were recovered from horse burials in those areas as well. At the sites in Vestfold the ratios are very similar, with a higher ratio of female graves with horses at Kaupang, 28% to 18%, and a higher ratio of male graves at Gulli, 38% to 29%. The only anomaly is Lille-Guldkronen where there is a general lack of identified female graves. At Gausel in Rogaland, the sexed burials are quite few in number, but show an equal ratio of 50% between the sexes. The burial data reveals that symbolism associated with horses and riding was appropriate in equal measure for men and women. Thus, it is clear that the traditional assumption about the male gendering symbolism of horses does not pertain to Norway, at least not on the sites discussed here. In this light it should not be surprising at all that the Viking Age grave with the highest number of horses ever recorded, the Oseberg burial mound, was the double grave of two women (Holck 2006).

Other symbolisms associated with horses in the Late Iron Age have been discussed in the past. The hypothesis which has gained perhaps the most following in recent years pertains to the liminal character of horses, that they were perceived as being capable of traversing borders between worlds (Oma 2001; 2004; Loumand 2006). A symbolic nature of that sort would certainly be applicable to any age and gender, but does not explain why female graves with horses enter the archaeological record in the Viking Age, or why certain graves in general have horses and riding equipment while others do not. That is to say, horse burials are known throughout the Norse settlement of Norway, both as inhumations and cremations and are dispersed among burials without horses. So specific areas cannot be defined within the Norse cultural zone where these sorts of rituals were preferred as opposed to other areas (apart from perhaps Hálogaland, but recorded burials there are fewer than further south). Further, if the custom was purely due to religious reasons it would point towards quite regulated cosmological ideas over the entire Norse world, which is difficult to substantiate. And even if that was so why then would not everyone get a horse ride to the afterlife? Setting aside possible cosmological connotations and religious matters a more fruitful avenue of interpretation, and one which can be substantiated archaeologically, is to look at societal status, fashion and memes.

Horses and equestrian artefacts appeared in burials all over Norway at a similar time (Meling 2000:37), indicating the spreading of a meme among the upper layers of the Norse population (Meling 2000:59). Horse graves and equestrian symbolism became properly incorporated into the Norwegian burial record at the start of the Merovingian Period in the Late Iron Age. Prior to that, in the Early Iron Age, horses and riding gear were rarely deposited into burials but have been more frequently recorded (in Sweden and Denmark, not in Norway) as wetland sacrifices (e.g. Hagberg 1967; Ferdinand & Ferdinand 1962). The Merovingian horse burial fashion has strong connotations with power politics and warrior symbolism (Meling 2000:85-103), which is likely to be a significant factor in it being adopted over a wide area. Horse remains in a burial did not necessarily incorporate identical cosmological ideas on every single site in Norway. It is in fact quite probable that there was a disparity in this regard over the vast Norwegian landscape (Andrén *et al.* 2006:13-14). Rather than the ritual representing a standard myth, the formalised act is likely to have influenced and created meaning in itself (Bell 1992; Humphrey & Laidlaw 1994; also discussion in chapter 6). Writing along these lines, Andrén (2005:123) argues that so called ‘Old Norse religion’ must be regarded as a series of partly overlapping traditions that differ between places, times and groups, but that the shared Scandinavian features (such as horse burials) should be regarded as expressions confined to an aristocracy with wide-ranging connections. As the Late Iron Age wore on, the horse burials evolved. This happened most certainly in tandem with developments in the wider society, namely that women started getting buried with horses in the Viking Age. Further, more horse burials in general are known from the Viking Age than from the preceding Merovingian Period. It is not clear whether the horse burials became relatively more numerous or just quantitatively along with other kinds of burials, but more graves in general are known from the Viking Age than from previous periods. The higher total number of burials and the obvious wider societal application of horse rituals indicate that the original symbolism of horse graves had changed or modified. It seems that in the Viking Age, perhaps alongside the Viking expansion, raiding and trade, more people were becoming affluent or respectable enough for elaborate burial. Society was becoming more complex. The fact that women started getting buried with horses as well signifies important societal developments in the Viking Age. It probably indicates a general shift in horse symbolism, but more significantly a shift in relations between the sexes. This indicates that women were entering more authoritative roles deserving rituals after death that used to be the prerogative of certain high-status males. This may have coincided with a stronger hereditary tradition in which a female line was sometimes needed to continue the linage. The symbolism of equestrian burials seems to have developed towards more general statements of stature in the world, probably landownership and class. In this respect there is discernable a further evolution during the Viking Age itself.

In Vestfold there was a change through the course of the Viking Age where horse rituals became more common as time went on. The 10th century is the time in Vestfold when equestrian symbolism as part of burial practices peaked in popularity. This can best be observed in the Kaupang cemeteries that have by far the highest total number of recorded graves in this study, but the same trend is seen in the far smaller grave fields of Gulli and Lille-Guldkronen. In the municipalities on the west coast the situation is different. The samples there are neither as secure nor as large and are not bound to individual sites but derive from a larger geographical area. A result similar to Vestfold is seen in Vik municipality in Sogn og Fjordane county, where horse burials increase in frequency in the 10th century, while in Gloppen municipality in the same county there is consistency through time with a third of the burials having equestrian symbolism from the 8th through the 10th centuries. In Voss municipality in Hordaland there seems to be a decrease in horse burials from the Merovingian Period to the Viking Age. This on the other hand is uncertain due to the fact that a large portion of the total number of burials is only dated as late Iron Age and the number of burials that are dated to the Viking Age is over four times greater than the number of burials dated to the Merovingian Period. In the other Hordaland municipality, Kvinnherad, the sample is much smaller but more equal between time periods, and the ratio is similar between the Merovingian and the Viking Age where in both instances about half of the total number of graves were horse burials.

3.1.5 Horse burial traditions in the 10th century

The rise in popularity of horse burials in Vestfold and to some degree on the west coast in the 10th century, took place at a time of significant social developments. Power was shifting and centralising and there was an encroaching cultural clash as the presence of Christianity was beginning to be felt (e.g. Skre 1998). This atmosphere of political change and competing identities may have provided fertile ground in Norway for ritual horse killing in burial customs. But these deep-rooted traditions may have been reinforced from another direction as well which focused their socio-political connotations.

Equestrian symbolism, different from the Norwegian horse burials discussed above, was at this time in the 10th century systematically used in certain burials in the Danish kingdom and in its sphere of influence in Southern Scandinavia. Unlike Norway and Sweden however, equestrian burials were not common in Denmark previous to that. While horses and bridles were commonly deposited into burials in Norway and in parts of Sweden they seem not to have been deemed appropriate grave goods in Denmark (Pedersen 2014:250; 2011:54). The Danish type of equestrian burials (Dan./Norw. *ryttergraver*, Swe. *ryttargravar*) is mainly found in western Denmark and has also been recorded to a lesser extent in western Sweden and south-eastern Norway. These burials are characterized by the presence of certain types of spurs and/or stirrups and usually contain weapons as well (Pedersen 2014:55). Unlike traditional Norwegian (and Icelandic) horse burials, the Danish type of equestrian burial does not necessarily contain horse remains (Pedersen 2011:52). Although many of the Danish graves were excavated in the 19th century (Pedersen 2011:48) and the lack of horse remains might in some instances be due to poor recording, there are others excavated more recently that have been shown to contain equestrian equipment only and not horse remains. In those instances the equestrian gear was often part of the personal attire of the human, such as spurs, but not gear directly related to a horse (Pedersen 2014:101-102, 199). Pedersen (2011:52) has hypothesised that it may have been a conscious choice, perhaps religious, which excluded horses and equipment related to the animal from these equestrian burials. In general the Danish type of equestrian burials are highly standardised, often chamber burials, and occur close to royal or defensive sites or on major farms, for example the so-called *huseby* farms in Norway and Sweden (Pedersen 2011; Braathen 1989). Originally these Danish equestrian graves were interpreted as simply being part of a pan-Scandinavian pagan burial tradition (Neergaard 1892). But that has been contested in later writings where it has been argued that these burials represent changes in social structure (Randsborg 1980; Pedersen 2014:223, 258; 2011, 1997a & 1997b). The equestrian graves have in recent years been seen as representing males (mounted warriors) with military obligations towards the king or emerging state (Pedersen 2014:240, 258; 2011:59-61; 1997a:171). The Danish 10th century burials can thus be been as manifestations of royal power and could possibly represent an attempt to emulate western European court life (Pedersen 2014:255; Dobat 2009:74-75). If that is so, then the origins of the 10th century equestrian burials in Denmark is different (as noted by Pedersen

1997a:181-182) than the horse burials on, for example, the west coast of Norway that are rooted locally in earlier pre-Christian beliefs and rituals dating to the Merovingian Period.

Whether or not the Danish equestrian burial custom that took root in the 10th century emulated Carolingian and Ottonian cavalry symbolism (Pedersen 1997b:132-133) is left open for speculation. What is interesting however, is that this new burial practice came to light at the same period as a renewal in local horse burial practices took place further north in Scandinavia. This is apparent in Vestfold, where the best sample in the present study is located. The *Viken* area is traditionally seen as having been within the sphere of influence of the emerging Danish kingdom (Roesdahl 1998:73-76) and as such it is not surprising that Danish style *ryttergraver* appeared on certain sites in south-east Norway in the 10th century. The link between eastern Norway and Denmark was discussed by Braathen (1989), who noted that 49 equestrian graves of the Danish type have been found there. These graves in Norway were unusually rich weapon burials with spurs, etc., recorded at high status farm sites with probable administrative functions. It is difficult to ignore, that horse burials became more fashionable than ever before in the 10th century, at a similar time as when the new Danish style *rittergraver* emerged on the scene in south-east Norway with the accompanying horseman symbolism and connotations with authority and control over land. The rise in traditional horse burial in Scandinavia may be connected to this resurgence in equestrian symbolism.

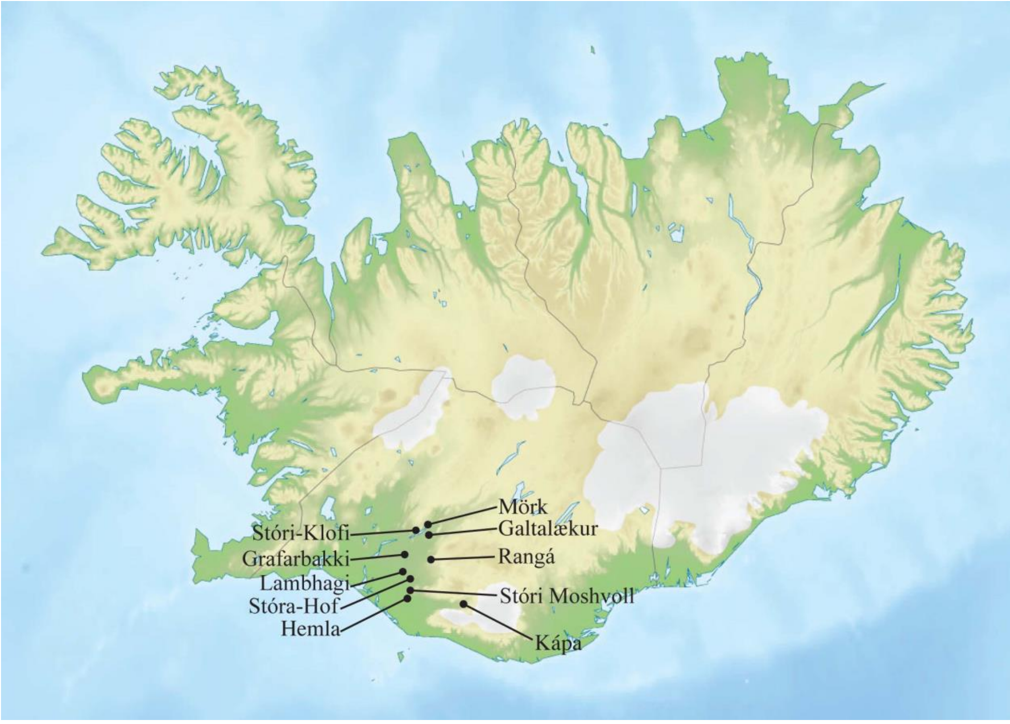
There was a long tradition of horse burials in the entire Norse region of Norway. The 10th century equestrian burials of the Danish kingdom have been argued to have been of a highly political nature (Braathen 1989; Pedersen 2014:258; 2011; 1997a; 1997b; Dobat 2009) and, given that the tradition extended to south-eastern Norway, are likely to be linked with the rise in traditional horse burials in general. This is not necessarily a case of direct influence from the core in Denmark on the peripheral Norwegian communities, or vice versa. The relationship between areas is likely to be more subtle and nuanced viz-à-viz each other, especially since horse symbolism in burial ceremonies had deep roots in Norway. On the other hand, the influence of the Danish *ryttergraver* may have magnified the socio-political statement of traditional horse rituals in Norway, sharpening the connotations with prestige and social authority. Traditional rituals could have been recycled to some degree with, if not new then at least more focused, symbolic connotations. People of certain pedigree or who had links, either through family or otherwise, to those in power or those laying claim to it, were fashionably buried according to old equestrian rituals and thus enhancing the respect of the social group as a whole. This trend could of course also be the case in western Norway, even at Voss in Hordaland where the sample is too limited to say anything other than horse burials were common through out the late Iron Age.

It is in the Atlantic colonies where the best examples are found of how fashionable the horse burial meme was in 10th century Norse communities. For example in the British Isles, horse graves enter the Viking Age archaeological record of the 10th century and are relatively frequent (Harrison 2008:158-160). The clearest instance of this is the Viking Age burial record of Iceland which is the topic of the next two chapters. The societal implications of recycling these Iron Age traditions in Iceland are discussed in chapter 6.

4 Viking Age animal burials in Iceland

In this chapter are discussed all Viking Age burials in Iceland in which animal remains have been recorded. The model for this is Kristján Eldjárn’s doctoral thesis *Kuml og haugfé* where all Viking Age burials recorded at the time were discussed. The difference here is that the focus is on the zooarchaeological record. The animal bone data is also contextualised to the furthest possible extent with other archaeological evidence. In almost all instances this adds new information to each site and in some cases sites are significantly reinterpreted. Every single animal bone from almost all Viking Age burials recorded up to the year 2012 was analysed for the present work and the raw data is listed in appendix 1. Only in five instances was the animal bone analysed by others, in which instances the sources are quoted in the text, or the bone was unobtainable for study. The burials discussed here were excavated at different times and by different means. Also, most of them had prior to investigation been disrupted to a varying degree by erosion or by human hand. This means that the bones recovered were often scattered remains. Due to this, and the general lack of osteolocial analysis, previous information about the animal part of the burials was in most cases quite limited or even erroneous. The zooarchaeological analysis aimed to reveal the species present, the number of individuals, age at death, size, cause of death, pathology and trauma and whether complete animals or butchered parts were buried. The methodology of the zooarchaeological analysis is discussed in more detail in chapters 5.1 (horses) and 5.2 (dogs). Decsriptions are kept concise and the discussion about each site is standardised as far as possible, starting with a brief description of the site, its discovery and recording. This is followed by a description of the animal bone portion based on the zooarchaeological analysis and lastly an interpretative discussion. Due to various factors, such as difference in bone preservation and recovery, as well as differences in previous research and past interpretations, the discussions can vary in detail, length and topics touched upon. The grave fields discussed in this chapter are ordered by *sýsla* (Eng. county). The discussion starts in the south of Iceland, in Rangárvallasýsla, and continues clockwise around the island. This order follows that of *Kuml og haugfé*. Within each *sýsla* the grave fields are listed in alphabetical order, the name of each is usually based on the respective farm where it is situated and in every instance the same name is used here as in Kuml og haugfé. In order to avoid confusion and due to the fact that two farms in the same sýsla may share the same name, the respective *hreppur* (district) where each farm is located is also noted.

4.1 Rangárvallasýsla



Map 4–1 – Sites in Rangárvallasýsla discussed in the text.

4.1.1 Galtalækur, Landmannahreppur

A Viking burial eroded out of the riverbank of Rangá ytri in 1929 on the farm of Galtalækur. Matthías Þórðarson (1932:50-52) conducted a subsequent investigation. Unfortunately the burial had been dug into by a neighbouring farmer prior to the arrival of the state antiquarian and all artefacts had been removed so the layout could not be recorded. The burial was of an old man and a horse (Kristján Eldjárn 2016:62). Most of the bone had been disturbed and it is not clear from the original report if the human and animal shared the same grave cut or not (Matthías Þórðarson 1932). A number of artefacts were associated with the burial, including a spear, shield boss, axe, two whetstones, two strike-a-lights, a knife, four scale weights, a vice or clamp of bone, three iron fish hooks, an iron hook and various iron fragments and charcoal. An iron bit and nails from a saddle were associated with the horse.

The horse bone collection consists of 43 specimens, distributed over all body parts of a single individual. The animal was an old male. All bone elements are fully fused. Both mandibular and maxillary incisors are heavily worn and the occlusal surfaces are triangular in shape. The horse was at least 20 years old at the time of death (Silver 1969; Habermehl 1975).

The male sex is evident from the morphology of the pelvis which meets all the criteria by Getty (1975) and by the presence of canines in both mandible and maxilla. This elderly animal suffered from some age- and stress-related pathology. Two lumbar vertebrae are fused together and the formation of new bone is evident around the articular surface of a thoracic vertebra. This is due to prolonged mechanical stress to the animal’s back, i.e. it had been ridden and/or worked hard up to its death. Based on the measurement of femora, humeri, metapodials and radii, the horse stood at 1.36 m at the withers in life (May 1985), similar to other contemporary horses in Iceland. The way the animal was killed can be inferred from the bone analysis. The cranium is quite complete and well preserved apart from the parietale and occipitale which are broken. This breakage must have taken place before the horse was interred because the fracture edge is brown in colour, the same as the rest of the bone, which signifies that the cranium has lain broken in the ground over an extended period of time. A part of the edge of the fracture is light in colour and must thus have been chipped off during excavation. Due to the over-all good preservation of the skull it seems most likely that the more recent fracture lines occurred because the parietale and occipitale were already broken by the time the horse was dug from the ground. This shows that the horse was poleaxed (the skull severely broken by a blow to the forehead), which was a common method of killing. Further, there is a cut mark on the axis, indicating that the animal was bled after being stunned. This gives a partial glimpse into the burial ceremony. It seems that the horse was brought to the grave in full reins. There it was hit on the head with a heavy, blunt instrument, bringing the animal down. Perhaps it fell straight into its part of the grave. When down, somebody came up behind the animal and cut its neck, just beneath the junction with the head. The cut was deep enough to leave a mark on the axis and if the animal’s heart was still beating it would have caused a gush of blood.

4.1.2 Grafarbakki, Rangárvallahreppur

It was reported in 1818 that a few years previously two burials had come to light because of erosion, each containing the remains of a human and a horse. One of the graves also contained iron remains thought to have been from a weapon (Kristján Eldjárn 2016: 59-60). The horse bone was not preserved for posterity.

4.1.3 Hemla, Vestur-Landeyjahreppur

In the winter of 1930 a low hillock started to erode just outside the homefield of the farm Hemla. Gradually over the course of the next few years three burials were exposed in the erosion face. The first burial discovered was that of an adolescent, aged thirteen to seventeen years at the time of death (Hildur Gestsdóttir 1998:12). The skeletal remains cannot be sexed accurately, but the associated artefact collection is male gendering. The grave goods include a spear, an axe, a shield, a large knife, a whetstone, a led wheight, a bead, a comb, four pieces of jasper and a fragement of wood. About a meter north of the adolecent's feet was the skeleton of a horse, clearly in association and facing SW-NE. The horse was buried harnessed; a bridle-bit and a buckle were found with it. About two to three m southeast of the adolescent was another horse grave, the animal facing N-S. It had also been harnessed; nails from a saddle and fragments of buckles were found buried with the second horse. The remains of both animals were very weathered and lying under the bare sky upon discovery. Matthías Þórðarson speculated that both horses had accompanied the adolescent in his burial (Matthías Þórðarson 1932:55-57). But the positioning of the horses relative to the adolescent and the way they faced in different directions, makes it very likely that the horse further away, southeast of the human's head, belongs to a different burial process. A few years later, in 1937, another human burial was discovered south of the others. A badly decomposed skeleton in a narrow casket had been buried facing E-W, with seemingly no associated artefacts (Matthías Þórðarson 1932:55-57; Kristján Eldjárn 2016:49-50).

The animal bone collection from the burial ground at Hemla is comprised of 185 specimens. The great majority is associated with the two horse burials, but seven specimens arrived at the National Museum with the bone from the second human burial in 1937. The bones from the two horse burials are stored in two boxes under the number 11338, each box is then sub-labelled 'a' and 'b'. The two horses clearly died at a different age, one was practically fully grown but the other far from it. Both individuals are mixed between the two boxes, but there is a lot more of the older horse in box 'a' and a lot more of the young animal in box 'b'. It is not stated in the Museum's catalogue which horse belonged in which grave. The animal associated with the adolescent human was excavated first, and as such it would make sence that it would be called 'a'. This on the other hand cannot be verified and the fact that there is a mix between the two containers is not easily explained, exept if we assume that the bones of the two individuals were randomly deposited in the two boxes for the best fit. Thus, it is more likely that the older animal was buried with the adolescent but it is clearly not certain.

The horse bone assemblage is white and weathered. Both individuals are represented by elements covering most body parts and were undoubtedly buried whole and unbutchered. The two animals appear to have been male, based on the morphology of both pelves (Getty

1975). The male characteristics are nonetheless more pronounced in the older individual. Cause of death is unknown; the older animal's cranium is missing and the younger one's is too fragmented to determine if it was poleaxed. The older animal has almost all elements fully fused, apart from some of the thoracic vertebrae where the fusion line is still visible posteriorly. The eroded fragments of both left and right mandibles have adult dentition (p2, p3, p4, m1, m2, m3 present) and real roots have started to develop on some of the molars. The animal was about five (up to six) years old at the time of death (Silver 1969, Sisson 1914). The withers height of the older horse was 1.32 – 1.34 m, based on the measurements of femur, tibia and radius (May 1985). Other elements are too eroded for measurement. The younger horse was between one and a half and two years of age at the time of death (Strand *et al.* 2007, Silver 1969, Habermehl 1975). Sacrum and all vertebrae are unfused and so is the surviving femur. The humeri are fused distally but not proximally, the tibiae are fusing distally but are unfused proximally and the left radius is unfused distally. This harmonises with the tooth eruption and wear. The deciduous molars dp2, dp3 and dp4 are still in both mandible and maxilla. The permanent molars m1 and m2 have erupted, but seem unworn, and m3 has not erupted. Loose insicors in the assemblage almost certainly belong to the younger animal and are unworn. It is curious that riding gear should be found with such a young animal, which was almost certainly not fit to carry a person.

In box 'b' there are six to seven specimens of sheep and cattle. The artiodactyle bone exhibits different preservation from the horse elements. They are not weathered and seem to contain more organic material, i.e. the bones look almost greasy. Most likely the artiodactyle bone is a 'contamination' from outside the burial assemblage, which is not surprising given how eroded the burial ground is.

A few animal bones arrived at the National Museum in 1937 with the contents of the latter human burial. All of the seven specimens are very weathered, but four are identifiable as horse. One of them is an incisor from a relatively young individual. The occlusal surface is oval and the infundibulum wide open, indicating an age at death of perhaps five years or less. Since contextual information is missing it cannot be determined if the horse, or part of a horse, belonged with the person in the casket or to a nearby burial.

4.1.4 Kápa á Almenningum, Vestur-Eyjafjallahreppur

At a site called Kápa on the badly eroded highland pasture of Almenningar are (or used to be) the ruins of a farm and a badly eroded burial ground. The farm is thought to have been Steinfinnsstaðir, which is mentioned in the Book of Settlements. The site was investigated on a few occasions during the late 19th and early 20th centuries. The reporting of the burials is confusing, but it seems clear that the remains of at least three to four burials, and probably more, have been discovered and two of those are known to have contained horse remains (Kristján Eldjárn 2016:46-48).

The first burial, discovered in 1860, was represented by the lower part of a human skeleton with no artefacts or animal bone reported. The second one, discovered roughly 20 year later, was comprised of human and horse remains. Around 1900 a shepherd found two human crania on the site. Then in 1925, Matthías Þórðarson excavated a stone covered burial of a human and nearby a complete skeleton of a horse which he thought was associated. The human grave was oriented N-S and the horse had been deposited on the left hand side, its head facing towards the person. A few artefacts were found by the human, three silver buttons, gold thread and charcoal. By the horse were two buckles and iron fragments from a saddle and a spearhead as well. The horse is reported to have been old at the time of death. Ten years later more artefacts were found; a gold button, a copper-alloy buckle and a lead weight. More stone cairns, probably disturbed burials, are reported from the site (Matthías Þórðarson 1926:49-51; Kristján Eldjárn 2016:46-48). The original interpretation, of the horse being part of the same burial as the human in the stone-covered grave, is highly unlikely. The distance between the human and the horse was not recorded, but it seems clear from the description that the stone cairn covering the human grave did not include the horse. Also, the layout of the horse grave to the left hand side of the human burial and with the animal’s head facing towards the human is unusual and raises serious questions whether the two were part of the same burial process. Matthías Þórðarson assumed that the shaft of the spearhead found with the horse had extended from the human grave over to the animal grave (Matthías Þórðarson 1926:50), but that arrangement does not conform to any recorded weapons layout in Icelandic Viking graves. Spears usually turn ‘downwards’ relative to the human body, but in this instance the spear would have had to extend to the left from the human body and from under the stone cover. It is more likely that the horse was buried with another, undiscovered, human or possibly by itself.

Matthías Þórðarsson did not retrieve the entire horse skeleton, but took a sample of eight specimens in order for stature and age to be inferred (*Aðfangabók Þjóminjasafnsins* 30.8.1925, item 9093). The assemblage consists of a left metacarpal, six incisors and a canine tooth. A measurement of the metacarpal, although it is eroded, indicates that the animal stood at about 1.34 m at the shoulder in life (May 1985). The accessory metacarpals, the second and fourth, are fused with the central one. The horse was most likely male given the presence of a canine. The occlusal surface of the insicors is triangular in shape. The mark is almost worn away on the central incisors, but it is well pronounced, filled with cement, in the middle and corner incisors. The animal was a bit younger at the time of death than estimated by Matthías Þórðarson, or most likely fourteen to fifteen years old (Habermehl 1975). The animal was buried bridled and saddled.

Other animal remains from Kápa stored at the National Museum are a few cranial fragments (Museum number 9088). They arrived at the same time as the horse remains, but most likely do not originate from a burial context. On the box containing the cranial fragments is written that they originate from a byre (Icel. *úr flór*) which indicates origins in the farm ruins.

4.1.5 Lambhagi, Rangárvallahreppur

In 1922 the National Museum received a spearhead and a human molar derived from a Viking Age burial found at the farm Lambhagi. In 1968 it was further reported that the remains of a horse and dog had been discovered at the same site (Kristján Eldjárn 2016:59). The animal remains were not kept.

4.1.6 Mörk, Landmannahreppur

The eroded burial of a human and horse was discovered in 1936, a kilometer south of the abandoned farm of Mörk. The human remains were badly preserved, but remains of a cranium and teeth showed that the individual had been buried with his/her head facing west and feet towards the east. The person was buried with an iron object, a possible weaving tool. The horse grave was one meter east of the human grave. The horse skeleton was more complete and better preserved than the human one. The horse's head faced north and the animal was buried with a bridle bit (Kristján Eldjárn 2016:60-61). The layout of the horse relative to the human is odd. The animal's head faced north (Kristján Eldjárn 2016:60-61), but it is not stated if its back or belly had turned towards the human remains. This positioning of the horse relative to the human remains and the fact that the animal grave was 1 m away from the human grave (which is unusual distance, pages 292-293), makes it likely that it was part of another burial process, perhaps obscured by erosion.

Only four specimens of horse bone were collected for storage at the National Museum. The two molars in the assemblage are a part of adult dentition but have not developed real roots. This indicates that the animal was a young adult at the time of death. The other two bones are a phalanx and a metacarpal. The metacarpal has the accessory second m/c fused with it. This fusion of leg bones could be the result of stress caused by riding.

4.1.7 Rangá (eystri), Rangárvallahreppur

The Rangá burial ground is severely eroded. The first report came in 1818 where it was described how five human skeletons had come to light around the year 1800. On several occasions throughout the 19th century artefacts and bone were reported found in the burial ground and some found their way to the National Museum. Finds included spearheads, iron bridle-bits and hobbles. In 1883 horse bone found at the site was described and horse teeth were noted during a survey of the site in the middle of the 20th century (Kristján Eldjárn 2016:52-56). No horse bone from Rangá was found at the National Museum during the present work.

4.1.8 Stóra-Hof, Rangárvallahreppur

In the 19th century a tale was recorded of men digging into a burial mound close to Stóra-Hof and finding both human and horse bone. In 1885 the National Museum received a bronze weight from a Viking burial discovered close to Stóra-Hof, but it is not known if it is the same site as the earlier find (Kristján Eldjárn 2016:59). The horse bone was not preserved.

4.1.9 Stóri-Klofi, Landmannahreppur

In 1933 two burials eroded out of the ground at the abandoned farm of Stóri-Klofi. The National Antiquarian, Matthías Þórðarson, recorded the burials that same summer (Kristján Eldjárn 2016: 59-60).

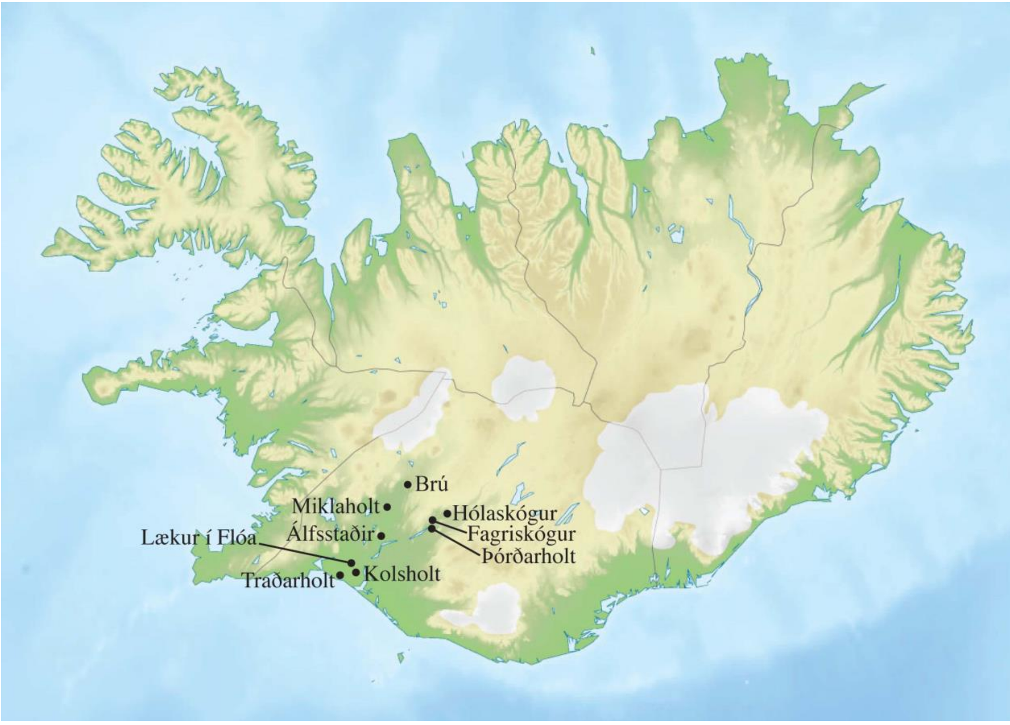
The first burial was made up of a rectangular grave cut 1.5 x 0.5 m facing E-W in which a middle aged person, probably a woman, had been deposited with her head in the western end. She was buried with a knife, whetstone, iron strike-a-light and a piece of jasper. A few meters northeast of the rectangular grave cut was a scatter of many horse bones. Kristján Eldjárn thought that the horse grave had been part of this burial, even though Matthías Þórðarson (1936:29) found the distance between the two graves too great. The horse bone was not preserved.

The second burial was badly eroded. It could nonetheless be deduced that the grave cut was shorter than in the other burial and faced E-W. It contained the remains of a single male laid out on his side, with his feet bent and his head in the eastern end. Spear, knife, whetstone, lead weight, a single nail and unrecognisable corroded iron fragments. No animal remains were noted.

4.1.10 Stóri-Moshvoll, Hvolhreppur

In 1912 the remains of a horse were discovered in a small mound at the farm of Stóri-Moshvoll. A year later when digging a foundation for a new barn on the same spot, the skeleton of a human came also to light accompanied by an axe and a knife (Matthías Þórðarson 1916:86-87; Kristján Eldjárn 2016:51). The horse remains were not preserved.

4.2 Árnessýsla



Map 4–2 – Sites in Árnessýsla discussed in the text.

4.2.1 Álfsstaðir, Skeiðahreppur

Three Viking Age burials have been discovered at the farm Álfsstaðir. The first one in 1894, no research was done but three beads were sent to the National Museum. The other two graves were discovered in the wake of a bulldozer at separate occasions in 1945 and 1947. The latter was that of a young woman and no grave goods were discovered. The burial discovered in 1945 was thought by Kristján Eldjárn to be of a young male, buried with a few grave goods including weapons and a horse. Two iron buckles from a saddle were also recorded (Kristján Eldjárn 2016:79-81). The male grave was sexed by proxy of the grave goods. Analysis of the 1945 horse bone reveals that at least two horses are present in the collection. An extra left scapula and humerus, both quite weathered, are stored with other 81 horse elements that probably belong to the same animal. It cannot be determined if the extra elements represent a horse from the same burial or if they were introduced from a neighbouring one. The more complete animal is represented by elements distributed evenly over all body parts. All elements, including vertebrae, are fully fused. Wear on incisors indicates that the animal was most likely around twelve years of age and the presence of canines suggests that the horse was male. The sexing is further supported by analysis of the animal's pelvis (Getty 1975). The cause of death could not be inferred nor could poleaxing wounds be determined due to the amount of cranial bone broken away from the maxillae and missing. A common pathology was recorded on a tarsal; the horse suffered from bone spavin.

4.2.2 Brú, Biskupstungnahreppur

In 1876 a ten year old girl stumbled upon two spears and an axe on top of a hillock located on the farm of Brú. The artefacts came from an eroding bank of earth and when the farmer at Brú had a closer look he unearthed more artefacts, scant human bone as well as horse and dog remains. The artefacts were sent to the National Museum in 1877 and in 1880 the antiquarian Sigurður Vigfússon met the farmer and got a description of the burial (Sigurður Vigfússon 1881a:52-56). Apart from the spears and axe the artefacts included a shield boss found on the human's head, 26 beads, a copper-alloy bell, a quernstone, two rivets with textile fragments attached, fragments of an oval brooch, five iron fragments (possibly the remains of a cauldron) and small piece of lead. As noted by both Sigurður Vigfússon (1881a:55-56) and Kristján Eldjárn (2016:86) it is likely that the array of artefacts either indicate two burials, that of a woman and a man, or that they shared the same burial. No description of the animal bones exists and the assemblage seems not to have been sent to the National Museum.

4.2.3 Hólaskógur, Gnúpverjahreppur

A Viking Age burial ground was discovered at Hólaskógur in Þjórsárdalur in the summer of 1978. Today the area is mostly barren fields of lava and pumice, but as the name suggests must have been forested in the past. Two to three badly eroded graves were recorded.

The first one was that of a woman in her 40s or 50s (Hildur Gestsdóttir 1998:12), found along with fifteen beads and rusty fragments of wood. The grave appeared to have faced NE-SW. A few meters to the northwest were the scant skeletal remains of a horse along with a few stones that seemed to have been moved to the site. The horse grave was interpreted to have belonged with the burial of the woman (Þór Magnússon 1979:91-96). The distance between the grave of the woman and the horse is not known, but the animal's positioning relative to the directional facing of the human grave is curious. It might suggest that the horse is part of another burial process, that some of the bone has shifted due to erosion (which is unlikely given the presence of the stones), or that the human and horse graves simply were not in alignment (which would be unique). The horse remains consist of eight specimens; a pelvic fragment and a few teeth.

The entire assemblage is white in colour and very weathered. The pelvic fragment was grown with moss. This suggests that it had eroded out of the ground quite some time before being discovered, which might be a factor of why so few elements were found. The teeth suggest that the animal was adult. The dentition is permanent, both incisors and mandibular molars. The incisors are too eroded for analysis, but real roots have clearly developed on the molars indicating an age of six to seven years (Levine 1982). The pelvis is too eroded for sexing. More horse teeth were discovered on the site during reconnaisance in 2000 (Kristján Eldjárn 2016:84).

The second burial was 60 m south of the first one. It was recognised by the grave cut and stone slabs different to the surrounding volcanic rock. At the bottom of the cut was a spear-head, a piece of which had been discovered on the surface adjacent to the cut along with a single sheep bone, which was not collected. No other human or animal bone was found at the site. The researchers speculated that the human remains had either eroded away or been removed (Þór Magnússon 1979:94). The context of the sheep bone is unsecure which is a likely reason why it was not included in the second edition of *Kuml og haugfé* (Kristján Eldjárn 2000:83-85).

4.2.4 Kolsholt, Villingaholtshreppur

In 1958 a Viking Age burial was decimated by a bulldozer at the farm of Kolsholt in Árnessýsla. It had been the final resting place of a single person and a horse. The only artefacts found were three iron fragments. The bones were collected in the trail of the machine, but no *in situ* burial material was found. Jón Steffensen analysed the human remains as young female, while according to Hildur Gestsdóttir the bone belongs to a person between 36 – 45 years of age of unknown sex (Kristján Eldjárn 1966:9; Hildur Gestsdóttir 1998:13).

The animal bone collection is comprised of 76 specimens. Of those, 59 are most likely horse. The horse remains are well preserved and have good texture. The main damage is recent fracturing due to the circumstances of discovery. The animal was probably between four and five years of age and not fully adult at the time of death. All vertebrae are fusing proximally and are either unfused or fusing distally. This correlates well with the insicors; the occlusal surfaces are lightly worn and oval in shape with the infundibulum wide open. Given the young age of the animal it is interesting that new bone growth, osteophytes, is present on the ventral side of the proximal articular surface on a thoracic vertebra, as well as on the medial side of the coracoid process of the scapula. This could be evidence for riding and/or other physical toil. The socket for the mandibular canines is visible, althought the teeth themselves are missing, which indicates that the animal was most likely male. Cause of death is unknown. The only part of the cranium is a piece of occipitale, recently broken. The horse stood at about 1.39 m at the shoulder in life based on the measurement of the left metatarsal (May 1985).

A total of seventeen cattle, caprine and unknown mammal fragments are present in the Kolsholt assemblage. The other mammal bone is stored in a separate box, with a single shard of glass, and clearly shows different preservation from the horse remains, being much more weathered and fractured. Although nothing is noted about the presence of the other mammal bones in the National Museum’s records, it is almost certain that they were picked up in the wake of the bulldozer with no direct association with the burial material.

4.2.5 Lækur í Flóa, Hraungerðishreppur

A burial was discovered at the farm of Lækur in 1968 when a bulldozer was breaking land for cultivation. The following year Þór Magnússon investigated the site (Kristján Eldjárn 2016:77-79). The burial was quite damaged upon investigation, but seemed to have consisted of two grave cuts, one for a human and another for a horse. The human part of the grave was decimated by the levelling and neither sex nor age of the individual can be determined (Hildur Gestsdóttir 1998:13). The horse grave was not as badly damaged. It was obvious to the researchers that it had been dug into and disturbed at some point in the past, as the horse bone was not articulated but mixed. The horse had been harnessed; a bridle bit and a buckle were found in the grave. The horse bone assemblage consists of 57 specimens, many of those are fragments. The assemblage is well preserved but quite extensively fractured. The fracture lines are much lighter in colour than the rest of the bone so the breakage probably occurred during excavation, since the bulldozer did not touch the horse grave (Kristján Eldjárn 2016:79). The assemblage is comprised of front- and hindleg elements and vertebrae. No head or innominate elements are present and there are quite a few elements missing from the legs and vertebral column. This imbalance in body parts is probably due to the ‘grave robbery’ event that took place at some point prior to the discovery of the burial in the 20th century. The horse was most likely buried whole and unbutchered. The animal was fully adult at the time of death, as all vertebrae are fully fused. But a more exact age limit cannot be ascertained. The sex of the animal is unknown, since both head and pelvis are missing.

4.2.6 Miklaholt, Biskupstungnahreppur

In 1840 the farmer at Miklaholt found a few artefacts in a burial mound on his land. The artefacts were sent to the National Museum in Copenhagen the following year. It was noted that four or five other smaller mounds were close by. The artefacts include two oval brooches, a Jelling style round brooch, a Borre style trefoil brooch, eleven beads, a bridle-bit and iron fragments. It is noted that the bridle-bit was discovered in a horse's mouth (Kristján Eldjárn 2016:86-87). This is likely to have been the burial mound of a woman buried with a horse. The horse remains were not preserved for posterity.

4.2.7 Traðarholt, Stokkseyrarhreppur

Four burial mounds are known to have been located by Haugavað, a ford on the boundary of the farm Traðarholt (figure 4.1). The mounds are first mentioned in the late 13th century Book of Settlements and again in Flóamanna Saga. Both of these early written sources relate the names of the men supposedly buried there and some background history (ÍF I 1968:376; ÍF XIII 1991:247). The mounds were mentioned in the 1817 archaeological survey and excavated a few decades later by Sigurður Vigfússon in 1880. They were then very visible in the landscape and represented some of the most imposing known Viking Age mounds in Iceland. At that time they were about 1 m tall and the largest one about 6.25 m in diameter. When Brynjúlfur Jónsson visited the site in 1897 the mounds were diminished as a result of the excavations seventeen years previously and Kristján Eldjárn noted in 1952 that all but the largest one had disappeared completely (Kristján Eldjárn 2016:71-74).

The first mound contained the remains of a man, along with 13 beads, substantial amounts of degraded wood and oxidised copper and iron remains. Sigurður Vigfússon thought that an iron streak he observed in the soil was the remains of a sword. He further observed that a large stone had been placed on the man's chest. No animal bone was recorded (Sigurður Vigfússon 1882:49-50).

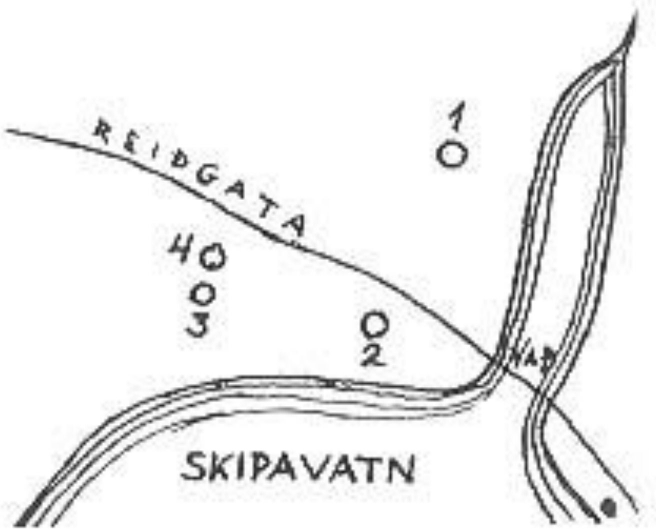


Figure 4–1 – The burial ground by Haugavað on the boundary of Traðarholt (Kristján Eldjárn 2016:71).

The second mound contained the remains of a man and a horse. An iron bridle-bit was found by the horse. No other artefacts were discovered, but the soil was noted to be black and greenish in places. The horse had been deposited into the grave by the human's feet and lay on its right side. The horse was not curled up but had its legs stretched towards the human's feet (Sigurður Vigfússon 1882:50). Of the horse, a total of 24 bone specimens survive in the National Museum, represented by head, vertebral and hindquarter elements. The horse was not quite adult at the time of death. The femur and tibia are fully fused, which makes the animal older than about three and a half years (Sisson 1914:114-117; Silver 1969), but the lumbar vertebra is fusing proximally and is unfused distally. This indicates that the animal died between four and five years of age (Silver 1969). This corresponds well with the wear of the insicors. They are all a little worn, the occlusal surface is 'flat' and oval in shape and the infundibulum wide open. Both right and left pelvic bones are broken and somewhat eroded. Nonetheless some male defining morphology can be noted on the left pelvis; the obturator foramen is oval in shape and the ischiatic arch is angled (Getty 1975). Based on the measurement of the left tibia and metatarsal, the horse stood at 1.32 m at the shoulder in life (May 1985).

The third mound contained the remains of a man, horse and dog. The horse had been deposited into the burial by the human’s feet, but unlike the horse in the second burial this one was hunched in a semi-circle with its head by the curled-up legs. The position of the dog within the burial is unknown. The horse was buried with a bridle-bit and a few other artefacts of iron, copper-alloy and wood were also discovered, including a shield boss on the man’s cranium (Sigurður Vigfússon 1882:51). The animal bone assemblage stored at the National Museum consists of 35 horse specimens and three dog specimens. The horse was adult at the time of death as all of its surviving elements, including a lumbar vertebra, are fully fused. Judging by the tooth wear, the horse was still quite young. The infundibulum of the insicors is filling in, indicating that the animal might have been nearing six years of age at the time of death (Silver 1969; Habermehl 1975). The horse’s withers height was about 1.39 m in life based on the measurement of the tibiae, right metatarsal, left radius and left metacarpal. The scant dog remains are broken and eroded long bones, which originate in both front- and hindlegs, which gives grounds to assume that a complete carcass was interred.

The fourth mound contained the remains of a human and a horse. The bone in this burial was more degraded than in the other ones and no artefacts were retreived (Sigurður Vigfússon 1882:51-52). The animal bone collection consists of nine specimens, all fragmentary and degraded, but three of which can be confidently identified as horse.

4.2.8 Fagriskógur, Þjórsárdalur

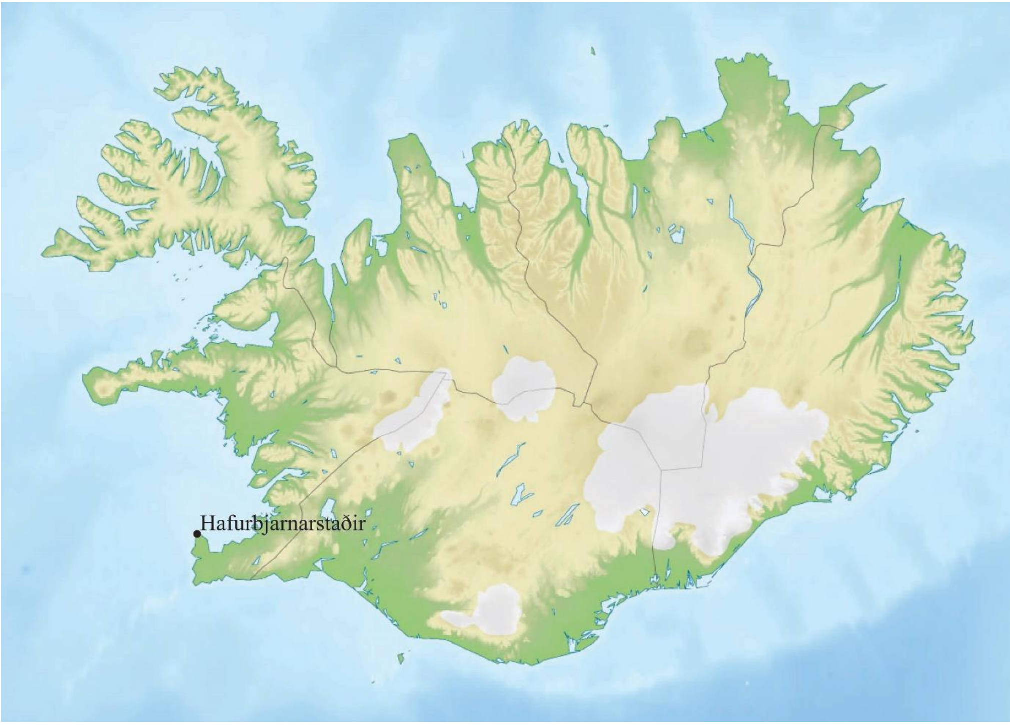
During archaeological surveying in Þjórsárdalur in the summer of 1951, the remains of a possible Viking Age burial were discovered at the site of Fagriskógur. A spearhead and some horse teeth are reported to have been found above ground, likely deriving from an eroded grave (Gísli Gestsson & Jóhann Briem 1954:9-10). The animal bone assemblage collected at the site and now stored at the National Museum is made up of two caprine molars, weathered and white in colour, and a single horse incisor, completely unworn. The origins of the spearhead and single horse tooth could very well be from a burial, but the caprine molars are more likely to originate from a midden. In the report of the find no mention is made of the caprine molars and the context these finds is insecure (Gísli Gestsson & Jóhann Briem 1954:9-10).

4.2.9 Þórðarholt, Þjórsárdalur

In 1885 Brynjúlfur Jónsson (1885:42) reported that a Viking burial ground was located at Þórðarholt in Þjórsárdalur. He wrote that the bones of humans, horses and dogs had been seen eroding there, but at the time of his writing nothing 'of value' had been found. Matthías Þórðarson inspected the site in 1939 and found 'many' horse teeth, a whetstone, rusty iron fragments and a quite a lot of slag, but no human bone (Kristján Eldjárn 2016:83). Then in 1951, Kristján Eldjárn (2016:83) surveyed a large area at Þórðarholt and found similar archaeology as Matthías had done twelve years earlier, horse teeth, a whetstone, spindle whorles, slag and a few 'small things' of iron, which he brought back to the National Museum. Kristján Eldjárn noted that the horse teeth were the only thing likely to originate from a grave, while the rest of the archaeology was most likely domestic refuse originating from the ruins of an unknown farmstead.

The animal bone assemblage collected in 1951 is made up of six cow elements, two horse molars, six caprine bones and 27 unknown mammal bone fragments. The entire collection is weathered. The species distribution strongly suggests origins in a household midden. It is quite possible that the archaeology reported by Brynjúlfur Jónsson in 1885 is completely eroded.

4.3 Gullbringusýsla



Map 4–3 – The site in Gullbringusýsla discussed in the text.

4.3.1 Hafurbjarnarstaðir, Miðneshreppur

The earliest account about the Viking Age burial ground at the coastal farm of Hafurbjarnarstaðir dates to around 1828, when a silver ring was found there and eroding human bone was collected and reburied in the local cemetery. Forty years later, in the winter of 1868, high winds eroded and revealed seven burials. A report was written about this find by Ólafur Sveinsson, the farmer, and sent to the National Museum. His account of the burials is slightly confusing. Ólafur Sveinsson said that horse bone was found in all the graves and some also contained dog bone. Nonetheless, when each individual grave is described it is not always stated that animal bone was found (Kristján Eldjárn 1949:108-122). The inconsistency of the descriptions of the graves might in some instances be due to variable preservation, both in terms of erosion and previous removal of bones and artefacts. In 1938 and again in 1939 animal bone was collected from the surface at the site and sent to the National Museum. These finds are not recorded in the Museum's catalogue, but can still be found in storage. Kristján Eldjárn (1949:108-122) visited the site in 1947 and excavated two more Viking Age graves, both undisturbed, bringing the total of known burials to nine. There is consistency in the construction of all the graves. Stone was packed around each burial and flat stones (or whale bone in one instance) sealed them off. In the following discussion the nine burials and the loose finds are described. First, there is a discussion about the surface-collected bone of 1938 and 1939, then the two graves excavated by Kristján Eldjárn in 1947, and lastly the other seven described in 1868.

The loose surface finds collected in 1938 and 1939 are odd for a burial assemblage. The close proximity of both a farm and the coastline should be kept in mind when the two assemblages are discussed. Each individual bone collected in 1938 had the date of collection written on it, 10/10/38 and 13/11/38. Three specimens were collected on the former day, a horse scapula, a sheep axis and a large mammal ischium fragment, all white in colour and weathered. On the later day 21 specimens were collected. They are mostly seal bone and probable seal, but also three sheep elements, two horse bones, one dog bone and four unknown or large mammal specimens. These elements are also white in colour and quite weathered. In 1939 a total of 61 specimens were collected at the site, the majority of which are polished fragments of mammal bone. The polished texture of the fragments (some are almost porcelain like) is a taphonomic indication that this part of the collection rolled around in the sea board. The identified specimens are mostly sheep, with some seal, horse, cattle and haddock elements. The lack of contextual information, along with the varying taphonomic histories, great species diversity and unusual element distribution gives doubt regarding the origin of these assemblages. Even if some of these elements might originate from a burial context it is highly likely that the majority of them are farm refuse or even the remains of stranded seal carcasses. As such, they cannot be used when discussing the burial assemblage at Hafurbjarnarstaðir.

Burials I and II were those of a woman who died in her fourties and of a small child less then two years of age, respectively, and were only 0.6 m apart. Neither grave contained animal remains, apart from three shells (*Arctica islandica*) in the woman’s grave, which was also partly covered by a slab of whalebone. Other items in burial I were jewellery, a knife, a comb, exotic stones and iron fragments (Kristján Eldjárn 1949:109-113; Hildur Gestsdóttir 1998:12).

Burial III was mostly undisturbed in 1868 when Ólafur Sveinsson wrote his report. It is thought to have been a small boat burial with two people, an adult male and an adolescent, accompanied by a horse and a dog. The grave was oriented E-W, with the humans in the western part, the dog at their feet and the horse in the east. The artefacts found included weaponry, a bridle bit and buckle, a comb, a whetstone, an iron cauldron, nails and iron fragments. The weapons were a sword, axe and spear, all deposited next to the adult male, but a shield had been placed on top of his face. It is interesting that the harness, the bridle-bit and buckle, was not found by the horse remains but had been deposited on top of the weapons, the sword, axe and spear (Kristján Eldjárn 1949:113-116). A total of eleven animal bone specimens have been preserved from burial III. Of those, seven are dog elements, three are horse and one is a pig element. The MNI is one for each species. The dog bone is a mix of front and hind limb elements along with a cranium and left mandible. The dog was adult at the time of death, but not old. All epiphyses are fused, although no vertebrae are in the assemblage and the dentition is permanent. M1 and m2 are present in the mandible. M1 is in occlusion, but not much worn. The sex of the animal is unknown. The dog seems not to have been poleaxed, although the anterior part of the cranium has broken off and is missing. The parietale, a bit of left frontale, temporalis, occipitale and perioticum are present and not fractured. Moreover, the fracture line where the anterior part has broken is lighter in colour then the rest of the element, indicating that it has not had the same exposure to soil. The dog stood at the shoulder at about 0.64 m, based on measurements of femur, humerus and two radii (Harcourt 1974), and was of quite a tall breed for Iceland at the time (pages 271-274). The horse is represented by a right humerus, a left radius and a right maxilla with four molars. The individual was adult at the time of death. The dentition is permanent and the roots on the m3 are well developed. The taphonomy of the horse bone is curious for a Viking Age burial context. The horse elements are creamy white in colour and the two long bones smell as if they have retained quite a lot of organic material. Elements of the other species in the assemblage are also very light in colour, but not as the horse. This must be due to special conditions in the soil matrix, because burial III is described as having been completely undisturbed upon investigation (Kristján Eldjárn 2016:96). The horse was relatively low in stature, its withers height was only about 1.25 m, based on the measurements of the surviving long bones (May 1985). The unworn pig's m3 in the assemblage is curious. It is not discussed in the published report (Eldjárn 1949:108-122), but there is a discussion by Sigurður Brynjólfsson Sívertsen in the Museum's catalogue (page 14). He was not sure from which species the tooth came, 'probably seal, walrus or bear'. Next follows a short taphonomic consideration, as Sívertsen wonders if the molar was purposefully placed in the burial, or if it had fallen in by mistake, and then concludes that this cannot be resolved (Sigurður Guðmundsson 1874:95). This could possibly have been argued for or against if the location of the grave's contents had been recorded. The presence of pig mandibles or isolated teeth in

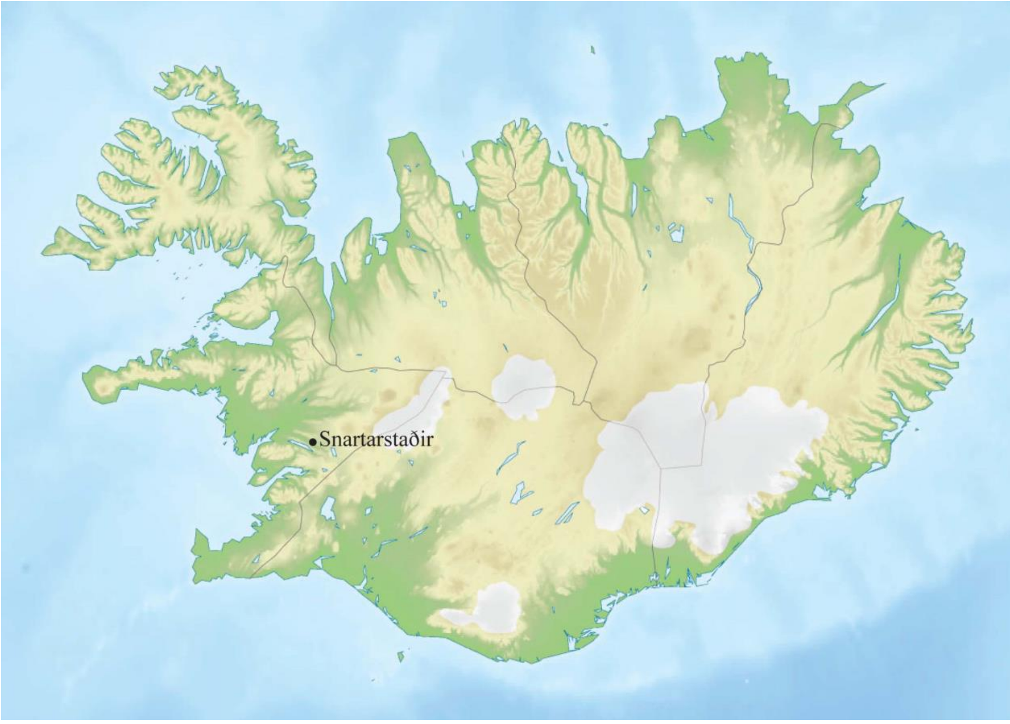
Viking Age burials has been recorded elsewhere. For example, a pig mandible was discovered in a burial at Kolkuós and at Daðastaðir only dog teeth were deposited in a grave with a woman. In light of this it is very plausible that the pig tooth was an intentional feature of the burial assemblage. Sívertsen's original interpretation of isolated teeth in burials is further discussed in chapter 5.

Burial IV was the grave of a woman, accompanied by a horse and dog. In the original report by Ólafur Sveinsson it is stated that a spear-head originated from this burial, but no other artefacts were mentioned. Kristján Eldjárn had doubts about the origins of the spear. He re-excavated burial IV in 1947 and found the rest of the skeletal remains of the woman, only the skull had been sent to the National Museum in the 19th century. He also found the remains of a dog and a few artefacts; a comb, three beads and a silver finger-ring. Kristján Eldjárn's reason for dismissing the spear was based on the sexing of the skeletal remains (Kristján Eldjárn 1949:117). There are 97 bones and fragments in the animal bone assemblage from burial IV. All the specimens are dog except two; a cattle maxillary molar and a caprine calcaneum. No horse bone was collected by Kristján Eldjárn in 1947 despite the previous description of the grave. The dog bone MNI is one and the element distributrion suggests that an entire, unbutchered animal was deposited into the grave. The animal was adult, all elements are fused and the dentition is permanent and in wear. Some new bone formation was taking place on four vertebrae at the time of death. Callus bone was forming around the posterior articular surface of two cervical and one lumbar vertebrae, but one thoracic vertebra has callus bone around the anterior articular surface. These could be age related pathological changes. The sex of the animal is unknown. The dog stood at the shoulder at about 0.46 m in life, based on the measurements of humerii, an ulna, a femur, and a tibia (Harcourt 1974). The different withers heights of the dogs from burials III and IV show that the two animals were not of the same type (pages 271-274).

Burial V was that of an adult male and a dog. The only recorded artefact is a spear-head. The animal bone from this burial was not preserved. Ólafur Sveinsson reports that the human's head had been placed 'between his ischia' (Icel. *sett milli þjóa*), but Kristján Eldjárn thought that the remark was evidence of the burial having been disturbed and the farmer being led on by the Saga literature and local folklore (Kristján Eldjárn 1949:117). A recent excavation of a medieval cemetery at Hofstaðir in Mývatnssveit has revealed an undisturbed grave of a man that had the head of another individual (which had been removed post-mortem) placed between his legs (Hildur Gestsdóttir pers. comm. 23.5.2014). If all other bone in burial V was *in situ* except the head, then the 19th century report might have been right in the original assumption.

Burial VI was that of a man and dog, but the animal bone was not preserved. Burials VII-IX were disturbed, containing a mix of bone and bone fragments but no artefacts. It is possible that these are the graves from which bones got reburied in 1826 (Kristján Eldjárn 1949:117-118).

4.4 Borgarfjarðarsýsla

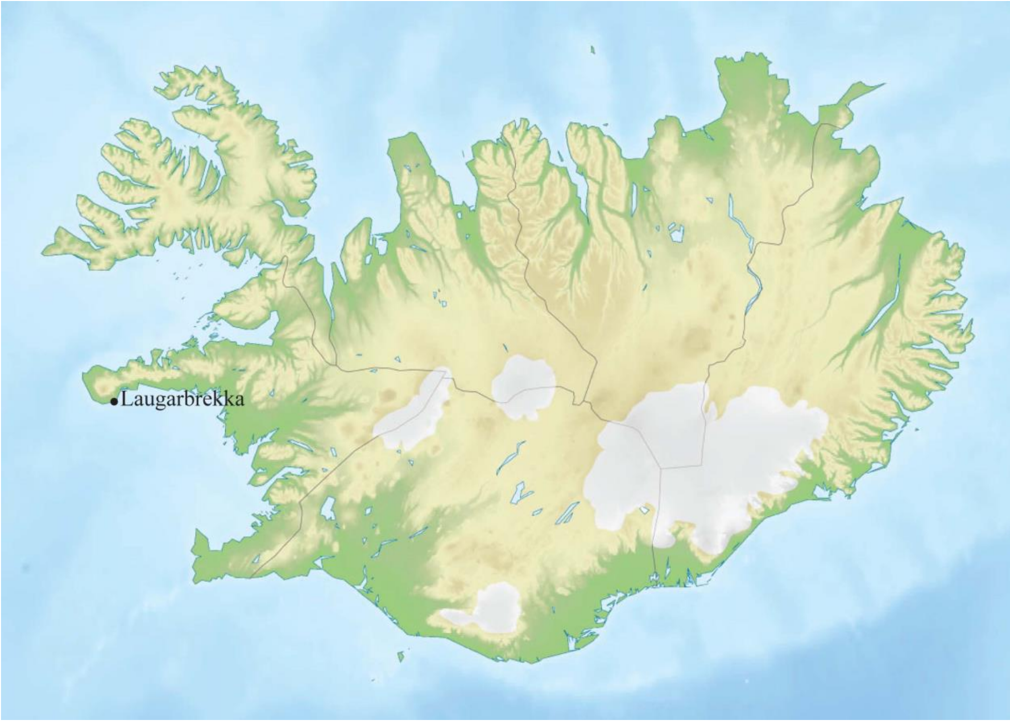


Map 4–4 – The site in Borgarfjarðarsýsla discussed in the text.

4.4.1 Snartarstaðir, Lundareykjadalshreppur

In 1938 a Viking burial was discovered during road construction at the farm of Snartarstaðir. The burial was of a man and horse and was discovered on a gravel hill outside of the home field. Two artefacts were collected, a spearhead and a buckle (of a saddle). A description of the find is otherwise lacking and the horse bone was not collected (Kristján Eldjárn 2016:99-100).

4.5 Snæfellsnessýsla

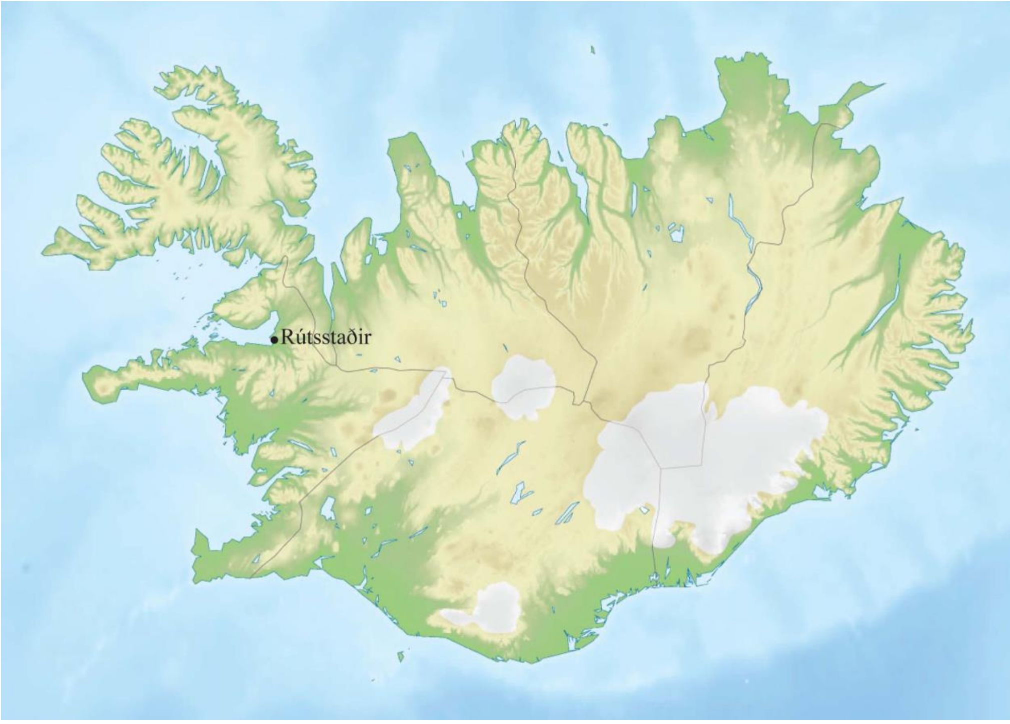


Map 4–5 – The site in Snæfellssýsla discussed in the text

4.5.1 Laugarbrekka, Breiðavíkurhreppur

In 1794 the local priest Ásmundur Vigfússon conducted an excavation of a Viking Age burial at Laugarbrekka. The burial was situated in a field of 24 small mounds, all thought to be burials as well. Ásgrímur found ten to twelve horse teeth, a spearhead and a few large rivets. He thought that the rivets might have been from a shield but later writers have surmised that this was a boat grave. In 1818 Ásgrímur dug into three more mounds but found nothing except reddish soil (Kristján Eldjárn 2016:104-105). The horse teeth were collected at the time but not preserved.

4.6 Dalasýsla

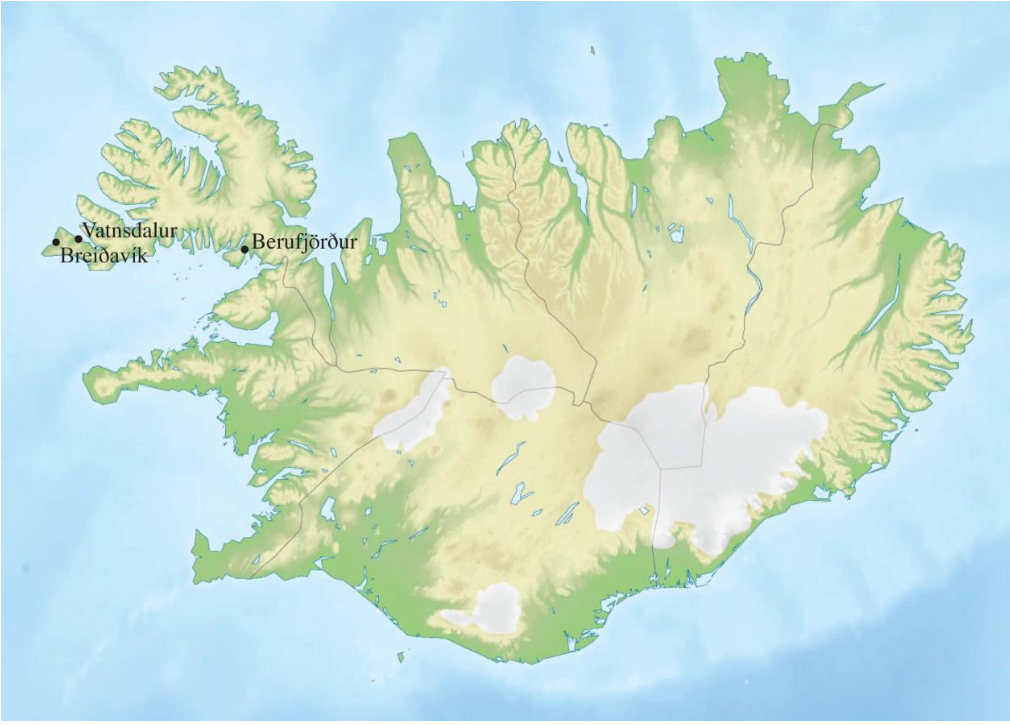


Map 4–6 – The site in Dalasýsla discussed in the text.

4.6.1 Rútsstaðir, Laxárdalshreppur

The context of the possible horse burial at Hrútsstaðir is not secure. In 1938 it is recorded in the National Museum's archive (Þjms. 12454) that a scatter of horse bone had come to light when the farmer was breaking new land for farming and a fragment of an oval brooch was found close by (Kristján Eldjárn 2016:108). The horse bone was not preserved.

4.7 Barðastrandarsýsla



Map 4–7 – Sites in Barðastrandarsýsla discussed in the text.

4.7.1 Berufjörður, Reykhólahreppur

Four Viking Age burial grounds have been discovered at the head of the fjord of Berufjörður, belonging to two or more farms (figure 4.2). The burial grounds were excavated by a local farmer, Snæbjörn Kristjánsson in 1897 and again by Daniel Bruun and Brynjúlfur Jónsson in 1898 (Brynjúlfur Jónsson 1899:6). In total at least 27 burials are known in the area, but the recording is basic and lacking in detail. A few artefacts are known to have been discovered but not all of them found their way to the National Museum. Two small boxes with animal bone exist from the 1898 enquiry, accompanied by short notes written by Bruun. One of them, a cigar box, contains horse teeth accompanied by a note stating that the teeth come from grave number three. From Bruun's published report it is clear that the horse teeth come from grave three in burial ground "c", which is made up of six visible burials. Bruun and Jónsson dug into four of those. The first one was completely empty, the second contained a human bone and a few artefacts, the third contained the horse teeth and the fourth was empty. The horse burial was four and a half m east of the human burial and about five m west of burial number four.

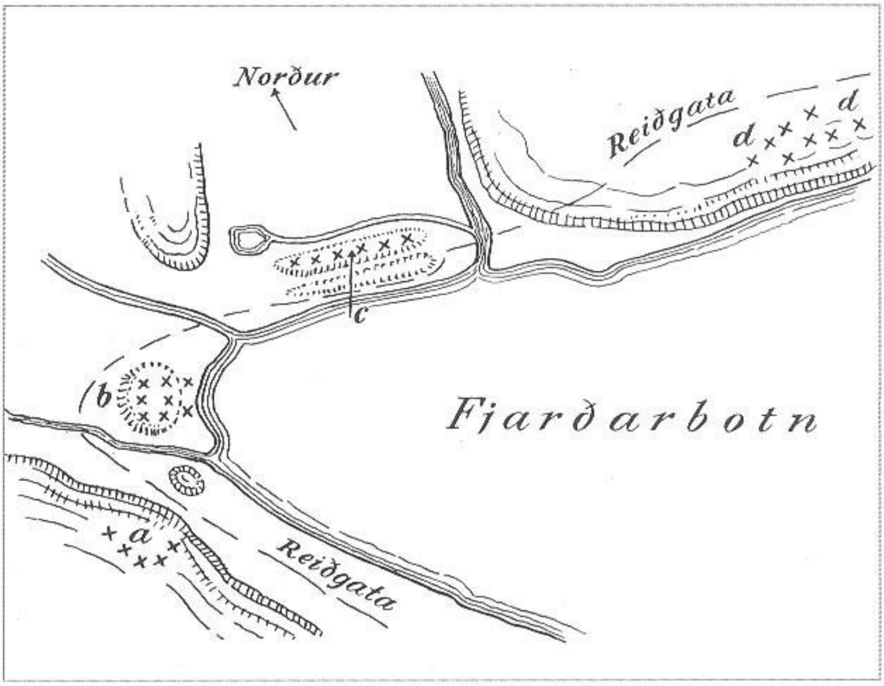


Figure 4–2 – The burial grounds in Berufjörður (Kristján Eldjárn 2016:110).

It is thus not clear if it was associated with a human grave or not, even though Bruun does note in his report that the horse remains were possibly associated with the now empty burial number four. Bruun thought it most likely that the burial had contained a severed horse's head rather than a complete animal because he only encountered teeth during the excavation. He supported this by noting that it was not uncommon to find parts of animals in Norwegian graves. Bruun speculated that the reason for this might have been that burying an entire horse was simply much more difficult and thus people were content with this simpler option (Bruun 1899:79). Snæbjörn Kristjánsson excavated burials on the site the year before Bruun and it is almost certain that among those were burials two and three on burial ground "c" (Kristján Eldjárn 2016:110-111). Snæbjörn noted that the former grave had human bone and artefacts, but the second only contained horse bone (Snæbjörn Kristjánsson 1930:149) which was not stored. Although the different descriptions by the two researchers over a hundred years ago are not conclusive about this, it does raise the question if the teeth found by Bruun in 1898 could have been accompanied by more horse bone the year before when Snæbjörn Kristjánsson carried out his investigation. The horse teeth from burial three are eight maxillary molars. They are permanent teeth but from a fairly young animal since they are little worn and have not developed real roots. The animal was probably at least five (but no more than seven) years of age at the time of death (Levine 1982; Silver 1969). Other animals are not mentioned in the published accounts, but a box containing the remains of a dog from Berufjörður is nonetheless stored at the National Museum. It says on an accompanying note that the bones derive from burial number 22, but it is difficult to ascertain what burial in which burial ground at Berufjörður that number applies to. The dog is represented by twelve elements and fragments, mostly from limbs. All the elements are fully fused indicating that the animal was adult at the time of death. The dog had a wither height of about 54 cm based on the biometric measurement of its left humerus (Harcourt 1974).

4.7.2 Breiðavík, Rauðasandshreppur

In 1913 a new house was built on the farm of Breiðavík, outside of the home field. While digging the foundation trench the builders came upon “quite many” (Icel. *allmörg*) human and horse bones. No artefacts were reported (Matthías Þórðarson 1924:46; Kristján Eldjárn 2016:115). The horse bone was not preserved.

4.7.3 Vatnsdalur, Patreksfjarðarhreppur

A boat burial containing the skeletal remains of seven people and one dog was discovered at the abandoned farm of Vatnsdalur in 1964 (figures 4.3 and 4.4). The burial came to light when a sandy hillock by the coast, called ‘Reiðholt’, was being levelled for cultivation. The bulldozing also stripped the soil of another burial, a stone cist that had mostly been emptied out, twelve m away to the southeast. The subsequent investigation revealed that the boat had been six m long and most likely made of larch (Þór Magnússon 1967:5-32). It has been interpreted as a fishing boat, equipped with two carved pieces of whale bone nailed to the port side gunwale for the running of fishing lines (Vilhjálmur Örn Vilhjálmsson 1994). Numerous artefacts were found in the boat along with the bone, including various items of jewellery, combs, scale weights, etc. Among the jewellery is a hammer pendant of silver, a copper-alloy bell, a kufic coin fashioned as a pendant and finger- and armrings. The excavators thought that a woman had originally been buried in the boat grave, while the other six individuals had been relocated there from other eroding graves in the vicinity (Þór Magnússon 1967:1-32).

The dog skeleton in the boat grave was more or less complete and well preserved. By far the most fractured element is the animal’s cranium, 34 fragments of which are found in the bone assemblage. This indicates that the dog was possibly killed by poleaxing, but other taphonomical post-mortem causes for the fracturing cannot be ruled out. The dog was fully grown at the time of death, with all its vertebrae fused. The teeth on the other hand show little wear. The mandibular canines and p3s are completely unworn, while the m1s and m2s are very recently in wear. This indicates that the dog was killed as a young adult. The dog was about 0.46 m tall at the withers in life, based on the measurement of the femora, humeri and radii (Harcourt 1974). The skeletal remains bear witness to the treatment of the dog in life. It is evident that the animal suffered injury to its right shoulder at an early age. The trauma is most likely the result of the dog's leg having been forcefully pulled and as such is most likely the result of violence inflicted upon it by the hands of a human. In addition, the dog is also missing four teeth from its mandibles, perhaps extracted long before death. The blade of the right scapula is torn proximally on the cranial edge (figure 4.5). The scapular blade tore in a ventral direction (from the upper part and downwards) making a 28 mm long rift, separating a three to seven mm thick 'lobe' from the rest of the blade. The lobe is curled up and still attached to the rest of the blade at its ventral end. This trauma must have taken place when the animal was very young and the scapular bone still soft, otherwise the bone would have broken instead of torn. This area of the scapula is where the *supraspinatus* muscle attaches. From the scapula, the supraspinatus inserts cranially on the greater tubercle of the humerus (Budras *et al.* 2007:20). This indicates that the right front leg was violently jerked, causing strain on the supraspinatus which caused the scapula to rip. The injury caused the animal problems, probably throughout its life. Evidence of that is seen on the left humerus where there is pathological lipping (or extra bone growth) on the lateral side of the proximal diaphysis and epiphysis. The new bone growth is by tendon and muscle attachments and is not seen on the right humerus. This indicates more long term stress on the left side, which would be due to the animal shifting its weight to the left and sheltering its injured right leg for an extended period of time, probably for years. Because of this, it is hard to imagine that the dog would have been a working animal. The fact that the dog lived as long as it did and ended up following a person to the grave must be a sign that it was cared for, possibly by the person it was buried with. The missing teeth in the dog's mandibles are also curious. A total of four teeth, left and right p2s and p4s, are missing. This is clearly not post-mortem taphonomy since there are no empty sockets in the alveolar bone. Either the teeth were extracted long before the animal's death and the alveolar bone has resorbed or this is a case of *hypodontia*, where the teeth failed to erupt. Hypodontia is uncommon in most wild canids, such as wolves, but conversely may be more common in domestic dogs (Hillson 2005:281).

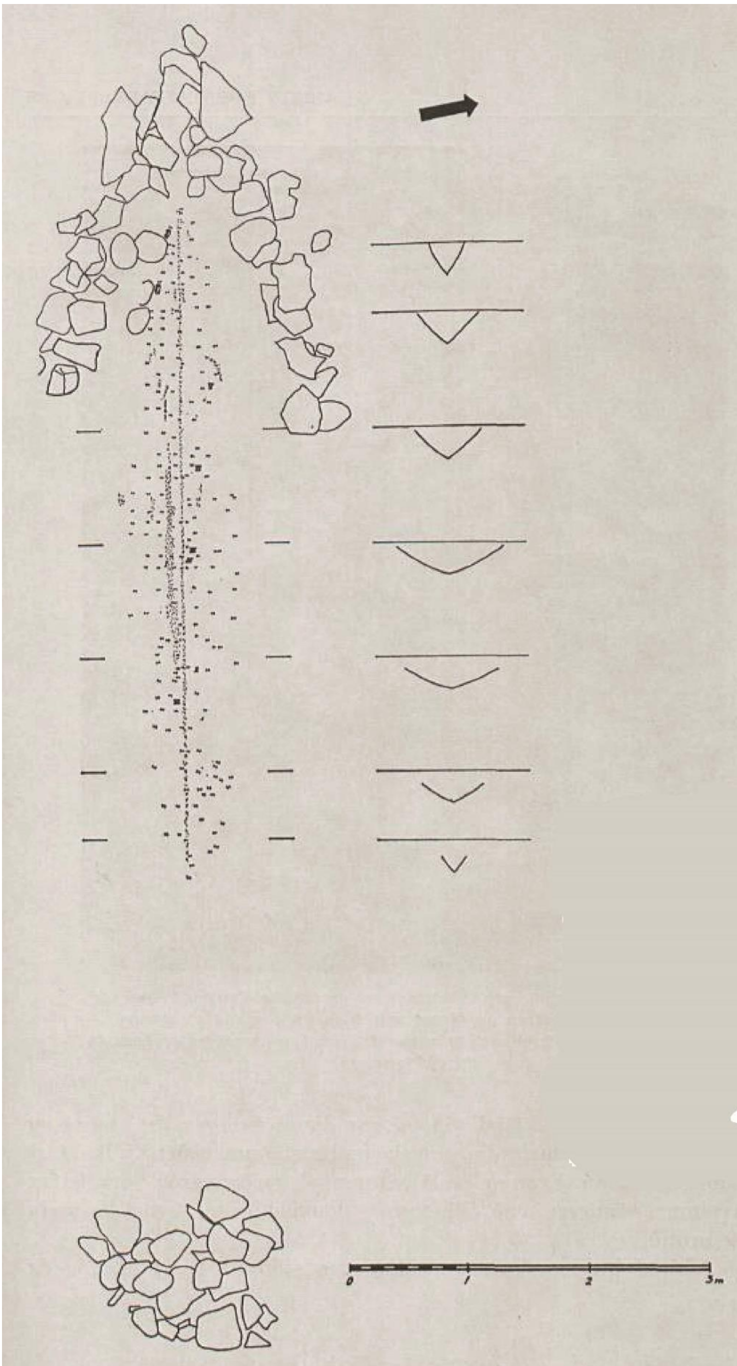


Figure 4–3 – The boat burial in Vatnsdalur (Þór Magnússon 1967:11).

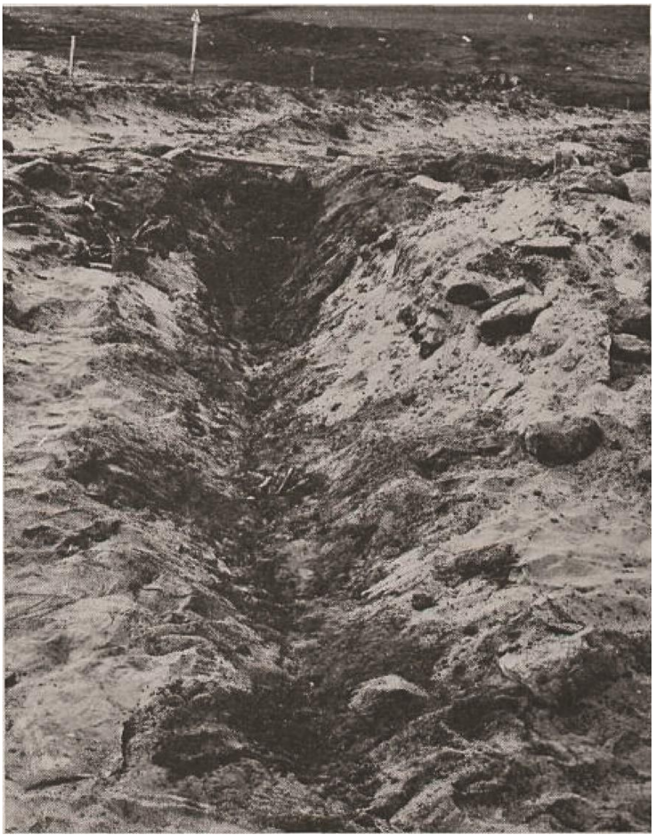


Figure 4–4 – Vatnsdalur, impression of boat (Þór Magnússon 1967:9).

Figure 4–5 – Vatnsdalur, right dog scapula.

Figure 4–6 – Vatnsdalur, stone cist (Þór Magnússon 1967:13).

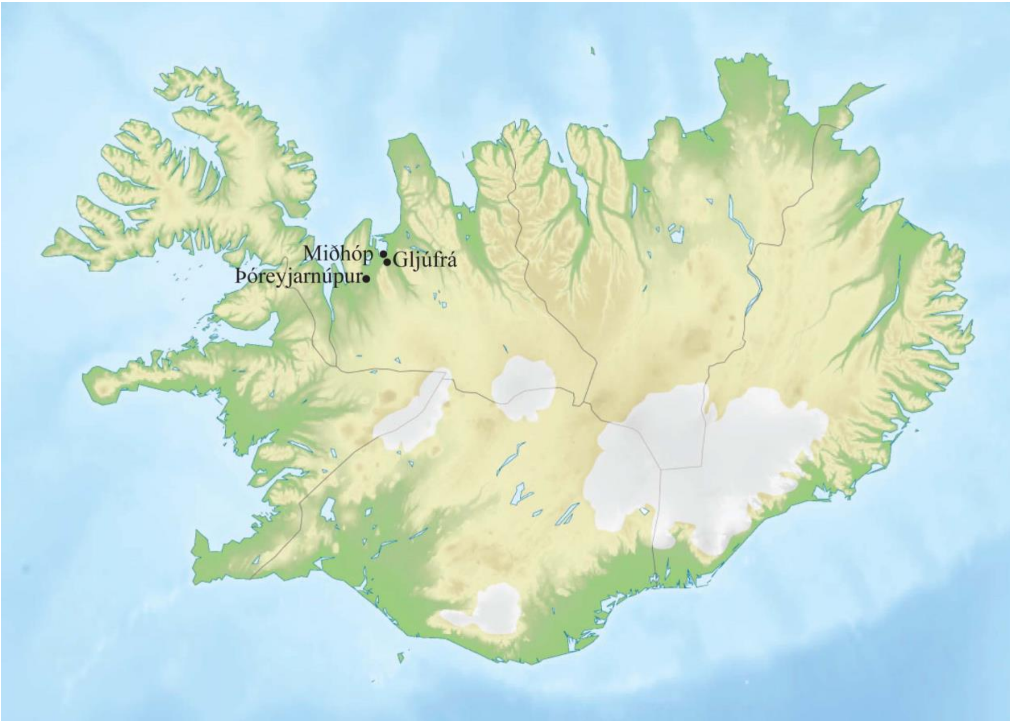
In cases of tooth loss and repair during life the alveolar bone is more roughened and pitted, but tends to be smoother in cases of hypodontia (Baker and Brothwell 1980:137). The alveolar bone where the p2s should be is still 'dented' and rough, like sockets that have not completely filled in. Where the p4s should be the alveolar bone is smoother but still porous. Thus an examination by eye makes the pulling of teeth seem more likely than hypodontia, but radiographic checks of both mandibles are still necessary to exclude the possibility of the missing teeth still being buried in the jaws (Baker and Brothwell 1980:137). If these mandibular premolars where indeed pulled, the reasons are not clear. This is especially so since the p3s are still in place between the missing p2s and p4s, which seems to eliminate as likely causes this being a remedy for biting, a modification related to the dog's tasks or trauma due to violence. Orthodontics due to desease or tooth decay is possible, but does seem unlikely due to the symmetrical tooth loss between the two mandibles.

The other burial discovered in 1964, the stone cist, was located twelve m southeast of the boat grave (figure 4.6). The excavators hypothesised that the cist must have been emptied out at some point in the past, but were convinced that it must have been a Viking Age grave because it contained a whetstone and a horse tooth. Another horse tooth was found on the surface adjacent to the cist. It is further noted in the account of the excavation that a pig tooth was also found "in the same place", but it is not certain if that was inside the cist or adjacent to it (Þór Magnússon 1967:27-28). The stone cist could thus be one of very few horse burials known from the Western fjords (pages 284-289).

Apart from the dog bones found in the boat burial, a total of 45 animal bone specimens and fragments were collected at the Vatnsdalur excavation in 1964 and are stored at the National Museum. The finds context of these bones is not known. Among them are a total of four horse maxillary teeth, one incisor and three molars. These teeth could be the ones associated with the cist, although Þór Magnússon (1967:27-28) only speaks of two teeth being found there (no pig tooth is present in the assemblage stored at the National Museum). Other bones include twelve bird specimens, five fish elements including wolf fish (*Anarhichas lupus*) teeth and 24 unrecognisable mammal bone fragments. It is unlikely that these specimens originate in a burial context and while no contextual data is associated they must be treated as outside 'contamination' to the burial assemblage.

Bone was regularly collected at the burial site by locals for a few years after the excavation and sent to the National Museum. Some of this bone clearly comes from a burial context whereas other specimens are dubious or very unlikely to be grave material. In 1967 a total of 57 bone specimens were collected. In the Museum's catalogue it is stated that the bone was accumulated twelve m away from the "1964 burial area" (*Aðfangabók Þjóðminjasafnsins* 1967-341). It is not certain how this statement should be interpreted, i.e. if the bone was collected by the stone cist, if the bone was collected twelve m away from the boat burial in another direction than the stone cist, or if the bone was collected twelve m away from the stone cist itself. The collection is mostly made up of large mammal specimens and unknown fragments of mammal bone. The presence of wolf fish teeth, a single bird humerus and a single caprine calcaneum is indicative of a midden origin of at least a part of the assemblage. In 1968 two boxes arrived at the National Museum. The contents of the first one were 38 specimens collected in the summer at the boat burial, the contents of the second one were 78 specimens collected in November just outside the boat burial. These two assemblages were not registered in the Museum's catalogue, but are still stored in the Museum and the contextual information is written on notes stored in the boxes. The contents of the first box are at least partially Viking Age grave material. The assemblage includes human and dog bones (a first phalanx and a second metatarsal of a dog) and a fragment of a comb. Other specimens, fragments of mammal bone and twelve wolf fish teeth, are less secure due to lack of contextual information. The contents of the second box are mostly horse and large mammal bones with one horse as MNI. The horse was adult at the time of death as can be seen by the fully fused vertebrae. All six lumbar vertebrae have significant amounts of new bone growth around the articular surfaces and the fifth and sixth lumbar vertebrae are fused together. This might indicate that the individual was extensively ridden in life. A single large mammal rib has cut marks, which indicates that it is slaughter refuse. The finds context of the assemblage is unclear and thus cannot be designated as burial material. Lastly in 1970 a total of 35 specimens were collected at the "burial area" (*Aðfangabók Þjóðminjasafnsins* 1970-012). These are mostly horse, along with single cod and wolf fish premaxillae. The horse bone represents a single adult individual. It is unlikely that the horse bone originates in a Viking Age burial. It is very well preserved, light in colour and an axis in the collection seems to be greasy. The combined MNI of the 1968 and 1970 horse bone collections is one, which could indicate that the bone originates from the same individual.

4.8 Vestur-Húnavatnssýsla



Map 4–8 – Sites in Vestur-Húnavatnssýsla discussed in the text

4.8.1 Gljúfrá, Víðidal, Þorkelshólshreppur

In the summer of 1868 a burial was excavated by the river Gljúfrá close to where it flows into the lake Hópið. The burial contained only human and horse bone. The burial faced roughly north-south and the horse had been deposited by the human's feet. It is not noted in which direction the heads of the human and horse had faced (Kristján Eldjárn 2016:124). The horse bone was not preserved.

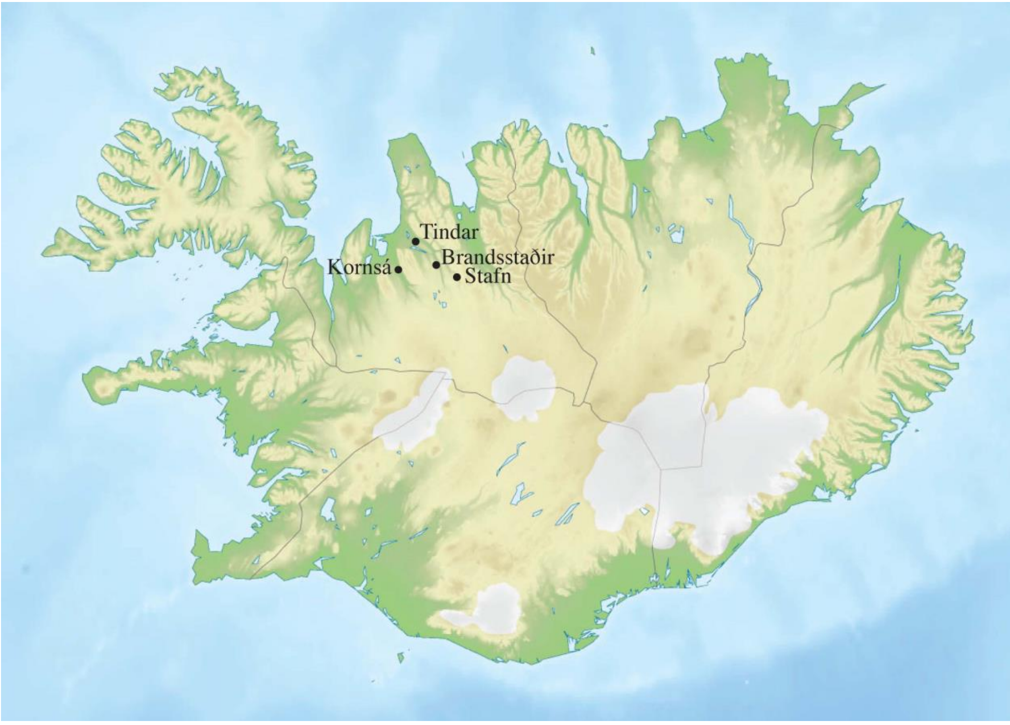
4.8.2 Miðhóp, Þorkelshólshreppur

In the winter of 1941 a Viking Age burial was discovered during road construction inside the boundaries of the farm Miðhóp. Gravel was being mined when the digger exposed human and horse bone along with an oval brooch. In 1958 Kristján Eldjárn visited the site but it had been decimated by a bulldozer. He noted a single horse tooth and some unrecognizable bone fragments (Kristján Eldjárn 2016:123), but these were not found at the National Museum during the present investigation.

4.8.3 Þóreyjarnúpur, Kirkjuhvammshreppur

The bones of a human and a horse were found on a gravel hillock by Þóreyjarnúpur in 1928. The human bone was re-interred in a churchyard but some horse bone was sent to the National Museum. The remains of a saddle were also discovered in the burial (Kristján Eldjárn 2016:122). Only a single bone from the horse survives at the Museum, a right tibia. It is fused with a lump of new bone growth, 24 x 13 mm in diameter and 4 mm thick, laterally on the proximal epiphysis. A measurement of the tibia indicates that the horse was 1.40 m tall at the withers in life (May 1985). In the box storing the tibia is a note saying that another small bone used to be there but is now lost (Icel. “*10435b er smábein, sem ekki er vitað hvar er*”).

4.9 Austur-Húnavatnssýsla



Map 4–9 – Sites in Austur-Húnavatnssýsla discussed in the text.

4.9.1 Brandsstaðir, Bólstaðarhlíðarhreppur

In 1965 a Viking Burial ground was discovered during the construction of a barn at the farm of Brandsstaðir. The farmer collected human and horse bone in the barn foundation and sent to the National Museum. The human bone was that of two adult males (Kristján Eldjárn 1968:95-99) but the horse bone was not analysed at the time and not found during the present investigation. In 1967 Kristján Eldjárn excavated the visible remains of the burial ground, which was a double burial of a young woman and a horse. Half of the horse burial was truncated by the foundation cut of the barn (and thus probably contained the partial remains of the same animal noted two years previously). The human part of the burial was unharmed by the construction but had been dug into or robbed at some point in the past. A small earthen barrier separated the human and horse burials, which was oriented WNW-ESE (figure 4.7). Analysis of the animal bone revealed that a single horse was buried with the young woman. The animal is most likely male, about five years of age. The sexing of the horse is based on the presence of canines and the ageing is derived from wear of incisors and the state of epiphyseal fusion (Silver 1969, Habermehl 1975). Incisors are not much worn and the

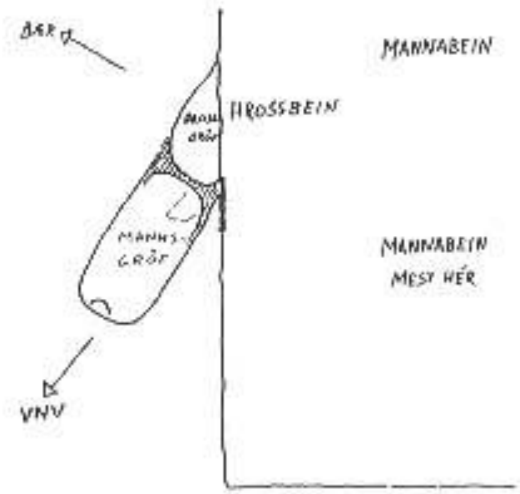


Figure 4–7 – Burial of man and horse at Brandsstaðir (Kristján Eldjárn 2016:131).

occlusal surfaces are still narrow and oblong. The back edge of the third incisor is slightly in occlusion, which must have happened shortly before the animal's death. The vertebral epiphyses are in the state of fusing, the fusion lines are very visible. This is most pronounced on a well preserved cervical vertebra, where the distal epiphysis is almost loose. A measurement of the right radius, of both metacarpals and the left metatarsal, reveal a medium hight of about 1.46 m at the withers (May 1985). Grave goods are scarce, possibly both due to grave robbing and poor preservation. Buried with the young woman were corroded iron scraps and some iron rusted wood, no harness or saddle are reported to have been found with the horse. The lack of artefacts in the horse grave could possibly be due to the severe damage caused by the mechanical digger during the construction of the barn.

4.9.2 Kornsá, Áshreppur

One or two Viking Age burials were discovered during house construction in 1879 on a hillock at the farm of Kornsá. The first one faced NW-SE, following the contours of the valley Vatnsdalur. It was probably the burial of a woman whose head faced northwest. She had been buried with an iron cauldron covering her face and various tools and jewellery.

Three and a half meters further east another burial was discovered, a jumble of human, dog and horse bone (Sigurður Vigfússon 1881b:57-64). No further description exists of this burial, but it seems to have been dug into and disturbed at some point. Kristján Eldjárn later noted that this may have been a misunderstanding and that the grave of the woman noted above and that of the horse and dog was one and the same (Kristján Eldjárn 2016:126). The reason for this is not clear since the original report is not ambiguous on the matter. No animal bone was preserved.

4.9.3 Stafn, Bólstaðarhlíðarhreppur

Two burials, of a man and a horse, were discovered in the autumn of 1933 on the farm of Stafn. The man was between 36 – 45 years of age at the time of death (Hildur Gestsdóttir 1998). The human bone was not articulated and iron fragments were scattered in the grave, which seems to have been oriented north-south (Matthías Þórðarson 1936:30-32). It was concluded that apart from being eroded by wind and water, the grave must have been dug into and disturbed at some point in the past. The iron pieces are mostly remnants of weaponry (including a sword) and probably of a saddle. The most complete object discovered was a bronze strap-end decorated with a Viking Age animal motif (Matthías Þórðarson 1936:30-32; Kristján Eldjárn 2016:130). The horse bone was found one and a half m southeast of the human grave. The animal skeleton was articulated upon discovery and better preserved than the human skeleton. The excavators noted that the grave seemed not to have been disturbed prior to its discovery. The horse had been deposited on its side in the grave, with its head facing towards north and its feet towards the human grave in the west (Matthías Þórðarson 1936:30-32). The positioning of the animal relative to the human grave is unusual (pages 292-293) and begs the question whether the animal was part of the human’s funerary process at all.

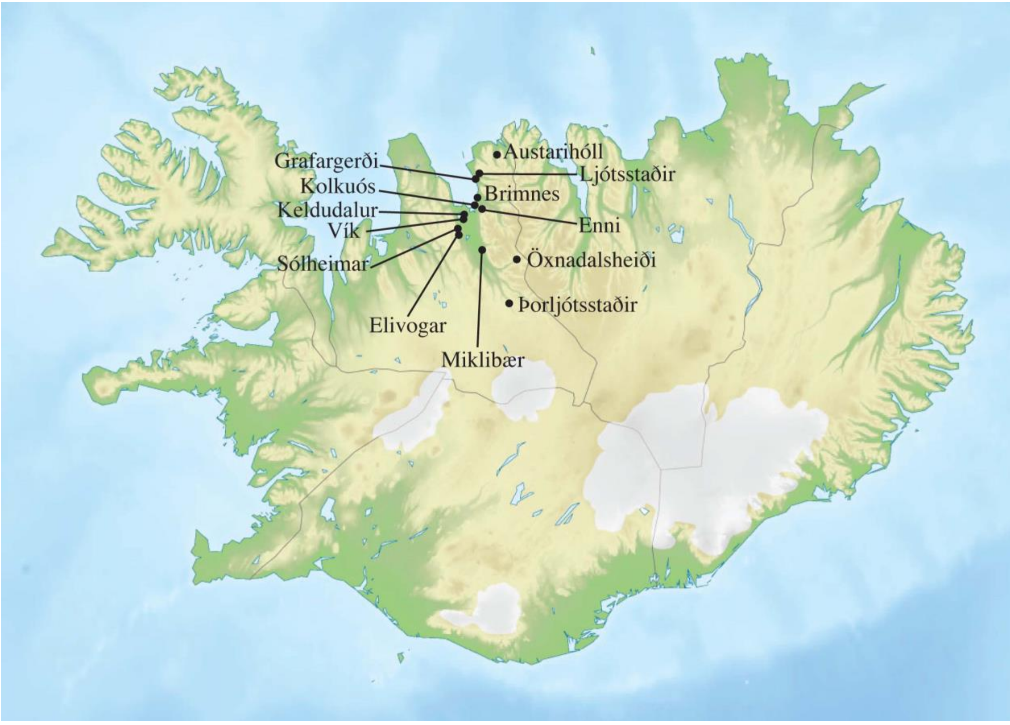
Despite the good preservation of the horse skeleton, only thirteen specimens were collected for posterity, two long bones and eleven teeth (Matthías Þórðarson 1936:30-32). It was noted during the present bone analysis that one of the long bones, a metacarpal, is missing from the collection. The limited range of elements can nonetheless be used to deduce the animal’s sex, stature and age at death. A single canine tooth is present in the assemblage, which indicates that the animal was most likely male. In life, the horse stood at 1.35 m at the shoulder, based on the measurement of the surviving longbone, a right metatarsal (May 1985). The horse was adult at the time of death, but not old. The age is indicated by the six incisors present in the collection. The back edge of four incisors was recently in occlusion at the time of death. The other two are more worn but still have an oval occlusal surface and wide open infundibulum. The horse was probably between five and six years of age at the time of death (Silver 1969, Habermehl 1975).

4.9.4 Tindar, Svínavatnshreppur

A Viking Age burial of a man and a horse was discovered one km north of the farm of Tindar in 1937. It was comprised of two grave cuts that were revealed during road construction and investigated later that summer by Matthías Þórðarson. Both graves had been disturbed in the past. The bones of man and horse alike were disarticulated and piled up, each in their own cut. Matthías did establish nonetheless that the man had probably faced towards NNW and the horse grave had been dug by his feet to the SSE. The burials were circular in shape and separated by a small earthen barrier. The human grave was 0.9 m in diameter and the horse grave a bit larger, about 1.05 m in diameter. A spear, a ringed pin and an iron fishing hook were found in the human grave. The horse bone was better preserved. Matthías deduced from the animal’s teeth that it appeared to have died quite old. He also noted the dent in the horse’s forehead and assumed that it had been poleaxed with a hammer or the back of an axe (Kristján Eldjárn 2016:129-130).

Even though the horse was reported to have been well preserved only eleven specimens were collected for storage at the National Museum. The first one to analyse the Tindar horse seems to have been a man called Herman Ebhardt. A note written by him is stored with the surviving animal bone regarding the association of the loose insicors with the mandibles. Ebhardt’s report of his analysis is not present however. The horse was an elderly male, judging by the presence of canines in its mandibles and the wear of the insicors. The horse might have died at over 20 years of age (Silver 1969, Habermehl 1975). It is interesting that given the animal’s age, no sign of bone spavin can be noted on its surviving right metatarsal. The horse appears to have been quite tall in life. The measurement of the metatarsal indicates that it stood at about 1.43 m at the shoulder (May 1985).

4.10 Skagafjarðarsýsla



Map 4–10 – Sites in Skagafjarðarsýsla discussed in the text.

4.10.1 Austarihóll, Haganeshreppur

The Viking Age burial at Austarihóll was discovered and subsequently excavated by Kristján Eldjárn in the summer of 1964 (Kristján Eldjárn 2016:146-147). The grave cut was sub-rectangular, four meters long and one meter wide, facing NE/SW (Kristján Eldjárn 1966:24). Horse bone was found in the NE-end of the grave and the excavators deduced that one or two humans had been deposited in the SW part, although no human bone was found (figure 4.8). The SW part of the grave had been disturbed and the human remains undoubtedly removed at some point in the past (Kristján Eldjárn 1966:24). Towards the centre of the grave were a number of undisturbed and *in situ* artefacts, including weapons (a spear and arrowheads) and tools for textile making (scissors and loom weights). The artefact assemblage caused Kristján Eldjárn to speculate if the burial had been that of two people, a man and a woman (Kristján Eldjárn 1966:30). Analysis of the animal bone reveals that not one but two horses were buried in the grave, which strengthens the idea that this was a double grave. The burial was discovered during road construction and the SW end with the animal bone was partly damaged by a bulldozer (Kristján Eldjárn 1966:23), leaving mostly the posterior parts

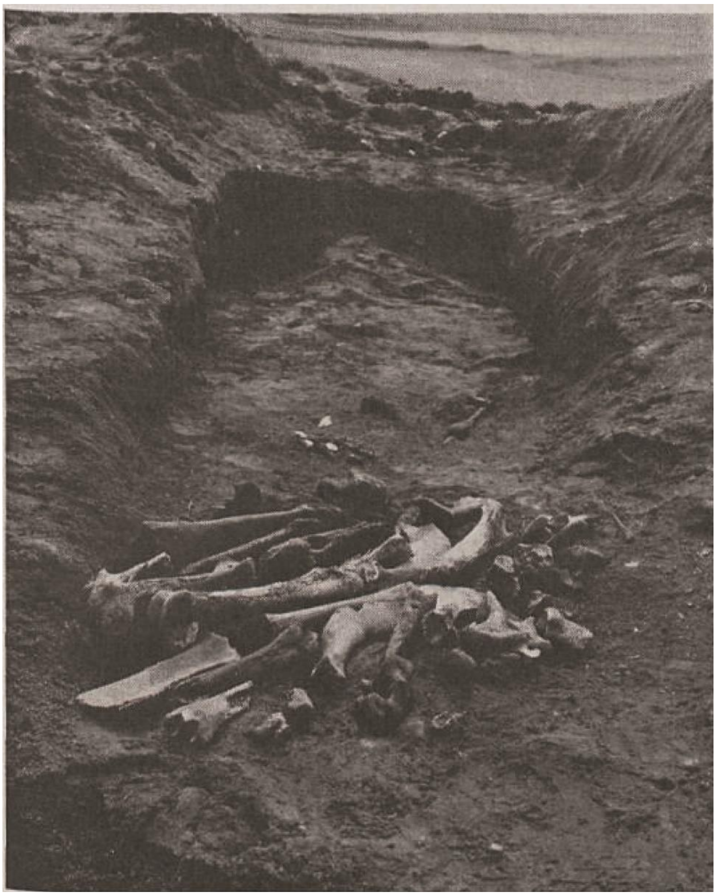


Figure 4–8 – Horse bone in a burial at Austarihóll (Kristján Eldjárn 1966:25).

of the two horses, hind leg elements and the lower portion of the vertebral column. Photographs taken during the excavation show that the horses seem to have been deposited into the grave on top of each other, perhaps in a similar way as in the more recently investigated Ingiríðarstaðir burial (pages 190-191, 295). The sex of the horses is unknown, but based on epiphyseal fusion, the animals were of different ages. The bones of both individuals were mixed together in storage, but were quite readily sorted based on the state of fusion. One animal was fully adult with all elements fused (femora, tibiae, calcaneum and vertebrae). The other individual was not fully adult. Its one complete femur is fused distally but unfused proximally, a calcaneum is fusing, the fusion line being very visible and its vertebrae are completely unfused. This indicates that the older animal was at least five years or older and the younger one was probably around three and a half years of age at the time of death (Silver 1969). A single element, a left metatarsal, is preserved well enough to calculate withers height. The metatarsal is an early fusing element (Silver 1969) and as such could derive from either horse. The measurement reveals a height of about 1.42 m at the shoulder in life (May 1985). It is noted in the published report that no riding gear was found in the burial and that it is highly unlikely that such equipment had been deposited (Kristján Eldjárn 1966:26). But keeping in mind that the anterior parts of the two horses are mostly missing due to road construction, leaving very little above the lumbar vertebrae, such statements are unwarranted, especially since a crampon (an iron spike used for better traction on ice) was associated with one of the horses. The crampon further suggests that the funeral took place during winter. In the same museum box as the remains of the two horses is a left maxilla from cattle. The maxilla is specially labelled as “unknown if it belongs to the rest of the assemblage” and as such is not counted here as part of the Austarihóll burial assemblage.

4.10.2 Brimnes, Viðvíkurhreppur

The small Viking Age burial ground at Brimnes was excavated in 1937 by Matthías Þórðarson (figure 4.9). It consisted of three burials in a row covering an area of twelve meters (Kristján Eldjárn 2016:142).

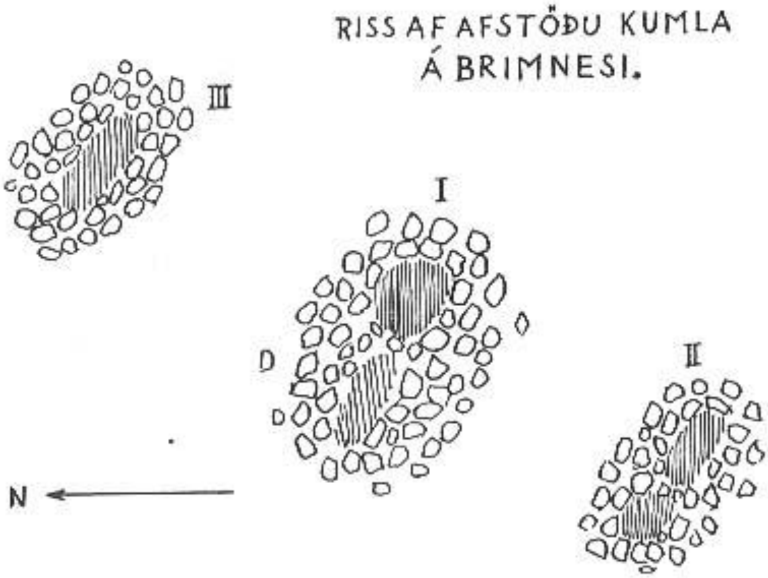


Figure 4–9 – The Brimnes (Viðvíkurhreppur) burial ground (Kristján Eldjárn 2016:143).

Burial I was partly disturbed. The northwest part of the burial where the human remains had been deposited had been dug into at some point in the past and the fractured human bone was found piled in the centre of the grave. By the human remains was a small piece of obsidian and traces of iron (Kristján Eldjárn 2016:142). In the southeast part of the burial was the undisturbed grave of two horses. They had been deposited into an oblong cut 1,65 x 1,25 m and 0,25 m deep. In the National Museum’s catalogue from 1937 it says that a sample of horse bone from burial I was retained under the museum number 12106 (Matthías Þórðarson Unpublished a). This was not found in the museum storage or on the museum’s list of animal bone collections. The description is thus based on written evidence. Both horses had been laid to rest on their side with their croup facing northwest. The horse to the southwest lay on its right side and the other one, to the northeast, lay on its left side. The latter horse was described as being ‘smaller’ than the previous one. This could mean that it was not fully grown. The smaller horse seemed to have been decapitated and its head placed on the centre of its body. The larger horse, to the southwest, had probably been decapitated as well. Its head is said to have been ‘standing upright’ between its front legs. I.e. the anterior end of the head, the nose, faced vertically down and the head was between the front legs (Matthías Þórðarson Unpublished a). This description could indicate that the horse was decapitated after it was deposited, dead or stunned, into the grave. The head could then have fallen forward, but subsequently not have been placed on top of the body as with the smaller horse. The horse bone was quite deteriorated upon excavation (Matthías Þórðarson Unpublished a). The larger horse (or possibly the older one) had been buried with riding gear; an iron bit and a wooden saddle (Kristján Eldjárn 2016:143). The small (or younger) horse was seemingly buried without riding gear. It is more common than not in double horse burials in Iceland that one of the animals was very young at the time of death, this trend is further discussed in chapter 5.4 (pages 297-298). Interestingly, an iron spear was found in the horse grave, stuck vertically into the grave. The presence of a spear in the horse grave has been interpreted as a relic of the disturbance made to the human part of the grave in antiquity. According to Kristján Eldjárn the spear must have been taken from the human part of the burial when it was looted and ‘stuck’ into the horse grave (Kristján Eldjárn 2016:143). There are two possibilities for the presence of the spear. Either it came from the human grave cut or was originally thrust into the horse grave cut. Based on the excavation data and parallels, the latter possibility seems more likely. The reasons for that are twofold. First, it is stated that the horse grave was undisturbed (Matthías Þórðarson Unpublished a; Kristján Eldjárn 2016:143), which means it was not dug up, the spear deposited, and then refilled. Second, the soil into which the grave was cut and subsequently the soil covering the grave was made up of ‘stone, gravel and clay’. The notion that the spear was stuck into the grave without it being emptied out first seems out of the question, since it is hard to imagine a spearhead having been thrust through rocky soil, let alone deep enough to have entered the grave itself and be preserved for posterity. It is well attested in the archaeological record of the Viking Age for spears to be ‘stabbed’ into burials before interment. For example, in Birka a spear was thrown vertically into a grave chamber containing a man, woman and horse (Price 2002:135-139; Gräslund 1980:30-31) and a recent excavation by Lake Dalstorp in Västergötland revealed five spearheads that had been driven into the 10th century grave of a woman (Artelius 2005:261-276). Kristján Eldjárn (2016:143) writes in footnotes that two fragments of silver inlaid iron found in burial II are undoubtedly from the same spearhead, and that stands to prove how disturbed the burial ground really is. This complicates the matter significantly. It would have been useful to have more contextual information about where the two fragments were found in burial II and what their relation was to other archaeology in the burial. Eldjárn states that burial II seems to have been disturbed, but does not elaborate further on that matter (Kristján Eldjárn 2016:143). The typological comments about the spearhead in the horse grave thus seem to contrast with the excavators’ statement about the horse burial being completely undisturbed upon investigation.

Burial II was southwest of burial I. It contained the graves of a person of unknown sex and a horse (Kristján Eldjárn 2016:143; Hildur Gestsdóttir 1998). A sickle and shears of iron were found with the human bone. Southeast of the human grave was a horse grave. It contained ‘a few deteriorated’ horse bones (Kristján Eldjárn 2016:143). No mention is made of these bones in the National Museum’s catalogue so it must be concluded that they were not collected.

Burial III was northeast of burial I and it seemed to have been undisturbed. Burial III contained human bone, along with an axe, knife, a silver ring and two silver inlaid led scale weights. No animal remains were found.

4.10.3 Elivogar, Seyluhreppur

Late in the summer of 1956 an archaeological investigation was conducted at the farm of Elivogar by Kristján Eldjárn (1958:132-4). A couple of years previously a fox hunter going about his business had stumbled upon bone eroding from a gravel hillock, some distance from the farm’s modern home field and closer to a known older settlement on the farm. There, Kristján found the double burial of a man and a horse (figure 4.10) cut into the low hillock

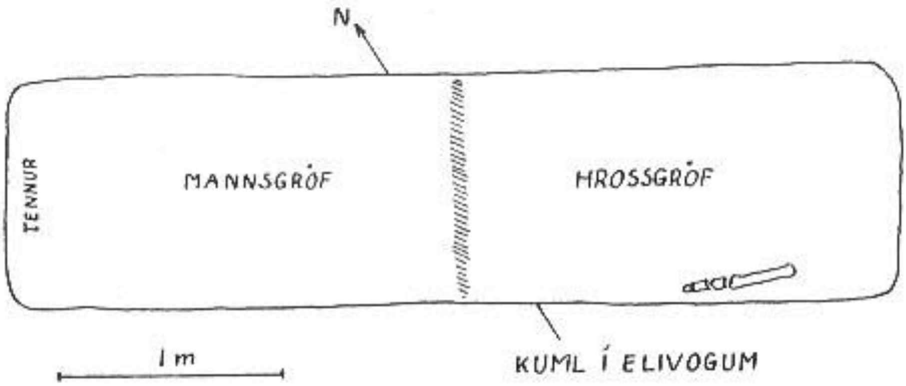


Figure 4–10 – Elivogar burial (Kristján Eldjárn 1958:133).

and covered by large stones. The two graves were in total four m long, facing WNW-ASA and one m wide. They were separated midway by an earthen boundary. Both human and horse parts of the burial had been purposefully disturbed at some point in the past. Nothing was *in situ* except one of the horse's articulated front legs by the southern edge of the grave, indicating that the horse's head faced east. It was determined that the human had occupied the western part of the burial because of teeth found in the western end. Human and horse had therefore faced in opposite directions. Few artefacts were discovered, only five iron fragments. The only recognisable fragment is a nail, most likely from a saddle (Kristján Eldjárn 1958:132-4). The human was male and had died between 26 – 35 years of age (Hildur Gestsdóttir 1998:11). Of the horse, 21 elements and fragments survive at the National Museum. The animal's withers height is estimated at 1,31 m, based on measurements of left and right metacarpals (May 1985:368-382). The animal was fully grown. All epiphyses are fully fused, including the articular surfaces of the vertebrae. This means that the horse was at least five years or older at the time of death (Silver 1969). No arthritis or spavin was noted on the animal's joints, so it was probably not old or worn out. It seems that the horse was adult but not old, although this cannot be defined in more detail. No teeth or mandibles are found in the collection and only the acetabulum remains of the pelvis. Because of this it is not possible to sex the animal.

4.10.4 Enni, Viðvíkurhreppur

Matthías Þórðarson (1936: 28-46) excavated the double burial of a human and a horse in the summer of 1935. Some months before he had been notified that human bone had been seen protruding from a low hillock which had been mined for gravel a few years previously. Upon excavation Matthías found the grave of a person who had been between 36-45 years of age at the time of death (Hildur Gestsdóttir 1998:11). The burial had been dug into and disturbed at some point in the past and all the human bone was mixed and disarticulated. The preservation was bad and sexing is thus not conclusive. Matthías Þórðarson (1936:36) writes in his report that the bone is thought to be from a female because it lacks robustness, although being from a person with the stature of 1,66 m. Hildur Gestsdóttir (1998:11) on the other hand determined that the bone is more likely male. No artefacts were discovered. Also on the hillock, about 1.75 m west of the human bone, was the disturbed and disarticulated skeleton of a horse. Some nails and iron fragments were found with the horse remains, which probably come from a saddle. A total of 78 horse bone fragments and elements from Enni are stored at the National Museum. The animal bone collection represents one individual horse and is mostly composed of ribs and vertebrae. The animal cannot be sexed since the pelvis is in fragments, only parts of left and right ilia surviving, and the anterior parts of mandibles and maxillae that would contain the canines are missing. The horse was fully grown at the time of death but not old. All vertebrae are fused and real roots have started to develop on molars, but still the teeth are little eroded. The relationship between human and horse is not evident from the descriptions by Matthías Þórðarson. He says that the human and horse occupied two graves (Icel. *dysjar*) on top of the hillock, separated by 1 ¾ m (Matthías Þórðarsson 1936:36). But it is not clear if the two graves shared the same mound and could thus be called part of the same burial. It is thus difficult to state definitely if the horse represents a part of the human's burial, perhaps another undiscovered individual's burial or if the horse was simply buried by itself.

4.10.5 Grafargerði, Hofshreppur

Two Viking Age burials were discovered at the farm of Grafargerði by a road construction crew in the late summer of 1934. The following description of the find is based on a short report constructed by a local man, who posted it along with some bones to the National Museum in Reykjavík (Matthías Þórðarson 1936:39-41).

The first burial was that of a male, probably between 36-45 years of age (Hildur Gestsdóttir 1998:11). No artefacts or animal bone was found in association. The second burial was only about two m further NW and was covered by a low mound, half m high and two m long. Under the mound were two grave cuts separated by a boundary of gravel. On the northern side was human bone, originally thought to be from an old woman. Hildur Gestsdóttir (1998:11), on the other hand, writes that the skeleton is too eroded to be sexed and comes from a person past 46 years of age. To the south of the boundary was a horse.

The animal bone assemblage from Grafargerði stored at the National Museum is surprising. It is comprised of twelve specimens and none of those is a cranium, mandible or a substantial long bone, which is what would be expected to be kept as a sample from a horse grave. Instead there are three vertebrae that are most likely horse, two horse carpals, but the rest of the bone comes from sheep/goat, medium sized mammal and unidentified mammal. It is not clear from the account by Matthías Þórðarson (1918:39-41) whether the horse bone was collected at all. In the National Museums register of acquisitions concerning Grafargerði, human bone is listed as arriving but not animal bone. Due to the fact that the human bone was removed to be reburied at the Sauðárkrókur church yard (which did not happen in the end, because it got sent to the National Museum instead), it seems most plausible that the horse bone was entirely discarded or left *in situ*. This is supported by the element and species distribution in the animal bone assemblage. It is highly improbable that the locals misinterpreted a jumble of sheep bone as a horse grave. In light of that, what do the Grafargerði animal bones stored at the National Museum represent? They must have arrived at the Museum mixed with the human bone and as such there are two possibilities for their presence in the assemblage. Either the animal bone was buried with one or both humans, presumably as food, or it represents a later 'contamination' from outside the burial context. The latter possibility is quite plausible given the poor excavation, retrieval and recording of the site.

4.10.6 Keldudalur, Rípurhreppur

In the summer of 2003 a pre-Christian, Viking Age burial ground was discovered by a mechanical digger at the farm of Keldudalur in Hegranes. At the time of discovery, an excavation of a Christian cemetery dating also to the Viking Age was ongoing only 500 m away by the farm mound (Guðný Zoëga 2008; Adolf Friðriksson 2016:494-495).

Excavation of the pre-Christian burial ground revealed at least four burials, two of which contained dog bone along with human remains. The animal bone was not available to the author for the present study.

Burial I had been decimated by the mechanical digger. It had been the resting place of a woman who died between the ages of 30 – 45 years.

Burial II contained only the leg bones of a human and a few dog bones. The dog had been put in the grave by the human's feet. The burial was orientated S-N and the dog had rested in the northern part. The only artefacts discovered were three beads. The dog remains are described as being not from a normal [modern] Icelandic sheep dog, but from a long-limbed 'greyhound' (Guðný Zoëga 2008:10).

Burial III had been highly disrupted and only contained a few badly preserved human bones and the remains of short-limbed dog (Guðný Zoëga 2008:11).

Burial IV contained the highest amount of human bone, but no animal bone. It was the grave of a young woman, buried with a lead weight and a dressing pin carved from bone and decorated with an animal-head motif.

4.10.7 Kolkuós, Viðvíkurhreppur

In 2004 a burial possibly dating from the Viking Age was excavated by the ancient port of Kolkuós. The grave contained human bone and a pig's mandible (Guðný Zoëga *et al.* 2008:8-9; Ragnheiður Traustadóttir pers. comm. 15.4.2012). Kolkuós is believed to have been used as a port-of-trade from the settlement period until the 16th century and, due to coastal erosion, a rescue excavation was conducted there from 2003 until 2012 (Ragnheiður Traustadóttir & Svensson 2012).

The excavation of the burial has not yet been published and the animal bone was not available during the present work. If a Viking Age date is proven secure then this would represent one of a handful of instances where bone from other species than horse and dog have been recorded in a Viking Age burial context in Iceland.

4.10.8 Ljótsstaðir, Hofshreppur

The double grave of a man and horse was discovered during road construction at Ljótsstaðir in 1958 when a bulldozer scraped soil from off the burial, repositioning both human bone and artefacts. A year later, Kristján Eldjárn (1966:19-22) visited the site and conducted investigations. The burial was oriented WSW-ENE and consisted of two grave cuts separated by a barrier of earth 0.7 m thick. The human grave was to the west. It had been badly damaged by the machine and almost emptied of human bone and artefacts. The horse grave in the east end was not affected by the bulldozing and was found to be 1.2 x 0.8 m in diameter. It was obvious by the state of the horse grave that the burial had been dug into and disturbed at some point in the past. The horse bone was not articulated and the mixe of bones and soil suggested that the bone had been dug up and then partly redeposited into the cut. A few artefacts were discovered originating from the human grave. Most notably a plaque of whale bone carved with Mammen style motifs, but also a few iron fragments and two whetstones.

The horse bone stored at the National Museum is quite fragmentary, only consisting of fourteen specimens. But given the element distribution (both head, frontleg and hindleg elements are present) it is most likely that an entire animal was deposited into the grave. The loss of skeletal elements is most likely due to the fact that the grave was dug into in the past. The loose teeth in the assemblage give an idea of the age at death and the sex of the individual. The two incisors present, an i1 or i2 and an i3 are permanent dentition. The i3 is well into wear, but quite oval in shape and the infundibulum is still open. Further, the i3 has a visible ‘seven year hook’. However, the infundibulum is almost filled in the more central incisor (i1 or i2). This indicates that the animal was most likely around seven years of age at the time of death (Levine 1982; Silver 1969). The presence of a canine indicates that the animal was male. A measurement of the right radius gives an estimate of a withers height of 1.34 m (May 1985).

4.10.9 Miklibær, Akrahreppur

A Viking Age grave field containing a number of humans and horses was excavated at the farm of Miklibær towards the end of the 19th century. Available descriptions are unfortunately quite confusing. For example it is not certain how many graves were there originally, nor how many humans or horses had been buried. No bone was brought to the National Museum for posterity. Miklibær is best known for being the only example of food remains found in a Viking Age burial in Iceland. Matthías Þórðarson (1910:67-70) noted that horse bone found on site was most likely joints of meat, not the remains of a complete animal. This interpretation is however strongly refuted here.

In 1895/6 a Viking Age burial ground was discovered by a road construction crew at the farm of Miklibær. This event was described by an eyewitness in a letter sent to the National Museum over fourty years later, partially reproduced in the second edition of Kuml og haugfé

(Kristján Eldjárn 2000:139). The men were mining a low hillock for gravel, north of the farmhouse, when they came upon both human and horse bone. The bone was shallow in the ground. Only a thin strip of soil covered the gravel beneath and the bone was sandwiched in between, the bodies seemingly having been laid on the gravel. The road crew stripped the soil of a sizeable area and found a lot of bone. Some of it was disturbed and scattered upon discovery, but mostly it was more or less articulated. The skeletons faced in different directions and stone slabs seemed to have been placed adjacent to and/or on top of some of them. The eyewitness describes how more and more bone was piled upon the banks of the excavation as it moved further west. As the men dug on westwards the disarticulated bone got denser. The eyewiness remembers the road crew discussing that the remains of many men and horses had been discovered. He himself remembers seeing three human crania, but noted that more people could well have been buried there because the skeletons were obviously not complete and the preservation was variable. He also remembers metal riding gear having been found. All the bone was then re-interred in a churchyard (Kristján Eldjárn 2016:139), but it must be assumed that that only applies to the human portion of the assemblage.

In July of 1910 the National Antiquarian, Matthías Þórðarson, was touring the county of Skagafjarðarsýsla, recording archaeological sites, when he visited the farm of Miklibær. He was informed about the previous discovery and shown the artefacts and a single human cranium kept for posterity (Matthías Þórðarson 1910:67-68). When surveying the site he found a scatter of horse teeth in the excavated area. After digging up some remaining soil within the excavated area, Matthías discovered disarticulated human bone in a pile. He inferred that the bone might have been re-interred there by the road crew (Matthías Þórðarson 1910:68), but according to the eyewitness all the human bone was brought to a churchyard, so Matthías may have discovered more of the disturbed gravefield.

Directly west of the excavated area (the distance is not recorded in the report and could be adjacent), Matthías noticed bone sticking out of the ground. He cleaned soil from the bone and discovered a substantial pile of disarticulated horse bone; among them scapulae, long bones and pelvises. Matthías (Þórðarson 1910:68) notes that he did not see any head elements, vertebrae or ribs. He dug northwards from the pile of horse bone until he came upon badly preserved and fractured remains of a person of unknown sex, seemingly placed on its right side in a flexed position. The horse remains were thus north of the human's head. Close by Matthías found three horse teeth on the eroded ground surface, but concluded that they must have spread over there from the area excavated in 1895/6. Matthías interpreted this as a single grave and noted that it was surrounded by an irregular stone setting. He was further convinced that the horse bone was undisturbed and represented food placed in the grave (Matthías Þórðarson 1910:69). This is the only recorded instance of food in a burial in Iceland and has been quoted by several researchers as a special burial in this regard (e.g. Kristján Eldjárn 2016:138-9, 310; Sikora 2004:94; Loumand 2006:131; Þóra Pétursdóttir 2010:191). Matthías further noted that the single artefact found by the human remains, an iron knife, would have been placed there so the deceased could eat its provisions (the horse) while “travelling” (Matthías Þórðarson 1910:69).

The interpretation by Matthías of the horse bones being the remains of food is highly suspect for several reasons. Matthías (Þórðarson 1910:69) did not fully excavate or lift the bones from the pile he encountered, he rather ‘cleaned the soil’ off the bones and then left them undisturbed. No recording was done; no drawings, photographs nor textual descriptions. Matthías’ description of the element distribution is also curious. He does not name all the elements present, merely that they were ‘many’ and including pelvis, scapulae and long bones (Matthías Þórðarson 1910:68). It is unlikely that the pelvis represents a cut of meat. A butchered part of the pelvis articulated with the hindleg might be present in a cut of meat, but not the entire bone unbutchered and unarticulated. Further, he notes how complete all the bones were (the scapulae are mentioned as a special example) which indicates a lack of primary butchery marks or chopping. It is common to encounter heavily disturbed bone on Viking Age burial grounds in Iceland and sometimes the horse bone has been ‘bundled’ up or shoved to the side in a pile while the grave is being dug into. A good example of this is Litlu-Núpar (pages 195-201). If this takes place far in the past and the bone is re-interred, this process can be difficult to spot, especially with poor excavation and recording. Indeed, other parts of the Miklibær grave field were disturbed prior to the 1895/6 excavation and Matthías even describes a relocated and disarticulated cache of human bone possibly dating from an ancient ransacking (Kristján Eldjárn 2016:139), which sound suspiciously like the description of the pile of horse bone and is probably the result of the same taphonomical process.

With all this added up, it is concluded here that the horse bone recorded at Miklibær cannot be regarded as an example of food placed in a burial. Rather this is probably an example of a poorly excavated site which was disturbed in antiquity.

4.10.10 Sólheimar, Staðarhreppur

Two burials, both containing human and horse remains, were discovered at the farm of Sólheimar in 1956. The first one came to light when a gravel hillock was being mined for road construction. The burial was damaged by a mechanical digger. The other burial was subsequently found 35 m further ESE but had not been damaged by the mining (Kristján Eldjárn 1958:130-132).

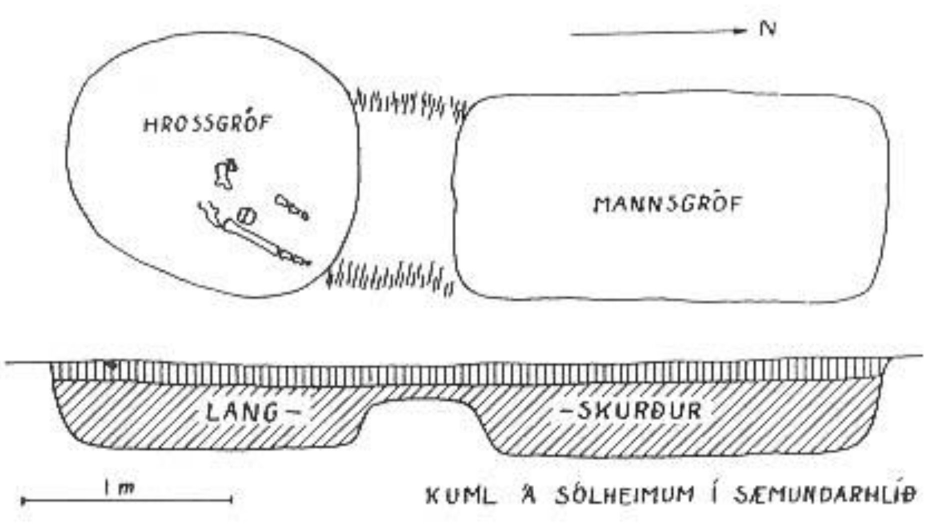


Figure 4–11 – Sólheimar burial II (Kristján Eldjárn 1958:131).

Burial I contained the remains of a person, most likely male (Hildur Gestdóttir 1998:14), and two horses. No artefacts were found. In the original report it is assumed that a single animal was buried with the human (Kristján Eldjárn 1958:130), but the present analysis of the horse bone revealed the collection's MNI of two. Only four animal bone elements were preserved for posterity, a single metatarsal and three metacarpals, two of those are left side elements which gives the number of individuals present. The damage done by the mining is a likely cause of the original erroneous MNI estimation. The elements collected and saved were probably the most complete ones and more obvious MNI defining specimens, like crania and mandibles, might have been decimated. It could be that the horses originate in separate burials, but the remains of only one human are present and Kristján Eldjárn found no other burial in the immediate vicinity. Two of the metacarpals are of equal length but the third one is longer. The measurements of the metacarpals indicate that the two animals were 1.28 m and 1.40 m tall at the withers, and thus that their physique was quite different. The larger metacarpal has the accessory second metacarpal fused to it. This condition could be stress related; the two bones fusing together for extra support.

Burial II was not damaged by mining, but had evidently been dug into at some point in the past (figure 4.11). It was oriented N-S and was composed of two grave cuts separated by a 0.45 m wide earthen boundary. The northern cut was two by one m and contained the jumbled remains of human and horse bone. The southern grave was smaller and circular, about 1.20 - 1.35 m in diameter, and contained horse bone, some of which was *in situ*. The only artefacts discovered were by the horse bone in the southern grave, a buckle, a nail and a few iron fragments, interpreted as the remains of a saddle (Kristján Eldjárn 1958:131-132). It seemed evident to the excavators that the larger cut to the north had been the human grave, the horse bone presumably having been shovelled over the boundary between the grave cuts in a past 'grave robbery' event, which is very likely since the MNI between both cuts is one. Further, it was detemined that the human's head must have faced north and the horse's head faced south, the animal's rump turning towards the person's feet (Kristján Eldjárn 1958:131-132). The horse bone assemblage consists of 25 specimens. The bulk of the collection is hindleg elements which were still *in situ* when the grave was excavated. The horse was an adult at the time of death. That can be ascertained by a fully fused thoracic vertebra in the assemblage. Age or stress related pathology can be seen on a metatarsal, where the accessory second metatarsal has fused with it, probably a reaction to provide support in this portion of the hindleg. The measurement of the metatarsal reveals that the animal's height at the withers was about 1.41 m (May 1985).

More human bone was found in the vicinity of these two earlier burials during gravel mining in 1968, indicating that the grave field is larger than the two previously recorded burials (Kristján Eldjárn 2016:135).

4.10.11 Vík, Staðarhreppur

In 1908 the National Museum received the remains of a shoe which had been recovered from a Viking Age burial. The burial was discovered during the digging of a foundation trench for a house. The diggers dug up a square stone setting, about two by two m in size. Inside the stone setting were both human and horse bones along with the shoe remains and the remains of riding gear. The site was not investigated and no animal remains were kept (Kristján Eldjárn 2016:134).

4.10.12 Þorljótsstaðir, Lýtingsstaðahreppur

Prior to 1869, an old burial ground was discovered at the abandoned farm of Þorljótsstaðir. Six human crania were found, along with a ringed pin decorated with an animal head biting the ring. A silver object was also found (but now lost), thought to have been a brooch. Kristján Eldjárn (2016:136-137) visitied the site in 1948 after having received a few weathered human bones from there. He discovered an eroding Viking Age burial with two grave cuts. One containing a human with a dog at its feet, the other containing a horse. The horse grave was adjacent to the foot-end of the human grave. The burial was about two m long, 0.8 m wide and had been oriented NW-SE, with the human in the NW grave cut. The entire burial had been dug up in the past so the bone was disarticulated. A few artefacts were nonetheless found, fragments of an iron couldron, a strap-end and buckle of copper-alloy, and some wood and iron fragments. Previously an oval brooch and a couple of beads had been found by the burial.

Only two animal bones from Krisján Eldjárn’s excavation, from a dog and horse, were stored at the National Museum for posterity. The dog element is a well preserved right radius, which came from an animal that stood at about 0.49 m at the shoulder in life (Harcourt 1974). The horse bone is a well preserved atlas.

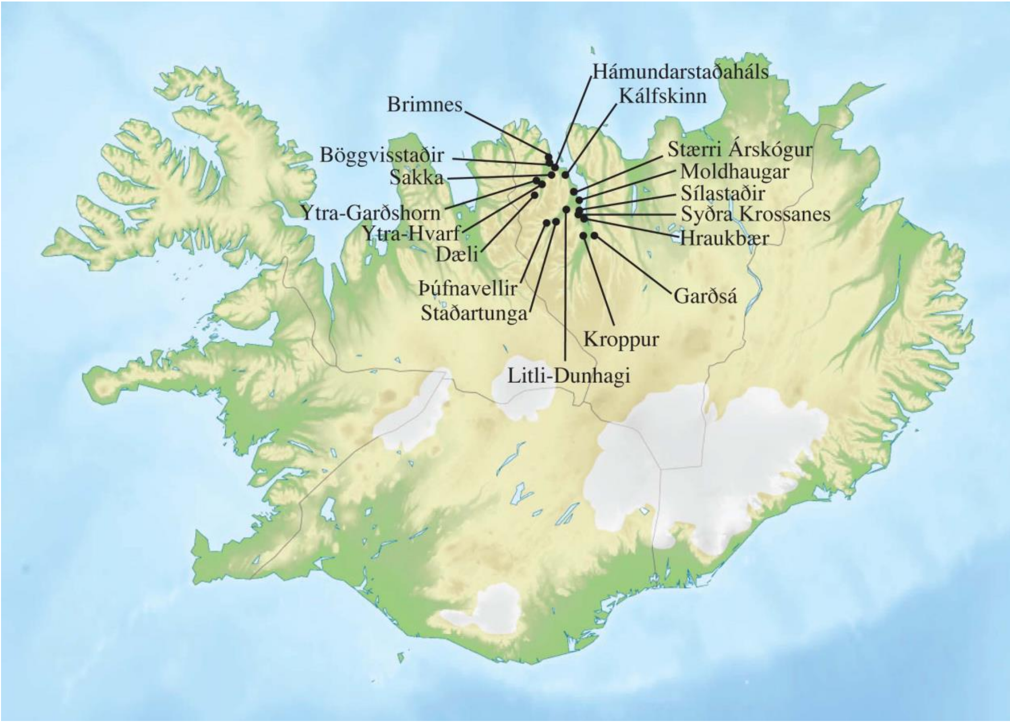
4.10.13 Öxnadalsheiði, Akrahreppur

The remnants of two Viking Age burials were discovered in 1962 by the mountain pass of Öxnadalsheiði. The location of these burials has been seen as unusual (Krisján Eldjárn 1966:13-18) since the nearest farm is over one and a half km away. Orri Vésteinsson (2013:21-25) has recenly hypothesised that the grave field belongs to a *sel* (a summer farm) whose remains are 200 m west of the burials.

The first burial was made up of two eroded grave cuts containing the remains of a woman and a horse. The two grave cuts were separated by a 0.3 m thick earthen boundary. The burial was oriented SW-NE. The human grave was the southwestern one, 1.8 x 0.8 m in diameter. It had been dug into and disturbed in the past. The human bone was disarticulated, but half of the horse grave was undisturbed (Kristján Eldjárn 1966:13-18), indicating that whoever dug into it stopped when realising that it was a horse grave. The woman had died between 36-45 years of age (Hildur Gestsdóttir 1998:16). A few artefacts were found in association with the human bone, including two beads, two buttons of tin-alloy, a knife, nineteen iron fragments (two of which were thought by Kristján Eldjárn to be from a pot or a ladle) and substantial wooden remains. The horse grave was 1.5 x 0.9 m diameter. The horse had been deposited with its head to the NE, its croup facing towards the woman's feet. The animal was buried with a saddle, the remains of which is a buckle and three nails (Krisján Eldjárn 1966:13-18). The horse is represented by 27 specimens stored at the National Museum. It was an adult of unknown sex, the relative age is evident from the fully fused vertebrae in the assemblage. A further relative age indicator are pathologies seen in the animal's vetebral coloumn and right hindleg. Three thoracic vertebrae are ankylosed. The vertebrae are fused on the articular processes, but the vertebral bodies are separate. The ankylosed vertebrae are quite eroded, so another vertebra may have been attached anteriorly. The other pathology is bone spavin in the right hindleg. Two tarsals, the grand cuneiform and the navicular, are ankylosed. The articular surfaces of the two tarsal bones are completely fused together and there is a growth of new bone on the anterior side of the tarsals. These pathologies are probably the result of prolonged mechanical stress due to riding or other load bearing, although genetics are also likely to have played a part. The horse stood at about 1.27 m at the withers in life, based on the measurement of the right tibia (May 1985).

The other burial was discovered 75 m north of the one described above. A large gravel hillock used to be there, called *Mannabeinahóll* (Eng. Human-Bone-Hill). The hillock had been completely mined for road construction, leaving a deep hole in the ground where Kristján Eldjárn found a few weathered human bones and one horse specimen (Kristján Eldjárn 2016:141). The age and and sex of the human cannot be determined (Hildur Gestsdóttir 1998:16). The single horse element, a cervical vertebra, is stored at the National Museum. The vertebra is quite weathered and white in colour. The state of epiphyseal fusion could not be ascertained.

4.11 Eyjafjarðarsýsla



Map 4–11 – Sites in Eyjafjarðarsýsla discussed in the text.

4.11.1 Dalvík (Brimnes), Svarfaðardalshreppur

The Dalvík (Brimnes) burial ground in the modern town of Dalvík is one of the largest and best-documented Viking Age grave sites known in Iceland. It was excavated by Daniel Bruun and Finnur Jónsson in 1909 and a total of thirteen graves, unevenly preserved, were described. The fourteenth grave was discovered during construction work in 1942, but was not as thoroughly documented as the previously recorded graves (Kristján Eldjárn 2016:170). The burial ground is situated on the coast, adjacent to a riverbed to the south that is also the farm's boundary to a neighbouring farm (figure 4.12). The excavators saw the burials as arranged in three main clusters that they labeled A, B and C. Northernmost is cluster A, which is comprised of three burials numbered I-III on figure 4.12.

Burial I was the grave of a middle-aged woman[3] accompanied by a dog, jewellery and unrecognisable objects of wood and iron. Eldjárn does not mention the dog in burial I in his thesis *Kuml og Haugfé*, but it is mentioned in Bruun's original report of the excavation (Bruun & Finnur Jónsson 1910:68-70; Kristján Eldjárn 2016:164-165). In the National Museum's catalogue the dog bones from burial I are given the number 5844, but that number is not to be found in storage. On the other hand there are dog bones along with horse bones in box 5845, which is according to the catalogue supposed to be human bone from burial I. The dog bones are only three, a femur and an ulna, and a rib fragment that is probably dog. The limb elements are fully fused and probably derive from an adult animal. The wither height of the dog cannot be accurately calculated due to erosion to the bone. It is curious that the two horse bones are accessory metapodials, both of which are relatively small compared to other horse limb elements. A complete horse in burial I would not have escaped Bruun's attention and it is hard to imagine only two accessory metapodials having been deposited into the grave. It is most likely that the horse elements are introduced from another assemblage, e.g. from burial II, since there seems to be some confusion with the numbering in the storage.

Burial II was a shared grave of a middle aged man and a horse. The man was lying on his back with his head facing SW. The horse was at the foot end of the grave and partly lying on top of the man's feet and on top of a spear-head, indicating that is was deposited after the human body. The horse was decapitated and its head placed on top of its body. The same treatment was observed with the other horses on this burial ground. Grave goods included a knife and a whetstone, scale weights and the before mentioned spear. Remains of a saddle were found by the horse (Bruun & Finnur Jónsson 1910:70-73). A total of 115 bone elements survive of the horse in burial II, distributed over all body parts. The horse in burial II was a relatively young animal at the time of death, between four and five years of age, and probably male. All seventeen vertebrae are unfused distally, but most are in the state of fusing proximally, the fusion line being very clear. One lumbar vertebra has both epiphyses unfused. All other elements, including all major limb elements, are fully fused. The state of fusion harmonises with tooth eruption and erosion (Silver 1969, Habermehl 1975). All mandibular molars are erupted, but incisors are little worn; they are flat and oval in shape and the 'cup' is wide open. The anterior part of the mandibles is missing, leaving only loose incisors, so the presence of canines is unknown. The pelvis is eroded and broken, so sexing is uncertain. The

[3] According to the analysis by Hildur Gestsdóttir (1998:10) burial I was of a middle aged male.

ischiatic arch looks rather shallow and flat, but is very broken and eroded. The obturator foramen, on the other hand, is oval in shape, which usually is a male indicating feature (Getty 1975). The animal was of average height in life, about 1.32 m – 1.37 m at the withers (May 1985, based on measurements on left tibia, right meta tarsal and left meta carpal). The cause of death and some interesting insights into the ritual killing of the horse in burial II can be inferred from the osteological analysis. Poleaxing was a very common way to kill animals in Icelandic Viking burials (Rúnar Leifsson 2012a) but could not be determined in this case due to the cranium being too fractured and the cranial fragments that have survived are mostly from the ventral and posterior part. An interesting mark, on the other hand, can be observed on one of the animal's neck vertebrae. It is a deep cut on the ventral side of the axis, the second neck vertebra (figure 4.13). The cut mark is 20 mm long and in the transverse plane; facing in a plantar – volar direction (or *vice versa*). The cut is thin but deep and was clearly administered with a sharp blade. The angle of the cut as it extends into the bone is midway between dorsal and cranial, which indicates that whoever inflicted the wound would have stood behind and above the animals head. That in turn makes it likely that the horse had been poleaxed because it does not seem to have been standing upright when its throat was cut. The cut mark further indicates that the horse must have been decapitated after death, i.e. after being poleaxed and bled

Burial III contained the remains of an adult male, with a spear and scale weights.

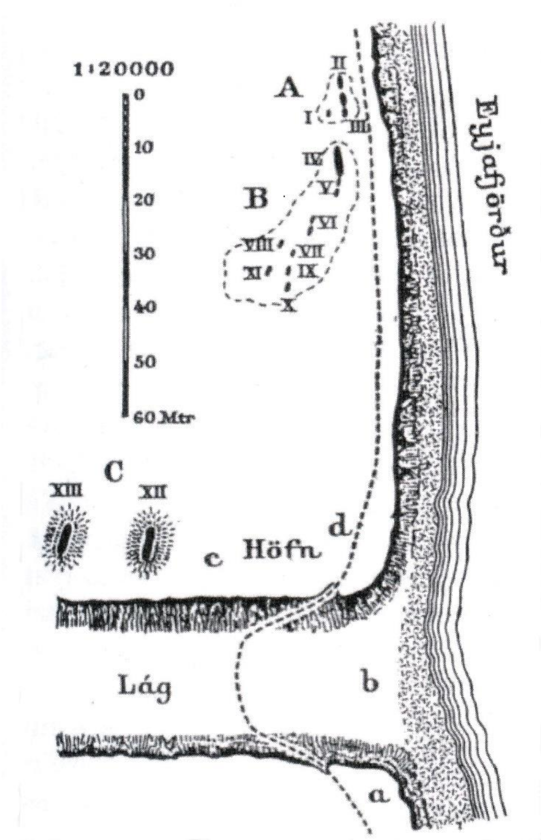


Figure 4–12 – The Dalvík (Brimnes) burial ground (Bruun & Finnur Jónsson 1910:65).

Figure 4–13 – Dalvík (Brimnes) burial II, cut mark on axis.

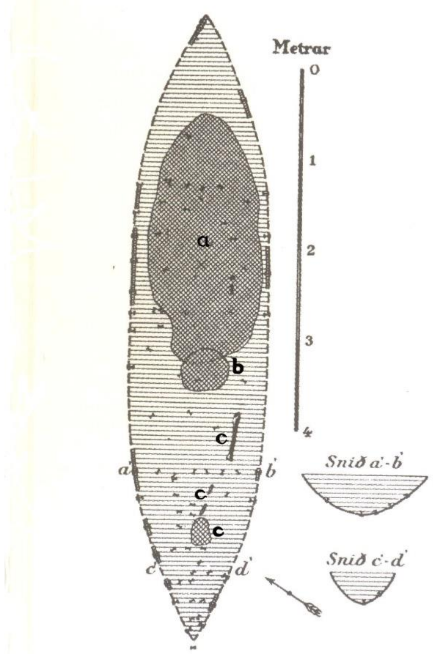


Figure 4–14 – Dalvík (Brimnes) boat burial IV (Bruun & Finnur Jónsson 1910:76).

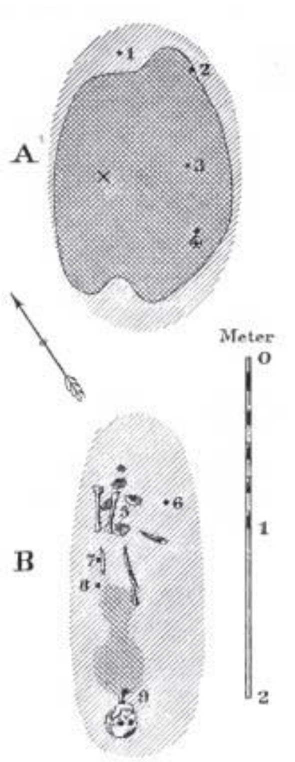


Figure 4–15 – Dalvík (Brimnes) burial V (Bruun & Finnur Jónsson 1910:81).

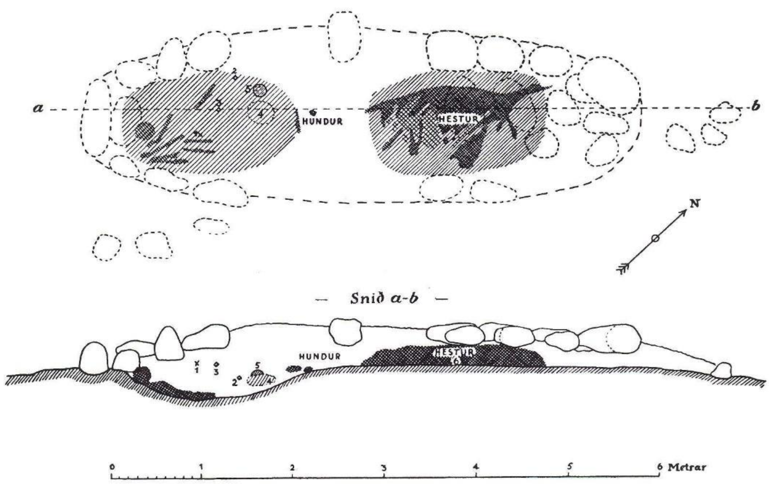


Figure 4–16 – Dalvík (Brimnes) burial XII (Kristján Eldjárn 2016:167).

Figure 4–17 – Dalvík (Brimnes) burial XII, cranium on midsection (Bruun & Finnur Jónsson 1910:87).

Figure 4–18 – Dalvík (Brimnes), sternal foramen from burial XIII.

Cluster B is comprised of burials IV-XI. Burial IV was a boat grave (figure 4.14). The boat was about seven m long with the prow facing NE. It was built of oak, which does not grow in Iceland, and would thus have to have been imported. The stern held the remains of an adolescent of unknown sex. A dog had been deposited by the human’s feet, toward the centre of the boat, and in the prow was, according to Bruun and Finnur Jónsson (1910:80), the skeleton of a decapitated horse with an associated buckle. The horse’s head was found among the bones of its midsection (Dan.: *imellem knoglerne i midterpartiet*), a sign that the animal had been decapitated. No other artefacts were discovered, but the excavator thought that the grave had been robbed (Bruun & Finnur Jónsson 1910:76-80). Analysis of the animal bone from burial IV reveals that the collection consists of the remains of two horses, not one, a dog and a single cow bone. Thus the original interpretation of the archaeology is somewhat altered. The dog was an adult animal. All of its bones, including vertebrae, are fully fused and mandibular molars are quite worn. At the shoulder, the dog stood at about 49 cm (based on Harcourt 1974), which is a bit taller than the modern Icelandic breed. The frontale and parietale on the dog’s cranium are unbroken. These are the parts of the skull that are usually fractured by poleaxing, which was a common way to kill dogs found in burial contexts. It is not known how the animal died or if it was indeed killed. The obvious lack of poleaxing indicates that the ritual proceedings surrounding dog burials were not rigid or always the same, at least when it came to the actual killing itself. The original report of the Dalvík (Brimnes) excavation describes a single horse buried in the prow-end of the boat of burial IV. The horse was saddled and had been decapitated prior to being buried, its head placed on its midsection (Bruun & Finnur Jónsson 1910:76-80). Because of that it was surprising to find the remains of two horses in the collection. The horses are represented by 47 elements and fragments, and two of those stand out as being “extra” elements indicating the presence of at least two animals. There are two right pelvises and two right tibiae in the assemblage. Apart from the extra pelvis and the extra tibia, the skeletal elements quantify a single individual which was killed by poleaxing. The extra pelvis and tibia seem to have undergone different taphonomic processes than the rest of the horse bone because they are much whiter in colour. That could indicate that they were introduced from another soil matrix outside of burial IV. At least it is obvious that these two bones have not absorbed as much mineral from the soil in burial IV as all the other. It is not certain that the two whiter bones come from the outside, but the different taphonomic state makes it highly likely that they are a “contamination” and not a part of the original burial. This could have happened during a previous ‘grave robbing’ event or either during or after the archaeological excavation. All of the horse bone is fully grown.

The more complete animal was adult and so was probably the ‘extra’ horse as well. Sexing is possible on both horses. The more complete horse has canines in its maxillae, which means it was probably male. The whiter extra pelvis also has male characteristics (Getty 1975). Measurements of a tibia and a metacarpal from the more complete horse show that it stood at ca. 1.33 m at the withers (May 1985). Further supporting a contamination of animal bone from outside of the burial context is the single specimen of cattle; a broken distal diaphysis of an ulna. The single cattle bone seems to be an anomaly in the collection. It does obviously not represent an entire animal and it is hardly the remains of food placed in the grave because it is a small fragment of a non-meaty joint. Three basic hypotheses concerning the presence of the cattle bone can be put forth; it could have been placed intentionally in the grave during the burial ritual, it could have been accidentally introduced into the burial matrix at some point during the funeral proceedings (e.g. waste from a feast), or it could have been introduced at a much later stage, e.g. either during or after excavation. One of these three hypotheses could possibly have been strengthened if the location of the bone in the grave was known, both stratigraphic and in relation with other archaeology, but unfortunately it is not.

Burial V was to the south of the boat grave and contained the remains of a middle aged woman and at her feet was another cut containing a badly preserved horse (figure 4.15). The woman was buried with jewellery, a knife, a stone vessel and some unrecognisable iron objects. The horse was buried with a saddle, based on the presence of nails and a buckle. It had been decapitated and the head placed on top of its body before interment (Bruun & Finnur Jónsson 1910:80-82). A record of the horse remains from burial V is not found in the catalogue of the National Museum and the animal bone was not located for the present study. It is nonetheless certain that the remains were at the time kept for posterity because Nobis (1961) studied them shortly after the middle of the 20th century. He found that the horse had been around 4 years of age at the time of death (Nobis 1961:130).

Burial VI contained the bones of an old woman and a horse, but no artefacts. The horse was deposited in a separate cut to the northwest of the human burial and both graves were covered by the same small mound. The horse was lying on its right side. It had been decapitated and the head deposited on top of its body (Bruun & Finnur Jónsson 1910:82-83; Kristján Eldjárn 2016:168). A single horse bone from burial VI exists at the National Museum, the second metacarpal from the animal’s right front leg. The horse stood at about 1.32 m at the shoulder, based on the measurement of the right metacarpal (May 1985), which fits well with both the Viking Age and the modern breed of Icelandic horses.

Burial VII was a disturbed grave of a man and dog. The burial had been disturbed the year before the excavation, but Daniel Bruun and Finnur Jónsson (1910:83) inferred that the human must have been buried in a sitting position, with the dog resting between his or her legs. No animal bone from burial VII is curated at the National Museum.

Burial VIII was of a single human. Some wood remains were discovered in the grave but no animal bone was found (Bruun & Finnur Jónsson 1910:83).

Burial IX was a horse grave. The animal had been decapitated and the head placed on its body. This is the only grave recorded at Dalvík (Brimnes) that contained solely an animal. The excavators hypothesised that the horse in burial IX would have belonged to the human in burial X, which was located a few meters away (Bruun & Finnur Jónsson 1910:83). The report does not state explicitly how far apart burials IX and X were or why it is hypothesised that they would go together. It is likely that the joining of burials IX and X can be attributed to 'common sense', i.e. that it would not have been conceivable at the time that horses could have been buried on their own and thus the burial was connected to the nearest human one that did not contain a horse. According to the sketch map of the burial ground the distance between the two is no less than between other burials, e.g. VII and VIII or VII and IX (figure 4.12). It is thus unknown if the horse in burial IX was buried at the same time as the human in X or if it took place on a separate occasion. The burial of horses in their own graves, not directly associated with another human grave is not unknown in Iceland, the best example being the Hrífunes burial ground in southern Iceland (pages 224-227). Two elements from the horse in burial IX are stored at the National Museum, a right maxilla and a left femur. The maxilla has m3, m2, m1, pm4 and pm3. Unfortunately it is broken so the presence or absence of a canine cannot be determined, which would have indicated the sex of the individual. The dentition is fully adult but the molars are not heavily worn, so the animal was fully-grown but not old at the time of death. The proximal epiphysis is broken off the femur so its greatest length cannot be measured in order to calculate the withers height.

Burial X was a disturbed human burial. Fragments of human crania were discovered in the southern end of the grave but otherwise it was empty (Bruun & Finnur Jónsson 1910:83).

Burial XI contained human bone, eroded iron objects and a little bit of charcoal. No animal remains were discovered (Bruun & Finnur Jónsson 1910:83).

Two graves were in cluster C (burials XII and XIII) which was about 50 m further SW from cluster B. Both burials were covered by very visible mounds and contained animal bone. The recovery of bone in cluster C was quite good and all the animal bone discovered seems to have been stored at the National Museum. The horse skeletons are more complete than most others from Dalvík (Brimnes). Bone from both burials has been sampled for c14 and the results calibrated for reservoir correction (Árný E Sveinbjörnsdóttir *et al.* 2010:682-696). Horse bone (ARR-5905) in burial XII is cal AD 940-1040 (1σ), dog bone (ARR-5906) from burial XII is cal AD 890-1020 (1σ) and human bone (ARR-5860) from burial XIII is cal AD 978-1027 (1σ).
Burial XII contained the remains of an adult person in a special cut at the southern end of the burial with a dog's head by its feet. The remains of a decapitated horse with bridle bits were in the northern end (figure 4.16). The biological sex of the person is uncertain. In the original report the individual is thought to have been female (Finnur Jónsson & Daniel Bruun 1910:88). In *Kuml og haugfé* the individual is thought to be male (Kristján Eldjárn 2016:169). But in the most recent analysis the biological sex is said to be indefinable (Hildur Gestsdóttir 1998). The horse seems to have been deposited straight onto the original earth surface instead of being buried in a grave cut, but the human and the horse were covered by the same mound. Artefacts in the grave included 19 chess pieces, a stone vessel similar to the one in burial V, a whetstone and some unrecognisable iron fragments (Bruun & Finnur Jónsson 1910:84-88; Kristján Eldjárn 2016:168-169). In their report, Bruun and Jónsson (1910:88) state that only the remains of a dog's head were found by the feet of the buried person. This is confirmed by the bone analysis; a left mandible, a maxilla and a loose canine are the only dog elements in the burial XII bone collection. The dog was adult but relatively young animal. The dentition is permanent and fully erupted but the m1 in the mandible is completely unworn. The question arises if a decapitated head of a dog was placed in the grave without the body or if this is a result of taphonomy. Decapitation certainly was common at the Dalvík (Brimnes) burial ground. All the horses are decapitated, although there is no mention of that treatment having been applied to other dogs. If the dog was indeed decapitated and only its head buried then that might contradict traditional ideas of dogs in graves being trusted companions and favourite pets. The act of burying only a head seems to resonate more with a deep symbolic meaning that goes beyond interspecies relationships on individual basis, or pet keeping. There

is, on the other hand, a possibility that taphonomic factors are to blame for the dog bone distribution. The excavators note in their report that the human part of burial XII, which also contained the dog bone, was disturbed upon excavation. The human crania was probably *in situ* at the south end of the grave cut, but the rest of the skeleton, although quite complete, seemed to have been somewhat shifted (Bruun & Finnur Jónsson 1910:84). In the osteological report written by Herluf Winge it is obvious that although the human skeleton is badly preserved and not complete, all body parts are represented by the bone distribution (Bruun & Finnur Jónsson 1910:100). The poorer preservation of the human skeleton compared with the horse skeleton, which is in good condition, might be due to anataxic processes caused by the disturbance (or robbery) of the human part of the mound, which took place at some point prior to the archaeological investigation. The lack of dog bone might be due to the disturbance. Two possibilities concerning this have to be considered. First there is the possibility that the entire dog skeleton except for the head was removed from the grave in a robbing (or post-depositional ritual) event. Secondly there is the possibility that taphic and anataxic processes caused most of the dog bone to disintegrate completely. Both of these scenarios are flawed. The first one seems unlikely because the human bone was not removed as well. It is at least not obvious why someone would remove the bone from the body of a dog, leaving the head, from a burial. The removal of human bone from Viking Age burials has been asserted (e.g. at Keldudalur in Skagafjörður, Guðný Zoëga 2008:25), often assumed to have been reburied in a Christian cemetery, so if the dog bone had been mistaken for human bone, there should presumably not have been so much human bone left in the burial. There is also the possibility that the dog was simply shovelled out of the grave during a robbing event, but the head resting *in situ* at the feet of the human makes that unlikely. The second scenario concerning the preservation seems very farfetched. The bone that does remain, the cranium and mandible, is not badly degraded and the soil conditions would have to be quite extraordinary for robust limb bones to disintegrate entirely leaving only the head. It can never be known for certain whether an entire animal was laid at the feet of the human in burial XII or only a severed head, but given the limited taphonomic inferences that can be made the second possibility seems more likely. The horse buried at the northern end of the mound is much more complete. The horse bone assemblage is comprised of 104 elements and fragments that are distributed over all skeletal parts. As can be seen on figure 4.17, the animal had been decapitated before burial and the head placed on its torso. The horse was male, based on the presence of canines in both mandible and maxilla and the form of the pelvis (Getty 1975). The animal was fully grown at the time of death. All bones, including the vertebrae, are fused. The incisors are quite worn and the occlusal surface is triangular in shape. The molars are likewise quite worn, with well developed real roots. This indicates that the animal was still in its prime, but clearly not young. Some stress-related pathologies can be observed on vertebrae and hindlegs which point towards strenuous labour, possibly years of riding. Five thoracic vertebrae have new bone forming on the ventral periphery of the anterior and posterior articular surfaces. This bone formation appears to be the first step in the fusion or locking (ankylosis) of the thoracic spine due to repeated mechanical stress to the anterior part of the vertebral column. The most obvious stress on the thoracic spine would be a saddled rider. Supporting that interpretation are medio-lateral fissures on the posterior articular surfaces of these thoracic vertebrae, which is a stress related pathology attributed to heavy riding (Levine *et al*. 2005; Pluskowski *et al*. 2010). The horse in burial XII was inflicted with pathology in its hindlegs, bone spavin, which is common in the Icelandic breed (Sigríður Björnsdóttir 2002). The tarsal bones (grand cuneiform and navicular) are fused together in both hind legs and both third metatarsals have extra bone growth on the anterior side of the periphery of the proximal articular surfaces. The bone spavin might be caused by extended mechanical stress on the animal's hind legs, but there might also be genetic factors at play inherent to the Icelandic breed (Sigríður Björnsdóttir 2002). The horse in burial XII stood at the shoulder at 1.36 m (May 1985) which is within the normal range of Viking Age horses in Iceland.

Burial XIII was similar to XII, with the skeleton of an adult female and a decapitated horse by the foot end. The mound covering burial XIII is the most substantial one known to have survived into modern times in Iceland (Kristján Eldjárn 2016:169). Jewellery and pieces of iron were found with the human bone. The horse is well preserved and represented by 158 elements and fragments, although some of the bone has broken, probably during excavation. The sex of the animal is unknown. The pelvis is in pieces and was probably damaged during excavation. It is not known if the horse had canines or not. The cause of death is also uncertain. The decapitation is obvious due to the placing of the head in the grave, but because of fragmentation of the cranium it can not be ascertained if the animal was previously poleaxed. The horse is clearly adult. All bone is fully fused and nine loose maxillary molars in the assemblage have well developed roots. Based on the average of the measurement of six long bones, the animal stood at 1.4 m at the shoulders in life. The horse in burial XIII has to some extent similar pathologies to the animal in burial XII, suggesting that it underwent similar mechanical stress in life, quite likely due to riding. The left tarsals and metatarsal are missing, but the right ones show definite signs of spavin, although not as advanced as in the previous horse. Callus bone has started to form on the central and second tarsals and on the periphery around the proximal articulation surface of the metatarsal. Four thoracic vertebrae in the collection have started fusing together, with new bone formation on the periphery of both posterior and anterior joints, and have medio-lateral fissures on the posterior articular surfaces. The new bone formation on the vertebrae and the fissures on the articular surfaces are probably due to the weight of a rider sitting on the horse's back. Finally, there is a most curious mark to be found on the horse's ossified sternum. There is a 30 mm deep and seven mm wide hole through the sternum. The hole pierces through the bone in a ventral-dorsal direction and is almost perfectly round (figure 4.18). The bone on the edges of the puncture is the same colour as the rest of the sternum, which indicates that the mark has been on the bone in the ground for a long time. If the sternum had been punctured during excavation the periphery of the hole should be lighter in colour than the rest of the bone. This is almost certainly a 'sternal foramen' (e.g. Kumarasamy & Agrawal 2011; Babinski *et al.* 2012; Azizi *et al.* 2012). It is a congenital condition of the sternum, the result of an incomplete fusion of the sternal ossification centers and is usually asymptomatic. This is further discussed in chapter 5 (pages 253-254).

In the 1940s another burial, the fourteenth one, was discovered close by. It contained human bone, thought to be female, and the skeleton of a horse with a buckle at the human's feet (Kristján Eldjárn 2016:170). The human bone was collected and preserved but not the horse or the buckle.

The Dalvík (Brimnes) grave field gives the overall impression of the group buried being of considerable standing in society. Despite the range in material wealth in the graves (which could at least partly be due to the artefact assemblage being skewed by 'grave robbing' and varying preservation) it is clear that the burials were quite elaborate. Three radiocarbon dates have been published from the site, from burials XII and XIII. The samples derive from human, horse and dog bone, and the overlapping dates point towards the latter part of the 10th century or the beginning of the 11th. There seems to have been intra grave field correlation in funerary rituals at Dalvík (Brimnes), e.g. regarding the killing and placing of animals. The standardised decapitation of horses indicates some bloody theatrics to the funerary ritual that was maintained over time (e.g. Lucas & McGovern 2007). There is some indication in burial II that the horse there was decapitated after death, which means that the beheading was clearly not just means of killing but an integral part of the funerary ritual itself. There is further evidence that the horse was laid in the grave after the human. So the killing and subsequent decapitation and deposition of the horse took place while the deceased person lay in the open grave. The decapitation of horses is not unique to Dalvík (Brimnes), but it is still not a common practice in Iceland. This stands to show that burial rituals could be to some extent specific for individual sites while retaining the overall characteristics of burial practices in society at large. For example, what does stand out at the Dalvík (Brimnes) grave field is the common occurrence of horses in the graves, accompanying young and old of both sexes, which is very characteristic of known Icelandic Viking Age burials. The horses at Dalvík (Brimnes) are similar in many respects. They are fully grown but not very old, they are male, and some show signs of having been ridden heavily. There are four dogs known from the Dalvík (Brimnes) burial ground, but the dog from burial XII stands out to some extent. It is not uncommon to find dogs buried with humans in pre-Christian graves field (chapter 5.2). Usually they are deposited by the legs of the deceased and the standard interpretation is that they were a faithful companion following its master to death. The dog in burial XII is represented by the head only and it seems likely that this is a relic of a funerary ritual rather than a later taphonomic event. The burying of a decapitated dog’s head does not seem to conform to the idea of a trusted companion, at least not in the modern sense. This on the other hand does indicate that ‘common sense’ ideas about pre-Christian burial rituals might in some cases be overly simplified, or at least only tell a part of a more complicated story.

4.11.2 Dalvík (Böggvisstaðir), Svarfaðardalshreppur

The modern town of Dalvík occupies the land of two much older farms, Brimnes and Böggvisstaðir, both of which have Viking Age burial grounds. Brimnes has already been discussed above. The burial ground at Böggvisstaðir was also by the coast, about 300 m further southwest, and is documented to a much lesser degree than the other one. It largely succumbed to house construction during the first half of the 20th century. Four or five burials are known but only one of those underwent archaeological investigation. In 1937 a boat burial was excavated by Matthías Þórðarson. It had been discovered during excavation work for water pipes. A few years previously two other graves, of a man and a horse, had been found a little further to the west also during construction. They were not investigated. In the records they are called two graves (kuml), so it is not certain if they were part of the same burial or were separate. Sources tell of two other Viking Age burials found close to the boat burial, one to the southwest and the other to the northwest. Nothing was documented about these remains. The boat burial excavated by Matthías Þórðarson turned out to have been dug into and disturbed sometime in the past. All human remains had been removed and the horse bone, which was mainly to be found in the northern end of the boat grave, was mixed up and not articulated. The only horse bone the excavators thought might be *in situ* was a cranium found in the prow with articulated mandibles, atlas and axis (Matthías Þórðarson Unpublished b). No artefacts were found apart from nails and rivets and a few iron fragments, one of which might be a piece of a sword blade with the remains of a wooden scabbard attached. It was concluded in the excavation report that the burial must have contained a human body at some point, which had been removed along with all artefacts.

A total of 338 elements and fragments make up the Böggvisstaðir animal bone collection. The bone is stored at the National Museum under the number 12118 and according to the description in the catalogue it originates in the boat burial excavated in 1937 (Matthías Þórðarson Unpublished b). It was somewhat surprising to find upon analysis that the bone collection consists of elements from at least five individual horses. The MNI count is based on the presence of five right metacarpals. Nothing in the unpublished report or *Kuml og haugfé* suggests other than that the bone originates from the same boat grave. The labelling on the bone storage boxes holds clues to the origins of the five animals, but they are not conclusive. Part of the horse bone definitely originates from another grave, but it is definite that at least three horses were laid to rest in the boat grave and possibly even four. The presence of more than two horses in a single burial is rare in Icelandic archaeology but not unheard of (pages 293-296). The collection is split into four containers. A large box numbered "12118" containing 298 elements and fragments, a smaller box numbered "12118?" containing five elements, and two paper bags numbered "12118?a" and "12118?b" containing 32 and three elements respectively. Number "12118?a" is labelled "the remains and fragments of northern-most horse bone in the central burial" (Icel. *Leifar og brot af nyrðri hrossbeinum í miðdys*), meaning the boat burial. Number "12118?b" is labelled "horse legs and a tooth from the southwestern most burial (Icel. *Hrossleggir og tönn úr suðvestustu dys*), indicating an origin from an undocumented burial discovered during construction years before the boat grave. The box containing the bulk of the collection, "12118", has a MNI of three individuals based on the count of metacarpals, first phalanges, tibiae and ulnae. If the elements from 12118?a (which also come from the boat grave) are added, the count of incisors also gives three as MNI. The five elements from 12118? mostly fit with 12118 and 12118?a in terms of MNI and element distribution. The exeption is a single right metacarpal, which would inflate the MNI to four in the boat grave. This 'extra' left metacarpal is fused with the accillory m/c3 and has a small lump of callus bone on the medial diaphysis between m/c2 and m/c3, which makes it likely that it originates from a mature individual. A mandible also present in 12118? corresponds in terms of age with the right metacarpal. It comes from a male, based on the presence of canines, and the wear of the incisors indicates that the animal that died roughly at ten years of age, perhaps a bit older (Silver 1969, Habermehl 1975). It is unknown if the five elements in 12118? derive solely, partly or not at all from the boat burial. But the extra metacarpal and corresponding mandible make same origins seem unlikely.

The three animals buried in the boat were of different age and at least two but probably all of them were male. The sex is derived from the total number of canines in the 12118 assemblage, which has a MNI of two, and with the addition of a mandible in 12118?a the MNI of males rises to three. It can be noted that no element in the entire Böggvisstaðir assemblage has discernible female characteristics. Age at death of the horses in the boat burial is inferred by the state of epiphyseal fusion and tooth wear. Two of the horses seem to have been relatively young at the time of death while the third was old. All elements are fully fused, apart from 23 vertebrae (cervical, thoracic and lumbar) that have the distal epiphyses either in the state of fusing or completely unfused. This means that at least one of the horses was quite young at the time of death, between four and five years of age (Silver 1969). The unfused vertebrae might come from more than one individual, but that cannot be conclusively determined and it is the raw count of them that gives one as MNI. A number of incisors in 12118 are little worn and correspond with the unfused vertebrae both in terms of MNI and age. Occlusally they are flat and oval in shape with the infundibulum wide open. On the other hand, when assemblage 12118?a is added the MNI of young animals (around five years) increases to two. There are a number of loose incisors and the remains of a (male) mandible with incisors in assemblage 12118?a which show similar wear as the incisors in 12118 (Silver 1969, Habermehl 1975). When 12118 is analysed independently the other younger animal can only be aged as being older than three and a half years based on epiphyseal fusion of long bones, but when the two assemblages (12118 and 12118?a) are combined the number of young animals inflate to two while the total number of horses in the boat remains three. The cause of death cannot be determined for either of the younger horses. The third animal in the boat grave was considerably more mature, with fully fused elements, worn teeth and well developed real roots. The wear of incisors indicates that the horse might have been at least 20 years old (Silver 1969, Habermehl 1975). The cause of death seems to have been poleaxing judging by the fractured cranium. The old animal suffered from bone spavin in its hind legs, probably due to heavy work over extended time. On the right hind leg, the second (central) and third tarsals are fused with the metatarsal. Anterior and medial on the proximal epiphysis is a massive callus lump (possibly periostosis) which could be the result of infection or simply an exaggerated form of spavin. The left hind leg also shows evidence of spavin with callus formation on the proximal epiphysis of the metatarsal. The left metatarsal was in the state of fusing with the tarsals and the central and third tarsals of the left leg are already fused together with callus bone. Both metacarpals of the oldest animal also have the accessory m/cs fused to them. It seems clear that the animal would have been affected by these pathologies, especially by the state of its right hind leg.

The Böggvisstaðir assemblage is obviously quite mixed, which is further supported by the presence of a right sheep pelvis. The sheep bone shows evidence of different preservation than the rest of the bone. It is whiter in colour and has very good texture. The sheep bone is most likely a "contamination" from outside the grave. It is also evident from the labelling on one of the paper bags in the storage that the bone does not all originate from the boat grave. It is certain that at least two metapodials and a maxillary molar derive from a burial southwest of the boat burial. There are the remains of at least three horses from the boat burial, possibly even four and at least two of these animals are relatively young. The question arises how many people were deposited in the grave? The burial had been disturbed in the past and all human remains evidently removed. It is most common in Iceland for a single horse to be buried per person (pages 292-296) and that could be the case at Böggvisstaðir. A boat grave with seven people is known from Vatnsdalur in west Iceland (Þór Magnússon 1967:5-35) so a boat grave with three to four people at Böggvisstaðir would not be unique. There is also of course a possibility that a single human was buried in the boat, which would in turn make this one of the most elaborate burials of a single person ever recorded in Iceland. It seems highly unlikely that the horses were simply buried by themselves. Not only are burials definitely only containing a horse rare but the presence of a supposed sword fragment makes it highly unlikely in this instance.

4.11.3 Dæli, Svarfaðardalshreppur

In 1970 a bulldozer was working about 200 m away from the farmhouse at Dæli, breaking land for a new field, when it disturbed a Viking Age burial on a hillock. No investigation took place and the exact location is unknown. In the tracks of the bulldozer were found horse teeth and bones, human teeth and at least two whalebone pins (Kristján Eldjárn 1979:97-98). The animal bone was not collected.

4.11.4 Garðsá, Öngulsstaðaheppur

Two Viking Age graves are known from the farm of Garðsá. One is of a human the other of a horse, but they do not seem to be part of the same burial process or the same funeral. The ancient burial ground is situated 400 m NW of the farmhouse, in an eroded area by the banks of the river Þverá. This area had been mined for gravel for years without any archaeology being found, until the spring of 1952 when people noticed human bone in the shovel of a mechanical digger. Kristján Eldjárn (2016:186-7) conducted the research that summer. He discovered a few human bones *in situ* from where the mechanical digger had been working but otherwise the grave was severely disturbed. The person had been facing NW and an axe, a knife and a fragment of a buckle were found in association. Kristján speaks of the individual as being male, perhaps based on the artefactual context, which in this instance would be quite tenuous. Hildur Gestsdóttir (1998:11) says the bone cannot be sexed due to bad preservation.

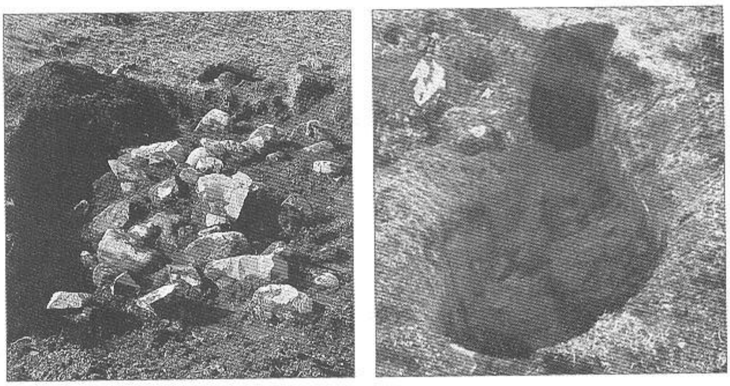


Figure 4–19 – The Garðsá burial (Kristján Eldjárn 2016:187).

The horse grave was subsequently discovered in an eroding bank of soil, about twelve to fifteen m further south. The distance is too great for the two graves to be convincingly associated with one another, although they clearly belong to the same grave field and the horse might very well have followed another unknown human grave closer by. The horse burial was covered with stone and faced in the same directions as the human burial, NW-SE. It was oblong in shape and narrowed toward SE (figure 4.19). The grave cut was two and a half m long and the width was one m where it was greatest, but narrowed to half m. Kristján Eldjárn (2016:187) interpreted the strange shape of the cut in such a way that the head must have rested in the narrow SE-end. That could however not be verified because the burial had evidently been dug up and disturbed in the past. All the horse bone, apart from a few vertebrae at the bottom of the grave, was disarticulated and mixed with the grave fill. The sheer size of the grave does raise the question if it was shared by a human to begin with, whose remains could have been removed later on, leaving only the disarticulated horse bone. This could possibly have been argued for or against if a plan of the *in situ* vertebrae within the grave cut existed. A few iron artefacts were found in the horse grave; two bosses or nail heads, interpreted as the remains of a saddle, a hook and a small buckle. The saddled horse was an old male. Of the animal itself 57 specimens survive. The bone elements are dispersed over all body parts, indicating that an entire carcass was originally buried. The sex is inferred from the presence of canines in the mandible, but the pelvis is too fragmented for sexing. All bone elements are fused and fully grown. The heavy wear of the mandibular incisors indicate that the animal was elderly. The occlusal surfaces are triangular in shape and no mark can be seen on any of them, only a round yellow 'star' of secondary dentine in the pulp cavity. The horse is probably at least 20 years old. Its wither height is about 1.34 m based on the measurement of the left metacarpal (May 1985). It is not clear how the horse was killed for burial. The cranium is too fragmented and partial for determining if the animal was poleaxed or not.

4.11.5 Hámundarstaðaháls, Árskógshreppur

A discovery of a human cranium and a large spear-head was made on Hámundarstaðarháls in the autumn of 1930 by a man from a nearby farm. Shortly before, two horse skeletons had been discovered in a grave a few meters from the disturbed human burial. Both discoveries were due to gravel mining for road contruction. Matthías Þórðarson (1936:38-39) published a report of these finds and assumed that the disturbed human grave and the double horse grave had been part of the same funerary process. That seems unlikely given that a few meters separated the burials, which would be an unusual feature in Iceland (pages 292-293). When the double horse burial was first found, the road crew investigated the immidate surroundings but found no other graves (Matthías Þórðarson 1936:39). But even so, it is likely that more burials either are or used to be on the site. According to local lore pagan graves were supposed to be in the area and people had in the past unsuccessfully excavated there in pursuit of grave goods (Kristján Eldjárn 2016:172). Moreover, Kristján Eldjárn investigated a sizeable burial mound some distance east of this site, but also on Hámundarstaðaháls, that contained horse remains. The mound, about five m in diameter, had been dug into before and disturbed. The horse remains Kristján Eldjárn found in the mound unfortunately did not find their way to the National Museum. Twice since, human bone has been discovered in the vicinity on Hámundarstaðaháls, but not on those two exact locations (Kristján Eldjárn 2016:172).

The animal bone assemblage from Hámundarstaðaháls is made up of 30 elements from the double horse burial found in 1930, and three elements of seal and cattle from an unknown context. The horse bone has a MNI of two as would be expacted, based on the count of left metatarsals, left tibiae, scapulae and pelves. The assemblage is quite weathered and eroded and mostly comprised of limb and axial elements. No cranial or mandibular specimens are present. It is not possible to determine the cause of death for either individual. When infering the age at death, it can only be stated that both horses were adult. All the elements are fully fused, including the vertebrae, but no age or stress related pathologies can be seen. At least one of the animals was male, based on the morphology of the pelvis (Getty 1975). The other pelvis is too fractured for sexing and all mandibular evidence is missing. Withers heigth can only be calculated on three elements; a left and right metatarsal and a humerus. The metatarsals give similar results, 1.35 m at the shoulder, but the humerus gives 1.26 m. This could possibly indicate that the metatarsals and the humerus come from separate animals and that the two individuals were of different physique.

The three other bones, a seal scapula and pelvis and a cattle tibia from a very young animal are more of a mistery. They arrived at the National Museum with the horse bone, but are labelled differently. All the horse bone is labelled 11435, while the three other elements are 11435b. The museum’s catalogue does not talk about the context of these bones or if they come from the grave or not. If they did originate from the burial, i.e. the same context as the horse bone, it is strange that they would be given a ‘b’ number. In the published report Matthías Þórðarson (1936:38) writes in a footnote, that these elements had arrived with the horse bone, but that they are without a doubt younger and unrelated to the burial. It is not clear if he based that assumption on the account of the locals who found the grave or if he based it on the specimens themselves. The three elements certainly seem to have undergone different taphonomic processes than the horse bone. The seal and cattle bone is not weathered, it is much better preserved and slightly darker in colour. In light of that it would be unwise to use these three specimens in future studies of animal bone from burial contexts.

4.11.6 Hraukbær, Glæsibæjarhreppur

The animal bone assemblage from Hraukbær stored at the National Museum is probably not derived from a burial context. It is nonetheless included here because this catalogue is an unabbreviated account of all known animal bone material associated with burial sites. In 1995 a burial was discovered by bulldozing about 10 m from the modern farmhouse of Hraukbær. Bone was scattered in the trail of the machine, but the lower part of a human skeleton was found still resting in the grave. The bones belonged to a woman, 18 – 25 years of age at the time of death. No artefacts were found, but the soil next to the *in situ* pelvis was oxidised and there must have been an iron object placed there (Ragnheiður Traustadóttir 1996:7). A total of twelve animal bone specimens from the Hraukbær investigation are stored at the National Museum. Half of them are sheep, the rest small fragments of medium mammal bone. The sheep bone is comprised of two left radii and four phalanges. The context of the find is insecure, the bone did at least not come from the *in situ* grave. The site was decimated by a bulldozer and is located on a farm mound. The animal bone is thus more likely to originate from a refuse dump than from a burial context.

4.11.7 Kálfskinn, Árskógsstrandarhreppur

Two double Viking Age burials were excavated at the farm of Kálfskinn in 2005. Each burial was made up of two grave cuts containing a man and a horse. One burial also contained the remains of a dog. The burials were situated on a gravel plain called *Reiðmelur*, crossed by an old horse trail (Adolf Friðriksson 2016:495) which must have provided the plain its name. Both burials had been dug into in the past and significantly disturbed (Adolf Friðriksson *et al.* 2009b), and the element distribution of horse bone indicates the presentce of a third burial which is as yet undiscovered.

Burial I was oriented NW-SE (figure 4.20). The grave cut containing the human bone was to the SE, 1.8 m long and 0.4 – 0.7 m wide. Only a few scattered human bones were found and the remains of a dog. The person was of unknown sex and had died before the age of 35 years. The only artefacts were a few nails with wooden remains and a couple of iron objects, thought to be the remains of a casket, and a dark and polished stone pebble. The horse had been deposited into a separate grave cut to the NW, separated by a 0.3 m thick earthen boundary. The horse had been put into the grave on its side, with its back up against the SW-bank of the cut and its croup turned towards the human’s feet. The horse’s legs were curled up. The head was mostly missing but the rest of the skeleton was little disturbed (figure 4.21). No artefacts were found in the horse grave (Adolf Friðriksson *et al.* 2009b). The animal bone was unavailable for the present work but the assemblage was previously analysed by Lisa Yeomans:

The pelvis, in addition to the presence of canines shows that the horse […] *was a male. The animal had reached a mature, but not old, adult when he died. This is based on the wear of the incisors which had worn below the level of the enamel infundibulum. The bones demonstrated no signs of age related pathologies. Infection was probably the cause of the tarsals and third metatarsal of the left leg fusing together. The bone seems to have responded to an infection of the joint by remodelling with the new bone growth causing the bones above the metatarsal to fuse. A congenital anomaly was probably the reason for the sacrum and the first caudal vertebra to also be fused* (Adolf Friðriksson *et al*. 2009b:26-27).

The relative age of the horse is here based on the wear of the incisors, which are said to have worn below the level of the enamel infundibulum. The disappearence of the infundibulum (or the mark) by itself is not very accurate for determining actual age at death, since this can occur with in a frame of a number of years. Since the mark has disappeared from all incisors it can be estimated the animal died between 14 – 20 years of age (Habermehl 1975, cf. Silver 1969). The description of the fusion of the tarsals with the center metatarsal of the left leg corresponds with bone spavin, which is commonly found in Viking Age (and modern) horses in Iceland (Sigríður Björnsdóttir 2002). This condition is probably due to a combination of mechanical stress to the hind legs as well as genetics. In addition to the horse skeleton, three extra horse elements (atlas, sacrum and upper canine) and two caprine elements were mixed in the grave fill. The horse MNI is thus two, but the extra elements probably originate from outside the burial and got 'contaminated' when the grave was disturbed in the past. A dog had been deposited with the human remains in the other grave cut. Lisa Yeomans describes the dog bone thus:

These were in poor condition, fragmented and, do not represent a complete skeleton. The body parts recovered consisted of the atlas, axis, most of the cervical vertebrae and part of a heavily fragmented pelvis. There was also the right humerus, right proximal ulna and radius, left scapula, left proximal humerus, part of the left ulna shaft and right proximal tibia in addition to parts of three fragmented metapodials. Since the skull was absent and the pelvis was fragmented it is impossible to determine the sex of the dog which was a medium-sized animal. At some point during the dog's life it suffered a fracture to lower portion of the left humerus shaft. This was a spiral fracture that had time, before the dog died, to heal itself. In addition to the dog bones was a left unfused distal tibia of a sheep and the astragali that articulates with this bone (Adolf Friðriksson *et al.* 2009b:27).

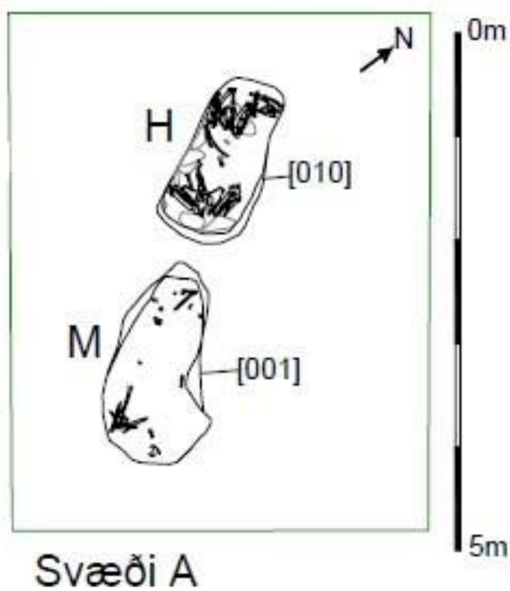


Figure 4–20 – Kálfskinn burial I (Adolf Friðriksson et al. 2009b:9).

Figure 4–21 – Kálfskinn burial I (Adolf Friðriksson et al. 2009b:9)

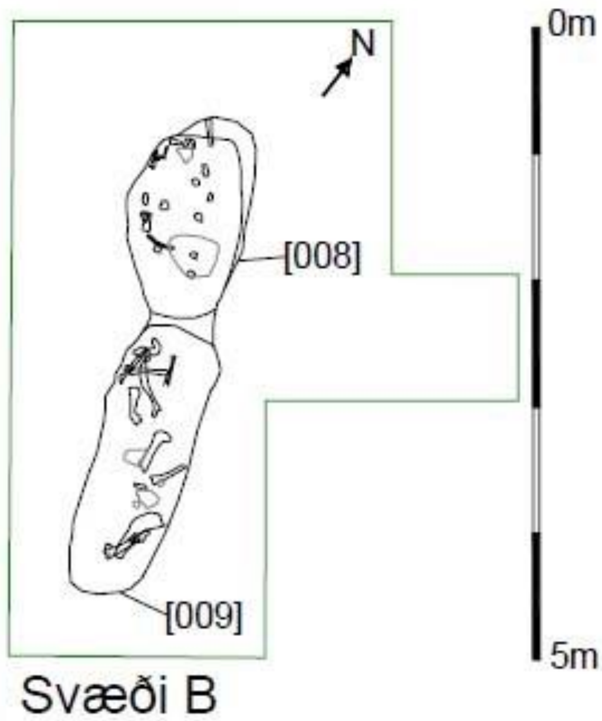


Figure 4–22 – Kálfskinn burial II (Adolf Friðriksson et al. 2009b:11).

Considering that the human grave cut was very disturbed (all bone within disarticulated and the human skeleton was also partial) it seems clear that the dog was buried complete and unbutchered. The healed fracture is interesting. It stands to show that someone would have cared for the animal while it was recovering, indicating a bond with a human being, possibly the person it was buried with. The sheep bone could be a later contamination to the bone assemblage, occurring when the burial was dug into. This is not likely to be the remains of food placed in the grave, since the distal part of the tibia and astragali do not represent a meaty joint.

Burial II was similar to the former one but more disturbed and contained no artefacts. It was made up of two grave cuts and was oriented NNE-SSW (figure 4.22). The northern grave cut was 2.2 m long and 0.75 m wide, while the southern grave cut was 1.5 m long and 0.9 m wide. The two cuts were separated by a 0.2 m thick earthen boundary. Disarticulated human and horse bone was found mixed in both grave cuts. The excavators assumed based on the size and shape of the graves that the human had originally rested in the southern cut. The human was male and died between 22 and 33 years of age (Adolf Friðriksson *et al.* 2009b). The animal bone was analysed by Lisa Yeomans:

> *The bones from the fill* […] *of the horse grave comprise of an almost complete mandible with both sides present. Breakage across the diastema has meant that it is not possible to determine whether there would have been any canines. However the fact that no canines were recovered suggests that the animal was more likely to have been a female. Based on the tooth wear of the incisors recovered and the fusion of the bones, the horse must have died as a young, but skeletally mature adult. The upper right I4* [sic] *recovered from the stone spread context* […] *was completely unworn. No pathologies were visible on the bones present* (Adolf Friðriksson *et al.* 2009b:27-28).

The horse in burial II is thus a younger animal than the horse in burial I, probably a young adult. It is stated that the corner insicor is unworn (called I4 in the report, but must of course mean I3) which would mean that the animal was probably between four and a half and five years at the time of death (Silver 1969, Hablermehl 1975). The absence of canines in the assemblage is not a viable argument for sexing the animal. The presence of well developed canines would have meant that the horse was most likely male, but seeing that the part of the mandible where the canines would (or would not) be located is missing, means that neither sex can convincingly be argued for. On the other hand, in burial I there was an extra canine present, meaning that there was very likely another male horse present on the burial ground. The two other extra elements in burial I were also not found in burial II. If the burials were 'robbed' at the same time, then the three extra specimens could have belonged to the horse in burial II. Lisa Yeomans does not discuss the presence or absence of pelvic bone, nor how many specimens there are in total in the collections. In the human part of burial II was an extra left humerus from a horse. This element means that on the entire burial ground there were at least 3 horses, since another left humerus is in the horse part of burial II and the third is found in burial I (Adolf Friðriksson *et al.* 2009b). The distribution of animal bone in burials I and II is testament to how much the site was disturbed in the past and a strong indication that at least three burials were dug up simultaneously.

4.11.8 Kroppur, Hrafnagilshreppur

The animal bone assemblage from Kroppur stored at the National Museum is probably not derived from a burial context. It is nonetheless included here because this catalogue is an unabbreviated account of all known animal bone material associated with burial sites. In the summer of 1900 two burials were discovered during gravel mining. The former was that of a male, between 36 – 45 years of age at the time of death and the other, found a meter away, was of a woman roughly the same age (Hildur Gestsdóttir 1998:13). The man was buried with an axe and a spear, while a bronze pin and bronze sheet were discovered with the woman. No animal bone is recorded as having been found in either grave, not in in the original report by Daniel Bruun (1903:20-21) or in Kuml og haugfé (Kristján Eldjárn 2016:185-186). Further more, the National Museum's catalogue does not have an entry concerning the arrival of this animal bone assemblage. The only clue is written on the lid of the storage box, which reads "From Kroppur?". The assemblage contains five specimens. Of those, one is sheep, two are probably cattle and two are large mammal. It is most logical to assume that the bone was collected in the vicinity of the burials, but originates from household refuse.

4.11.9 Litli-Dunhagi, Arnarneshreppur

In 1963 both human and horse bone was collected in the wake of a bulldozer levelling a hayfield at the farm of Litli-Dunhagi. No artefacts were found and the layout of the burial was obliterated (Kristján Eldjárn 1966:50). The human bone is most likely from a male past 46 years of age (Hildur Gestsdóttir 1998:13). Even though the actual grave was not found it was concluded that the bones must have come from a Viking Age burial, due to the association of human and animal bone. The analysis of the animal bone assemblage, which consists of eight well preserved specimens, complicates the original interpretation of the site. The collection is mostly made up of horse bone, but a single cattle element is also present. Further, the horse bone comes from at least two individuals. The horse MNI is based on age distribution. There are fully fused vertebrae in the assemblage, mixed with a fusing femur and humerus, which cannot derive from the same individual. This is because the long bones fuse at an earlier age than the vertebrae (Sisson 1914, Silver 1969). The cattle element, a sacrum, and one of the horse specimens, a first phalanx, have primary butchery marks. Both have been chopped with a heavy instrument. The cattle sacrum has been chopped in the transverse plane immediately behind the first sacral segment, leaving only the anterior part. The horse phalanx has similarly been chopped in the transverse plane, removing a part of the distal epiphysis. Both chops are 'clean' and with no additional cut or chop marks adjacent, indicating that in both instances a single heavy blow was executed. The assemblage is unusual for a burial context and must be regarded with caution given that no actual grave was found and all the material was hand collected from the ground after being redeposited. Radiocarbon dating of both human and animal bone could disprove the Viking Age burial interpretation, but not entirely support it. Given the species distribution, lack of elements and the butchery marks, it seems likely that at least part of the assemblage is refuse.

4.11.10 Moldhaugar, Glæsibæjarhreppur

In 1908 two Viking Age burials were discovered on the farm of Moldhaugar during road construction. The burials were located on a hillock outside of the home field where views of the surrounding landscape and Eyjafjörður are good (Páll Jónsson 4. July 1908:188). The first burial contained the bones of a human, a horse and a dog. The second burial only contained human bone along with a few artefacts. No animal bone was preserved.

4.11.11 Sakka, Svarfaðardalshreppur

Around 1770 a Viking Age burial was discovered on a hillock at the farm of Sakka. It is reported that the grave contained a human cranium, horse bone, a sword and a silver needle (Kristján Eldjárn 2016:149-150). No animal bone from this find has survived.

4.11.12 Sílastaðir, Glæsibæjarhreppur

Four Viking Age burials are known from Sílastaðir, all from the same grave field (figure 4.23). Two of those contained horse remains alongside the human bone. The burial ground was undisturbed until the spring of 1947 when the farmer broke new land for cultivation with a bulldozer. Burials I and II were damaged by the machining, but burials III and IV were intact upon investigation by Kristján Eldjárn (1954:53-68) in the autumn of that year.

Burial I was of a male accompanied by at least one but probably two horses. The present analysis of the horse remains revealed that the MNI is two, whereas before it was thought that a single animal had been in the grave. Burial I was damaged by the bulldozer and a substantial part of both bone and artefacts were relocated in its wake. There is a possibility that the second animal originated in another burial, but Kristján Eldjárn found no indication of such in the immidiate vicinity. A radiocarbon sample taken from horse bone (ARR-5907) revealed a cal AD range of 780 – 970 (1σ) and a sample from human bone (ARR-5863) gave a cal AD range of 810 – 950 (1σ) (Árný E Sveinbjörnsdóttir *et al.* 2010). The man was over 46 years of age at the time of death (Hildur Gestsdóttir 1998:13). The bone material still *in situ* showed that both man and horse/s had rested in the same grave cut; the man in the western end and the animal/s by his feet in the eastern part. The man was buried with several weapons and other artefacts. The artefacts include a sword, two axes, a spear, a shield boss, a knife, a whetstone and two buckles. Substantial wooden remains were in the grave. The investigators thought that they did not come from a coffin but seemingly from some sort of internal structure (Kristján Eldjárn 1954:55-57).

The animal bone assemblage is made up of 51 specimens. The MNI is derived from the presence of four metatarsals, two from each side, indicating that at least two individual horses were in the grave. The relatively low count of specimens compared to the MNI is surprising. The MNI is derived from only one type of element, the rest counting only a single individual. The most common elements in the assemblage are long bones, but apart from the metatarsals, they are too few to anatomically represent a single animal. Other elements are even scarcer, for example only six vertebrae are found in the collection. Similarly, fifteen of the 51 specimens are rib fragments, all ranging between five and seventeen cm long. Kristján Eldjárn (2016:178) writes in *Kuml og haugfé* that the bone preservation is varied on the site, ranging from bones being completely disintergrated to elements, even from the same skeleton, being reasonably well preserved. Poor *in situ* preservation of a substantial part of the assemblage, in conjunction with the damage done by the bulldozer, is thus the most likely reason for the low number of elements present. Also, burial I was decimated in the spring but the subsequent archaeological investigation did not take place until the following autumn (Kristján Eldjárn 1954:54).

All of the horse bone present is fully grown, including the vertebrae. A single thoracic vertebra has exostoses (new bone formation) on the ventral side of the vertebral body on the edges of both anterior and posterior articular surfaces, a possible mark of stress and age. This could be interpreted as being in contrast with the dental wear seen in the single mandible present. The second and third incisors are present in the mandible and show wear consistent witht the animal being about five years of age at the time of death (Habermehl 1975, Silver 1969). That would correspond with the vertebrae being fully fused, but for vertebral exostoses to evolve in such a young animal would probably require heavy and repeated stress on its back. Thus the thoracic vertebra with the exostosis and the mandible could come from two different individuals that died at different ages, but that cannot be resolved here. The mandible has a socket for a canine, indicating the male sex. The left pelvis in the collection also has male characteristics based on criteria regarding the form of the ischio-pubic, the obturator foramen and the medial pubis (Getty 1975; Cross 2009). The measurement of the only two suitable elements, a femur and a tibia, gave the withers height of 1.29 m and 1.31 m respectively (May 1985). A single caprine element is found in the assemblage, a proximal part of a left tibia, about 1/3 of the entire length of the bone. The caprine bone could either be an intrusion in the assemblage due to the bulldozing or it could be an original feature of the burial. The proximal tibia is part of a meaty joint and as such could be interpreted as food placed in the grave or eaten at a burial ceremony.

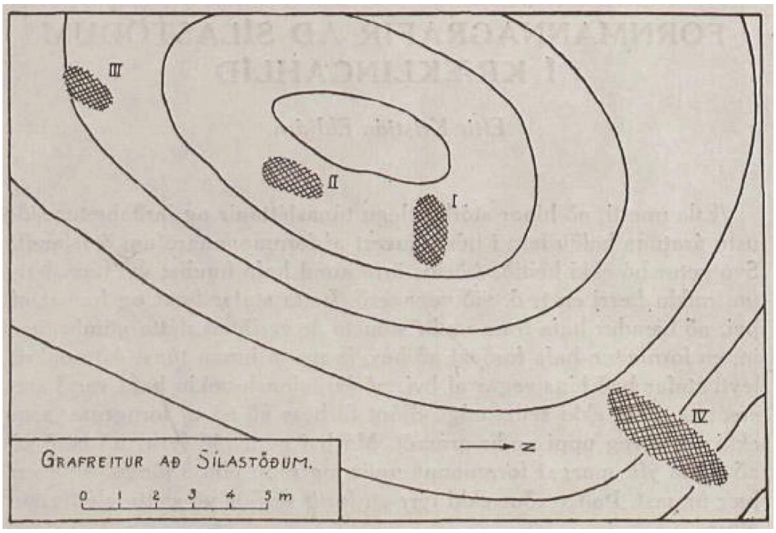


Figure 4–23 – Layout of the Sílastaðir burial ground (Kristján Eldjárn 1954:54).

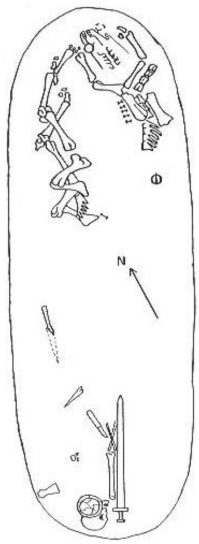


Figure 4–24 – Sílastaðir burial IV (Kristján Eldjárn 2016:181).

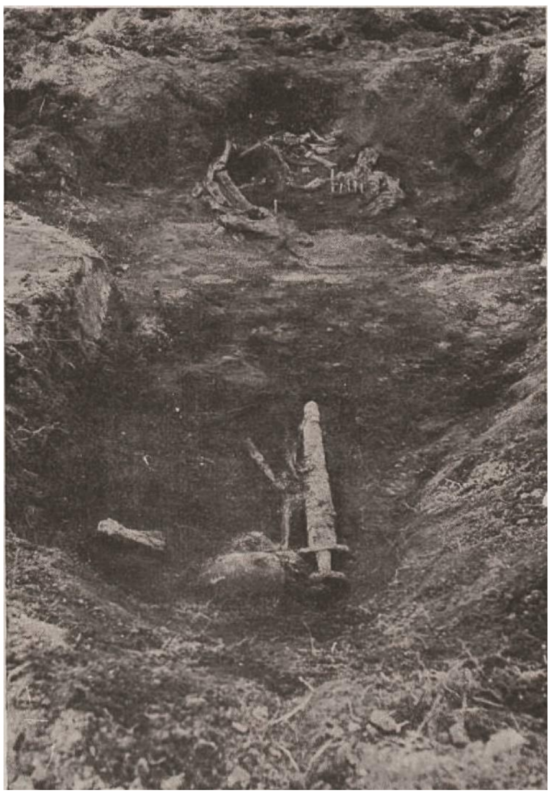


Figure 4–25 – Sílastaðir burial IV (Kristján Eldjárn 1954:63).

Burial II was two and a half m south of burial I. It contained the remains of a male who was past 46 years of age at the time of death (Hildur Gestsdóttir 1998:13). A few artefacts were found interred with the man; including a spear, a knife, a whetstone, two fragments of Kufic coins, a silver thread, strike-a-light, a bead, a brooch and a few other things. The burial contained a substantial amount of wood remains, similar to what was seen in burial I. The burial was oriented NNE-SSW and the man's head rested in the southern end. The northern part of the burial, where his feet had been, was damaged by the bulldozer (Kristján Eldjárn 1954:57-60). It is explicitly stated in the original report that a horse had not followed this individual to the grave (Kristján Eldjárn 1954:58). If not for this statement it would have been tempting to argue for the second horse discovered during the bone analysis of burial I to have originated in burial II. The bulldozed area in burial II corresponds to the positioning of the horses in burial I and IV and the distance between I and II is only two and a half m. This possibility must remain conjectural.

Burial III was of a person, most likely a woman, between 36 – 45 years of age at the time of death (Hildur Gestsdóttir 1998:13). The burial was 1.8 x 1 m in diameter, 0.5 m deep and covered with a low stone cairn. Artefacts discovered include six beads, a knife, three pieces of quartz, the remains of a casket with a lock, and an unrecognisable iron object. No horse remains were discovered in burial III (Kristján Eldjárn 1954:60-61).

Burial IV was of a man and horse, sharing the same grave cut (figures 4.24 and 4.25). The grave was 3.7 x 1 m in diameter and was oriented SW-NE. The human remains were of a male who had been between 36 – 45 years of age at the time of death (Hildur Gestsdóttir 1998:13). The man rested in the SW-part of the burial, his head in the SW-end. The horse was opposite, with its head in the NE-end and its rump turned towards the man's feet. The man had been buried well armed. A sword, a spear, an axe and a shield boss were found associated with the human remains. Artefacts found by the man's waist include a knife and a few things that probably came from a purse fastened to his belt; two lead weights, an iron object with a piece of jasper or flint attached at the end, a red piece of jasper and a translucent stone. The horse was buried harnessed and saddled. It was uncovered with a bridle bit still in its mouth and six nails and a buckle by its withers and upper vertebrae. The horse's hindlegs were stretched 'forwards' in an anterior direction and up against its torso (Kristján Eldjárn 1954:61-66). A total of 97 specimens of horse bone from burial IV are stored at the National Museum, representing a single individual. Of those, 59 specimens are on display at the Museum's permanent exhibition. The horse was not quite fully grown at the time of death. The fusion lines are still very visible on the animal's vertebrae and at least one eroded vertebra seems to be unfused. This is in unison with the wear of the incisors (Silver 1969, Habermehl 1975). The occlusal surfaces are oval in shape and the infundibulums are still open. The animal was thus probably between four and five years of age at the time of death and most likely male, based on the morphology of the pelvis (Getty 1975; Cross 2009).

4.11.13 Staðartunga, Skriðuhreppur

In the early 1870s a burial containing both human and animal bone was dug up on a hillock called *Mannhóll* (Eng. Manhill) by the local Jón Ólafsson. He re-interred the bone in a mixed jumble. Some 60 years later, in 1932, more bone was found on the site during gravel-mining for road construction, this time further west on the hillock. This caused Matthías Þórðarson to visit the farm of Staðartunga in 1935 to investigate the find and also re-excavate the bone found decades earlier (Matthías Þórðarsson 1936:34-35; Kristján Eldjárn 1966:50-51). Finally, in 1962 a third burial was discovered close by during gravel mining.

The burial originally excavated in the 1870s was of a male who died between 36-45 years of age (Hildur Gestsdóttir 1998:14). A single iron buckle was discovered with the bone when it was re-excavated, but it is not known if artefacts had been previously removed. An analysis of the animal bone collection from the grave has revealed that the man was buried with two horses and a dog. The burial found in 1932 was that of a male between 36-45 years of age at the time of death (Hildur Gestsdóttir 1998:14). No artefacts or animal bone are reported to have been found in association. The third grave was of a man at least 46 years of age at the time of death, no artefacts or animal bone was found with the bone.

The animal bone collection from the burial excavated in the 1870s consists of 89 specimens, eight of which are dog. The remains of two individual horses are in the collection, which is evident from the count of humeri, tibiae, sacra and scapulae. The horses were not the same age at the time of death, one was fully adult while the other was quite young. The age at death is determined by the state of epiphyseal fusion in the assemblage and by incisor wear. A majority of the vertebrae in the assemblage are fully fused. But the assemblage also contains a few unfused vertebrae, an unfused sacrum, a fusing tibia, two femurs that are unfused proximally and fusing distally, and a humerus with the proximal epiphysis unfused. The fused vertebrae come from a skeletally adult animal. The unfused elements all come from the younger animal, which was only about three years old at the time of death. The age estimation of about three years is based on the growth state of the femurs and tibia (Sisson 1914:114;

Silver 1969) and the other unfused elements correspond well to that estimation. The older animal was at least ten years of age at the time of death, possibly a bit older, based on the wear of the incisors (Habermehl 1975). One element in the assemblage, a left pelvis, can be used for sexing. The pelvis is most likely from a male, based on the ischio-pubic form, the obturator foramen and medial pubis (Getty 1975). The older individual stood at about 1.33 m at the shoulder in life, based on the measurement of the right tibia (May 1985). Although the horse skeletons are incomplete, the animals were probably buried whole and unbutchered, because no cut or chop marks are visible on any element. The cause of death cannot be discerned.

The dog is represented by eight specimens, but like the horses was most likely buried whole and unbutchered. This is supported by the element distribution and the absence of cut marks. The dog was adult, but not old. All the elements are fully fused and the dentition is permanent. The m1 and m2 are clearly in occlusion, but not much worn. Based on the measurement of the left humerus, the dog's withers height was about 0.54 m (Harcourt 1974).

4.11.14 Stærri-Árskógur, Árskógshreppur

Three Viking Age burials were found at Stærri-Árskógur between 1917 and 1918. Two horse burials and a single human burial. The human grave was found during road construction and was oriented E-W (Kristján Eldjárn 2016:171). The human remains were probably of a male, who had died between 36 – 45 years of age (Hildur Gestdóttir 1998:14). A knife and an iron rod were found in the grave along with the human bone. The iron rod was originally interpreted as a meat-spit by Kristján Eldjárn (2016:171), but has since been reinterpreted as a possible 'staff of sorcery' by Neil Price (2002:181-204), with the reservation that it is fragmentary and its original complete form is uncertain. Five meters north of the human burial was the grave of a saddled horse. A buckle, nail and a few iron pieces were found with the horse bone. Then in 1918, another horse grave was found in the vicinity. Bones were collected but the site was not investigated further (Kristján Eldjárn 2016:171).

The entire animal bone assemblage contains 41 specimens. The horse discovered five m north of the human burial was a young animal at the time of death. A majority of its elements are unfused, but most telling are the tibiae. The proximal epiphyses are unfused, but the distal ones are just beginning to fuse, the epiphyses hanging to the diaphyses by threads of bone. This indicates that the animal must have been killed at around two years of age (Sisson 1914:117, Silver 1969). It is interesting that the young animal was buried with a saddle, because it is hard to imagine that a two year old horse would have been ridden. Another possibility is that the killing and burying of a *saddled* horse was more about symbolism than the actual traits of the animal being killed, and thus the young horse could have been saddled for the occasion even if it had never been ridden in life (pages 261-262). The distance between the two horse burials is not certain, but was at least 50 m according to description (Kristján Eldjárn 2016:171). The other horse remains, discovered in 1918, are weathered and seem to have been exposed for some time before being collected. The MNI of the 1918 assemblage is one, most of the bone can be identified as 'definite' horse but a few elements can only be identified as 'large mammal' (horse sized) due to fracturing and erosion. This horse seems to have been a bit older than the other one. All the definite horse bone in the 1918 assemblage is fused, but the only vertebral body, which is identifiable as large mammal, is unfused on both anterior and posterior sides. An age at death based on the definite horse bone and the vertebra is about four years (Silver 1969). Also found in the assemblage is a weathered and eroded head of a femur from a large mammal. This element is unfused, so if taken with the definite horse bone it could push the age at death further back, to perhaps three and a half years (Silver 1969). There are no other femoral remains in the assemblage, but a fully grown humerus and tibia that are present should fuse at a similar time as a proximal femur (Sisson 1914, Silver 1969). This does raise questions about the validity of the femoral head being part of this burial assemblage and especially since contextual information concerning the find is lacking. There are minor pathological changes on the left metacarpal of the 1918 horse. A lump of woven bone, 27 x 24 mm in diameter, is on the proximal end of the posterior diaphysis, immediately between where the accessory metacarpal bones would have been. This inflammation could be osteoperiostitis, a lesion on the periosteum covering the area of new bone formation. How much (or if) this affected the animal in life is hard to say, but it might of course have been a factor when a suitable animal for burial was chosen. Further, there are indications on both metacarpals that the accessory second and fourth metacarpals had begun to ankylose (though only the central metacarpals are present in the assemblage). This is likely a response to stress on the animal's front legs and could well be related to the lesion on the left leg. Riding seems to be a likely cause of these bone changes, which is interesting given how young the animal seems to have been. No riding gear was recorded in association with the 1918 find. The animal stood between 1.33 – 1.35 m tall at the withers in life, based on the measurement of the right humerus and left metacarpal (May 1985).

4.11.15 Syðra-Krossanes, Glæsibæjarhreppur

In 1963 the burial of a middle aged male and horse came to light when a bulldozer was scraping soil of gravel for mining. The man had been laid on his left side in a flexed position and with his head facing WNW. More bone, both human and horse was found in 1965 (Gísli Gestsson 1966:74-77). The animal bone was not kept for posterity.

4.11.16 Ytra-Garðshorn, Svarfaðardalshreppur

Kristján Eldjárn excavated a large burial ground at Ytra-Garðshorn between 1954 and 1958 (figure 4.26). He recorded a total of ten burials, eight of which included horse remains. The grave field was originally discovered in 1952 when a few horse bones got exposed by bulldozing. The following year human bone eroded on the same spot and the National Museum was notified (Kristján Eldjárn 2016:153). The horse bone assemblage counts in total at least nine individual animals. All of the burials face in the same direction except burial V, which like burial IV, did not contain a horse. In half of the horse burials, human and horse shared the same grave, but in the other half there were two separate grave cuts. Human and horse shared a grave in burials III, VI, VII and VIII, but burials I, II, IX and X had separate cuts. Following is a description of the burials and the horse bone found within them.

Burial I was clipped on the western side by a bulldozer in 1952 and was subsequently excavated in 1954. It was a double grave containing both human and horse bone. The human grave cut was 2 m long SSW-NNE, 0.9 m wide and 0,6 m deep. It had been dug into and

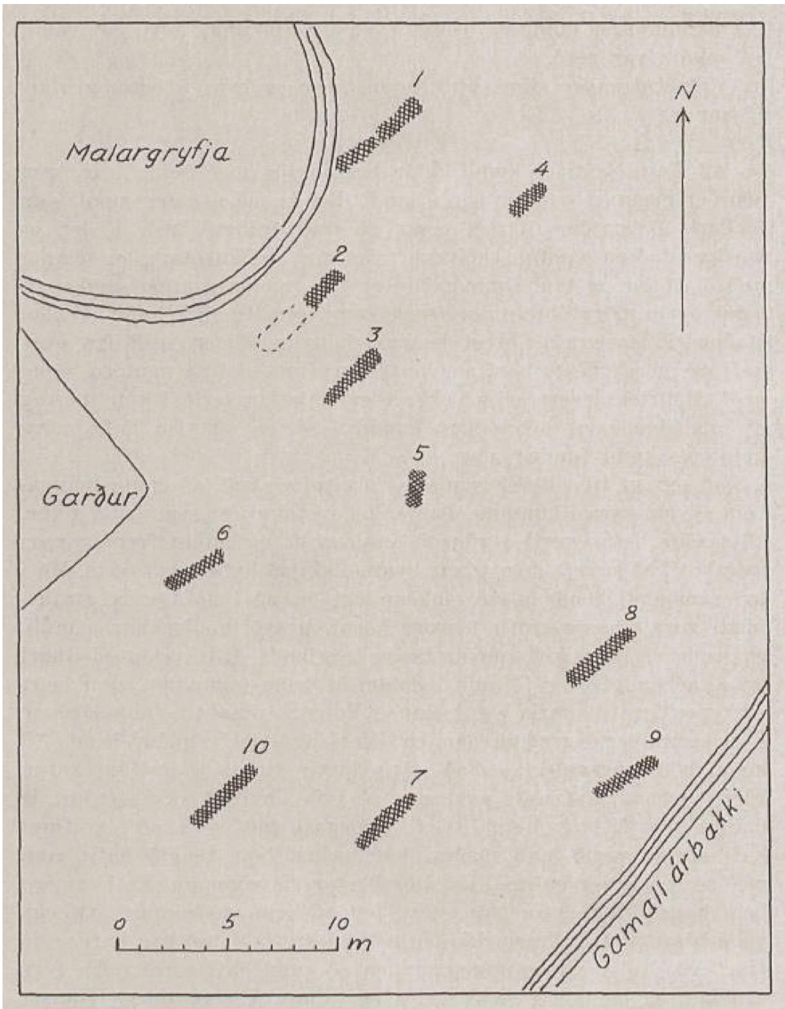


Figure 4–26 – The burial ground at Ytra-Garðshorn (Kristján Eldjárn 1966:32).

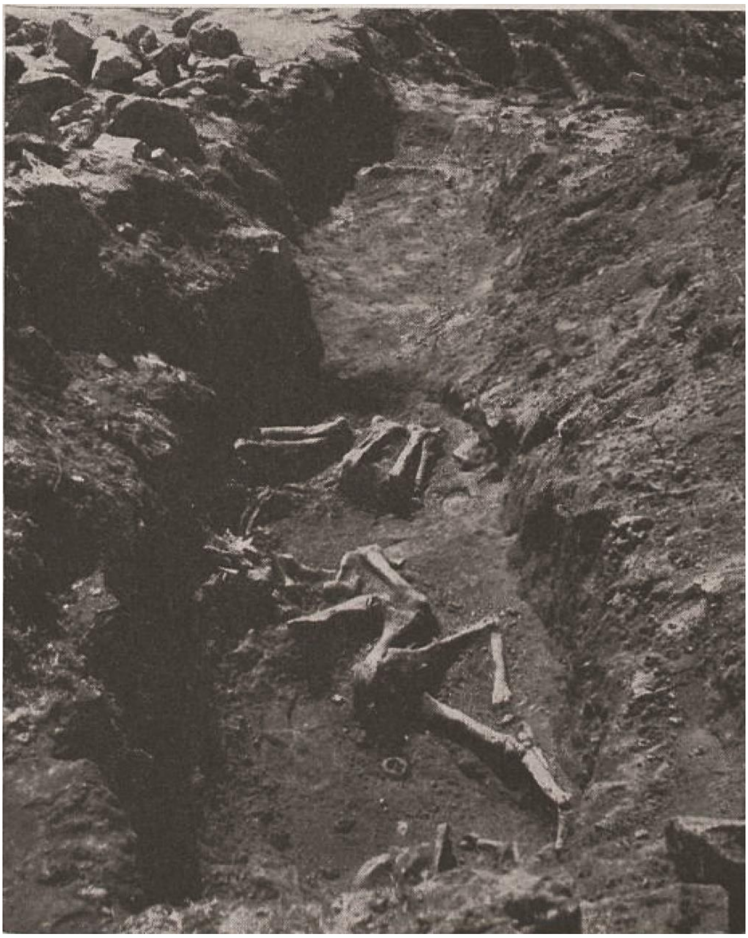


Figure 4–27 – Ytra-Garðshorn burial I (Kristján Eldjárn 1966:35).

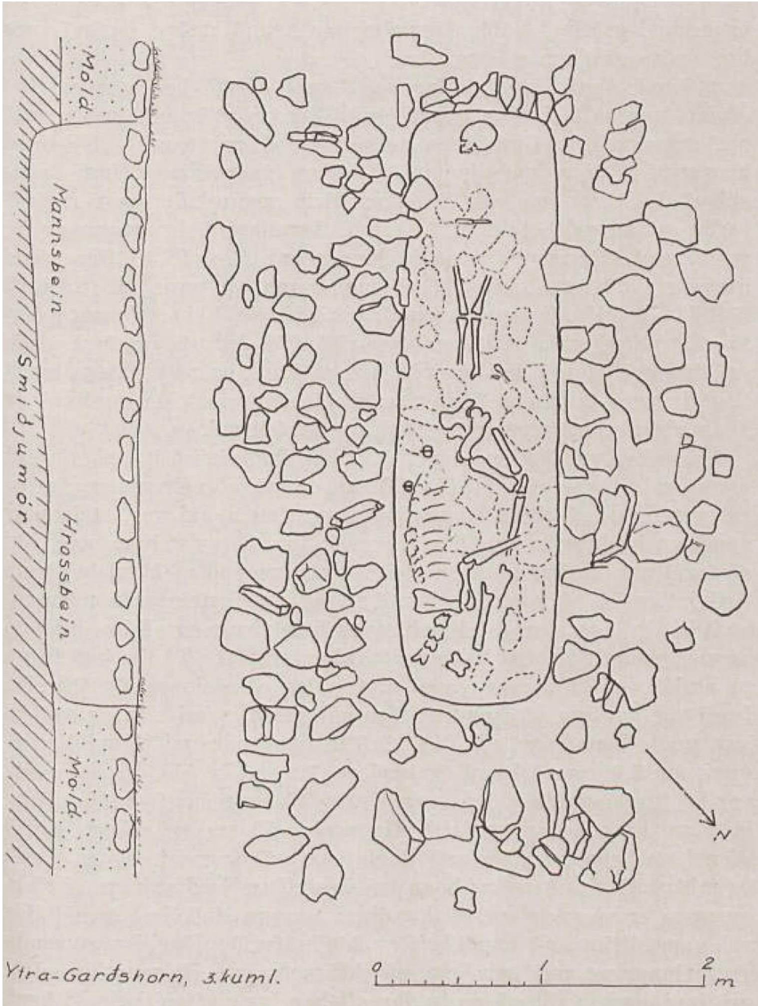


Figure 4–28 – Ytra-Garðshorn burial III (Kristján Eldjárn 1966:37).

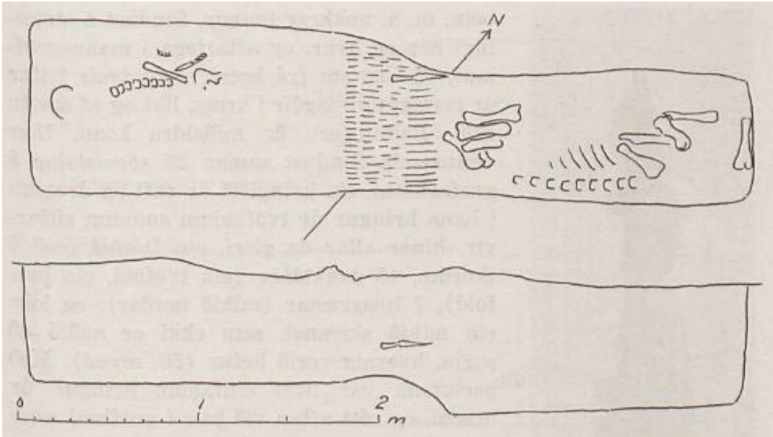


Figure 4–29 –Ytra-Garðshorn burial VIII (Kristján Eldjárn 1966:45).

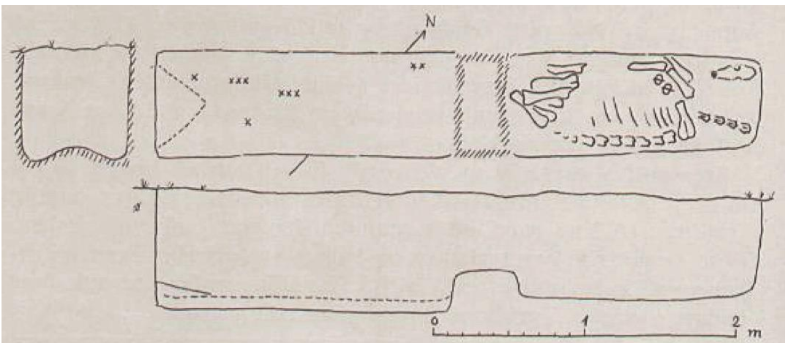


Figure 4–30 – Ytra-Garðshorn burial X (Kristján Eldjárn 1966:48).

disturbed in the past. The grave contained the fragmented remains of a male aged over 46 years at the time of death (Kristján Eldjárn 2016:154-155; Hildur Gestsdóttir 1998:15). In the wake of the bulldozer that had damaged the western side of the grave, there was a fragmented cranium of a second person. Kristján Eldjárn (2016:154-155) hypothesised that it had originated in another grave nearby, but it cannot be ruled out that burial I originally contained two humans. The human grave contained a few artefacts, including beads, chess pieces, a scale weight and a few iron fragments possibly from a casket (Kristján Eldjárn 2016:155). The horse grave was north of the human one, by its foot end, and they were separated by a half m thick earthen baulk but covered by the same layer of stone (figure 4.27). The horse burial had not been disturbed in the past like the human one, which indicates that whoever dug into the burial had knowledge of its internal layout. This could again indicate that the 'robbing event' took place not long after the original interment, at least that it took place while the burial practices followed at the site were still in living memory (see discussion in Hildur Gestsdóttir *et al.* 2015 about the re-opening of a Viking Age grave at Hrífunes about 60 years after burial). The grave cut for the horse was larger than the human's, 2.7 m long and 0.9 m wide, but faced in the same direction. It contained two animals. Both horses had been saddled, iron buckles were found with each animal and nails and other iron fragments by the withers of one of them. No bridle bits were discovered, but there is a possiblity that the bits were of organic material, wooden or made of rope. The placing of the animals within the grave is curious. According to Kristján Eldjárn's (2016:155) description both horses turned their croup towards the human grave and heads towards north. Their backs faced east and feet west. What seems unusual is how the carcasses were deposited into the grave relative to each other. One horse was closer to the southern end of the grave and was clearly put into the grave first. The second horse had been deposited more towards the northern end of the grave, with its backside on top of the other individual‘s frontquarter. The grave cut was not quite large enough to accommodate this layout of the carcasses so the second horse's neck and head sloped up the northern bank of the grave. It is more common for horses to be deposited in better alignment (pages 293-296), either side by side or on top of each other, rather than slightly overlapping lengthwise as is the case here.

According to the Museum's catalogue the collection from burial I is stored in two boxes, but only one of those was located in the present study. A total of 143 horse bone specimens from burial I were analysed, with two as MNI. It is notable that no mandibles and very fragmentary cranial specimens were recorded, which leads to the suspicion that these elements might be stored in the missing box. It is noted in the excavation report that the animal's heads were present and according to the description the horses were not decapitated (Kristján Eldjárn 2016:155). At least one of the individuals was male which can be discerned by fragmented pelvic bones. The ischio-acetabular ramus is robust, the obturator foramen is oval in shape and the medial pubis is quite broad and rectangular (Getty 1975; Cross 2009). The sex of the other animal is unknown, but could possibly be estimated if the maxillary and mandibular elements were located. The animals in the collection were clearly of different age when they were killed. One was younger and not quite fully grown, while the other was probably past its prime. Age at death in the assemblage is indicated by the state of epiphyseal fusion, by the five insicors present and of pathological changes on some elements which are age and stress related. Although only 39 vertebrae are present in the collection, it is certain that they derive from at least two individuals of a different age. Some of the vertebrae are fully fused and adult, while a majority has the posterior epihysis still fusing. Further, there is ankylosis between two of the adult vertebrae, either the posterior-most thoracic or anterior-most lumbar. These two vertebrae are fragmented, only the vertebral bodies are left and are fastened together with a large lump of new bone on the ventral side. The fusing of vertebrae in horses is usually attributed to repetitive strain due to riding (or load bearing) over an extended period of time and old age (Bartosiewicz and Bartosiewicz 2002). Of the four metatarsals in the assemblage, two have bone spavin. The grand cuneiforms, cuboids and second accessory metatarsals are fused with the central metatarsals. This pair of metatarsals almost certainly comes from the same animal as the fused vertebrae. This indicates that the horse must have been ridden over a number of years and was of mature age at the time of death. On the other hand, the still fusing elements most likely come from an animal that died at around four and a half and five years of age (Sisson 1914. Silver 1969), which corresponds with the wear seen on the loose incisors (Habermehl 1975, Silver 1969). Not only were the animals of a different age, they were also different in stature. Measurements of the right humeri and right tibiae indicate that one animal was 1.33 m and the other 1.23 m at the withers (May 1985). A measurement of the younger animal’s metatarsals give an estimate of 1.34 m at the shoulders (May 1985) which corresponds with the measurements of the larger humerus and tibia and means that the older individual was smaller. There are wooden remains on the older animal’s right humerus, on the medial side of the distal diaphysis, immediately above the distal epiphysis, which might derive from the younger animal´s saddle as the two were not deposited into the grave in alignment. The wood is 37 mm in diameter, about two mm thick and pressed to the bone.

Burials II and III were excavated in 1956 and each contained a human and a single horse. The animal remains were brought to the National Museum in two separate boxes, but not registered in the Museum's catalogue. Because of this it is unfortunately not possible to determine which animal came from which grave. Burial II was oriented SW – NE and the human grave cut, the SW part, had been badly damaged by bulldozing. The NE part of the grave, which contained the horse, was undisturbed. The horse had been deposited with its croup towards the human's feet and its head facing NE. Its back was up against the SE bank of the grave cut and its feet drawn in on the NW side. The horse had been buried with a saddle, which could be noted by the presence of an iron buckle and a nail (Kristján Eldjárn 1966:38). Burial III was of a woman accompanied by a horse in a single grave cut. It had not been damaged by the modern earthworks, but the human part had been dug into and disturbed in the past. The burial was oriented SW-NE, with the woman in the SW part and the horse in the opposite side. The woman had been buried with beads, probably from a necklace, a knife, a strike-a-light, scissors, and a casket. The horse skeleton was undisturbed. The animal was buried with a saddle. Two buckles and iron nails were found by its back (Kristján Eldjárn 1966:38-40). The animal had been deposited on its right side, head towards NE and croup up against the woman's feet. The grave cut seems to have been just barely large enough to fit both woman and horse. Burial III stands out from the rest on the gravefield because the horse and human share a grave cut substantially smaller than the others (figure 4.28). The person's feet might have been in contact with the animal's rump, but the internal layout is essentially the same as in the other burials on the site. The reasons for this discrepancy in the size of burial III are unclear. It has been suggested that the physical proximity of the human and horse in burial III could have been itself significant (Þóra Pétursdóttir 2007:74-77), but more mundane and practical reasons could just as well have been at work. For instance, the grave might have been cut during the middle of winter when the ground was frozen, an element speculated to have affected the size of medieval grave cuts in Iceland (Hildur Gestsdóttir pers. comm.13. November 2012).

Following is a description of the two horses discovered in burials II and III. As stated previously it is not known which animal came from which burial. The former horse described here is represented by 28 specimens stored at the National Museum. No mandibular or cranial elements are present in the collection. It was very young at the time of death. Its proximal right humerus is fusing and the proximal left femur is either unfused or fusing. Both elements are expected to fuse at around three and a half years of age (Sisson 1914:90, 114; Silver

1969). The animal stood at about 1.40 m at the withers in life, based on the measurement of the left metatarsal (May 1985). It is interesting that given how young the animal was at the time of death that it was buried with a saddle, indicating that it may have been ridden. The other horse is represented by 68 specimens and also has no cranial or mandibular elements present. It was fully adult at the time of death; all its elements are fused, including the vertebrae. Further, there are age and stress-related pathological changes seen on many vertebrae and on the right hindleg. The first and second lumbar vertebrae are in ankylosis and the eleventh to the fifteenth thoracic vertebrae have lipping (osteophytic projections) on the dorsal side of the vertebral body, both anteriorly and posteriorly. It can also be noted that the spinous processes of the sacrum are completely fused together. There is evidence of bone spavin on the right metatarsal, where there is new bone growth, or lipping, laterally on the proximal articular surface. The left humerus also has new bone growth, 50 mm in diameter and eleven mm thick, centrally on the medial diaphysis. The bone growth is by the attachment of the coracobrachialis. These pathological changes indicate that the animals had been ridden/worked heavily over an extended period of time and as a consequence probably past its prime. The horse stood at about 1.39 m at the shoulder in life, based on the measurement of the left metatarsal (May 1985). The animal was most likely male, judging by the right pelvis. The sexing is not conclusive due to fragmentation, but the obturator foramen is clearly oval in shape (Getty 1975).

Burials IV and V did not contain a horse. Both had been disturbed in the past. The former was of an older man while the latter was of a child aged between seven and twelve years at the time of death (Kristján Eldjárn 1966:40-41; Hildur Gestsdóttir 1998:15).

Burial VI was of a human and horse that shared a single grave cut, 3.6 x 0.7 m in size with a SW-NE orientation. The grave had been dug up and disturbed in the past. No human bone was found but the excavators were certain that human remains had rested in the SW part of the grave. The horse’s undisturbed front legs, cervical vertebrae and head were in the NE end of the grave, but elements further SW were disarticulated and had seemingly been dislocated when the human bone was removed. Artefacts included a nail and a few iron objects, including a buckle by the horse indicating that it was buried with a saddle (Kristján Eldjárn 1966:41). Of the horse there are 21 specimens stored at the National Museum, mostly eroded long bones and vertebrae. No cranial or mandibular elements are among those. The horse was adult at the time of death, which can be seen by the fact that all elements including the vertebrae are fused. The animal stood at 1.27 m at the withers in life, based on the measurement of the left tibia (May 1985).

Burial VII contained a human and horse in one grave cut, similar to burials III and VI. The grave cut was 3.2 x 0.7 m in size and was oriented SW – NE. The burial had been dug up in the past. The human had been deposited in the SW part of the grave, which was more disturbed and only a scatter of human bone was found. Conversely, some of the horse elements were still articulated and *in situ* in the NE part. Scale weights were found in the human part of the grave and substantial remains of a saddle and harness by the horse. The harness was decorated with at least 43 small iron nails with convex heads and some with decorations (Kristján Eldjárn 1966:42-43). A total of 26 specimens of animal bone from burial VII are stored at the National Museum. Of these 25 are horse and one is cattle. The horse is represented by maxillary, mandibular and fore- and hindlimb elements. All the long bone is fully fused, indicating that the animal was adult, although no vertebrae are present. Age is further indicated by the mandibular and maxillary molars, which are all worn and have well developed real roots. Measurement of the m1 indicates that the animal might have been roughly ten years old at the time of death (Levine 1982). The animal was about 1.35 m at the withers in life, based on the measurement of the right metacarpal (May 1985). The presence of the cattle astragalus is curious. It has a cut mark medially and a chop mark laterally on the dorsal side. The marks are probably due to primary butchery, when the carcass was being rendered into smaller units. It is not known if the astragalus was part of the original bone deposit in the grave, perhaps refuse from a funerary feast, or if it is a contamination in the burial context due to the later disruptions to the grave.

Burial VIII contained a man and horse in one grave cut (figure 4.29). The cut was four m long and more irregular in shape than the other grave cuts. The human side of the grave in the SW was 0.9 m wide, while the NE part where the horse lay was only 0.75 m wide. Further, there was a difference in depth. The NE portion, the horse part, was over ten cm deeper than the SW part and there was a sharp slope in the centre of the grave cut between the two parts. The human part of the grave had been dug into and disturbed in the past, although the human skeleton was largely articulated and *in situ*. The horse part was undisturbed upon excavation. An iron knife, a comb and a spearhead were found in the grave, but no riding equipment (Kristján Eldjárn 2016:44-45). The positioning of the spearhead within the burial is evidence for the sequence of interment during the funerary process. In Icelandic Viking Age burials, spears that have been recorded were placed with the shaft to the side of the dead body and the head facing “downwards” toward the feet (Kristján Eldjárn 2016:306). The positioning of the spearhead in burial VIII follows this, but what is interesting is that it is right at the end of the human part and the tip extends into the horse part of the burial. The horse half of the cut is deeper than the human part and was undisturbed upon investigation. As can be seen by the positioning of the spearhead, on the simple plan drawing from the original publication (figure 4.29), it was deposited on top of the basal fill in the horse grave. This shows that the horse must have been killed, deposited in the grave and covered with soil before the spear was placed in the grave. It can only be speculated if the horse carcass had been buried before the human body was placed adjacent to it or if this indicates the order in which ‘grave goods’ were deposited.

The horse in burial VIII turned the croup towards the human remains and its head towards NE. It had its back up against the SE edge of the trench and its feet were tucked in. A total of 26 specimens of horse bone fom burial VIII are stored at the National Museum. The elements come from the head, front- and hindlimbs and vertebral column. The presence of canines in the maxillae indicate that the animal was male. Further, the horse was a young adult at the time of death. All its bone appears to be fully fused, except two thoracic vertebrae where fusion lines are just barely visible by the posterior epiphyses. This points to the horse having been killed at around five years of age or shortly thereafter (Sisson 1914: Silver 1969). Measurements of the humeri, right metacarpal and metatarsal, radii and left tibia, indicate that the horse stood at about 1.34 m at the withers in life (May 1985). The horse was killed by poleaxing. In fact, there is significant trauma on the horse’s cranium indicating that it was poleaxed twice. The first blow seems to have been misdirected. There is a circular depression fracture on the frontale breaking into the frontal sinus. The fracture is ‘bowl shaped’ and happened when the bone was green (Lovell 1997). The circular fracture is 60 mm in diameter and fifteen mm deep, but the base of the depression is 30 mm in diameter and shows the outline of the hammer-like tool used for the killing. This is the clearest evidence to date for what sort of tools were used for poleaxing in Viking Age Iceland. The second blow hit the mark, breaking the cranium on top of the brain cavity, shattering the parietale and interparietale.

Burial IX contained a woman and a horse in two separate grave cuts. In total, the burial was 3.7 m long and had a SW-NE orientation. The human grave was in the SW and was 0.6 m wide. The horse grave was wider, about 0.9 m. A large earthfast stone protruded through the base of the horse grave, making it quite uneven. The entire burial, both human and horse graves, had been dug up in the past. Only a few dispersed human and horse bones were remaining. Interestingly the human femurs had been left forming a cross just east of the human burial's centre. Artefacts include 25 beads, a copper-alloy ring, an iron pincet, 58 chalcedony pieces and a lump of probable beeswax (Kristján Eldjárn 1966:45-46). No riding equipment was recorded in the horse grave.

Only eight specimens of horse bone survive at the National Museum, all of them from the posterior part of the skeleton. What can be derived from the horse remains is that the animal was very young at the time of death. The single lumbar vertebra is unfused. The sacrum is unfused both anteriorly and posteriorly and there are wide fusion lines between individual sacral vertebrae. Further, the femur present in the collection is unfused proximally and fusing distally. This indicates that the animal might have been killed at around three to three and a half years of age (Sisson 1914:114; Silver 1969).

Burial X was of a human and horse in two separate grave cuts (figure 4.30). The burial was four m long with a SW-NE orientation. The human grave cut in the SW had been dug up in the past and all bone removed. Substantial wooden remains were in the base of the human grave and a few nails. Other artefacts included five beads, a whetstone, a single piece of chalcedony, a comb and unrecognisable iron fragments, some from quite substantial objects. The horse grave in the NE was undisturbed upon excavation. The horse had been deposited into the grave with its croup towards the human, its back up against the eastern edge of the cut and head in the NE-end. The horse's legs were curled up. Two buckles were found in the centre of the horse grave and five nails (Kristján Eldjárn 1966:46-47), indicating that it was buried with a saddle.

Even though the horse grave was in pristine condition up on excavation, only ten specimens of horse bone were collected and stored at the National Museum. The horse was adult at the time of death, which is evident by the real roots that have developed on the mandibular molars. Measurement of the right m3 and left m2 indicates that the animal might have been roughly ten years old at the time of death (Levine 1982). The horse probably suffered from bone spavin. New bone growth is seen on the medial and anterior proximal diaphysis of the right metatarsal and the accessory second metatarsal is also fused with it. This might be an indication of strain in conjunction with age and possibly genetics. Based on the measurement of the animal's left radius, it stood at 1.35 m at the shoulder in life (May 1985).

4.11.17 Ytra-Hvarf, Svarfaðardalshreppur

The Viking Age burial ground at Ytra-Hvarf was discovered in 1949 during road construction. The burials were located on a steep river bank close to an old road (figure 4.31). Low mounds had previously been visible on the site, but they had been levelled some years earlier for cultivation. Two burials were recorded, but the gravefield had been larger in the past. Evidence of that are scraps of human bone found at three locations nearby and in one of those horse bone was also mixed with the human remains (Kristján Eldjárn 2016:150-152). Horses had been deposited into both of the recorded graves. Burial I had two horses and burial II had at least one horse. Only animal bone from burial I is stored at the National Museum.

Burial I almost certainly contained both human and horse remains originally, although no human bone was found during the archaeological investigation. The grave had been dug up at some point in the past. It was rectangular in shape and very long. The cut was 4.75 m by 0.8 m and was orineted N-S. The excavators suspected that the human had been deposited in the southern end of the grave because there they found a strap-end decorated with an animal motif, iron fragments and a spearhead. The disarticulated horse bone was in the northern part of the burial. Kristján Eldjárn (2016:150-152) notes that apart from extra teeth, the animal bone assemblage represents a single individual. He speculated that the extra teeth must have been introduced from another grave during a robbing episode. Among the horse bone were pieces of iron originating from a saddle, a buckle and many copper-alloy studs, probably from a harness or saddle (Kristján Eldjárn 2016:152). An analysis of the animal bone from burial I has revealed that the grave must have contained two horses and that the ‘extra teeth’ do not originate from outside the burial. A total of 41 specimens of horse bone are stored at the National Museum. There are two sets of maxillae with teeth, two sets of mandibular molars and two sacra. Also, the humeri are clearly not from the same individual due to a difference in size and robusticity. The bone collection is thus a mix of at least two partial animals, which might explain the size of the grave cut and raises the possibility of more than one person having been buried there as well. The two horses were quite differently built. The breadth of the cranial articular surfaces (BFcr) of the two sacra are 42 mm and 51 mm, the difference being almost a centimetre. Similarly, the greatest length of the two humeri is 265 mm and 279 mm and the height of trochlea 48 mm and 59 mm respectively. One animal was quite slender while the other was much more robust. Withers height can be calculated based on the measurement of three specimens in the assemblage, the two humeri and a tibia. The humeri are both slightly eroded, but not enough to greatly skew the results. The two humeri gave a

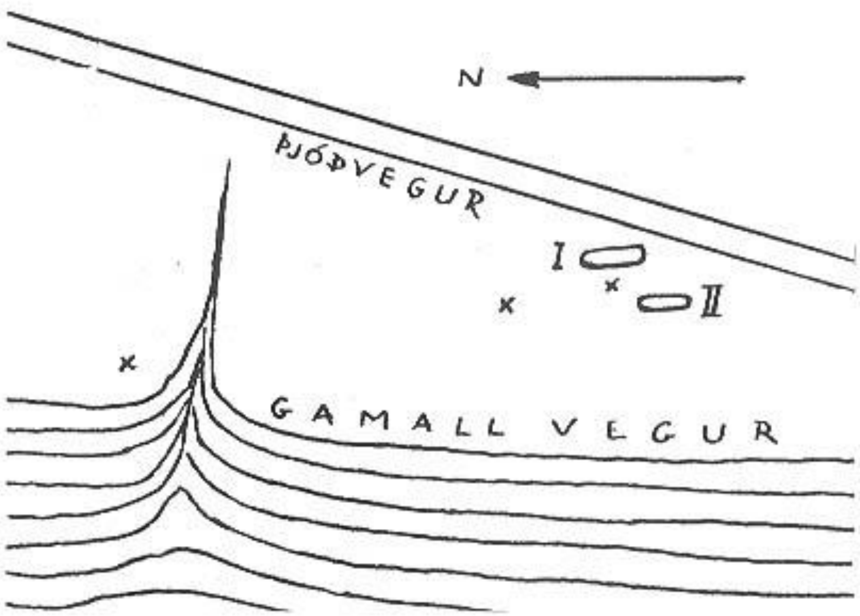


Figure 4–31 – The burial ground at Ytra-Hvarf (Kristján Eldjárn 2016:151).

result of 1.23 m and 1.29 m respectively, whereas the tibia indicated 1.38 m as shoulder height (May 1985). The discrepancy between the larger humerus and the tibia is 90 mm, which is within acceptible range of results from different elements (Johnstone 2004:157; Ambros and Müller 1975), so the two bones most likely derive from the same individual. Both animals were adult at the time of death but one seems to have been somewhat older. The maxillary and mandibular molars from the older animal have well developed real roots, while the younger has no real roots on the m3s and small roots on other molars. The three quite eroded incisors in the collection must come from the younger animal (Habermehl 1975; Silver 1969), but are too badly fractured for absolute ageing. At least the younger animal but possibly both were still in their prime. An estimation of age at death based on crown height of mandibular and maxillary molars is that the younger horse was around seven to eight years and the older perhaps thirteen to fifteen years (Levine 1982). A single thoracic vertebra has bone nodules growing on the ventral side of the proximal articular surface. This is most likely related to mechanical stress to the animal's back, perhaps from riding.

Burial II, like the former one, probably contained both human and horse remains originally, although only disarticulated horse bone was found during the archaeological investigation.

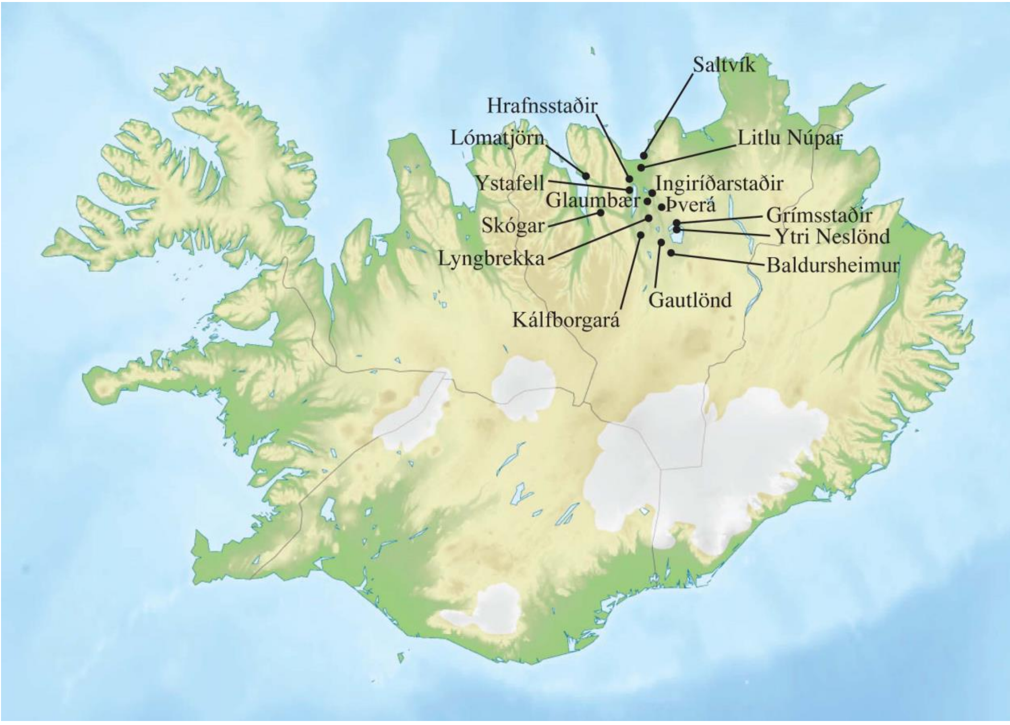
The grave had been dug up at some point in the past. The grave was rectangular in shape, 3.5 m by 0.75-1.0 m and had a N-S orientation. The horse bone was piled in the northern end, along with a buckle and oxidised iron fragments and nails from a saddle. In the southern end, which probably contained human remains at some point, only rusty iron fragments were found. No bone from burial II was located at the National Museum during the present analysis.

The bone found outside of the burials does not seem to have been brought to the National Museum for storage.

4.11.18 Þúfnavellir, Skriðuhreppur

In the spring of 1948 the farmer at Þúfnavellir was digging a house foundation when he came upon the scant remains of a Viking Age burial, consisting only of a piece of a human cranium and horse teeth. The site was not investigated and no animal bone was kept (Kristján Eldjárn 2016:175).

4.12 Suður-Þingeyjarsýsla



Map 4–12 – Sites in Suður-Þingeyjarsýsla discussed in the text.

4.12.1 Baldursheimur, Skútustaðahreppur

In 1860 a Viking Age burial of a human and horse was discovered at the farm of Baldursheimur. The human and horse were each interred in a separate grave cut. With the human were a number of artefacts, including a sword, a spearhead, a shield boss, a knife and a whetstone as well as 25 gaming pieces and a die.

The horse grave was about 50 cm from the foot end of the human grave and the cut was circular in shape. The horse had been placed on its side in a flexed position with its back towards west and its feet towards east. The horse's head was in the north end of the grave and bent towards its front legs. A bridle bit was still in the horse's mouth and an iron buckle was found in the grave as well, along with a small axe. It is noted in the original report that the horse had been of an average size and young based on the wear of the teeth (Kristján Eldjárn 2016:200-203). The horse bone was not preserved.

4.12.2 Gautlönd, Skútustaðahreppur

In 1855 the Viking Age burial of an adult male and a dog was unearthed at the farm of Gautlönd (Kristján Eldjárn 2016:203). The man was probably between 36-45 years of age at the time of death and descriptions of the find suggest that he had been laid to rest in a foetal position with the dog resting under one knee (Hildur Gestsdóttir 1998:11; Kristján Eldjárn 2016:203). Two associated artefacts were discovered, a knife and a whetstone. Only two teeth from the dog were sent to the National Museum at the time, but the bulk of the dog remains were reburied along with the human bone. In 1947 the bone was re-excavated and sent to Reykjavík for preservation. The animal bone collection consists of fifteen dog elements and three large mammal specimens. The large mammal specimens arrived at the museum with the reburied part of the human and dog bone and so the origins are unsecure. It is quite probable that they represent a 'contamination' from outside the grave context and because of that they are not further discussed here. The dog bone assemblage is composed of head, axial and limb elements and most likely represents the remains of an entire, unbutchered animal deposited into the grave. All the dog's elements are fused, so it was fully grown. This corresponds with the state of tooth eruption and wear. The dentition is entirely adult and both maxillary and mandibular molars are quite worn, indicating that the animal was mature. The cause of death cannot be determined. The cranium is not complete, only fragments of the maxillae and occipitale are present and there is not enough bone to determine if the animal was poleaxed. No cut marks can be seen either. Based on the measurement of the animal's femurs it stood at about 55.7 cm at the shoulder in life (Harcourt 1974:151-175). That is comparable to the stature of a modern breed like Doberman but considerably taller than the modern Icelandic breed. A sample (McGovern *et al.* 2007) taken from dog bone (SUERC-2664) revealed a c14 age of BP 1175+/-35 (1σ). The δ13C is –20.5‰ which indicates that the dog mostly consumed terrestrial carbon. Also, the δ15N of this sample is quite high (+8.3‰) and demonstrates the trophic level expected of this species which is obviously higher than most other domesticates (Ascough *et al.* 2010:1105).

4.12.3 Glaumbær, Reykdælahreppur

A Viking Age burial ground with at least three to seven separate graves was discovered and excavated in 1915 at the farm of Glaumbær (figure 4.32). The burials were detected during road construction which significantly disturbed their outer appearance, since soil had been removed from the top of most of the graves. The state antiquarian Matthías Þórðarson

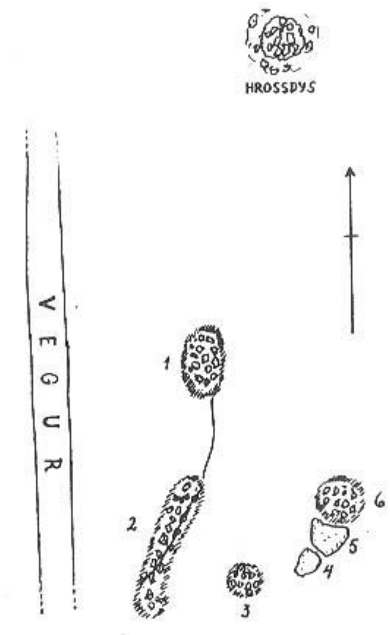


Figure 4–32 – Map of the Glaumbær burial ground (Kristján Eldjárn 2016:205).

conducted the subsequent research. He determined that the burials had been dug into at some point in the past, prior to the road construction (Kristján Eldjárn 2016:204-207). A total of 21 animal bone specimens survive from the burial ground, representing three individual horses and two dogs, but the presence of two more horses is documented even though their remains were not brought to the National Museum (Matthías Þórðarson 1918:31). Following is the description of the graves and animals found within.

Burial I contained only a horse, with the nearest human grave 2.5 - 3 m to the south. The grave cut was oval in shape, 1.6 x 1 m and 1 m deep, with a N-S orientation. The horse's head rested in the northern part and the curled-up feet turned west. No artefacts were discovered in the grave and it did not seem to be much disturbed. According to the report the horse skeleton was more or less complete in the grave (Matthías Þórðarson 1918:27-8), but nonetheless only three specimens were brought to the National Museum for storage. All the specimens are right sided, a femur, a metacarpal and a metatarsal. The three elements are fused and thus fully grown. This alone, however, does not give evidence to the animal's age at death, since there are other later fusing elements found in the body and horses may obviously live a long time after reaching skeletal maturity. There are pathologies found on both metapodials which indicate that the animal was not young and perhaps even past its prime at the time of death. The central (third) metacarpal has both accessory metacarpals (second and fourth) fused with it. This is evidence of prolonged strain on the leg which has resulted in the bones of the lower front leg locking together for support. In a similar way there is new bone formation around the articulation surface of the proximal epiphysis on the metatarsal. The callus bone is five to six mm thick and is indicative of the tarsals having started to fuse with the metatarsal at the time of death. This is probably bone spavin which may be caused by prolonged strain to the hind legs, but might also have genetic causes. The horse stood at about 1.40 m at the shoulder in life based on the measurement of the right femur and metacarpal (May 1985). Sex and cause of death can not be determined from the three surviving elements.

Starting by the centre of the horse skeleton in burial I and running 2.5 m south, towards burial II, were wood remains. They were mostly represented by a dark mark in the ground, but were clear enough, especially towards the south end, and determined as not birch but some other larger species of tree. At the southern tip of the wood remains was a nail running through them (Kristján Eldjárn 2016:205). Close to the nail was a single horse bone, called *köggull* in the report, probably meaning a phalanx, which Matthías Þórðarson (1918:28) speculated might possibly have been relocated from burial I or VI. The origins of the wood remains are uncertain. Kristján Eldjárn (2016:281) speculated if they were the remains of an oar or even a mast. This was an elaboration of his argument for burial I being a boat burial. At any rate, whatever the wood remains represent, it is clear that they connect burials I and II (figure 4.32) and must have been an intentional feature of the original burial process.

Burial II was almost certainly a boat burial, containing the bones of a human male and a dog. The grave had been disturbed at some point in the past, prior to 1915. This was evident from the disarticulated skeletal remains found within. The burial is described as having been 4 x 0.7 m and facing N-S. The grave cut itself was considerably longer though, about 5.5 m and cut into the underlying gravel (Matthías Þórðarson 1918:28). A total of 25 riveted nails were dispersed in the fill of the grave, along with a fragment of a silver-inlaid spear, three fragments of a probable sword, a pin from an iron buckle and wood remains. The dog accompanying the man in the grave is represented by eight bone elements stored at the National Museum. The bone specimens are both axial and from fore- and hindlimbs. Although the cranium is missing, the element distribution suggests that a complete animal was deposited into the grave. All the elements are fully fused, including the vertebrae, indicating that the dog was adult at the time of death. The sex of the animal cannot be determined and the cause of death is unknown. A measurement of the right femur indicates that the dog stood roughly at 53 cm at the shoulder in life (Harcourt 1974), which is taller than the modern Icelandic breed.

It is speculated by Kristján Eldjárn (2016:206) that burials III – VI might in fact be part of the same burial. Burials III – V are especially small and fragmented and all four burials are in close proximity to one another. This inference is very likely, but it is difficult to determine the context of these finds based in the rather limited data available. The following descriptions are based on the original report of the findings (Matthías Þórðarson 1918:29-31; Kristján Eldjárn 2016:205-207).

Burial III was a small grave of a male (Hildur Gestsdóttir 1998:11), located 2 m east of burial II. It was only about 1 m in diameter and no artefacts were found in association. The human bone was not articulated and Matthías Þórðarson (1918:29) thought that there was a possibility that the bones represented a secondary deposition, uprooted from another grave nearby and reburied. Given that the burial was covered with stone it is more likely that it had simply been dug into at some point in the past rather than the bone having been transported a few meters and reburied.

Burial IV was also a small stone-covered grave. It contained a dog maxilla with five molars and an iron nail with wood remains (Matthías Þórðarson 1918:29). Two fragments survive of the maxilla, the left one has p4 and m1 embedded and the other p4, m1 and m2. All of the teeth are part of an adult dentition.

Burial V is described as a tussock, containing a fragment of a human arm bone and two iron fragments with textile imprints in the rust.

Burial VI was a horse grave, 1.5 m in diameter and 1 m deep. It had been dug into and disturbed in the past. The horse bone was not articulated and only eight bone elements were brought to the National Museum although many more were found (Matthías Þórðarson 1918:30). Despite the few surviving elements, it is evident that at least two individual horses, of a different age, were deposited into the grave. Kristján Eldjárn (2016:206) noted that the artefact collection indicated the presence of two horses, but believed that the bone evidence did not. The artefact assemblage consists of an iron bridle-bit, four buckles, three iron loops, an s-shaped iron hook which may be of a harness, three plated bosses of copper-alloy on iron mounts and a few iron nails and nail fragments, probably from a saddle (Matthías Þórðarson 1918:30-31). The bone assemblage consists of a radius and ulna and a tibia, all fully fused. The rest of the specimens are mandibular and maxillary. It is the teeth that give the MNI as two; the tooth wear indicates two different ages at death. One horse was quite young at the time of death, with no real root development and little or no wear on the occlusal surfaces on the surviving mandibular and maxillary molars. The younger animal was no more than five years of age, perhaps as young as four years at the time of death (Levine 1982; Silver 1969). The older animal is represented by the only incisor in the assemblage and by a left mandible with all six molars embedded. The molars are worn with a well developed real root. The measurement of the p3 and an estimation of the occlusal wear of the incisor indicate that the animal was at least ten years old at the time of death and perhaps a bit older (Levine 1982; Habermehl 1975). Both horses were buried with harnesses.

Another double-burial of horses is known from Glaumbær. It was located about eleven m north of burial I (figure 4.32). The double horse grave was discovered at the same time as the other graves but not excavated by Matthías Þórðarson (1918:31), who based the description on the account given by the road crew. The burial seems to have been very similar to burial VI, but undisturbed by the time it was unearthed in 1915. The grave cut was about one m in diameter and one m deep. The two horses had been deposited in the grave facing in alternate directions, one facing north the other south. It does not follow in the account if they turned their bellies or backs toward each other. No artefacts were discovered and it is not clear if the bone has been removed or not. No human grave associated with this horse burial was noted.

Finally a fragment of a human cranium was found on the burial ground but not in any clear association with a particular grave (Matthías Þórðarson 1918:31).

4.12.4 Grímsstaðir, Skútustaðahreppur

The results of the animal bone analysis from the burial ground at Grímsstaðir are surprising. The number of individual horses found on the site was thought to have been two (Kristján Eldjárn 1968:99-101) but has increased to at least seven after the present analysis. The site was examined by Gísli Gestsson in late August of 1967. He arrived after men working on road construction had noticed human and horse bone in the excavated earth. The road crew indicated a spot where they thought the human grave had been, which had had a NE-SW orientation. East of the supposed human grave, Gísli Gestsson recorded a horse grave. A bulldozer had cut the upper part of the horse burial, but the bottom seemed still *in situ*, and the southern part was the least disturbed. An exact distance between the human and horse graves is not known, but they did not face the same way and are thus probably not part of the same burial process. The horse burial was square in shape, 2 x 1.3 m in diameter and faced E-W. Gísli Gestsson’s description of the burial is most curious (based on Gísli Gestsson’s report in Kristján Eldjárn 1968:99-101). He writes that it contained two horses, both facing west, one by the southern side of the cut, the other by the northern side (figure 4.33). Before having dug all the way down to the skeletons, the excavator describes a horse's head in the eastern part of the grave and many nails just west of centre, probably from a saddle or two. Beneath the nails the southern skeleton surfaced. The southern horse was found lying on its left side. Nothing was left but the front part, vertebrae, neck vertebrae and front legs (Icel.: *frampartur, hryggur, hálsliðir og framfótabein*). The animal's vertebrae were up against the southern edge of the grave cut. Gísli notes that the head was missing; it should have been in the western end. The hind legs and pelvis were also missing; they should have been under where the before mentioned head was found. The northern horse was discovered lying more or less on its back, slanting slightly to its right side and its vertebral column up against the northern edge of the cut. Gísli writes that the northern horse's front part was completely missing, leaving only vertebrae and the hind legs, which stretched towards the south. The original interpretation of this find is unusual. It is stated in the report that both horses had been sectioned in half. Then the front part of the southern horse and hind part of the northern one were deposited. After this the saddles were put on top of the sectioned carcasses, lastly followed by the remaining horse front and hind parts and heads. The carcass remains on top then got displaced by the bulldozer prior to the investigation (Kristján Eldjárn 1968:101). This sequence of events is highly improbable and the original interpretation has most likely been misled by taphonomic factors. When looking at a photograph of the horse remains *in situ* (figure 4.34) it is obvious that at least the southern horse was not butchered and deposited in the described way. Its right hind leg is articulated and anatomically more or less *in situ*. It is the posterior most lumbar vertebrae, sacrum and pelvis which are missing. A dark stain, almost certainly of organic nature, is very visible where the missing parts were. This further indicates that the articulated hind leg must have been connected to the rest of the horse upon deposition and the animal was thus not sectioned in half but buried complete. The missing posterior part could have been relocated by the roadwork or during an earlier 'grave robbing' episode. Furthermore, bone analysis has revealed that the animal bone assemblage is comprised of the remains of at least seven individual horses. Gísli Gestsson was convinced that the upper part of the burial, which was decimated by a bulldozer, had contained more horse bone (Kristján Eldjárn 1968:101). Given that it is highly unlikely that the horses discovered *in situ* were butchered (as originally thought), the horse remains in the top part of the burial must have belonged to one or more of the other five known individual animals. It is very rare to find burials in Iceland that contain more than two horses. Apart from this one, only a boat burial discovered at Dalvík (Böggvisstaðir) in Eyjafjarðarsýsla is known to have contained three to four horses and a burial at Litlu-Núpar discovered inside a stone setting in 1915 contained three horses. If all seven horses did not originate from the same grave, than the road construction crew must have completely obliterated the traces of another burial, or burials, containing only horses and no human bone, without noticing it.

Figure 4–33 – Two *in situ* horses facing each other in the Grímsstaðir burial (Gísli Gestsson GG-2442, National Museum of Iceland).

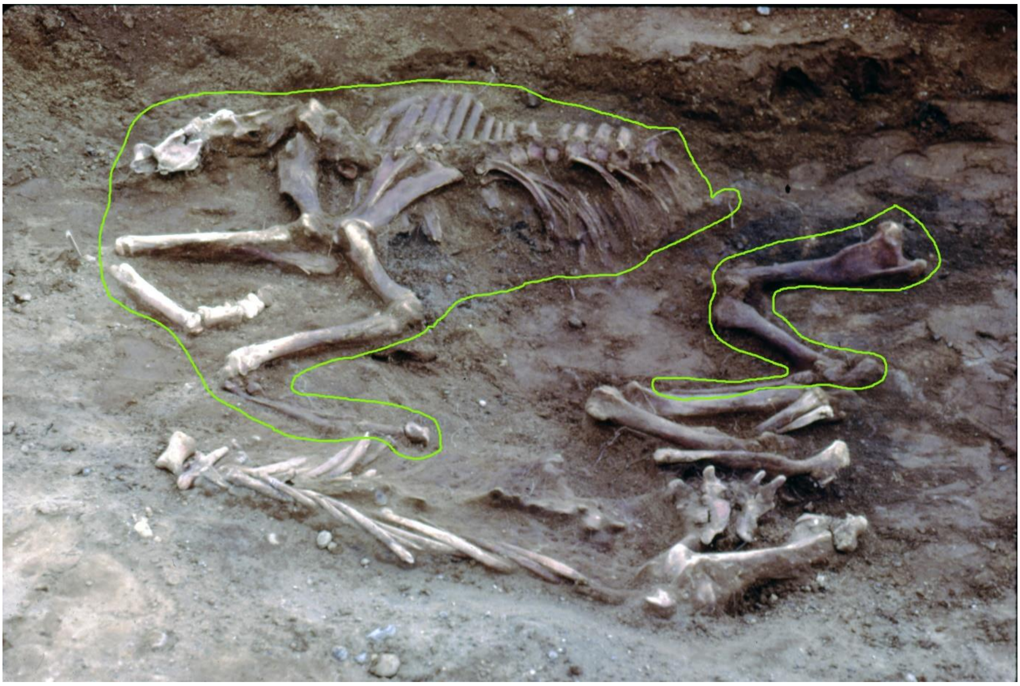


Figure 4–34 – Articulated horse in the Grímsstaðir burial (adapted from Gísli Gestsson GG-1716, National Museum of Iceland).

Figure 4–35 – Late Iron Age (Thompson 1975:70) carving illustrating horse baiting, on a stone from Häggeby in Uppland, Sweden (Photo: Wikimedia Commons).

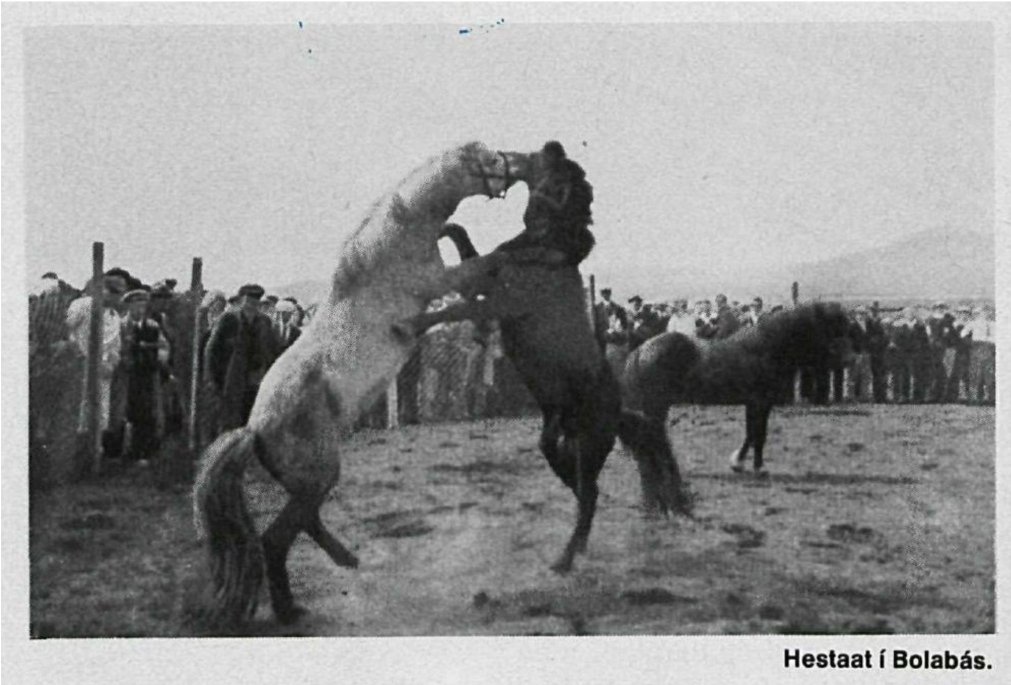


Figure 4–36 – Horse baiting (Lpr/2003-68-48, National Museum of Iceland).

The way the two *in situ* animals at the bottom of the grave are arranged brings to mind possible iconographic symbolisms (figure 4.35). The animals are laid on their side facing each other. The long bones still *in situ* show that the front legs are suspended upwards. The layout is reminiscent of horse baiting (figure 4.36), where stallions raise themselves up on their hind legs and use their front legs as offensive weapons, kicking and biting. Similar postures can be seen on contemporary rune stones in Scandinavia and in decorative art (e.g. Rúnar Leifsson 2012b). This, and the fact that the horses were buried by themselves, could be a clue to the motives behind the sacrifice of these animals. This ritual killing and burial could be linked with horse tournaments and represent either a sacrifice, for example to deities or ancestors, or it could be a ritualised aspect of *hestaat* as it might have been practised in the Viking Age.

The animal bone assemblage from the Grímsstaðir burial ground, stored at the National Museum, is comprised of 359 specimens that are divided between five boxes. Each box contains the mixed remains of at least two to four individual horses. There is no indication of the remains in each box being representative of a specific deposition or containing isolated archaeological contexts. On the contrary, the boxes seem to contain a mix of bones from Grímsstaðir, whether these all derive from the recorded horse grave or if some of them originate from other, unknown, burials. Further, the contents of each box are to some degree characterised by certain element types and body parts and the element and age distribution in each box corresponds to a large degree. Due to this it would be highly problematic to estimate the MNI for the entire assemblage by splitting it according to boxes. The only convincing method is to lump the contents of all five boxes. In that way, the entire assemblage has a minimum of seven individual horses present. The count of right femurs and left humeri is six each. But when the MNI is put into context with the age at death data, the number of individual animals rises to at least seven. Of those, two are juveniles between two and a half and three years of age, four are sub- or young adults from four to seven years of age based on tooth analysis, and at least one was mature at the time of death with age related pathologies and worn teeth. The assemblage is not preserved well enough for the cause of death to be determined, but no butchery marks are present. Only male characteristics are found in the assemblage, no definite female ones. In the following the bone collection is described according to storage box.

Box 1 contains 75 specimens, 32 of which are rib fragments. The main characteristic of the contents in box 1 is the frequency of robust limb bones, with a total of fourteen femurs, humeri and tibiae. The other elements are ten phalanges, five pelvic fragments and fourteen cranial and mandibular fragments. The assemblage is made up of the remains of at least four individual horses, based on the count of right femurs. The individuals were of different ages. All the long bone is fully fused; a possible exception could be a single fragment of a right femur (a proximal diaphysis) where the state of fusion could not be determined. The fully fused long bone elements could be in contrast with one of the mandibular fragments. It is a posterior fragment, with one m3 present that has not yet erupted and is well beneath the occlusal plane. This indicates that the mandibular fragment comes from a young individual that was not fully grown at the time of death. The m3 should have erupted at about three and a half to four and a half years of life (Silver 1969; Habermehl 1975). The last long bones fuse at around three and a half years (Silver 1969). A humerus, tibia and a pelvic fragment are noticeably more gracile then the rest. This difference between individuals in physique is probably due to variation in age and maturity. It could also indicate sex variation, but clear osteological evidence for that is lacking. Two pelvis fragments are complete enough and well preserved to be sexed with confidence. They are both male (Getty 1975). A third fragment is quite complete but too eroded for accurate determination and the remaining two are too fragmented. The withers height can be calculated on nine specimens, three humeri, three femurs and three tibiae. The range is 1.29 m – 1.37 m. This illustrates that there was some size variation between the individuals killed at Grímsstaðir.

Box 2 contains 63 specimens, a mix of axial and limb elements, but generally lacking the most robust long bones which characterise the collection in box 1. The assemblage is comprised of the bones from at least four individual horses. The minimum number of individuals is derived by contrasting the number of the most numerous elements (left and right scapulas, left maxillae and left radii and ulnae), which are three of each, with the age at death data. The individuals in box 2 were of different ages at the time of death, which is evident from tooth eruption and wear and from epiphyseal fusion. The bones come from animals that died very young, as young adults and lastly mature. These three quite broad age brackets might correspond with the count of the most numerous elements, except for the fact that there are two mandibles that come from young adult animals. Thus there are at least two animals from the 'young adult' age group which inflates the MNI to four. The young animal group is represented by a maxilla in which the m3 has not yet erupted, five incisors that are hardly in occlusion, an unfused sacrum and possibly by a pelvic fragment (an ischio-acetabular ramus which is quite gracile and similar to a fragment in box 1). The young animal was perhaps around three and a half to four years of age at the time of death. The young adults are represented by left and right maxillae, which have a permanent dentition but no real roots on either m3, and two complete mandibles with permanent dentition but no real roots on the m3. One of the mandibles has incisors that are in occlusion but the occlusal surface is still oval in shape and the infundibulum wide open. The young adult animals seem to have been around five years old at the time of death (Silver 1969; Habermehl 1975). The mature group is represented by a maxilla with molars that have well developed real roots (which constitute about half of the total length of each molar) and by five loose and worn incicors whose occlusal surfaces are triangular in shape and the 'mark' nearly or completely worn away. The mature animal was at least ten years old and probably older at the time of death, up to perhaps fifteen years of age (Silver 1969; Habermehl 1975; Levine 1982). There are indications of the sex of the animals, although it cannot be ascertained for every individual present. The sexing is based on the presence of canines, but pelvic evidence cannot be used due to fracturing. Mandibles from two animals, the young adults, have canines. Other mandibles are too fragmented for such identification, but there are two loose canines in the assemblage. No direct female criteria are present. There is no evidence for the cause of death of the animals to be found in box 2, which is most likely due to the element distribution and the level of fragmentation. On the other hand, there are two cases of pathology. In both instances two lumbar vertebrae have fused together. This locking of the vertebrae is probably due to repeated stress on the animal's lower back, indicating labour and/or riding over some period of time. Withers height can be calculated from the measurement of two elements, a radius and a metacarpal, giving 1.39 m and 1.35 m respectively (May 1985).

Box 3 contains 40 specimens from at least three individual horses. The MNI is derived from the number of left tibiae, metatarsals and scapulae. The collection is characterised by many limb elements. No cranial or mandibular specimens are present. Similar to the other boxes, the contents of this one are a mix of bones from animals that died at different ages. Although no teeth are present, the age difference is obvious from the state of epiphyseal fusion. On the one hand there are ten elements, with the MNI as one, that are either unfused or in the state of fusion. Among those are two femurs, both unfused proximally and one still fusing distally, two humeri, both unfused proximally, two radii, both fusing distally, two tibiae, both fusing proximally, an unfused lumbar vertebrae and a left pelvis with unfused growth plates on hip and buttock. Given that the MNI is accurate, these bones come from a juvenile animal that was not fully grown at the time of death, probably only around three years of age (Strand *et al.* 2007; Silver 1969). All other elements are fully grown, both long bones and vertebrae, and come from at least two adult animals. One of these adult specimens is pathological. A left metatarsal has new bone formation, lumps of woven bone, around the proximal articular surface and there are some nodules on the surface itself. Both accessory metatarsals (m/t 2 and m/t 4) are also fused to the central metatarsal. This is most likely bone spavin, due to genetics and/or prolonged stress on the animal's hind leg. Two samples were taken from the horse bone (SUERC-2019 and SUERC-2662) for radiocarbon dating, giving the calibrated range of 880-990 AD (95.4% confidence) derived from the weighted mean (McGovern *et al.* 2007:37). A total of 10 long bones are suitable for measurement to calculate withers heights (May 1985). The range of the calculated shoulder height is between 1.32 – 1.40 m with a mean of 1.38 m.

Box 4 contains 166 specimens of horse bone with three as MNI, based on the number of first phalanges. The contents are characterised by vertebrae, phalanges, carpals and tarsals, with the addition of many rib fragments. The contents are a mix of bones from juvenile, sub-adult and adult animals. The age distribution corresponds with the element based MNI count, because it reveals at least three different ages at death. Firstly there are the juvenile remains that come from an animal that died younger than three to three and a half years of age (Silver 1969; Sisson 1914); an unfused head and trochander majus of both left and right femurs and an unfused sacrum. Possibly belonging to this age group are the unfused vertebrae and a few quite gracile carpals and tarsals. The sub-adult bone assemblage represents an animal that died around four and a half years of age (Silver 1969). It is comprised of vertebrae that have started to fuse on the anterior side but not posteriorly and by two incisors that are little worn (the occlusal surface is oval and the infundibulum wide). Lastly, the adult bone assemblage represents an animal that died at least five years old but almost certainly significantly older. It is represented by fully fused vertebrae, some of which have age and/or stress related pathologies. A total of four thoracic vertebrae have growth of woven bone around the posterior articular surface. This new bone growth could be a step towards the locking together of a part of the vertebral column which is a mechanical response to repetitive stress. One of the thoracic vertebrae also has a medio-lateral fissure across the posterior articular surface of the vertebra, just below middle (page 249). The horizontal depression is two mm deep and 28 mm long. It looks as if the articular surface has ‘collapsed in’ on itself on a strip that is six mm at its widest. This ‘cave-in’ of the bone healed before the animal died. The cause of this phenomenon is thought to be heavy riding but possible consequences for the animal, if any, are unknown since this has only been recoded in archaeological material (Levine *et al*. 2005; Pluskowski *et al*. 2010). Other pathological specimens that most likely originate from an adult or mature animal are four tarsals (navicular, grand cuneiform, cuboid and lateral cuneiform) that are fused together in a bundle of bone. The tarsals may at some point have also been fused with the metatarsal but broken off. This pathology is bone spavin and must have affected the individual animal in life.

Box 5 contains only sixteen specimens, a mix of limb and axial elements. There are bones from at least two individual horses present in this box. This is not based on element distribution, but on the different ages at death seen in the assemblage. The remains of at least two young animals, juvenile and sub-adult, are present. There is no clear evidence of a third, older individual. The younger individual must have been about two and a half to three years of age at the time of death (Silver 1969; Habermehl 1975). It is represented by a mandibular fragment with both deciduous and permanent molars. P2 is erupted, but not in occlusion. Dp3 and dp4 are still in the mandible, but p3 can be seen erupting under the heavily worn dp3, which must have been very close to exfoliation at the time of death. An unworn incisor, a femur and humerus both in the state of fusing and unfused cervical vertebra and humeral epiphysis fit this juvenile age group as well. The sub-adult group is represented by five vertebrae that are fusing, indicating that they probably come from an animal that was probably between four and five years of age at the time of death (Silver 1969; Sisson 1914). A measurement of a fully grown metacarpal which could belong to either age group (or an older animal) gives the estimated withers height of 1.31 m.

4.12.5 Hrafnsstaðir, Ljósavatnshreppur

In the summer of 1952 Krisján Eldjárn visited the farm Hrafnsstaðir because human bone had been discovered there. The farmer had been levelling a hillock south of the farm and outside the field boundary when he noticed a scatter of human bone and the outline of two grave cuts orientated N-S.

The human bone is from three individuals. A middle aged male, an adult female and probably another adult female. A single horse bone was noted in the assemblage but it was not found at the National Museum during the present research. Artefacts included an axe and a whetstone (Kristján Eldjárn 2016:195).

4.12.6 Ingiríðarstaðir, Þegjandadalur

The Viking Age burial ground at Ingiríðarstaðir was the subject of an investigation by FSI (Institute of Archaeology, Iceland) conducted between 2008 and 2015 (Adolf Friðriksson 2016:503-509). Ingiríðarstaðir is an abandoned farm in Þegjandadalur, a valley deserted before the middle of the 16th century at the latest (Elín Ósk Hreiðarsdóttir & Roberts 2009). Modelling of the ground surface and examination of aerial photographs has revealed up to fifteen burials on the site, which makes it one of the largest pre-Christian grave fields known in Iceland (Roberts 2013). The excavation strategy used at Ingiríðarstaðir is to open large contiguous areas and to excavate the gravefield in its totality. This has revealed features associated with the burials but lying outside the grave cuts, including postholes surrounding some graves and a square structure amidst the burials (Roberts 2013). By 2012 the burials of seven humans (six adults and one neonate) and of at least six horses had been excavated, along with a curious pit containing a mix of animal and human bone. Following is a description of the archaeology and animal bone discovered at Ingiríðarstaðir by year of research.

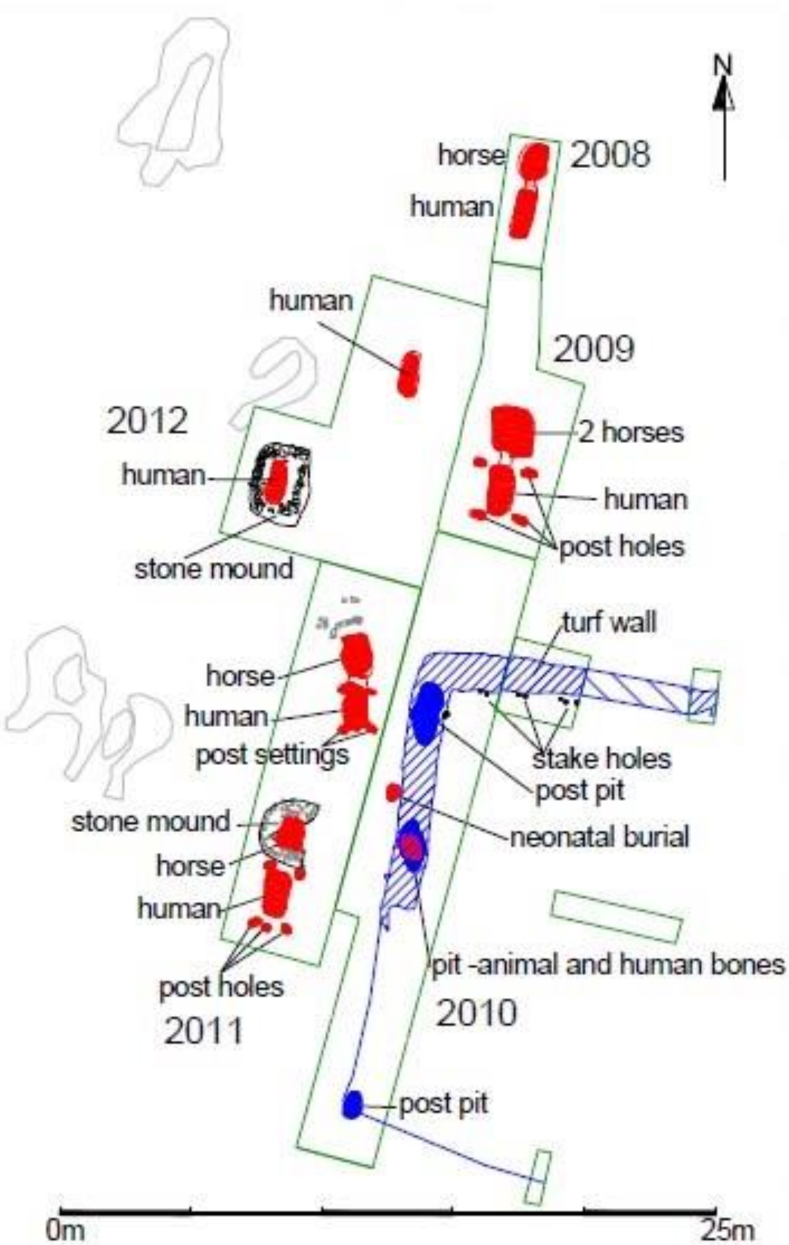


Figure 4–37 – The burial ground at Ingiríðarstaðir in 2012 (Roberts 2013:7).

Figure 4–38 – Ingiríðarstaðir burial I, wood remains on a thoracic vertebra.

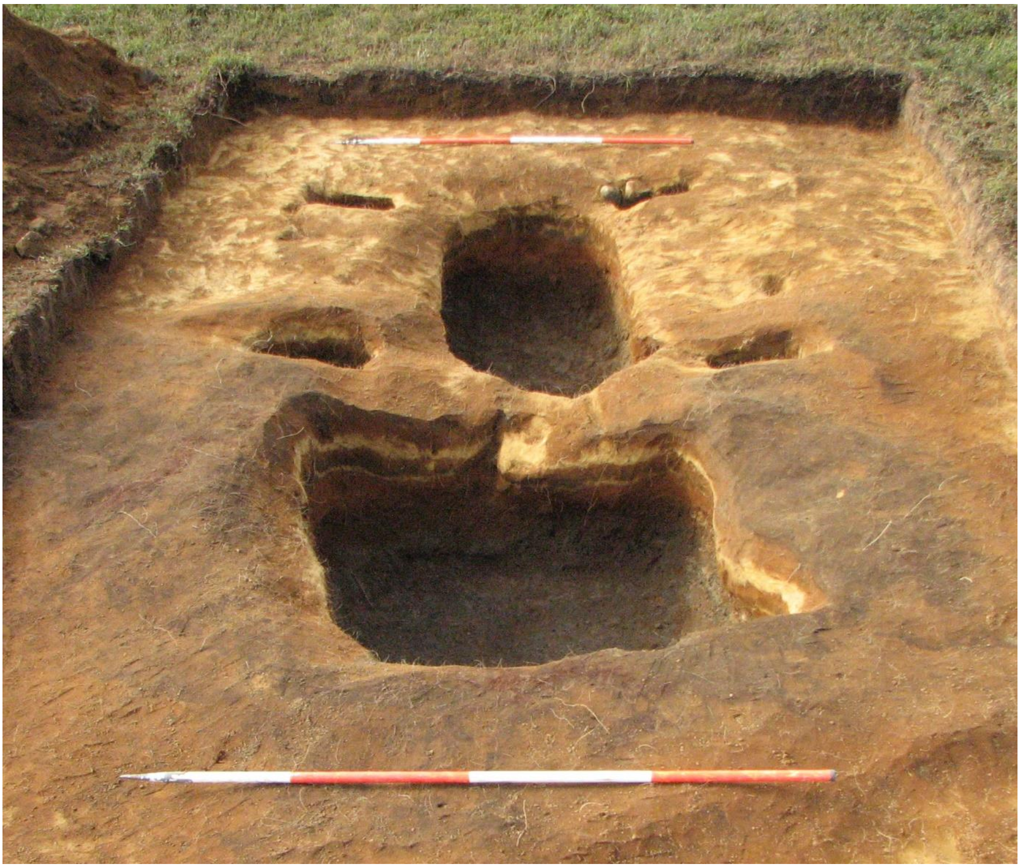


Figure 4–39 – Ingiríðarstaðir burial II, graves and postholes after excavation (Photo: Roberts, H M. Institute of Archaeology, Iceland).

Figure 4–40 – Ingiríðarstaðir burial II, excavation of horse two with bronze studded harness (Photo: Institute of Archaeology, Iceland).

Figure 4–41 – Ingiríðarstaðir burial II, cut mark on the axis of horse one.

Figure 4–42 – Ingiríðarstaðir burial II, poleaxed cranium of horse two.

Figure 4–43 – Ingiríðarstaðir burial II, metal and organic remains on the atlas of horse two.

Burial I was excavated in 2008 (figure 4.37) and contained the remains of a human and a horse in two grave cuts (Adolf Friðriksson 2016:503). Both graves had been dug into and disturbed prior to 1477 and it is likely that a majority of the grave goods was removed on that occasion. The only artefacts left were a scale weight made of lead and a small sheet of silver. The human was probably male and was at least 35 years of age at the time of death (Elín Ósk Hreiðarsdóttir & Roberts 2009). The burial was oriented N-S, with the human grave to the south and the horse grave to the north. The horse skeleton was disturbed during the grave robbery and some of the bone had been relocated to the southern cut, although a majority was scattered on the northern side. The horse bones represent a single individual. A majority of the skeleton is present, but the bones show differential preservation because the grave was disturbed in antiquity. It is evident from canines in the mandible that the horse was male. The individual was at least about five years old when it died. The minimal age limit is deduced from epiphyseal fusion. All the characteristic bones, including the vertebrae, are fully fused. But judging by dental eruption and wear the individual may have been a few years older, up to ten years. Thus, the animal was in its prime; adult but not old. The shoulder height of the horse was about 1.30 m based on the measurement of the right radius and the left metapodials (May 1985), which is similar to the modern Icelandic breed. A whole carcass was laid to rest in the grave, judging by the completeness of the skeleton and the total lack of cut and/or chop marks. No marks are found on the bones that could indicate the cause of death. An interesting ailment affected the horse's lower back. The first, second and third lumbar vertebrae are completely fused together. New bone has proliferated around the articular processes, particularly on the left side. The condition is probably not age related because no evidence of osteoarthritis is seen on the articulation surfaces. The fusion more likely occurred due to repeated and ongoing stress to the animal's back, e.g. from riding or pulling or carrying heavy loads. Also, there is spavin in the animal's right hind leg, possibly due to a combination of ongoing stress on the hind quarters and genetics. The fourth tarsal is fused with the metatarsal and the central tarsal is in the state of fusing with the third tarsal, there is a line visible between them on the medial surface but elsewhere they are completely fused together with a proliferation of new bone. It is interesting that no such pathology is visible on the left side specimens. The horse was very likely buried with a saddle, the remains of which can be seen on two vertebrae (figure 4.38). Wood remains are pressed tightly against two thoracic vertebrae. On one vertebra the wood remains are laterally on the left side, but on the other vertebra wood remains are found laterally on the right side and also on the posterior articulation. That the wood remains are the remnants of a saddle is supported by the fact that the wood is present laterally on both sides of the vertebrae.

Burial II was excavated in 2009 (Adolf Friðriksson 2016:503-504) and contained also human and horse bone in two grave cuts (figure 4.37). Two horses occupied the northern cut and the disturbed remains of a human were discovered in the southern one which was surrounded by four substantial postholes (figure 4.39). The burial had been disturbed in antiquity but was still quite rich in artefacts. The human grave contained four pieces of hack silver, two glass beads and several delicately patterned buckles and strap ends of bronze (Roberts 2013), while the remains of a harness and a bridle bit decorated with bronze studs and ornamented fittings was found *in situ* on one of the horses. The horse bone was undisturbed upon excavation. The horses' heads were in the northern end of the grave. *Horse 1* was younger and was deposited into the grave first. *Horse 2*, the older one, was deposited partially on top of the former and found with the remains of the bronze studded harness (figure 4.40). Bone preservation is fairly good and both horses are represented by elements from every part of the skeleton. This along with the lack of cut/chop marks (apart from a cut on a vertebra from Horse 1) indicates that the horses were deposited complete into the burial and not butchered. Horse 1 was deposited into the burial first (and thus presumably killed first). Horse 1 was a young animal of unknown sex. Based on dental eruption and attrition and state of bone fusion, the animal was probably between three and three and a half years old at the time of death. A horse this young would not have been used for riding or heavy labour. It was most likely killed by poleaxing, as is evident on the fractured skull. A cut mark can also be seen on the axis, the second vertebra in the neck (figure 4.41). The cut is transverse, 30 mm long, one to two mm wide and three mm deep, on the ventral side of the vertebra, 52 mm from the anterior joint margin. It is unlikely that this cut was caused by post-depositional taphonomy since the skeletons were undisturbed upon excavation and the narrow cut seems to have been inflicted with a sharp instrument. It is likely that the horse was bled after being poleaxed, but in order for a blade to mark the axis the cut would have to be very deep and inflicted high up on the neck. Horse 2 was deposited on top of Horse 1 in the burial. Like the former horse it had been poleaxed in the forehead (figure 4.42), but its skull was not as severely fractured as the younger ones. The fact that Horse 1 is likely to have been killed first must have caused anxiety for the second animal, leaving us to speculate how it was restrained and managed through the ‘ceremony’. Horse 2 was male, based on the presence of canines and the morphology of the pelvis. It was a fully grown animal probably up to fifteen years old and approximately 1.36 m in shoulder height based on the measurement of the right humerus and left radius and tibia (May 1985). Horse 2 was presumably a riding horse based on the presence of the bronze studded harness that accompanied it to the grave. Metal and organic remains of the harness are pressed on the dorsal side of the animal’s atlas, its first neck vertebra (figure 4.43). A few bones, both horse and ‘large mammal’ derive from another context excavated in 2009 which is not directly associated with the horse burial discussed above. The context is a fill of a robbers’ cut and is likely to contain re-deposited bone derived from another burial.

In 2010 a very interesting structure was discovered on the grave field and partly excavated along with a burial (III) of a neonate (figure 4.37). The structure is made of turf and seems to be square in shape. A part of the structure, an L-shaped wall, was investigated and found to contain elements of the LNL settlement period tephra layer. Further, the wall was built upon a surface covered by the tephra (Roberts 2013). This indicates that the structure is likely to be Viking Age and perhaps contemporary to the construction of the adjacent burials (or older). At the base of the turf wall on its western side and below turf debris was the grave of a neonate. Three pits were recorded that cut through the wall. Two of those, at each end of the wall, probably held large wooden posts, much larger than usually seen in Icelandic buildings of this time (Roberts 2013). The central pit contained 365 fragments of animal bone and two fragments of a human cranium. The animal bone was analysed by Seth D. Brewington (2010). A total of 121 specimens were identifiable to species. Most were cattle and caprine and a single pig bone was also identified. This part of the assemblage is reminiscent of household refuse and had been deposited at the bottom of the pit. On top of this assemblage was the articulated but degraded skeleton of a cat. Cats are very rare in Viking Age contexts in Iceland (McGovern 2009:221). The two fragments of human cranium were by the cat bone. The skull fragments exhibit evidence of violence. The human was beaten with a blunt instrument; the trauma is unhealed and probably caused death (Roberts 2013). On top of the entire bone collection and filling up the pit were large stones. The turf structure with the large postholes and the pit with human and animal bone might be part of the burial ground, but other taphonomic reasons for the presence of the bone pit cannot be excluded at this moment.

In 2011 two burials (IV and V) were excavated at Ingiríðarstaðir (figure 4.37). Each burial was composed of two grave cuts, one for a human the other for a horse (or horses). Both human graves were surrounded by postholes and both horse graves had in the past been covered by a mound of stone and turf. The horses had been harnessed when buried. An iron bridle-bit was discovered underneath the skull of the horse in the northern burial (IV) and an iron buckle was found with the southern horse in burial V. The burials had been dug into and disturbed in the past, which influenced bone recovery and preservation (Roberts 2013), but analysis of the human bone reveals that an adult woman was laid to rest in burial V (Adolf Friðriksson 2016:506). The pair of graves in burial V also contained far more animal bone than the pair of graves in burial IV.

A total of 90 specimens of animal bone were recorded from burial IV, all horse or probably horse. The animal bone in burial IV had been severely disturbed in antiquity. Some horse elements were recorded in the human grave cut, having presumably been tossed between graves when the burial was dug up in the past. The surviving bone is more poorly preserved than the animal bone in burial V. The surviving elements represent two horses, based on the number and different wear of teeth. One was killed quite young, about five years old. The dentition is adult but not old. The loose maxillary and mandibular molars from this individual have little or no real roots and a surviving incisor had recently come into occlusion prior to death. The other was much older, perhaps 20 years or more at the time of death. The surviving left and righ mandibles have four molars each nearly worn down to the root and eight loose maxillary molars in the assemblage are in the same state of wear.

A total of 260 specimens of animal bone were recorded from burial V, from horse, dog and sheep/goat. The MNI of dog and caprine is one but two for the horse elements. Most of the assemblage is from a single horse, represented by elements from every part of the skeleton but there are four elements (a femur, scapula, cervical vertebra and lunate) that increase the MNI. A single loose incisor in the assemblage seems to be less worn than the other teeth and might belong with these extra elements. There are also three dog elements and three caprine bone present. Two caprine elements, a mandible and a maxillary molar were recorded in the human grave cut and a tibia in the horse grave cut. A dog mandible was recorded in the human grave but two thoracic vertebrae in the horse grave. The „extra“ horse scapula was recorded in the human grave but no human bone in the horse grave. The horse represented by the majority of the bone assemblage is quite complete and the over all bone preservation is good. The lack of cut/chop marks on the horse bone, along with the fact that the skeleton is quite complete, indicates that the animal was deposited complete into the burial and not butchered. The skull is fractured and the animal was probably poleaxed, but some of the breakage is also due to a past disturbance to the grave. All molars are present in maxilla except the left P2. The molars are all very worn and the crown has almost worn off the right P2. Both canines are present and very worn, almost down to the bone. The incisors are missing from the maxilla, they probably fell out when the grave was dug up on the past. The entire right side and the anterior part of the left side of the mandible is present. Four incisors are left in the jawbone (left and right i2 and i3) and both canines. All molars are present in the right jaw. The teeth are worn, indicating that the animal was old at the time of death, probably over 20 years of age. This is supported by pathology seen in the animal’s back. At least two pairs of vertebrae, in the thoracic and lumbar regions, had fused together, and other vertebrae have new bone growth (osteophytes) on the edges of the articular surfaces. A single thoracic vertebra also has a medio-lateral fissure across the posterior articular surface. The vertebral pathology indicates repetitive strain, e.g. excessive riding, and old age (Pluskowski *et al.* 2010). The horse was male, based on the presence of canines and the morphology of the pelvis. It was a fully grown animal and stood at approximately 1.40 m at the shoulder (May 1985). The dog is only represented by three elements, a left mandible and two thoracic vertebrae. The presence of a part of the animal’s head along with a part of its back is a clue that a complete animal was originally deposited in the burial. The dog was young at the time of death. Its mandibular teeth are unworn and the vertebra is unfused posteriorly and just starting to fuse anteriorly. The mandible was recorded in the human grave, whereas the vertebrae were discovered in the horse grave. This, along with the fact that most of the skeletal elements are missing, is a sign of the level of disturbance to the burial in antiquity. It is not clear whether the dog was deposited with the human or the horse, but the former is more usual. It is unclear whether the caprine elements were an intentional part of the burial assemblage. Two of the caprine bones were recorded in the upper fill of the disturbed human grave, and as such it could be intrusive to the context due to the disturbance in antiquity. Sheep or goat bone has never been conclusively recorded in a primary context in a burial in Iceland.

The MNI does not increase if the extra horse elements from burial V are paired with the horse bone assemblage in burial IV. This indicates that the younger horse bone in each burial might originate from the same individual and might exemplify the level of past disturbance to the grave field.

In 2012 two human burials (VI and VII) were investigated, but no animal bone was recorded. Both burials had been covered by mounds of stone and turf in the past and both had been robbed, at least one of them prior to 1300. Fragments of iron were recovered from both burials and a decorative stud of copper alloy from one (Roberts 2013).

4.12.7 Kálfborgará, Bárðdælahreppur

In the summer of 1869 five Viking Age burials were discovered at the farm of Kálfborgará. The burials were aligned in a row from north to south and each burial faced WSW-ENE but the direction the human remains faced within each burial was not noted. The first burial only contained human bone. The second burial was 7.5 m further north and contained human remains along with jewellery: two brooches, four beads and a ring pin of copper alloy. The third burial was 7.5 m north of the second. It contained human bone and a single spearhead (Kristján Eldjárn 2016:195-196).

The fourth burial was 6.3 m north of the third. It was circular in shape and constructed of large boulders (Icel. "…mikilli hleðslu og stóru grjóti"). The burial contained the remains of two horses and a buckle from a saddle. No human remains were noted in the fourth burial. The horses had been deposited in the grave lying on their sides in a flexed position forming a circle (Icel.: *...beygðir í hring*) which seems to indicate they were placed alternately in the grave, i.e. the front feet of one facing the hind feet of the other. The horse remains were not preserved.

The fifth burial was 7.5 m north of the horse burial and contained only human remains (Kristján Eldjárn 2016:196).

4.12.8 Litlu-Núpar, Aðaldælahreppur

The remains of eight to ten horses and two dogs are known from the Viking Age burial ground at Litlu-Núpar. The first three horses were discovered in 1915 by Matthías Þórðarson. The dogs and the rest of the five to seven horses were excavated between 2004 and 2010 by FSI. The number of horses is uncertain because it is possible that the disarticulated remains of two horses found in 2008 and the bones of two horses found close by in 2010 derive from the same two individuals. Following is a description of the animal bone finds according to year.

Matthías Þórðarson (1916:31-33) investigated the grave field in 1915 after a local boy had dug into one of the graves. He discovered the burial (I) of an adult woman (Kristján Eldjárn 2016:207), her head facing north, and about fourteen m further northwest a horse burial (II), also facing north. The horse burial had been circled by lava rocks brought to the site. The horse grave was eroded and some of the horse bone had dispersed. The investigator thought that the entire horse bone assemblage, the *in situ* bone and the dispersed bone put together, represented at least two individuals, but was unable to conclude if both animals had shared the same grave of if there had been separate graves. He did not find a human burial adjacent to the horse bone (Matthías Þórðarson 1916:31-33) and Kristján Eldjárn (2016:207) thought it obvious later on that both horses had shared the same burial.
The animal bone assemblage from 1915, stored at the National Museum, is made up of 78 horse specimens that in fact derive from at least three individual horses. The MNI is based on the count of innominate bones. The surviving specimens are relatively few considering that they originate from three large mammals. The individuals present were of different age, at least one was fully adult and at least one was not. The age range is obvious from the state of epiphyseal fusion of the vertebrae. Some are fully fused and come from a fully grown animal, while others have the distal epiphyses either unfused or fusing indicating an age of death at around four and a half years (Silver 1969). This is consistent with the tooth wear data. One individual’s mandible, which could belong to the animal with the unfused vertebrae, has no

incisors but eleven molars. Neither left nor right m3s have developed real roots. Another mandible and a corresponding maxilla come from an adult. The occlusal wear of the incisors is indicative of about ten to twelve years of age at the time of death (Habermehl 1975; Silver 1969). This younger mandible has a canine present and is thus probably from a male animal. Other mandibulary and maxillary specimens in the assemblage are too fractured or eroded for sexing, but one right pelvis has male characteristics (Getty 1975). A measurement of a left metacarpal reveals a withers height of 1.44 m (May 1985) which is, if the estimate is accurate, unusually tall for an animal of the period.

All in all, the animal bone assemblage adds to the story originally written by Matthías Þórðarson. There are more horses present than previously thought. It is unknown if the three horses came from the same burial or if there were separate graves. At least one of the individuals was male and two distinct ages at death can be noted. No human bone was discovered in the immediate vicinity. But due to erosion and other possible disturbing taphonomic factors, such as grave robbing, it cannot be ruled out that the animals were associated with human burials. The eroded and incomplete state of the horse skeletons reveals the devastating taphonomy that has acted upon the archaeology. No butchery marks are seen on the bones and the horses were most likely buried whole, so the lack of elements must be due to anataxic, post-depositional processes. That said, the fact that a stone setting of transported lava rock surrounded the *in situ* horse bone gives strength to the idea that at least one horse rested in its own grave, perhaps similar to what has been recorded at Hrífunes (pages 225-226).

The grave field was revisited in 2004 by FSI and two more burials (III-IV) were excavated a few meters south of the ones excavated in 1915 (figure 4.44). Both burials had been dug into and disturbed at some point in the past (Adolf Friðriksson 2016:500-501).

The former burial (III) excavated was a 0.4 m deep cut, 1.85 x 0.9 m in diameter, covered by a low mound of earth and lava stone. It was obvious from tephrochronology that the burial had been dug into prior to AD 1477. The grave contained disturbed horse bone, but no artefacts were discovered (Adolf Friðriksson *et al.* 2005). The horse bone assemblage was analysed by Thomas McGovern (2004a) and was found only to contain six specimens with one as MNI. Based on tooth wear, the horse was adult at the time of death, but not old. It was at least five years of age. The sex of the animal could not be determined nor the cause of death. McGovern notes that the animal had been of similar size as the modern breed of the Icelandic horse.

The second burial (IV) excavated in 2004 was that of a man, horse and dog. The burial had been dug into and disturbed prior to 1300, based on tephrochronology. It faced north-south and contained two grave cuts, separated by eleven cm of soil. The northern grave cut was larger, 1.8 x 0.56 m, and had more or less been emptied out at least 700 years prior to the investigation. One human bone from an adult of unknown sex was found in the redeposited grave fill along with a single iron buckle, most likely from a saddle. In the smaller southern grave cut, which was circular and 0.7 m in diameter, were the remains of a horse and a dog along with disturbed saddle and bridle remains; two iron buckles and 38 fragments of rivets and nails, some with wood remains attached (Adolf Friðriksson *et al.* 2005). The animal bone assemblage was analysed by Jim Woollett (2004) and found to contain 51 specimens. Of those 20 are horse, twelve are dog and the rest are unknown fragments of mammal bone, consistent in size with horse, dog and human bone. The horse was adult at the time of death, the surviving vertebrae being fully fused. More detailed age inference is impossible because no teeth, or other head elements, are present. The sex of the horse is also unknown. Despite the fact that both crania and innominate bones are missing, the element distribution indicates that the horse was most likely buried whole and unbutchered. The dog was similarely most likely buried whole. Its bones are fully fused and the dentition is permanent, the dog was adult but probably not old. Woollett (2004) notes that there is a possibility that the dog bones represent two individuals, although he tentatively gives one as MNI. This is due to the presence of two fragments of left humerii, a proximal and a distal piece, that can not be fitted together. They might originate from the same element, but further study is recommended.

Burial V was excavated in 2007. It was a boat burial containing the remains of three people, two males and a female, and artefacts. No animal bone was recorded (Adolf Friðriksson 2016:501)

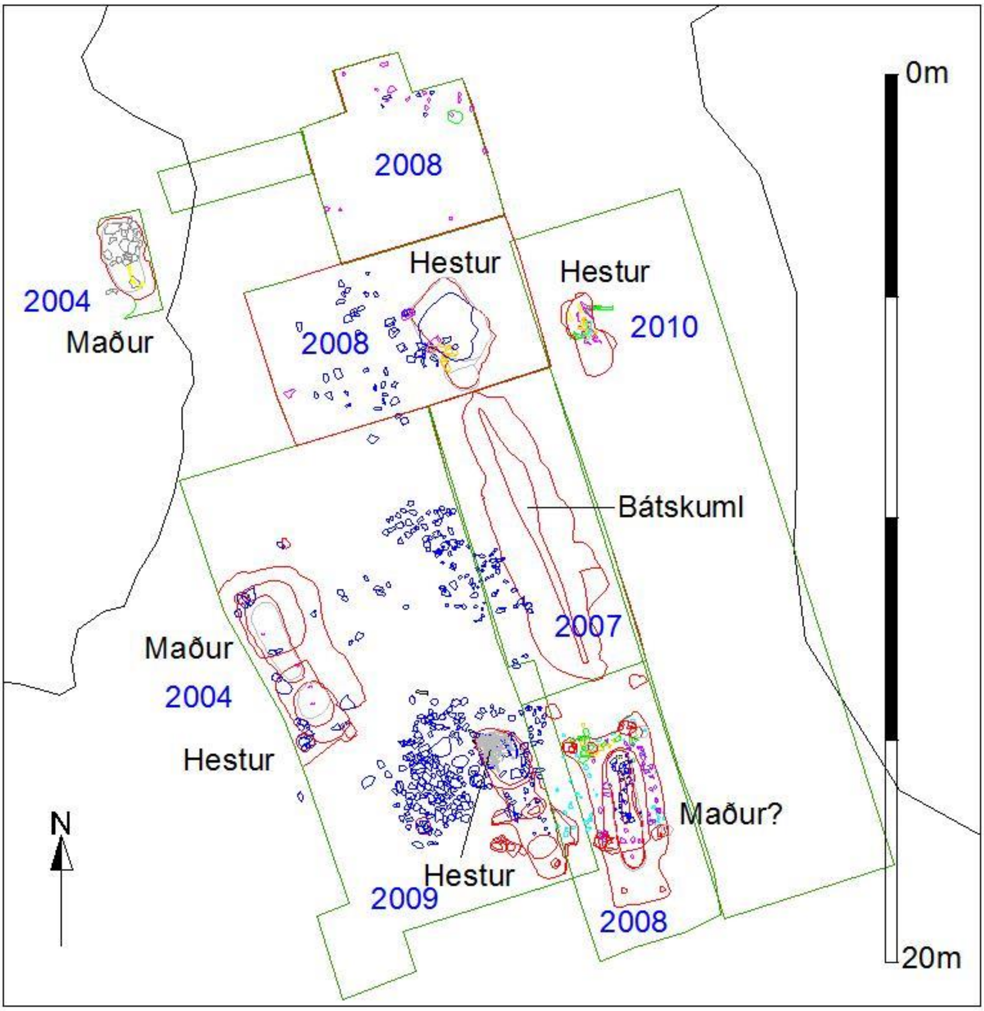


Figure 4–44 – Litlu-Núpar burial ground in 2010 (Plan: Roberts, H M. Institute of Archaeology, Iceland).

In 2008 the excavators discovered bones from a dog and two horses. The animal bone came from two burials (VI-VII), found on either side of the boat grave excavated in 2007 (Adolf Friðriksson 2016:501-502; figure 4.44). The dog remains were found in burial VI south of the boat burial, about twelve m south of the horse grave. All the horse bone was associated with burial VII north of the boat grave. It was found both in the grave itself but also scattered to the northwest; probably dug out by grave robbers along with soil. The 2008 animal bone assemblage consists of 65 specimens.

The burial containing the dog remains was surrounded by four substantial postholes, indicating that it might have been tented over or roofed (Lilja Björk Pálsdóttir & Rúnar Leifsson 2010:14-15). The dog elements were the only bones retrieved from the grave, but a copper alloy brooch in Borre style, an iron knife and a few iron fragments were also found. The dog is only represented by its cranium and two mandibles, all of which articulate together. Based on the dentition and the moderate tooth wear the individual was adult but not old. No pathology was observed. If the individual was killed with a blow to the frontal bone, then all such evidence has disappeared because of the fragmented state of the crania. It is curious that only the dog's head was found. There can be two reasons for that. Either only the severed head was placed in the grave originally or later disruption to the grave removed all bone leaving only the cranium and mandibles. It is not unknown for only dog cranial and mandibular elements to be found in Icelandic burials. For example in burial XII at Dalvík (Brimnes) (pages 127-129) a dog's head was discovered by the feet of a woman's skeleton (Bruun and Finnur Jónson 1910:84-88) and at Daðastaðir in Norður-Þingeyjarsýsla (pages 207-208) two dog molars were the only animal bone found in a woman's burial (Kristján Eldjárn 1958:134-140). On the other hand, considering the presence of artefacts in the grave and how disturbed all the other burials in the gravefield are, it seems highly likely that bone has been removed. Unfortunately, it is impossible to conclude if that includes the missing dog elements.

The horse bone assemblage is largely comprised of robust elements such as tarsal bones, vertebrae, phalanges and teeth. This selective preservation is indicative of destructive taphonomic factors, the main one being the robbery of the grave. After burial bone undergoes physical and chemical changes, but the degradation process often slows down relatively soon and undisturbed bone can preserve for a significant period of time. When bone is re-exposed (such as by grave robbing), broken and then relocated into a new soil matrix the degradation process may accelerate and lead to very selective preservation of elements (Lyman 1994:404-433). Given the element distribution, cranial fragments, vertebrae, femur and lower leg bones, it is highly probable that complete carcasses were interred. At least two individual horses are present in the assemblage, which is evident because of the two right astragali and of the five third phalanges. Also, the presence of a canine is indicative of at least one male. All elements found where fully fused and came from adult animals.

In 2009 FSI excavated a burial (VIII) which contained horse bone, but no human remains or artefacts (Adolf Friðriksson 2016: 502; figure 4.44). Possible postholes were found by the grave cut. The burial had clearly been dug into and disturbed at some point in the past. The horse skeleton had been relocated and formed a disarticulated pile at the north end of the grave (Lilja Björk Pálsdóttir & Rúnar Leifsson 2010:20). The element distribution and total lack of cut and/or chop marks indicates that a complete carcass of a horse had originally been interred. The horse is quite complete and bone preservation is good. The only major elements missing are the robust femora, which could have been separated from the rest of the skeleton when the grave was dug into. The horse was an adult, probably about fifteen years, based on tooth erosion. The presence of canines in the mandible and the morphology of the pelvis indicate that the individual was male. The shoulder height of the horse was roughly 1.30 m which is similar to the modern Icelandic breed, but the animal seems to have been somewhat shorter than one of the horses excavated in 1915 by Matthías Þórðarson (see above). Indications of poleaxing can be observed on the cranium, so the animal seems to have been killed with a heavy blow to the head. The horse was buried with a saddle; two buckles of which and a few nails were discovered in the grave.

The last season of excavation was in 2010 when a burial (IX) and associated remains of two horses were discovered (Adolf Friðriksson 2016:502). The grave was located a short distance away from horse burial VII excavated in 2008 (figure 4.44). The bone was disarticulated, mostly contained within the grave but some were found in the surrounding upcast. A total of 50 specimens were collected. It is interesting that if the 2010 assemblage is combined with the one from 2008, the MNI does not change. There is no overlap in element types between the two assemblages. This indicates that the bone exacvated in 2008 and the bone excavated in 2010 might derive from the same two individual horses. If so, then it is a testament to how great the medieval disturbance to the gravefield really is, when most if not all burials were dug up.

Both horses were fully grown at the time of death and based on wear of the incisors one of them was at least ten years of age (Habermehl 1975). One animal had spavin in both hind legs. The condition is worse in the right leg where the central, third and fourth tarsals and the accessory fourth metatarsal are fused in a lump with the metatarsal. There is significant new bone growth, nodules of woven bone, on the anterior surface of the fused lump of bones. This must have caused limpness and discomfort for the animal. No trace of spavin can be seen in the other animal, which might indicate that it died somewhat younger. As with other animal bone in Litlu-Núpar, there are no cut or chop marks on the horse elements, so both individuals were most likely buried whole and unbutchered.

4.12.9 Lómatjörn, Grýtubakkahreppur

The remains of four horses from three burials are known from Lómatjörn. A double horse grave, interpreted to be in context with a human grave found close by, and two single horse graves discovered 2.5 m apart from one another with no detectable association with human remains. Only fifteen specimens of horse bone were collected and stored at the National Museum, thirteen metapodia and two radii. The selective retrieval of bone elements for preservation limits the amount of information possible to deduce from the assemblage. The four horses are labelled A-D in the Museum's storage. A and B are most likely the remains of the two animals from the double grave, while C and D come from the single burials.

The double horse burial and associated human grave were disturbed twice by road construction before being investigated by Kristján Eldjárn (2016:190-191). First in 1930, the gravel mound on which the burials were located was mined revealing both horses and a human. The archaeology was subsequently reburied. Then in 1949 the site was bulldozed and the human grave was decimated. Fortunately the double horse burial was still more or less intact even after the second disturbance. When the horse remains were recorded they were *in situ* and articulated (figure 4.45). Both horses were laying on their right side, their heads facing north and feet to the west. The cut for the burial was irregular, about 1.5 – 2 m in diameter, so the neck of the eastern animal and the feet of the western one were stretched up against the banks of the cut. The eastern animal was killed first and deposited into the grave; the other one was lying on top of its outstretched legs. The eastern animal was also saddled. Remains of the saddle include two buckles and nails found by the horse's vertebral column. Two bridle bits were discovered in the grave, one in 1930 and the other by Kristján Eldjárn in 1949, presumably one bit belonging to each animal. It is not certain which horse is A or B, but animal A is represented by the most elements, all four metapodials and both radii. The horse was young at the time of death. The age can be deduced from the state of epiphyseal fusion. All metapodials are fully fused, whereas the radii are fused proximally and unfused distally, which indicates age of death somewhere between one and a half and three and a half years of age (Sisson 1914). The other animal, B, is only represented by the four metapodials which fuse early in life, so age cannot be inferred. Based on the measurement of the metapodials horses A and B stood at the shoulder in life at 1.35 m and 1.42 m respectively (May 1985).

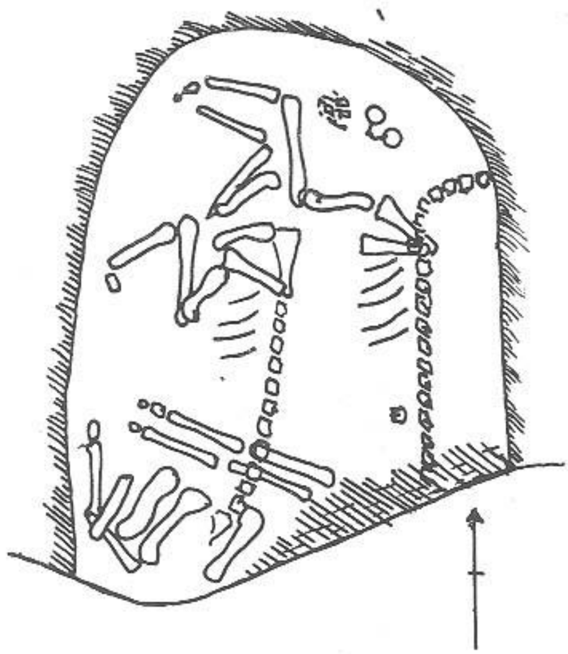


Figure 4–45 – Lómatjörn double horse burial, articulated remains (Kristján Eldjárn 2016:190).

The two burials containing horses C and D were excavated by locals prior to the arrival of Kristján Eldjárn. Both burials were located seven m north of the double burial and are reported to have both contained a jumble of horse bone, indicating that they might have been disturbed in the past. One was circular in shape, 1.25 – 1.50 m in diameter and 0.35 m deep. Along with the disarticulated horse bone there was a small spear head in the grave and rust fragments. Also, the presence of two cattle leg bones and a cattle mandible is noted, but Kristján Eldjárn writes that the origins and context of the cattle bones cannot be verified. No cattle bone is in the stored assemblage. The other single burial was 2.5 m further west. It was rectangular in shape, 2 x 1 m, and 0.5 m deep. It contained a lot of horse bone, along with an iron buckle and nails, indicating that the horse was saddled when it was buried (Kristján Eldjárn 2016:191). Horses C and D are only represented by metapodials in the surviving bone collection. It is not certain which horse comes from which grave, but it is logical to assume that horse C originates from the former burial. Horse C has bone spavin in both hind legs. The grand cuneiform, navicular and cuboid are fused with the metatarsal in both legs. This pathology must have affected the animal in life and is probably caused by genetics and prolonged stress due to heavy riding or work. Horse C stood at 1.37 m at the withers in life, based on the measurement of the right metacarpal and horse D stood at 1.40 m based on the right metatarsal (May 1985).

4.12.10 Lyngbrekka (Gömlu-Daðastaðir), Reykdælahreppi

During a survey by FSI in 2003 a Viking Age burial site was discovered on the farm Lyngbrekka, formerly known as Daðastaðir, in Reykjadalur. The subsequent excavation took place in 2004 and 2005 (Adolf Friðriksson 2016:509-510). The excavators unearthed a single burial of a human, horse and dog, although more are likely to be found on the grave field. The burial consisted of two oval grave cuts and had, based on tephrochronology, been dug into and disturbed at some point prior to AD 1300. The burial faced NW-SE. The southern grave cut was 1.15 x 0.65 m in diameter and was the grave of a female, aged 35 – 45 years at the time of death. The northern cut was 0.85 x 0.68 m in diameter and was a horse grave (figure 4.46). The two grave cuts were separated by a 0.30 m wide earthen baulk. Due to the pre-1300 grave robbery it is not certain in which grave cut the dog had rested. Its remains were dispersed, found on top of the earthen boundary as well as in both cuts. A few artefacts were found in the graves, mostly iron fragments, including a knife and some nails (Adolf Friðriksson *et al.* 2009a).

The animal bone assemblage is well preserved despite the disturbance in antiquity. The horse bone represents a single individual and a majority of the skeleton is present. The horse was male, which is evident from canines in both maxillae and mandible, and from the morphology of the pelvis (Getty 1975). All bones are fully fused, so the animal was clearly adult. Judging by the wear of the incisors the individual was at least fourteen years old at time of death (Habermehl 1975). The animal was mature but not old. The shoulder height of the horse was about 1.40 m which is average for the modern Icelandic breed. Judging by the completeness of the skeleton and the total lack of cut and/or chop marks, a whole carcass was laid to rest in the grave. A serious injury is evident on the cranium. The horse was clearly poleaxed, bashed in the forehead with a blunt instrument. The blow broke the distal part of the brain cavity and

Figure 4–46 – Lyngbrekka (Gömlu Daðastaðir), the two grave cuts after excavation. Northern cut on the left was a horse grave (Adolf Friðriksson et al. 2009a:10).

most likely stunned or killed the animal. The fifth and sixth lumbar vertebrae are completely fused together. The condition is not solely age-related because no evidence of osteophytosis or exostoses (indicating osteoarthritis) is seen on the articulation surfaces. The fusion looks 'clean', with no extra bone growth on either the ventral or dorsal surfaces. The fusion probably occurred due to ongoing stress to the animal's lower back, either because of excessive riding, or work.

The dog bone represents a single individual and a majority of the skeleton is present. Most of the bone is well preserved, but some of it has root etching. The dog was mature, probably quite old, judging from the heavy dental wear, especially on the carnassials and the incisors. Exostoses (new bone formation) can be seen on the proximal articulation surfaces of the humeri and is probably a sign of age related osteoarthritis. The shoulder height of the dog was ca 55-57 cm, based on the measurement of the femurs, humeri and radii (Harcourt 1974) and it was thus larger than the average individual of the modern Icelandic breed. The dog's cranium is very fractured. The distal part of the brain cavity has broken of completely. The fracture line is mostly dark which points to breakage in antiquity. The fracture could have happened when the burial was robbed, but that seems unlikely because the zygomatic arch and the nasal cavity (both of which are more fragile parts of the cranium) are unbroken. Given the similar injury on the horse cranium, it is likely that the dog was killed by being stricken on the head with a blunt instrument.

4.12.11 Saltvík, Reykjahverfi

Two Viking Age burials were excavated at the farm of Saltvík, in 2003 and 2004, by FSI (Adolf Friðriksson 2016:511-512). Burial I consisted of two grave cuts containing a human and a horse, while burial II was the grave of a man only. Both burials had been dug into in the past; based on tephrochronology this happened before AD 1477 (Adolf Friðriksson, *et al.* 2005; Adolf Friðriksson 2016-512).

Burial I was of a woman accompanied by a horse. The burial faced N-S, with the human grave cut to the south, 1.7 m long and 0.55 m wide. The horse grave was oval in shape, 0.95 x 0.7 m in diameter. The two cuts were separated by a 0.2 m thick earthen boundary. The bone was not articulated and the only artefacts were iron fragments in the human grave, probably from a casket and others possibly from a cauldron. Analysis of the human bone revealed that it was most likely an adult woman (Adolf Friðriksson, *et al.* 2005). The animal bone was analysed by Thomas McGovern (2004b). He found that the bone collection, consisting of 23 specimens, represented a single horse. The animal was adult at the time of death, with moderate to heavy wear on both incisors and molars. The sex of the animal is not noted, even though both innominate bones are present, as are the mandible and maxilla. An approximated measurement of the left femur, taken without an osteometric box, gives a withers height of about 1.02 m (May 1985). This is unusually low for an adult horse of the period and a question arises about the accuracy of the measurement. The horse bone was not available for re-analysis for the present work.

Burial II was 8 m NNW of the former one and faced in the same directions, N-S. It was a single grave cut, 1.25 x 0.6 m in diameter, containing the bones of a middle aged male. No artefacts or animal bone was discovered with the scant and disarticulated human remains (Adolf Friðriksson *et al.* 2005).

4.12.12 Skógar, Hálshreppur

In 1888 a bridle-bit was discovered on the farm of Skógar. The farmer sent his discovery to the National Museum and noted that human, horse and dog bone had previously been found at the same site as well as a large whetstone and some iron “rubbish” (Kristján Eldjárn 2016:191-192). The animal bone was not kept.

4.12.13 Ystafell, Ljósavatnshreppur

In 1917 the National Museum received a knife which had been found with human and horse bone. The burial was not investigated and no bone preserved (Kristján Eldjárn 2016:195).

4.12.14 Ytri-Neslönd, Skútustaðahreppur

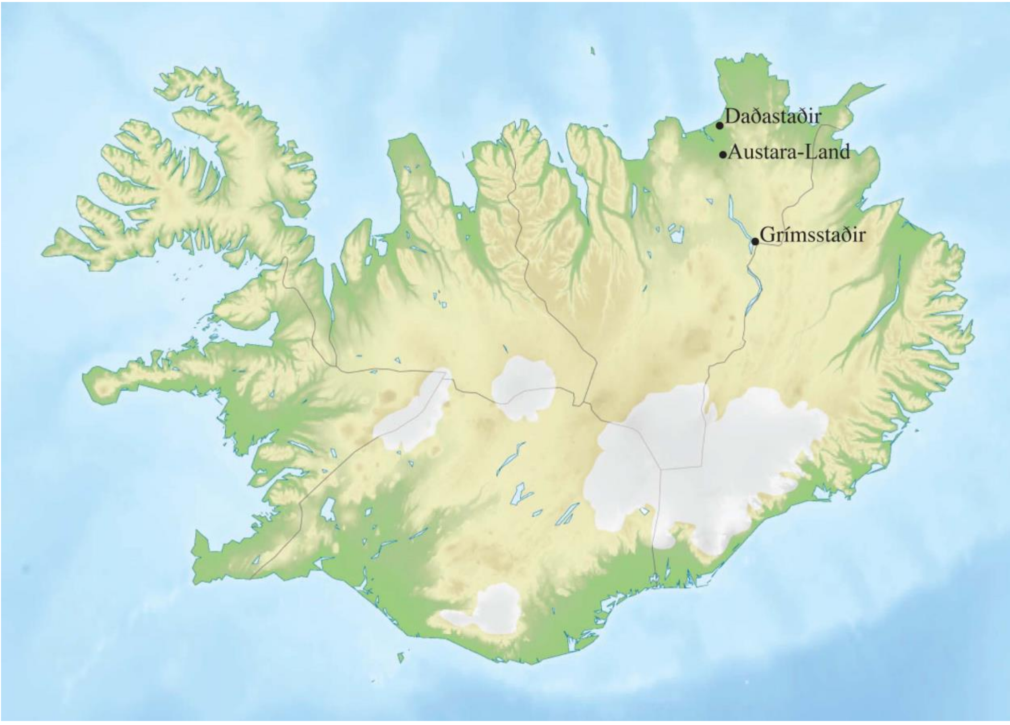
In 1960 a road construction crew accidentally dug up a Viking Age burial while mining pumice from a pseudocrater by Lake Mývatn called *Stóriforvaði*. The grave was completely destroyed by machining before the state antiquarian arrived, but according to locals a small mound had been visible there before. Bones of two people and a horse were collected on the site, along with a spear, an unrecognised iron fragment and a bridle-bit and a buckle, indicating that the horse had been buried harnessed and saddled. The human bone came from an adult male and a sub-adult of unknown sex. It is assumed in the excavation report, without being explicitly argued for, that the remains of both persons and the horse derived from the same burial (Kristján Eldjárn 1966:54-56). Radiocarbon dating of the burial is AD 770–900 (91.4% confidence, calibrated range derived from the weighted mean age of SUERC-2017 and SUERC-2661 – McGvern *et. al* 2007:37).
A total of 28 specimens of horse bone from the Ytri-Neslönd burial are stored at the National Museum. The elements represent most body parts and have a MNI of one. The animal was male. There are well-developed canines in both maxilla and mandible and the pelvis has male characteristics (Getty 1975). Five of the vertebrae in the assemblage still have visible fusion lines by the posterior epiphysis, which indicates age at death at around five years (Sisson 1914). The horse was between 1.32 m and 1.36 m tall at the withers based on the measurement of seven long bones (May 1985). Fracture on the skull shows that the horse was killed by poleaxing.

4.12.15 Þverá, Reykdælahreppur

Around 1945 the farmer at Auðnir, the neighbouring farm of Þverá, was mining for gravel on the boundary between the two farms when he came upon horse bone. Years later or around 1990 his son, the new farmer, noticed more bone in the same area, both human and horse. The site had been mined at least once in the meantime. Adolf Friðriksson visited the site in 1999 but saw no surface evidence of burials (Kristján Eldjárn 2016:204).

This site at Þverá is most likely a Viking Age burial ground where at least one human and a horse were buried, but no animal bone was kept or sent to the National Museum.

4.13 Norður-Þingeyjarsýsla



Map 4–13 – Sites in Norður-Þingeyjarsýsla discussed in the text.

4.13.1 Austara-Land, Öxarfjarðarhreppur

Shortly after 1900 a human skull was discovered by an eroding bank of earth. This was about 200 m north of the farmhouse at Austara-Land. In 1904 or 1905 the site was excavated by a local construction worker who discovered horse bone and an iron buckle from a saddle (Kristján Eldjárn 2016:210). The horse bone was not kept.

4.13.2 Daðastaðir í Núpasveit, Presthólahreppur

At least two Viking Age burials are known from the farm of Daðastaðir. Both contained animal remains along with human bone. It is not certain if the burial ground originally belonged to the farm Daðastaðir or to another now abandoned farm whose ruins are much closer to the burial site (Kristján Eldjárn 1958:140-141).

In the spring of 1956 an oval brooch was found by a shepherd in a wind-eroded area, half an hour walking distance from the modern farmhouse at Daðastaðir. This led to archaeological research conducted later that summer by Kristján Eldjárn. Where the brooch had been found, Eldjárn discovered an eroding burial of an elderly woman, mostly *in situ*, which contained substantial grave goods. Eldjárn found the other oval brooch of the pair and a *Borre*-style trefoil brooch, which dated the burial to the first half of the 10th century. Also there where over fifty beads, a ringed pin, an arm ring of copper alloy, belt clasp and a strap-end, comb, shears and a sickle of iron, a knife, two spindle-whorls, wool-combs, an iron hook and other pieces of iron, flint and copper-alloy. Along with these artefacts two dog teeth were found buried with the woman. The teeth are both mandibular first molars and almost certainly originate from the same individual. The teeth are permanent dentition, but not much worn and thus probably derive from a fully grown but not old individual. Eldjárn states in his report that no other dog bone was found (Kristján Eldjárn 1958:134-40). It is difficult to say if this is a result of post depositional taphonomic factors, i.e. that all of the dog remains except two teeth disappeared due to soil erosion, or if indeed only two molars were buried with the deceased woman, which would be unique in Icelandic archaeology. Isolated teeth of other species have been found in burials, e.g. a pig molar in one of the burials at Hafurbjarnarstaðir (page 80). In that instance a more complete horse and dog were also found, so the comparison is perhaps not ideal.

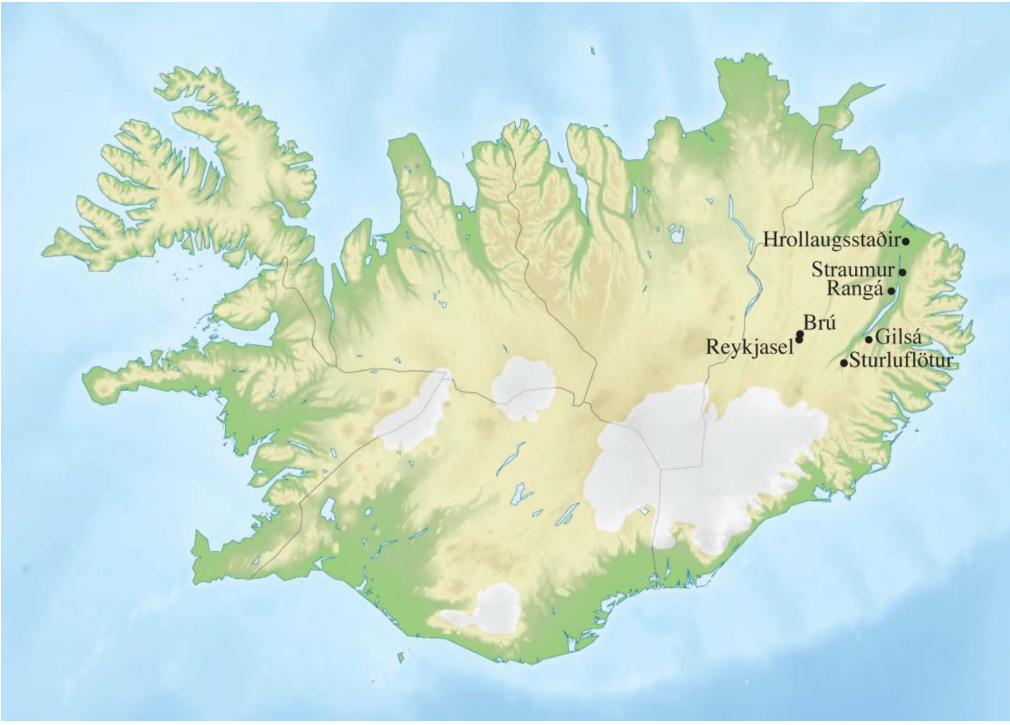
About 35 m further NE another Viking Age burial was found. It was more eroded and in worse shape than the previous one and none of the finds were brought back to the National Museum. The remains consisted of weathered horse bone and some badly degraded human remains. According to the farmer at Daðastaðir, two rings of iron (possibly the cheek-pieces of a bridle bit) and a couple of human skulls had been found previously on the site (Kristján Eldjárn 1958:134).

4.13.3 Grímsstaðir (á Fjöllum), Fjallahreppur

In 1965 Þorkell Grímsson (1966:84-86) investigated a Viking Age burial found close to the abandoned ruins of the farm (Gömlu) Grímsstaðir in NE Iceland. The research was instigated after a spear-head was discovered eroding out of the ground next to a human skeleton, but every now and then in the previous years bone had been seen eroding on the site. The badly eroded burial faced N-S and had been covered by sizable stones. Originally it was concluded that the human bone found on the site had belonged to three individuals, but recent bone analysis deems the remains to be of two persons of unknown sex. One of those was young, between seven and twelve years at the time of death, the other adult (Hildur Gestsdóttir 1998:12). No artefacts other than the spear were discovered.

The animal bone assemblage associated with Grímsstaðir is problematic as its context is uncertain. This is probably the reason why no mention is made of animal bone from the site in *Kuml og haugfé* (Kristján Eldjárn 2016:211). In the original report Þorkell Grímsson (1966:85) noted that animal bone had been gathered on the site along with a single human bone prior to his arrival. This is the animal bone assemblage now stored at the National Museum, which is comprised of 19 specimens. The animal bone bears clear evidence of having been exposed on the open ground for an extended period of time. The specimens are white and cracked from weathering and some have been overgrown with moss. The most common species in the assemblage is sheep, followed by a few unknown mammal elements. One horse element is recorded, a first phalanx. The species distribution is not typical for a burial context, but seems more akin to farm refuse, which calls to mind the close proximity of the abandoned farm. It is not known if the animal bone was collected in a burial, close by a burial, or just in the general vicinity. What is known is that the assemblage exhibits a similar intra taphonomic history. Because of these caveats the assemblage is not useable for study as burial material.

4.14 Norður-Múlasýsla



Map 4–14 – Sites in Norður-Múlasýsla discussed in the text.

4.14.1 Brú á Jökuldal, Jökuldalshreppur

In the autumn of 1988, human and horse bone was discovered at the farm of Brú when a bulldozer was levelling land for a parking lot. The burial had been disturbed before and according to Guðrún Kristinsdóttir, the archaeologist called to the site, this had happened between 1365 and 1477 based on tephrochronology. The bone was found piled in two grave cuts but presumably part of the same burial. The only artefacts were nails and some wood remains. The human bone was of a male who died around the age of 50 (Kristján Eldjárn 2016:216). The horse bone was not analysed and was not located during the current research.

4.14.2 Gilsá, Fljótsdalshreppur

In the late 19th century, the eroded remains of what was probably a Viking Age burial were discovered on a small promontory into the river Gilsá. The remains consisted of a stone circle inside which was a six ft long, square stone cistern facing east-west. Horse bone is reported to have been found on the site (Sigurður Vigfússon 1893:35-36), but none was kept for posterity.

4.14.3 Hrollaugsstaðir, Hjaltastaðahreppur

Kristján Eldjárn (2016:126-128) investigated burials on two different locations on the farm of Hrollaugsstaðir in 1952. On the former site, a bulldozer had upturned the burial of a woman. No artefacts were found and it looked like the burial had been disturbed before. On the other site, children at play found bone when digging into an eroded patch on a small mound. There Kristján discovered a disturbed burial containing the mixed and incomplete remains of a human, horse and dog, along with a few fragments of iron. Under the mound, the grave cut was 0.75 m deep and turned E-W, 1.75 x 0.9 m. About three m further west was another mound where Kristján found horse bone solely and in the third mound he found a single horse bone. The remains of two horses from Hrollaugsstaðir exist at the National Museum, but it is not known from which burials they come or if they represent the entire remains. The latter option is unlikely since no dog remains are preserved, which again might indicate that the horse assemblage is derived from the mound which contained only horse bone.

The assemblage is comprised of nine specimens from at least two individual horses that died at different ages. The older one is represented by three specimens; a fused cervical vertebra, a tibia and a metatarsal that has two tarsals (the grand cuneiform and navicular) fused with it. The pathology on the metatarsal is bone spavin. The older animal's whithers height is 1.33 m, based the measurement of the tibia (May 1985). The younger individual is represented by a femur, a tibia, a left and right metatarsals and possibly by an eroded phalanx. The femur is unfused proximally (the head and trochanter major are also present in the assemblage) and the tibia is fusing proximally. This indicates that the horse was around three years old at the time of death (Sisson 1914:114).

4.14.4 Rangá, Tunguhreppur

Around 1900 the burial of a human, a dog and one or two horses was discovered just south of the home field of the farm Rangá. The finder describes how pebbles of different colour had been arranged around the human's skull. A few artefacts were found in the burial, including an iron cauldron, shells found in the cauldron, fragments of a comb and pearls (Kristján Eldjárn 2016:223-224). The animal bone was not preserved.

4.14.5 Reykjasel, Jökuldalshreppur

Two Viking Age burials are known from where the ancient Reykjasel is believed to have stood. The first one was discovered in 1901 by Daniel Bruun. It was the grave of a woman buried with jewellery, an oval brooch and 35 beads. The woman's head turned southwards, and by her feet to the north was a horse grave (Kristján Eldjárn 2016:217-218). A buckle discovered on the site might have originated in the horse grave and be a part of a harness. Daniel Bruun only collected one horse bone for preservation at the National Museum, a left metacarpal, which is now lost. In 1975 the site was inspected again and two beads and some rusted iron fragments were found, alongside four small fragments of enamel and dentine from a large mammal, perhaps a horse.

The second burial was found in 1918, about 120 m from the first one. The burial was of a male. A total of 34 beads, a knife, a spear and a whetstone were found in association with the human remains, but no animal bone (Kristján Eldjárn 2016:218).

4.14.6 Straumur, Tunguhreppur

In 1952 Kristján Eldjárn researched eroding Viking Age burials at the farm of Straumur located on the bank of the river Lagarfljót. The burial least disturbed was that of a child around ten years of age buried with a small axe, a small knife, a lead weight and two small round pebbles. The grave cut was rectangular and faced S-N with the child’s head in the southern end. The grave contained wood remains and rivets. Kristján Eldjárn surmised that parts of a boat had been used to construct the grave.

Human bone was discovered on three other locations in the erosion bank, that of a middle aged male, of a woman around 30 and of a middle aged woman. A single horse bone was also discovered, a phalanx, which indicated a horse burial may also have been present (Kristján Eldjárn 2016:221-223). The horse bone was not found during the present research.

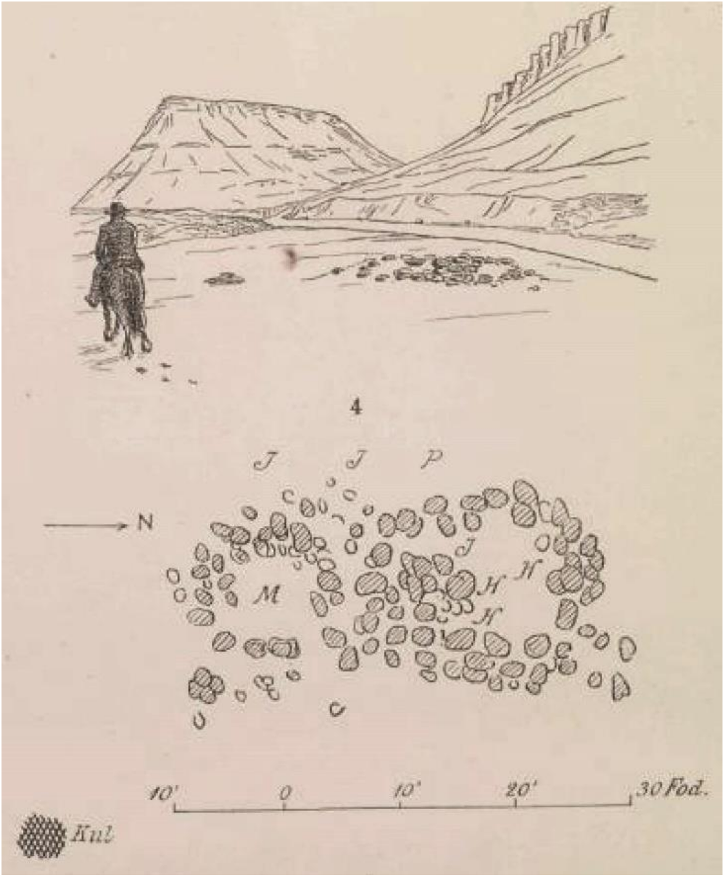


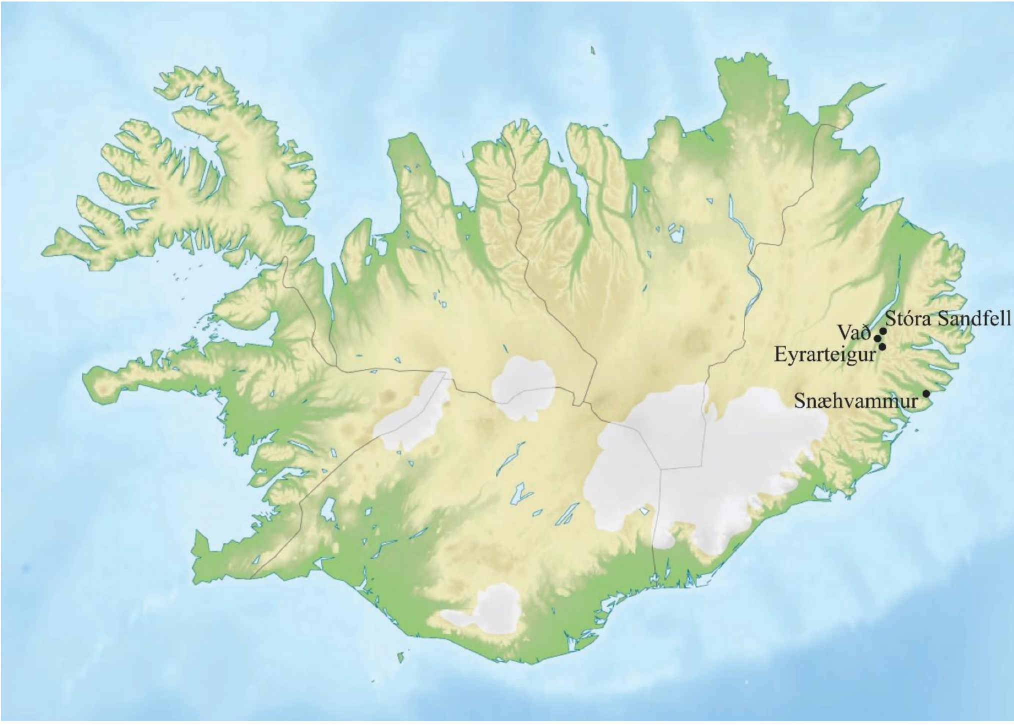
Figure 4–47 – Sturluflötur, eroding burial of man and horse (Bruun 1903:131).

4.14.7 Sturluflötur, Fljótsdalshreppur

Daniel Bruun investigated the eroding double burial of a human and horse at the farm of Sturluflötur in the summer of 1901 (figure 4.47). The human, thought to have been an elderly woman (Kristján Eldjárn 2016:224), and the horse rested in two separate grave cuts which were covered by the same small mound of stone. The woman had been placed in the southern grave cut, head facing south, which was about 1.8 m (six feet) long internally. The horse had been deposited in the northern grave, situated adjacent to the woman's feet. The horse grave was substantially larger, about 4.6 m (fifteen feet) long internally. In total the burial had the external length of about 10.4 m (35 feet), including the stone covering stone heap (Bruun 1903:19-20). The great size of the burial and in particular the horse's grave cut is curious. Even though the burial was eroded and both human bone and artefacts were quite degraded, the preservation of horse bone was very good. The human part of the burial was more seriously affected and its contents had been dispersed by wind. The horse had been buried with harness and saddle (Bruun 1903:19-20). Bruun, faced with the almost complete skeletal remains of a Viking Age horse, was the first one to realise the potential of having the animal component of a burial analysed by a specialist, so he sent the animal bone to Herluf Winge at the Zoological Museum of the University of Copenhagen. Winge concluded that the horse had in life been similar in stature to the modern breed of Icelandic horses (around 1900), perhaps a bit taller, as well as resembling known Iron Age horses remains from Denmark (Bruun 1903 and 1987). The remains sent to Copenhagen are still there[4] and only eleven specimens of the animal exist at the National Museum of Iceland. From the scant remains, it can be concluded that the animal was adult, but not old, at the time of death. The vertebrae in the assemblage are fully fused, but the real roots on the mandibular molars are relatively small and undeveloped.

[4] The bones [in Copenhagen] are pretty badly preserved and highly fragmented. Vertebrae, skull, teeth, foot bone, and limb bone fragments are all present (Kristian Murphy Gregersen pers. comm. 17.02.2017)

4.15 Suður-Múlasýsla



Map 4–15 – Sites in Suður-Múlasýsla discussed in the text.

4.15.1 Eyrarteigur, Skriðdalshreppur

The burial of a 30-40 year old male and a horse was discovered in 1995 on the farm of Eyrarteigur, not far from the riverbank of Þórisá, when a couple out walking saw a sizable portion of a sword blade protruding out of the eroding ground. Steinunn Kristjánsdóttir (1998:1-5) conducted the subsequent excavation (figure 4.48). The horse and man had been laid to rest in two separate grave cuts which were partitioned by a 30 cm thick earthen boundary. Both graves were about 40 cm deep and covered by a 50 cm high mound. The burial was oriented N-S, with the man in the southern grave, head facing south. In the northern grave cut, the horse's head was in the northern end. The deceased was well dressed and heavily armed when buried. Items of clothing include a ringed pin, strap-end and a belt buckle, all of bronze and the last two decorated in Borre style. Weaponry included a sword, two spears, an axe and a shield boss. Other finds were two whetstones, a pot made of soapstone, a purse containing four weights, a coin and strike-a-light, a ring of tin, two amber beads, a small piece of agate, and iron fragments (Steinunn Kristjánsdóttir 1998:1-5; Kristján Eldjárn 2016:232). The coin is only partial and has been cut as hack silver. It was minted in

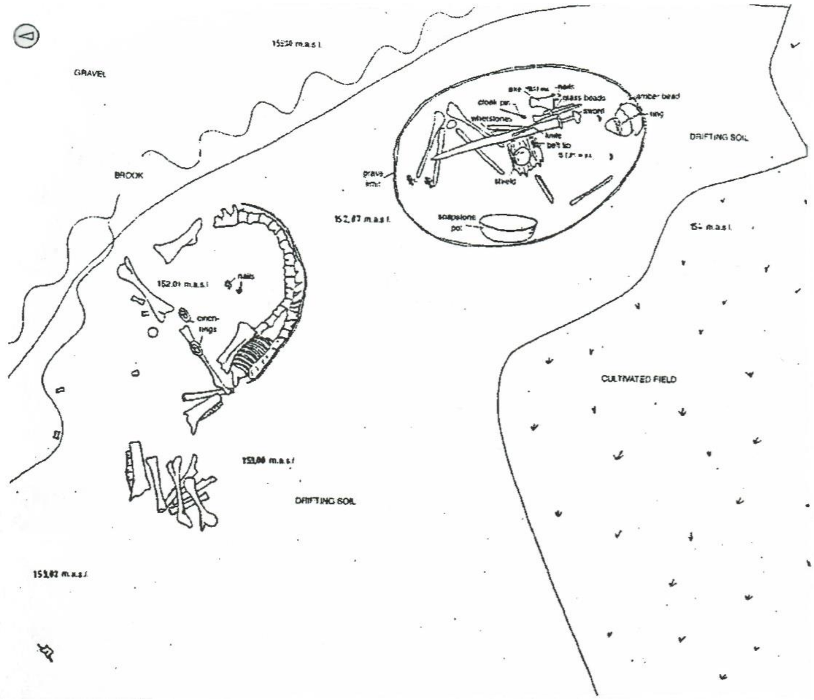


Figure 4–48 – Burial of man and horse at Eyrarteigur (Steinunn Kristjánsdóttir 1998-2).

England, either by Eadvig or his brother Edgar, and gives a terminus post quem of AD 955-975. According to Anton Holt (2000:90) it is more likely that the coin was minted during the reign of the older Eadvig AD 955-959. Radiocarbon sample taken from horse bone corresponds to the coin's *terminus post quem*. The radiocarbon date is cal AD 935-1015 (1σ). The burial is thus one of the best dated in Iceland. The horse was harnessed and saddled when buried. Two buckles and eight nails were discovered with the horse remains and a bridle-bit had also been found on the site some time before.

The animal bone collection consists of 135 specimens and represents a single individual horse, a young male. The sexing is based both on the presence of canines in the mandible and on the morphology of the pelvis (Getty 1975). The animal is not quite adult. The distal vertebral epiphyses are all either in a state of fusing or completely unfused, whereas the proximal ones are fused. This corresponds well with the occlusal erosion of the seven incisors found in the collection. They are all little worn. On all incisors the occlusal surface is oblong and flat and the infundibulum is wide open. The animal was probably around four and a half years of age when it was killed (Silver 1969; Habermehl 1975; Sisson 1914). The horse's whithers height can be calculated because the long bones are fully grown and fused. The animal stood at about 1.35 m at the shoulders in life, based on the average of measurements on the humerus and metacarpal (May 1985), and was thus of average height. A pathology possibly associated with riding is present on a single thoracic vertebra. A one to two mm deep depression runs horizontally across the posterior articular surface of the vertebra, well below middle. It looks as if the articular surface has 'collapsed in' on itself on a two mm wide strip that runs along the entirety of the articular surface. The cause of this phenomenon could be heavy riding and/or the use of wooden framed saddles that misplace the rider's weight (Levine *et al*. 2005). A similar pathology has been recorded in five to six other Viking Age horses in Iceland (page 249).

4.15.2 Snæhvammur, Breiðdalshreppur

In 1892 the farmer at Snæhvammur came down on a Viking Age burial while digging a house foundation on a hillock in his home field. The burial is most likely that of a female, based on the artefact assemblage that includes two oval brooches, a trefoil brooch, a soapstone pot, a fragment of copper-alloy and textile remains. The woman had also been buried with a horse (Kristján Eldjárn 2016:238-239). The internal layout of the burial was not recorded so it is unknown if the horse shared the grave with the woman or if it rested in its own cut. The animal bone assemblage collected at the site and stored at the National Museum is composed of 24 specimens. The assemblage is very fragmented and the element distribution is limited. Apart from two small pieces of tibia and pelvis, the assemblage is mostly made up of fragmented elements from the anterior part of the body. No mandibular or cranial elements are present. Nonetheless it is most likely that a complete animal was buried, because the body part distribution includes both fore- and hindquarters. The limited element distribution is most likely due to taphonomy. The fragmented nature of the surviving assemblage reveals that the skeleton was severely damaged, probably during excavation, and given the context of discovery and time period it is almost certain that not all bone elements found on site were collected. The scant remains reveal little about the individual in terms of sex or cause of death. It can be determined, however, from a fully fused cervical vertebra that the horse was a fully grown adult. Whether it was a young adult or old is impossible to say.

4.15.3 Stóra-Sandfell (Mið-Sandfell), Skriðdalshreppur

The Viking Age burial at Stóra-Sandfell was discovered in 1982 during road construction. The investigation was conducted by Guðmundur Ólafsson (1995). The burial was badly damaged by bulldozing and most of the bone was moved out of place. Only horse bone was found and no human remains. The horse grave was 1.6 x 1.3 m in diameter and south of it was a grave cut, empty apart from a single silver brooch and four beads. The human remains had most likely been removed at some point in the past. Along with the horse bone was an iron bridle bit and buckle, indicating that a harnessed horse had been buried. The animal bone assemblage stored at the National Museum is comprised of 171 specimens, many of which are small fragments. The analysis revealed that two individual horses are present, making the grave a double horse burial. The horses are lacking many bone elements, indicating that the horse part of the burial was probably dug into and disturbed at the same time as the human remains were removed. No cranial or mandibular elements are present in the assembalage and the innominate bones are too fractured and eroded for sexing. It is clear that the two animals were of different age at the time of death. This can be seen by the state of vertebral fusion. Some of the vertebrae present are unfused distally and fusing proximally, while others are fully fused and some even have age, stress and trauma related pathologies. All other elements are fused. This means that one of the horses died young, around four to four and a half years of age (Silver 1969; Sisson 1914), while the other might have been a bit past its prime or at least had been ridden or worked for an extended period of time. The pathology seen in the older animal is intervertebral ankylosis and a healed fracture on a thoracic vertebra. The ankylosis is between two lumbar vertebrae. They are locked together on the transverse processes by substantial new bone growth. Similarely, but not as advanced, three thoracic vertebrae have osteophytes projecting beyond the ventral posterior articular surface of the vertebral bodies. This is a step towards the ankylosis of the thoracic vertebrae which could have advanced had the animal lived longer. The most unusual pathology in the assemblage is a healed fracture on a spinous process of a thoracic vertebra. The spinous process has broken about 2/3 of the way up and has been allowed to heal. There is a lump of callous bone and a bend in the spinous process where the fracture occurred. The top part of the spinous process is thus curved in a slightly caudal direction instead of dorsal. The fracture must have been caused by some sort of trauma inflicted on the animal’s upper back. It is impossible to guess if this was intentional or accidental, but it is clear that the horse was allowed to live long enough for the fracture to completely heal. An estimation of the two horse’s withers height ranged between about 1.30 – 1.38 m based on measurements taken on a femur and tibia, two radii, a metatarsal and two metacarpals. It is not known which long bones belong to which individual.

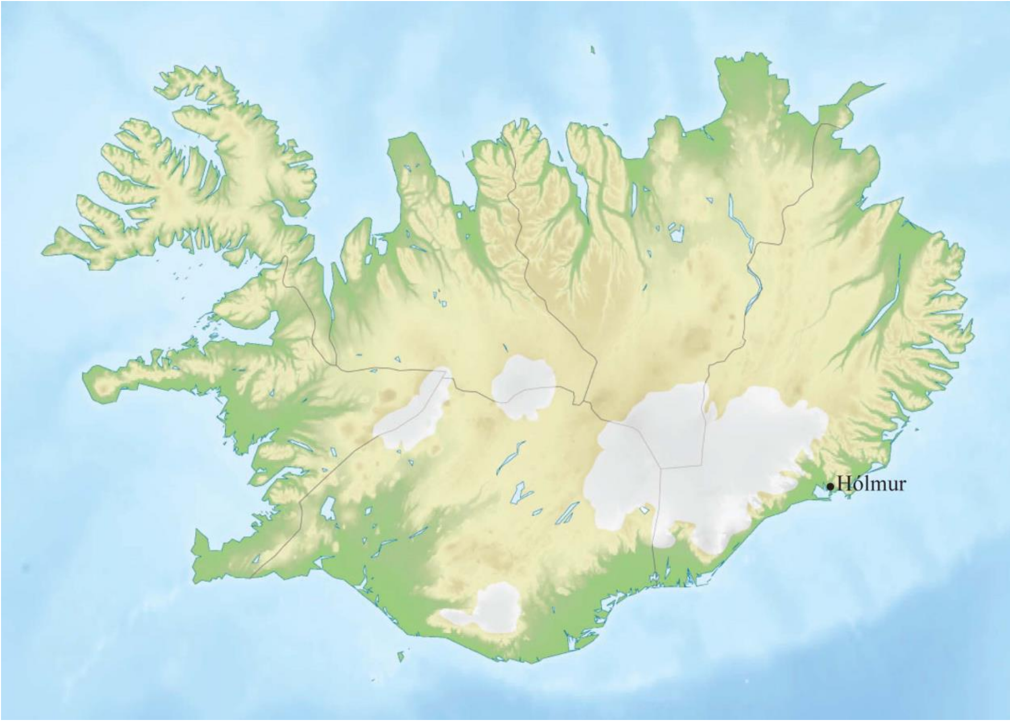
4.15.4 Vað, Skriðdalshreppur

Two Viking Age burials have been recorded at the farm of Vað. The former one was discovered by chance in 1894 by a local farmhand. Little is known about the find except that the human skeleton seemed to be undisturbed and a *Borre*-style breast-pin of copper alloy, found by the human remains, is now preserved at the National Museum (Kristján Eldjárn 2016:232-233).

The second burial came to light in 1986 after an oblong and irregular stone cairn was noticed eroding from the ground in the same general area where the first burial had been. Excavation by a local archaeologist revealed the grave of a man accompanied by a dog. The human skeleton was flexed on its left side, head towards south and feet towards north. One or two rhyolite slabs had been placed directly on top of the body, partially covering it. Only two artefacts were recorded in the grave, a large whetstone and a single nail. Degraded wood was recorded by the man's legs. The dog had been deposited by the human's feet in the northern end of the grave, its head facing west (Guðrún Kristinsdóttir 1988:89-97).

The dog remains were analysed by Thomas Amorosi (1996:139-141/576). According to him the dog was old at the time of death. All bone elements are fused and fully grown. Likewise the dentition is permanent, and advanced arthritis and bone lipping can be seen on articulation surfaces of many vertebrae. All lumbar and sacral vertebrae show signs of arthritis, as do the posterior thoracic and mid-cervical vertebrae. Other pathological changes include a lesion dorsally on the foramen magnum. An infection had evidently spread from the neural canal at the base of the skull. Also, the animal's hearing must have been impaired. The left auditory canal is fused over and the right one was in process of fusing over at the time of death (Amorosi 1996:142). The animal had been of medium size, with a shoulder height of about 0.51 m (Harcourt 1974; calculated from measurements taken by Amorosi 1996:576). Amorosi noted that the dog had been killed by poleaxing, having been struck in the upper facial area with a blunt object (Amorosi 1996:141). Amorosi (1996:141) noted what he thinks is a deliberate modification to the dog's teeth. The second premolars and second and third molars have seemingly been pulled out of the animal's mandible. This would have happened long before death since the alveoli had reabsorbed. This is not a unique feature in Icelandic Viking burials. A similar possible modification involving the pulling of teeth was recorded on the dog remains found in the boat grave in Vatnsdalur (pages 89, 279-281). Amorosi (1996:141-142) says that "this condition is seen in many Arctic dogs, especially in Inuit sled dogs. The practice was to knock out these teeth so that the dog could not bite through muzzles, leather thongs or the hand that feeds". A case of *hypodontia*, that the teeth have failed to erupt, cannot be entirely excluded as a cause. A radiograph of the animal's mandibles could resolve this.

4.16 Austur-Skaftafellssýsla

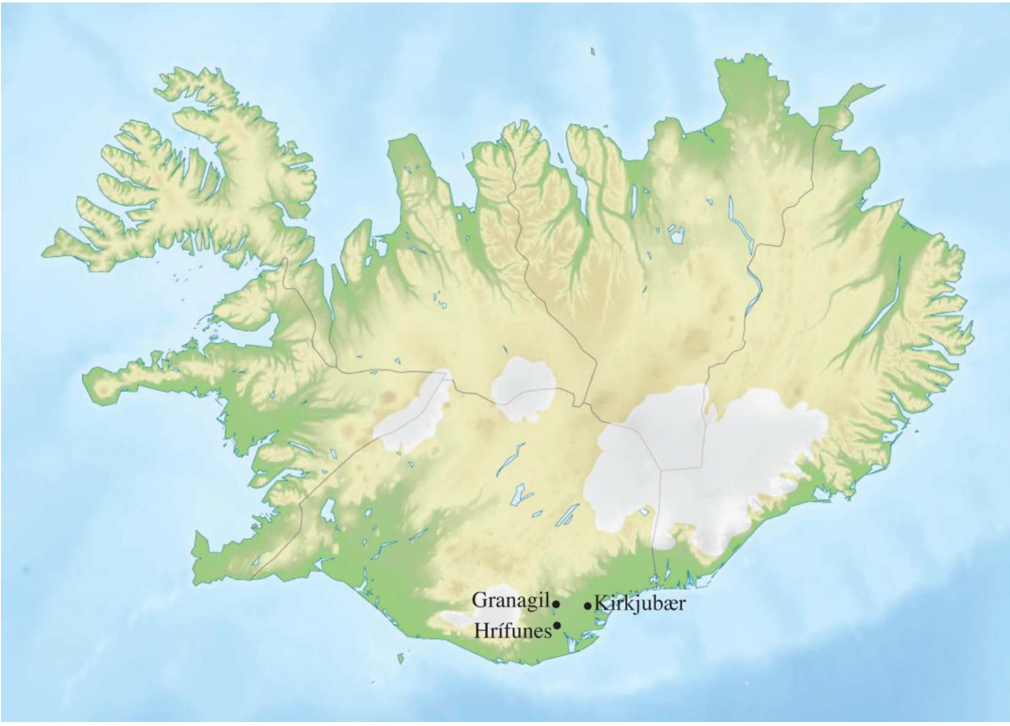


Map 4–16 – The site in Austur-Skaftafellssýsla discussed in the text.

4.16.1 Hólmur, Nesjahreppur

In 1894 a Viking Age burial was excavated on the property of the farm of Árnanes, quite some distance from the home field in an area called Hólmur. The burial was of a human and horse. The human's head was towards south and the horse had been deposited by the human's feet. Artefacts found in the burial included three whetstones, a knife and three beads. A thin layer of charcoal was noted under the bones (Kristján Eldjárn 2016:241). The animal bone was not kept.

4.17 Vestur-Skaftafellssýsla



Map 4–17 – Sites in Vestur-Skaftafellssýsla discussed in the text.

4.17.1 Granagil, Skaftártunguhreppur

The Viking Age burial ground by Granagil has been eroding over a long period of time, but no archaeological excavations have been performed there. In the late 19th century four burials, in close proximity to one another, were loosely described. They were all cist burials, lined with stone slabs. Three of them were oriented N-S with the head in the northern end, but the fourth had an E-W orientation but the direction of the body is unknown. The four cist burials were all of similar size; 2 – 2.5 m long and 1.25 m wide. No artefacts or animal bone is recorded to have been found in association with these burials (Pálmi Pálsson 1895:36-42). Artefacts and bones spotted on the site have nonetheless been finding their way to the National Museum for over a hundred years. First, in 1894, a bead, a fractured sword and a lead cylinder were sent to the Museum. In 1903 a few human bones arrived. In 1905 came a whetstone, two small pieces of textile, three beads and four copper-alloy pendants decorated in Viking Age styles. Brynjúlfur Jónsson (1910:17-18) inspected the burial ground and its surroundings in 1909. According to him a horse burial was eroding on the site, but he saw no human bone. Brynjúlfur did not collect the eroding animal bone or further record the burial, but he did note that the horse grave had not been visible when the site was last written about in 1895. Then in 1912 the first animal bone arrived from Granagil (Þjms. 6419), the remains of a horse. It cannot be determined if this bone is the same as the eroding horse remains Brynjúlfur Jónsson noted in 1909. Along with the horse bone came a lead fragment of a brooch (tongue-shaped) or of a strap-end, also a wooden shaft, sickle, knife, lead weight, and iron fragments (Kristján Eldjárn 2016:250-251). Over twenty years later, in 1933, more horse bone was sent to the National Museum from Granagil (Þjms. 11526). Apart from one iron buckle from a saddle and a few human bones, nothing was collected at Granagil and sent to Reykjavík until 1981 when the last horse bone collection arrived (no museum number, the box is labelled with the date 4.8.1981).

Apart from originating on a Viking Age burial ground, there is almost a complete lack of contextual information surrounding the animal bone and artefacts from Granagil. It is not clear what originated in which grave. All the animal bone is horse and arrived at the National Museum in three batches, from 1912 till 1981. The MNI of the entire Granagil horse bone assemblage is three individual animals. If each sub-collection is counted separately the MNI becomes four individuals. Without further contextual information it is impossible to determine which MNI count is correct. In the following the horse bone is discussed as three assemblages, even if some of the bones, between different sub-collections, might originate from the same individual.

The bone collection that arrived in 1912 (Þjms. 6419) consisted of 20 specimens in all. It is the partial remains of one individual horse. The collection is mostly from the anterior part of the animal, while the posterior part is only represented by a single pelvic fragment (right acetabulum and part of ischium). Given how small and/or fragmented some of the specimens are, this must be a remnant of on-site taphonomy, e.g. erosion, rather than of selective retrieval. Cause of death or the sex of the animal cannot be determined from the surviving specimens. Aging is not exact but the animal was adult at the time of death. The dentition is permanent and real roots have developed on a maxillary molar found in the assemblage.

The collection (Þjms. 11526) from 1933 contains 28 specimens. It is white in colour and weathered, the bones seem to have eroded to the surface quite some time before being collected. The assemblage is comprised of at least two individual horses, based on the number of humeri, radii and scapulae in the assemblage. The elements represent both front and hind quarters and no butchery marks are evident. Most likely whole and unbutchered horses were deposited into the burials at Granagil. The age at death is unknown. All elements present are fully fused, but no vertebrae are in the assemblage so it can only be noted that the animal was at least older than three and a half years (Sisson 1914). Sex and cause of death cannot be inferred.

The last bone collection to arrive from Granagil came in 1981. Similar to the 1933 assemblage, this one is white in colour and very weathered. The assemblage is made up of 24 specimens that represent one individual horse. The main difference between this collection and the previous two is the high percentage of vertebrae, which are not present in the others. The element distribution is indicative of a complete animal having been buried. The specimens originate in front- and hindlimbs, in the axial skeleton and head. The animal cannot be sexed because pubis and ischium have broken off the surviving pelvis. The state of epiphysial fusion on the other hand allows quite accurate estimation of age at death. Limb elements, such as femur, humerus, radius, calcaneum and tibia, are fused but the vertebrae are completely unfused. The sacrum has very clear and distinct fusing lines. This indicates that the animal was young at the time of death; the age bracket being between three and a half and four years (Sisson 1914). Given how young the animal was at the time of death, there is a surprising pathology affecting two of its lumbar vertebrae. The two lumbar vertebrae have unfused epiphyses like the rest, but are nonetheless fused with one another at the transverse processes. This would likely have occurred to provide additional support in the animal's lower back, due to repeated stress. The horse seems to have been worked hard and/or ridden despite its young age and lack of skeletal maturity. The cause of death cannot be inferred from the skeletal remains.

4.17.2 Hrífunes, Skaftártunguhreppur

In the home field of Hrífunes five burials were discovered and rescued in the years 1958, 1981 and 1982. They were aligned along a riverbank which bounds the home field and came to light due to the riverbank's erosion (Kristján Eldjárn 2016:244). The distance between each was 10 – 40 m east-west. It is likely that the grave field had at some point more burials that are now lost by river erosion and indeed burials are still being found on the site (Hildur Gestsdóttir *et al.* 2015; Adolf Friðriksson 2016:512-513). Three of the graves contained human remains (II, III and V). One grave was that of an infant (Kristján Eldjárn 1984). Another was of an adult of unknown sex, covered by a heap of stones. This individual was buried with various objects of metal, stone and wood, most of them corroded or degraded beyond recognition, but they included an iron strike-a-light and lead scale weights (Kristján Eldjárn 1984). The last was a grave of an adult woman, also covered by stones. She was lying on her side and buried with personal objects, jewellery and a knife. The woman's grave was dated with tephrochronology as having been dug around AD 934, when a substantial tephra layer was deposited in the area from an eruption in the volcano Eldgjá (Gísli Gestsson 1984; Guðrún Larsen & Sigurður Þórarinsson 1984). Apart from these three graves two horse burials have been unearthed, both seemingly without direct association with a human grave.

The first horse grave (burial I) was discovered 30 m east of the infant's grave. It has a *terminus ante quem* of AD 934 (+/-2) based on the Eldgjá tephra which was undisturbed on top of the burial (Kristján Eldjárn 1966, 61-2; Guðrún Larsen & Sigurður Þórarinsson 1984). Surrounding the horse grave was an oblong stone setting with a roughly east-west orientation (figure 4.49), 4.75 m long and 1.25 m wide in the middle. At its western end a stone slab had been erected, and west of the slab was a large, sub-triangular stone which pointed westwards with its sharpest point (Kristján Eldjárn 1966, 60). The elliptical grave cut was in the middle of the stone setting. At the bottom of the grave were the remains of a horse, its back against the south side of the cut and its head and neck curled in the western end. In the centre of the grave were a bridle bit and a buckle made of iron, seemingly the remains of riding gear placed on top of the horse's dead body before interment. The burial was undisturbed and the excavators were sure that a human had not been buried with the animal (Kristján Eldjárn 1966:62). The horse skeleton had been complete in the grave, but only five bone elements are curated at the National Museum. The collection consists of a right maxilla and mandible with four molars each, two tibiae and a metatarsal. The animal was adult at the time of death, perhaps around ten to eleven years old (Levine 1982). The long bones all have fused epiphyses and the dentition is permanent and real roots are well developed. The animal was quite tall in life. It withers height was 1.37 – 1.41 m, based on the measurement of the tibiae and metatarsal (May 1985). The stature of the horse makes it likely that it was male, although none of the surviving elements can be sexed directly.

The second horse grave (burial IV - figure 4.50) was covered with a heap of stones and like the other one has a *terminus ante quem* of AD 934 based on tephrochronology (Larsen & Þórarinsson 1984). This horse had been decapitated. The body seemed to have been deposited 'back down' into the grave with the front part facing north. The head seems to have been deposited afterwards on top of the body and was oriented roughly east-west. Remains of iron bits were found in the horse's mouth and corroded iron in the centre of the grave could be the remains of a saddle (Þór Magnússon 1984:24-27). Further, there are iron remains pressed on the buccal surface of the p3 and p4 of the right maxilla. The diameter of the iron remains are 15 x 12 mm on the p3 and 15 x 20 mm on the p4. These remains are unknown but could be from a harness or a bit. The horse was male, as is evident from the presence of both upper and lower canines and from the morphology of the pelvis; the ischio-acetabular rami are robust

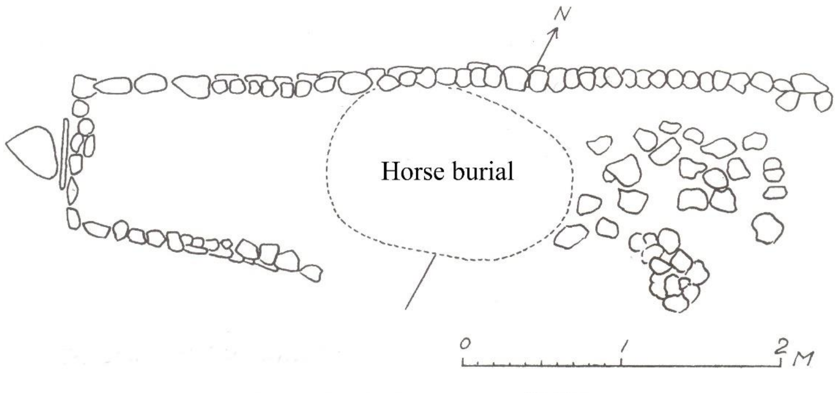


Figure 4–49 – Hrífunes burial I (adapted from Kristján Eldjárn 1966:60).

Figure 4–50 – Hrífunes burial IV (Þór Magnússon 1984:24).

and the obturator foramina oval (Getty 1975). All six insicors are present in the mandible. The occlusal surfaces are quite triangular and the 'mark' is disappearing in the central incisors. The animal was in its prime at the time of death, at least ten years of age (Habermehl 1975), but there is evidence of bone spavin in its hind legs. The pathology does not seem to be advanced but the grand cuneiforma and naviculars have started to fuse on the lateral side in both hind legs. On three thoracic vertebrae, a little bit of new bone growth is seen on the ventral side of the distal articular surface. The bone growth must be due to the animal's activities that caused stress on its back, most likely from continuous riding. Those activities are suggested also by the riding-gear found in the grave. The horse stood at 1.35 – 1.39 m at the shoulder in life, based on the measurement of radii and metapodials (May 1985). As noted by the excavators, the animal was decapitated before being deposited into the ground (figure 4.50). No obvious marks of this are seen on the surviving cervical vertebrae, although one of them is fractured. The animal's cranium is fractured, but that seems to have happened post-mortem. The fracture line is white, much lighter than the rest of the bone, which indicates that it must have broken during the archaeological excavation and not have been exposed to the surrounding soil matrix over an extended period of time. The occipitale, interparietale, parietale, part of the temporalis and part of the frontale are joined and unbroken, which makes poleaxing unlikely. At least the parietale would suffer trauma if the animal would have been successfully poleaxed. It is uncertain if the horse was killed by the decapitation or if it took place post-mortem, but the lack of poleaxing makes decapitation as a method of killing more likely.

It seems certain that the two horses were an intended part of the Viking Age grave field, not merely discarded carcasses. Both of the animals were buried with riding gear, the dating of both graves corresponds with the only dated human grave and the arrangement of the graves is similar to the human ones. The former horse grave is in the centre of an enclosed stone setting (fig. 4.49) which seems to point towards the importance attached to the animal itself by the people who killed it and buried it. No other graves were detected in the immediate vicinity of either horse grave, so we can only speculate if the horses where buried at the same time as the humans or if the horse burials represent a separate ritual. There are indications that more horses were buried at the grave field. In 1968 the National Museum received a single left femur sent by the farmer at Hrífunes. According to him it came from a third horse burial discovered previously (*Aðfangabók Þjóðminjasafnsins* 1968-260). The femur is white and weathered. It looks like it had been exposed for some time. The bone is eroded, but the withers height calculated from the greatest length of the femur is 1.30 m (May 1985).

4.17.3 Kirkjubær, Kirkjubæjarhreppur

Various reports from the 19th century describe an eroding burial mound called *Hildishaugur* at the farm of Kirkjubær. A shield boss and a spearhead were found in the eroding mound and in 1943 a few horse teeth were noted among the scatter of stone where the mound had previously stood (Kristján Eldjárn 2016:242-244). The animal bone seems not to have been collected and kept for posterity.

5 Animals and burial traditions in Viking Age Iceland

The animal remains routinely found in Icelandic Viking Age burials are the bones of horses and dogs. Scant remains of other species have, on a few occasions, also been discovered. The presence of other species in burial contexts is quite different to the presence of horses and dogs. Remains of other animal species never represent whole individuals, which is always the case with horses and most common with dogs, and the context is almost always insecure. That is to say, other remains have been found in (or by) eroded burials and most likely represent 'contamination' of midden material originating from outside the burial context. Species that have been recorded include caprines, cattle, pigs, various birds and fish (appendix 1). Of these, only the pig remains at three locations come from adequately secure burial contexts. Below, each of the species is discussed in turn, after which, the zooarchaeological data is contextualised with other evidence in order to draw a picture of burial rituals and of the human-animal interaction involved.

5.1 Horses

A total of 148 Viking Age horse graves were known in Iceland in 2011. These graves contained at least 175 individual horses. This means that one or more horses were deliberately killed and deposited into at least 41% of the 355 known burials of the Viking Age in Iceland. Grave fields without horse burials are discussed below (pages 288-289) and the burial traditions themselves are further discussed in section 5.4. Following is a description of the Viking Age horses chosen for burial; their physique, life and death. The discussion is mostly based on the results of osteological analysis of all surviving specimens of horse bone securely originating in Viking Age graves and available to this study. The remains of about 131 individual animals have been stored for posterity, mostly in the National Museum of Iceland. These animals are in a variable state of preservation, some are only represented by a couple of elements while other skeletons are mostly complete (appendix 1).

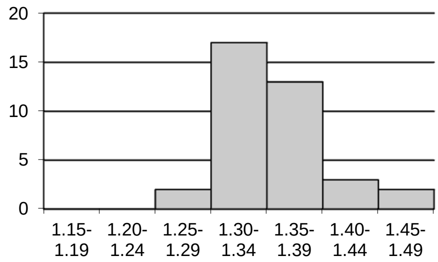
5.1.1 Deposition of entire horses

The horses found in Icelandic burials were deposited in their entirety into the grave and usually unbutchered. The only exceptions where dismemberment took place are a few instances of decapitation (pages 267-268), but even then both head and carcass were placed in the grave. Not a single case has been recorded where a partial horse was buried (see discussion on Miklibær pages 110-112). The strongest evidence, that burying complete horses was standard practice, is the fact that not a single bone element analysed and recorded so far shows butchery marks. Nonetheless, the remains of most individual horses stored for posterity are quite incomplete. This is due to three main post-depositional causes. The most obvious one is selective retrieval by the excavators in the past. It is often stated in the excavation accounts that a complete horse was discovered, but only a few bones were then selected to be stored at the National Museum (e.g. Hrífunes pages 224-227). As can be seen in the lists of identified specimens (appendix 1), there was a clear preference for robust elements to be collected and stored. Another important factor is wind erosion. Many burials have been discovered due to erosion which revealed their bone content (Kristján Eldjárn 2016:258-261). The erosion has both affected the preservation, probably favouring the destruction of less robust elements, but also causing bone to disperse outside of burials. Last but not least is the fact that most burials investigated in recent years have clearly been dug into in the past. Sometimes only the human part of burials was disturbed, but often the horse bone is also disarticulated upon investigation and has clearly been moved out of place. This has often caused the loss of some elements that did not get re-buried after the opening of the grave. Another critical factor when burials get disturbed by natural or human interference is the biochemistry of bone. After being buried, bone undergoes physical and chemical changes, but the degradation process often slows down relatively soon and undisturbed bone can be preserved for a significant period of time. When bone is re-exposed, such as by grave robbery or erosion, often broken and then relocated into a new soil matrix, the degradation process may accelerate and lead to very selective preservation of elements (Lyman 1994:404-433). Despite the partial nature of most of the horse bone assemblages, it is most common for surviving elements to represent a distribution over all body parts (appendix 1). For instance to originate in both front and hind legs and to be accompanied by some vertebrae and teeth, further supporting that complete carcasses got buried.

5.1.2 Physical appearance

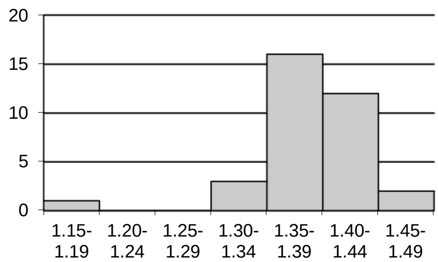
It was first noted around 1900 that the remains of an Icelandic Viking Age horse, discovered at Sturluflötur in Norður-Múlasýsla in the east of Iceland, physically resembled the remains of Iron Age horses previously discovered in Denmark. It was Captain Daniel Bruun who first realised the potential of having the animal component of a burial analysed by a specialist.

Horse – Metacarpals (n37)



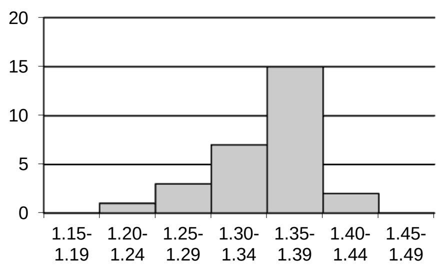
Withers height (m)

Horse – Metatarsals (n34)



Withers height (m)

Horse – Radii (n28)



Withers height (m)

Histograms of estimated withers heights by isolated elements. *Continued below.*

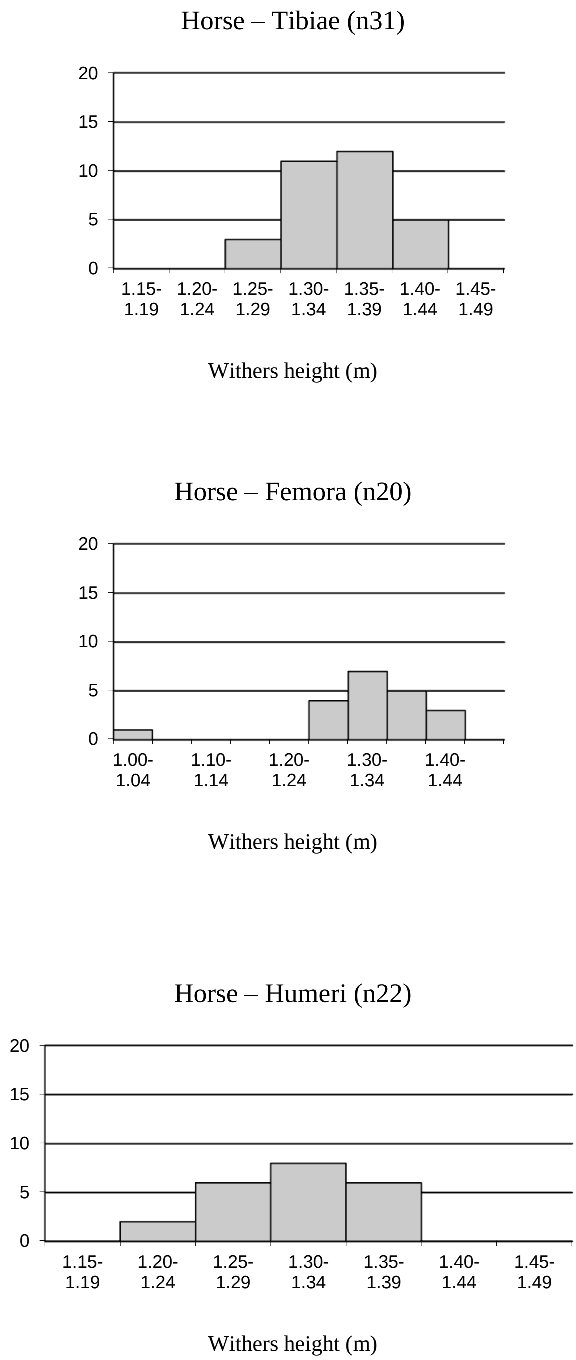


Figure 5–1 – Histograms of estimated withers heights by isolated elements. Continued from previous page.

He conducted the excavation of the burial at Sturluflötur and when faced with an almost complete skeleton of a horse, he sent the animal bone assemblage to the Zoological Museum in Copenhagen. There it was concluded that the horse had in life been similar in stature to the modern breed of Icelandic horses (around 1900) as well as closely resembling known Iron Age horse remains from Denmark (Bruun 1903:20; 1987:145-146). This observation is in line with later research which underpins our modern understanding of late medieval and early modern developments in livestock breeding and 'improvement', when most domestic species (except among others the Icelandic horse) significantly increased in size (e.g. Thomas 2005; Albarella 1997; Davis 1997). Prior to that, domestic animals were generally smaller than their modern counterparts. But despite this, not all Iron Age horses were the same. It has been noted that even within Northern Europe there was physical variation between ancient horse populations (Nobis 1961). For example Bertašius and Daugnora (2001) inferred that horses of different breeds had been buried at each of the Viking Age cemeteries of Marvelé and Veršvai in Lithuania. They based this on variation in withers height and defined two major groups, animals between 1,20-1,36 m and animals between 1,36 and 1,44 m; the larger horses having possibly been imported from abroad. Further, they observed that the horses from the Lithuanian cemeteries were on average significantly smaller than contemporary animals in Norway and Northern Germany (Bertašius & Daugnora 2001:398-399). It is good to keep in mind that the word *breed*, in the modern sense, may not be appropriate when discussing horses in general found in burials in Viking Age Iceland. Just as some of the horses in Marvelé and Veršvai cemeteries may not have been local breeds, then horses buried around 10th century Iceland may not all represent a uniform population. How people originally founded herds of livestock in the settlement society of Iceland is poorly understood (e.g. Orri Vésteinsson 2006:36), but horses of different populations from different areas are certainly likely to have been imported.

Figure 5.1 illustrates the withers height distribution of the entire burial assemblage based on six different but fully fused elements. The number of usable elements is different by type, ranging from 20 (femora) to 37 (metacarpals), but caution was taken to use only one element (either left or right) of each type from each individual animal. There are some differences to the height distribution depending on which elements are measured. This is not surprising since the factors used for calculating the withers height were not devised specifically for the Icelandic breed and different populations of animals may be slightly differently proportioned (Johnstone 2004:151-160; von den Driesch and Boessneck 1974). The general range in size is about 1.25 – 1.44 m at the shoulder. There are outliers, two humeri and a radius measured in the 1.20 – 1.24 m category and a single metatarsal from a young animal measured only 1.18 m at the shoulder. At the opposite end two metacarpals and two metatarsals measured very large, in the category 1.45 – 1.49 m. Based on this, the metapodials might be somewhat elongated in the Icelandic Viking Age animals compared to the modern stock used for calculating the factors (May 1985; von den Driesch & Boessneck 1974). There is an extreme outlier, a single femur which is calculated to have come from an animal only 1.02 m at the shoulder (McGovern 2004b; May 1985). This humerus was not measured by the author[5], the data was obtained from an osteological report, but if the biometrical information is accurate then the animal was very small indeed. It is most common for the animals to fall in the height category of 1.30 – 1.39 m based on the measurement of all the types of elements. The only exceptions are the humeri which show a slightly lower medium and the metatarsals which show a higher medium. In all there seems to have been some variation in horse size during the Viking Age. This could mostly be attributed to individual variation. Although between the extremes it cannot be ruled out that the variation might, at least in part, be due to animals of different populations (perhaps from different locations) being imported. But by and large the Viking Age population was similar in height as the modern Icelandic breed. Modern males of the Icelandic breed have grown in size in recent years, the average from 1985 – 1989 being about 1.39 m and between 2000 – 2004 about 1.41 m (Brynjar Skúlason 2010). Modern Icelandic horses vary in size but breeding regulations issued by the Ministry of Agriculture in 2001 states that it is best if the height of individuals falls in the range of 1.35 – 1.45 m at the wither (*Reglugerð um uppruna og ræktun íslenska hestsins nr. 613/2001*.). Thus in terms of physique most Icelandic horses of the Viking Age would probably not stand out in a heard of the modern Icelandic breed. The coat colour is another matter, which cannot be resolved without DNA work on the ancient bone (Svensson *et al.* 2012).

There is unfortunately not much biometrical information available for comparison from contemporary Viking Age or late Iron Age assemblages. The most extensive data set published so far comes from large burial grounds in Middle Lithuania, such as Marvelé and Veršvai (Bertašius & Daugnora 2001). Biometrical information concerning Scandinavian animal burials is generally less detailed and, for example in Norway, mostly concerns data from royal burial mounds in Vestfold (Nobis 1961). So in order to get a glimpse of the North European perspective (figure 5.2) the Icelandic corpus is compared with Marvelé (Bertašius 2009:99-103) in the southern Baltic on the one hand and with horses recovered from the royal

[5] The bone comes from burial I at Saltvík. The assemblage was not located for the present study and the accuracy of the measurement is questionable, see page 205 in chapter 4.

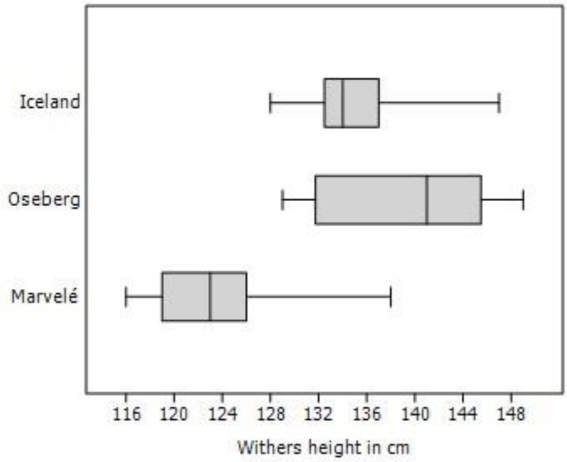


Figure 5–2 – Size distribution of horses from Iceland (n=37), Oseberg (n=12) and Marvelé (n=68). Withers height based on the measurement of metacarpals and calculated with factors by Vitt 1952.

burial mound at Oseberg (Nobis 1961:178) on the other. The data presented in figure 5.2 is based on the measurement of metacarpals from 68 individual horses from Marvelé, twelve horses from Oseberg and 37 horses from Icelandic burials. All the animals from Marvelé that could be sexed are male (Bertašius 2009:99-103), as are the horses from Oseberg with one or two possible exceptions (Nobis 1961:131). The picture that emerges is similar to the one discussed by Bertašius and Daugnora (2001; see above) concerning the difference between the horses found in the countries by the southern Baltic and horses in more western and northern areas; the Icelandic horses are generally larger than the ones from Marvelé cemetery. The horses deposited into the Oseberg burial mound mostly fall within the height range of the Icelandic animals, with only a single animal measuring 1.49 m at the shoulder exceeding in size. That said, the Oseberg horses are considerably taller on average and mostly fall in the larger end of the Icelandic range. Nobis (1961:137) noted this generally larger stature of the Oseberg horses as well. He explained it with natural selection; that the horse population in Iceland quickly adapted to harsh conditions which favoured smaller animals. This interpretation however is unlikely. It is not clear why smaller horses would be more suitable for conditions in Iceland, and it is perhaps reasonable to think that factors such as coat thickness would matter more. Also, this adaptation would have to have taken place very rapidly, in a matter of decades, because the burials date to the 10th century. Further, the early history of horses in Iceland is poorly understood, for instance with regard to for how long animals were being imported to the island. A more straightforward explanation might simply be that tall horses were intentionally selected for the Oseberg burial ritual. In general, the range in horse size seen in Viking Age Iceland seems at best to reflect less controlled breeding than is seen in modern times.

5.1.3 Age at death

The age of the horses at the time they were killed and buried can be estimated by the degree of epiphyseal fusion and dental development in each individual (Silver 1969; Habermehl 1975; Getty 1975; Levine 1982; Strand *et al.* 2007; Sisson 1914). The remains of the horses that make up the Icelandic burial assemblage vary in preservation. Usually, the more complete the animal is, the more precise is the age estimation. It is important to know which epiphyses fused last or should have been next to fuse. For example, if the femora are fused but not the vertebrae, then the animal was between three and a half and five years of age at the time of death (Getty 1975; Silver 1969). Of equal importance is for the teeth to be present in the assemblage. Just as humans, horses have deciduous teeth followed by adult dentition. Similar to epiphyseal fusion, these erupt at certain ages. After a permanent dentition has fully erupted the wear pattern can be used to deduce age (Levine 1982; Silver 1969; Habermehl 1975). The traditional method of aging horses is by observing wear of the incisors. The permanent incisors are conical in shape and the single infundibulum makes them "trumpet-like before wear" (Hillson 2005:126). The open infundibulum in little worn incisors is known as the *cup*. The infundibulum is oval at the beginning but gradually changes in shape with wear, becoming circular and eventually disappearing. Also, the pulp cavity gradually fills up with secondary dentine, forming a dark mark on the occlusal surface called the *star* (Hillson 2005 240). Coinciding with the change to the infundibulum, the entire shape of the occlusal surface evolves with time and wear, from being 'flat' and oval to becoming sub-triangular and then more rectangular with the anterior-posterior length of the occlusal surface greater than the lateral width. Further, as a horse gets old the row of incisors becomes almost straight (Habermehl 1975; Silver 1969). Aging by molars is somewhat different. Permanent horse molars erupt gradually with wear and only become rooted, developing *real roots*, in later life (Hillson 2005:126), so for the first years a majority of the crowns are embedded in the alveolar bone. A system has been devised to determine age from crown height measurements of premolars and molars, i.e. how much the tooth is worn down (Levine 1982). The main problem with this is that different breeds of horses may show variation in original crown size (Hillson 2005:241). In general, age determination gets less precise as the animals get older. This, in conjunction with scarcity of osteological material preserved from some individuals, sometimes leads to a broad age bracket or that animals can only be stated being older or younger than certain age. The following age estimates are based on a mixture of the methods discussed above. The principal methods are firstly epiphyseal fusion (Silver 1969; Sisson 1914) and secondly the wear of incisors (Silver 1969; Habermehl 1975). The second method becomes more important in fully grown animals with all their epiphyses fully fused. In some instances where neither of these methods are applicable (e.g. due to preservation) or when the animal can only be said to be older than a certain age based on bone growth and has no surviving incisors, Levine's (1982) method of measuring molars is used. But Levine's method is contricted to loose molars being present in the assemblage. There are bound to be some discrepances between methods, e.g. measurement of crown height and the wear of incisors. This will not however affect broad trends in the assemblage, between immature animals, adults and old individuals.

To a varying degree, the age of 113 individual horses can be estimated (see table 5.1 below). Of those, 43 can only be estimated relatively, i.e. said to be at least a certain age or older. These animals have a limited range of elements surviving, some of which fuse early, and very few have surviving teeth. The earliest relative parameter is one and a half years, the fusing time of the distal metapodials; eight animals were at least one and a half years old at the time of death, but were very likely substantially older. Next is three and a half years, the final fusing of many long bones; seven individuals are known to have been at least three and a half years old at the time of death, but most are likely to have been older. The final parameter is five years, the average fusing time of the vertebrae; 28 animals are known to have been at least five years old at the time of death. The vertebrae are the last elements to fuse and when they do the animal is skeletally fully grown.

A total of 70 individual horses can be aged more accurately, within a defined age limit. Those animals exhibit a wide range of ages at death, from about one and a half years to over 20 years (see table 5.1). Figure 5.3 illustrates the broad distribution of this assemblage. There is a clear trend for animals younger than about fifteen years of age to be selected for burial. There is a steady rise in the age curve from about one and a half years, peaking at the five to eight years category. The next category, with animals around ten years of age, is close behind, but then there is a steep drop as the animals get older. Fewer animals past the age of fifteen to sixteen years seem to have been selected for burial.

Site	Age in years
Rangárvallasýsla	
Galtalækur	20
Hemla	1.5
Hemla	5
Hemla	5-6
Kápa	14-15
Mörk	5-7?
Árnessýsla	
Álfsstaðir	12
Álfsstaðir	min 3.5
Hólaskógur	6-7
Kolsholt	4-5
Lækur í Flóa	min 5
Traðarholt mound 2	4-5
Traðarholt mound 3	5-6
Gullbringusýsla	
Hafurbjarnar-staðir burial III	min 5
Barðastrandasýsla	
Berufjörður	5-7
Vestur Húnavatnssýsla	
Brandsstaðir	4.5-5
Þóreyjarnúpur	min 3.5
Austur Húnavatnssýsla	
Stafn	5-6
Tindar	20 (+?)
Skagafjarðarsýsla	
Austarihóll	3.5
Austarihóll	min 5
Ljótsstaðir	7
Elivogar	min 5
Enni	min 5
Sólheimar burial I	min 1.5
Sólheimar burial I	min 1.5
Sólheimar burial II	min 5
Þorljótsstaðir	min 5
Öxnadalsheiði	min 5
Eyjafjarðarsýsla	
Dalvík Brimnes burial II	4-5
Dalvík Brimnes burial IV	min 5
Dalvík Brimnes burial IV	min 3.5
Dalvík Brimnes burial V	4
Dalvík Brimnes burial VI	min 1.5
Dalvík Brimnes burial IX	min 5
Dalvík Brimnes burial XII	10+
Dalvík Brimnes burial XIII	min 5
Böggvistaðir boat burial	4-5
Böggvistaðir boat burial	4-5
Böggvistaðir boat burial	20
Böggvistaðir boat burial?	min 1.5
Böggvistaðir SW burial	min 5
Garðsá	20
Hámundarstaðaháls	min 5
Hámundarstaðaháls	min 5
Kálfskinn burial I	14 - 20
Kálfskinn burial II	4,5-5
Kálfskinn burial II	min 5
Litli-Dunhagi	3-3,5
Litli-Dunhagi	min 5
Sílastaðir burial I	5
Sílastaðir burial I	min 1.5
Sílastaðir burial IV	4-5
Staðartunga	3
Staðartunga	10+
Stærri-Árskógur 1917	2
Stærri-Árskógur 1918	4
Ytra-Garðshorn burial I	4.5-5
Ytra-Garðshorn burial I	min 5
Ytra-Garðshorn burial II or III	3-3.5
Ytra-Garðshorn burial II or III	min 5
Ytra-Garðshorn burial VI	min 5
Ytra-Garðshorn burial VII	10+
Ytra-Garðshorn burial VIII	5-6
Ytra-Garðshorn burial IX	3-3.5
Ytra-Garðshorn burial X	10+
Ytra-Hvarf burial I	7-8
Ytra-Hvarf burial I	13-15
Suður Þingeyjarsýsla	
Glaumbær burial I	min 3.5
Glaumbær burial VI	4-5
Glaumbær burial VI	10-11
Grímsstaðir	2.5-3
Grímsstaðir	3
Grímsstaðir	4
Grímsstaðir	5
Grímsstaðir	5-7
Grímsstaðir	5-7
Grímsstaðir	10-15
Ingiríðarstaðir burial II	3-3.5
Ingiríðarstaðir burial I	6-10
Ingiríðarstaðir burial II	10+
Ingiríðarstaðir burial IV	5
Ingiríðarstaðir burial IV	20+
Ingiríðarstaðir burial V	20+
Litlu-Núpar burial II	4-5
Litlu-Núpar burial II	10-12
Litlu-Núpar burial III	min 5
Litlu-Núpar burial IV	min 5
Litlu-Núpar burial VII	min 5
Litlu-Núpar burial VII	min 5
Litlu-Núpar VIII	15
Litlu-Núpar IX	10+
Litlu-Núpar burial IX	min 5
Lómatjörn A or B	1.5-3.5
Lómatjörn A or B	min 1.5
Lómatjörn C	min 1.5
Lómatjörn D	min 1.5
Lyngbrekka	10-12
Saltvík	min 5
Ytri-Neslönd	5+
Norður Múlasýsla	
Hrollaugsstaðir	3
Hrollaugsstaðir	min 5
Sturluflötur	5-7?
Suður Múlasýsla	
Eyrarteigur	4.5
Stóra-Sandfell	4
Stóra-Sandfell	min 5
Snæhvammur	min 5
Vestur Skaftafellssýsla	
Granagil	4
Granagil	min 3.5
Granagil	min 3.5
Hrífunes burial IV	10+
Hrífunes burial I	10-11
Hrífunes 1968	min 3.5

Table 5-1 – A list of 113 aged horses.

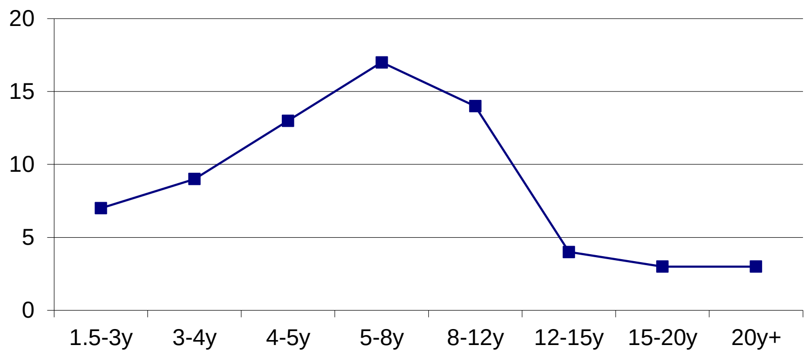


Figure 5–3 – Age at death distribution of the 70 most accurately ageable horses

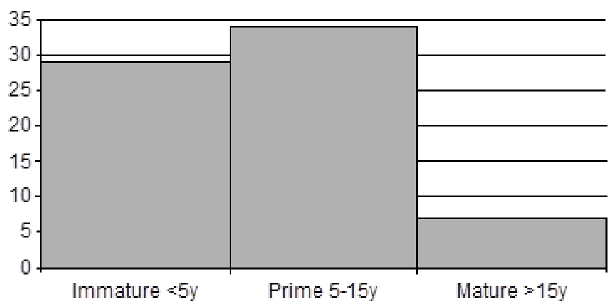


Figure 5–4 – Horses split into three main age age groups (n=70).

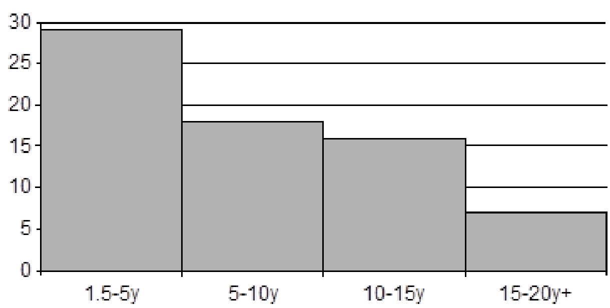


Figure 5–5 – Horses split into more detailed age groups (n=70).

In figure 5.4 the horses have been placed in three distinct age groups; immature animals or individuals that are not skeletally fully grown, secondly animals in their prime between five and fifteen years of age, and lastly mature animals past fifteen years of age. Here the same trend is illustrated more clearly. Adult animals in their prime were most commonly selected for the burial rituals, but following closely behind are immature animals. It is clear that it was less common to kill old horses for burial. The age structure of horse populations in Viking Age Iceland is unknown, but it is likely that old animals were in general fewer than immature and prime animals (e.g. Garrott & Taylor 1990). Still, the age structure of the burial assemblage is unlikely to directly represent the horse population. For that to be so, the selection of animals for ritual killing would have to be *ad hoc*. A completely random selection of individuals for killing is unlikely to have been the norm in the otherwise structured rituals, even though it may well have been the case in some instances. It can be deduced that for some reason the mature animals were usually considered unfit for use in burial rituals. In figure 5.5 the prime age group is further divided into two subgroups, each spanning five years, from over five to ten years and from over ten to fifteen years. Both age groups are fairly equal, indicating that animals within the prime age limit could be selected fairly randomly. Perhaps the most surprising thing revealed by the age distribution is the high frequency of animals that were not skeletally adult at the time of death.

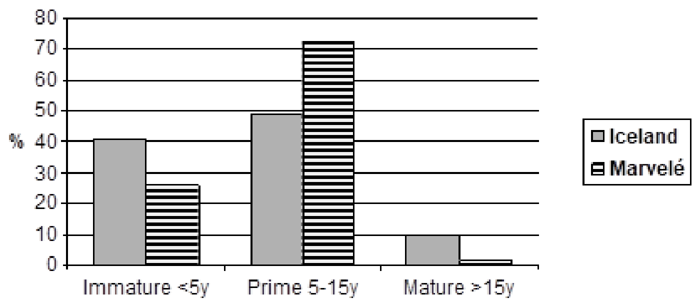


Figure 5–6 – Ratios of three broad age groups compared between Iceland (n=69) and Marvelé cemetery (n=103).

If compared with the age distribution of the horses in the Oseberg burial mound and at Marvelé cemetery, it can be noted that the Icelandic assemblage is quite different. The Oseberg assemblage is much smaller, with only fourteen animals that could be aged (Nobis 1961:131). Only one horse at Oseberg was between four and five years of age at the time of death, the rest were older. Most of them were in their prime between six and thirteen years of age, or ten in total. Three horses were between sixteen and nineteen years of age. It is interesting to note that not only were the horses deposited into the royal burial mound taller on average than the Icelandic ones, but they were also lacking immature animals. Just as with the size of the horses, the age is likely to have been a conscious choice at Oseberg, i.e. that neither very young nor old animals were considered usable for the burial ritual. A similar trend can be noted with the horse remains from the Gokstad burial mound; all the horses there were fully grown at the time of death (Nobis 1961:131). The large assemblage of horse remains recorded at Marvelé cemetery is perhaps better suited to comparison with the Icelandic material (figure 5.6). It is not the result of a single event like the assemblage from the Oseberg burial but was in use over a number of years and the total number of horses that have been aged is 103 individuals. Figure 5.6 above illustrates that the age at death at Marvelé is more prone towards prime animals than in Iceland. Over 70% of the horses chosen for ritual killing at Marvelé were adult but not old. The ratio between immature (41%) and prime (49%) animals in Iceland is a lot more balanced. Old animals are few, both at Marvelé (2%) and in Iceland (10%), but relatively more common in the Icelandic assemblage. The age structure at Marvelé could be indicative of more rigid tradition than was general in Iceland. This would not be surprising because the Icelandic assemblage is scattered over the whole island while Marvelé is a single burial ground and thus reflective of a local tradition. The Oseberg burial mound could, on the other hand, be regarded as an ideal model for lavish Viking Age horse burial, with large horses in their prime used for the ritual. A correlation between age at death of horses and status cannot be readily discerned in the Icelandic burial material. What can be suggested however, is that the age structure seen in Iceland could be indicative of immature animals having a specific symbolic role in the ritual expressed by their young age.

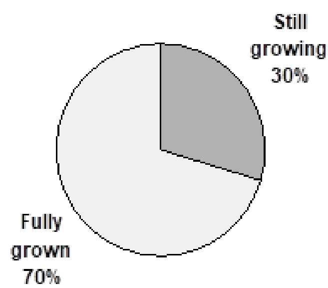


Figure 5–7 – Ratio of fully grown horses to horse that were skeletally immature at the time of death (n=98).

By adding to the collection of 70 horses in Iceland, that can be securely aged, the 28 animals known to have been at least five years old (fully grown), then a range of 98 animals can be used to estimate more accurately the ratio of skeletally immature to fully grown individuals (figure 5.7). In this sample of 98 Icelandic horses 30% were not fully grown at the time of death. These immature animals died at different ages. Some were close to adulthood, perhaps with only the posterior epiphyses of the vertebrae unfused, while others were much younger, with many bone elements unfused and far from skeletal maturity. These trends seen in the burial record obviously have implications for further interpretations discussed on pages 261-262 and in chapters 5.4 and 6 below.

5.1.4 Sex

All of the horse remains suitable for sexing by eye examination were likely male. No female bone specimens were clearly identified in the entire collection. The sexing of horses is based on the presence of well developed canines, in the maxilla and mandible, and on the morphology of the pelvis. For instance, there is not a single mandible or maxilla in the entire corpus that shows a lack of well developed canines or has reduced or no alveoli where the canines would have been. In a similar way, no pelves show definite female characteristics (May 1985). In total 46 individual horses could be sexed by eye. A total of 34 individuals could be sexed according to the presence of canines and 26 individuals were sexed according to pelvic morphology. There was an overlap of the two methods with thirteen animals. When sexing was not possible, the reasons were that the required elements were missing or too fractured. Stallions and geldings are very difficult to differentiate, and a distinction could not be made in the burial assemblage. Age of castration is a major factor in determining skeletal growth and possible differentiation from entire (uncastrated) males; the later the castration the less difference there is in physical development. On the other hand, it is not possible to sex young animals, the skeletal difference between females and entire males being none up until about seventeen months (Johnstone 2004:111-115). Another possible sex indication is the common occurrence of vertebral ankylosis in the burial assemblage (pages 244-250). *Spondylosis ankylopoetica* is eight to ten times more common in human males than females (Mathies 1984:190). Based on that, Bartosiewicz and Bartosiewicz (2002) have hypothesised that the same might be true for vertebral ankylosis in stallions. Due to the often limited range of surviving bone elements from many burials and the high number of immature animals, aDNA analysis is needed to identify females in the burial assemblage. Indeed a recent aDNA study has shown that females are present among burial horses (Albína Pálsdóttir *et al.* 2015).

The aim of that research was to understand better the origins of the Icelandic horse as well as to to study coat colour genes and the *tölt* gene (Albína Pálsdóttir *et al.* 2015; Wutke *et al.* 2016). As sexing was not the goal of the study, the sampling was not directed towards individual animals. Flakes or small loose fragments were retrieved *ad hoc* from boxes in the National Museum often containing the mixed remains of several individuals and sometime from more than one site (Albína Pálsdóttir *et al.* 2015). As a consequence it is difficult to use the data to directly sex individual animals and the number of different horses sampled is unknown as the same animal may have been sampled more than once (Albína Pálsdóttir *et al.* 2015). Another aDNA project is now underway at the University of Oslo where I played a small role by selecting the Icelandic Viking Age samples with the aim of targeting specific individual horses.[6]

5.1.5 The horses in life

By documenting pathological changes of bone and by contextualising the animal remains with artefacts buried with them, inferences can be made about the life of Viking Age horses before being killed for burial. Pathological changes on bone can be seen in at least 31 individual horses. Due to the fact that bones from two or more individuals are often mixed in storage, this number might be substantially higher. Another factor in the possible underestimation of pathologies is that the preservation of skeletal remains is highly variable between individual horses, with some only being represented by a handful of elements. Further, the pathologies noted here are ones that have progressed far enough to remodel bone whereas possible pathological changes in soft tissue are unknown. So if the conservative count of 31 horses are taken as a ratio of horses with surviving bone material (those with at least enough for estimating a relative age at death, i.e. have fusing elements and/or teeth) there are pathological changes seen in a minimum of 28% of the corpus. Similar pathologies are routinely observed throughout the entire burial assemblage. The most common pathologies are the ankylosis of vertebrae, growth of osteophytes on vertebrae, medio-lateral fissures on the vertebral articular surfaces, bone spavin in the hock joint of the hind leg and the fusion of accessory metacarpals to the central metacarpal.

[6] The project is led by Sanne Boessenkool and is called “Tracking Viking-assisted dispersal of biodiversity using ancient DNA” - http://www.mn.uio.no/cees/english/research/projects/143972/index.html.

5.1.6 Pathological changes on vertebrae

Vertebral ankylosis is recorded in at least twelve individual horses (table 5.2). In all instances but two or three the ankylosis is between lumbar vertebrae. There is a single case of ankylosis of thoracic vertebrae, another is between the sacrum and the first caudal vertebra and an ambiguous case is most likely lumbar but could be the posterior most thoracic vertebrae. Most often ankyloses are between two vertebrae. At Grímsstaðir in Suður-Þingeyjasýsla two pairs of ankylosed lumbar vertebrae are recorded. They probably derive from the same individual, but that is not absolutely certain. The occurrence of three ankylosed vertebrae was recorded on two occasions; three ankylosed lumbar vertebrae from Ingiríðarstaðir (figure 5.8) and three ankylosed thoracic vertebrae from Öxnadalsheiði.

Figure 5–8 – Three ankylosed lumbar vertebrae from horse. Excavated in 2008 at Ingiríðarstaðir.

Further, the growth of bone nodules, or lipping, is seen on the vertebrae of eleven horses. These are osteophytic projections extending beyond the end of each vertebra toward the adjacent one, the beginnings of vertebral ankylosis (figure 5.9). Of these eleven horses five also have vertebrae in full ankylosis, but six did not reach that stage before death. Osteophytic projections are only seen on thoracic vertebrae in the collection except for a single lumbar vertebra from Ingiríðarstaðir (table 5.2).

Figure 5–9 – Osteophytic projections extending beyond the posterior articular surface of a thoracic vertebrea. From Gímsstaðir, Suður-Þingeyjasýsla

Bartosiewicz and Bartosiewicz (2002) developed a method for describing and quantifying inter-vertebral fusion in horses. They described five stages, which are an elaboration (and an extension) of a previous list by Morgan (1967) that distinguished stages of osteophyte formation in dog vertebrae. The original stages proposed by Morgan (1967) are as follows:

Soft tissue change

Osteophytes do not project beyond the end of the vertebrae

Osteophytes project beyond the end of the vertebrae

Osteophytes project beyond the end of the adjacent vertebrae

Osteophytes between adjacent vertebrae fuse so that the joint becomes rigid

The quantifying descriptions proposed by Bartosiewicz and Bartosiewicz (2002) go beyond Morgan's fifth stage. For purposes of coherence, these are here called stage six, seven, etc. The following are quantitative descriptions of the level of inter-vertebral fusion, so each of the subsequent stages is allocated a score from one to four. From Bartosiewicz and Bartosiewicz (2002:821):

Ossified ligaments on the spinous and transverse processes (score one)

Fusion of small articulations, caused by the ossification of short ligaments of the vertebral apophyseal joints (score one)

Syndesmophyte formation between the vertebral bodies resulting from the ossification of the outer lamellae of the *annulus fibrosus* in the amphiarthrodial joint affecting the adjacent vertebral processes and paravertebral connective tissue (score two)

Complete fusion between the lateral and ventral edges of vertebral bodies (score three)
Bamboo spine, dominated by the visible ossification of the long ventral ligament spanning vertebrae in the form of a glaze-like spondilic crust (score four)

These ten stages (and four scores) serve to describe and quantify the level of osteophytic growth and vertebral ankylosis seen in the Icelandic Viking Age horses, as listed in the pathology table (5.2). Of the eleven recorded instances of osteophytic growth, it was most common (nine instances) for the osteophytes to project beyond the end of the adjacent vertebrae (level four), in two instances the osteophytes project only beyond the end of the vertebrae itself (level three). The vertebral ankylosis is in most instances score one according to the criteria by Bartosiewicz and Bartosiewicz (2002:821). In four instances the recorded ankylosis is more advanced. Remains of two horses from Ingiríðarstaðir have respectively score two ankylosis of the first to third lumbar vertebrae and of the fifth to sixth lumbar vertebrae. Two individuals, from Ytra-Garðshorn and Lyngbrekka, have complete fusion between the lateral and ventral edges of vertebral bodies, or score three ankylosis (Bartosiewicz and Bartosiewicz 2002:821). An extreme incidence of bamboo spine (score four) has not been recorded in Iceland. Of these instances discussed above, five horses were recorded with *both* ankylosis of the lumbar vertebrae and osteophytic growth on the thoracics.

Site	MNI	Age at death	Vertabral ankylosis	Lipping on vertebrae	Medio-lateral fissures on vertebrae	Spavin	Fused mc	Other pathologies
Rangárvallasýsla								
Galtalækur	1	20y	2 lumbar (5th-6th?)- stage 7 (score 1)	1 thoracic - stage 4				
Kápa	1	14 - 15y					yes	
Mörk	1	5 - 7y					yes	
Árnessýsla								
Álfsstaðir	1	12y				yes	yes	
Kolsholt	1	4 - 5y		1 thoracic - stage 3				new bone browth on scapula - medial side of the coracoid process
Vestur-Húnavatnssýsla								
Brandsstaðir	1	4 - 5y	2 lumbar (5th-6th) - stage 7 (score 1)					
Skagafjarðarsýsla								
Sólheimar burial I	1	At least 1.5y					yes	
Sólheimar burial II	1	At least 5y				yes		
Öxnadalsheiði	1	At least 5y	3 thoracics - stage 7 (score 1)			yes		
Eyjafjarðarsýsla								
Dalvík Brimnes burial XIII	1	At least 5y		4 thoracics - stage 4	4 (same) thoracics	yes		sternal foramen
Dalvík Brimnes burial XII	1	10y+		5 thoracics - stage 4	1 (same) thoracic	yes		
Böggvisstaðir	1	20y				yes	yes	
Kálfskinn burial I	1	14 - 20y	sacrum and 1st caudal			yes		r humerus - lipping by proximal epiphysis
Sílastaðir burial I	1	5y		1 thoracic - stage 3				
Ytra-Garðshorn burial I	1	At least 5y	2 lumb/thor - stage 9 (score 3)			yes		
Ytra-Garðshorn burial II or III	1	At least 5y	2 lumbar (1st-2nd) - stage 7 (score 1)	5 thoracics (11th-15th) - stage 4		yes		sacrum - spinous processies ankylosed, l humerus lipping on medial diaphysis

Pathological changes in the horse bone assemblage, table 1/2.

Site	**MNI**	**Age at death**	**Vertabral ankylosis**	**Lipping on vertebrae**	**Medio-lateral fissures on vertebrae**	**Spavin**	**Fused mc**	**Other pathologies**
Eyjafjarðarsýsla cont.								
Ytra-Garðshorn burial X	1	10y+				yes		
Ytra-Hvarf	1	7 - 8y		1 thoracic - stage 4				
Stærri-Árskógur (Þorvaldsdalsá)	1	About 4					yes	
Suður-Þingeyjarsýsla								
Glaumbær burial I	1	At least 3.5y				yes	yes	
Grímsstaðir	1*	10 - 15y	4 lumbar (3rd-6th?) - stage 6-7 (score 1)	4 thoracics - stage 4	1 thoracic and 1 lumbar	yes		
Ingiríðarstaðir burial I	1	6 - 10y	3 lumbar (1st-3rd) - stage 7-8 (score 1-2)			yes		
Ingiríðarstaðir burial V	1	20y+	2 lumbar (5th and 6th) - stage 7-8 (score 1-2)	6 thoracics and 1 lumbar – stage 4	2 (same) thoracics		Yes	
Litlu-Núpar burial IX	1	10 - 15y				yes		
Lómatjörn C	1	At least 1.5y				yes		
Lyngbrekka (Gömlu Daðastaðir)	1	10 - 12y	2 lumbar (5th-6th) - stage 9 (score 3)					
Norður-Múlasýsla								
Hrollaugsstaðir	1	At least 5y				yes		
Suður-Múlasýsla								
Eyrarteigur	1	4 - 5y			1 thoracic			
Stóra-Sandfell (Mið-Sandfell)	1	At least 5y	2 lumbar (5th-6th?) - stage 7 (score 1)	3 thoracics - stage 4				thoracic vertebra – healed fracture on spinous process
Vestur-Skaftafellssýsla								
Granagil	1	4y	2 lumbar (5th-6th) - stage 6 (score 1)					
Hrífunes burial IV	1	10y		3 thoracics - stage 4		yes		
Total cases	31		12	11	5	17	7	4

Table 5-2 – Pathological changes in the horse bone assemblage, table 2/2.

The third pathology seen in vertebrae of the burial horses is medio-lateral fissures on the articular surfaces, the *fossa vertebrae*, of thoracic and lumbar vertebral bodies (figure 5.10). This was recorded in five to six animals, two from Dalvík (Brimnes), one from Eyrarteigur, one from Ingiríðarstaðir and one or two from Grímsstaðir in Suður-Þingeyjarsýsla. All, except the immature animal from Eyrarteigur, had also the other vertebral pathologies discussed directly above (table 5.2). Traumatic fissures like this have only been observed in archaeological material and, as of yet, not in modern specimens (Levine *et al*. 2005; Pluskowski *et al*. 2010). Radiographic analysis by Levine *et al*. (2005:98) on a fissured thoracic vertebra from an early Iron Age horse from Ak-Alakha in South Siberia showed that the fissure did not penetrate into the spongy interior of the vertebra but was confined to the dense bone of the caudal epiphysis. It was hypothesised that the high incidences of this lesion in Scytho-Siberian horses could be related, not only to heavy riding, but to the type of wooden framed saddles used at the time. Riders using the so-called pad saddles rested their weight to a large degree directly on the dorsal spinous processes of the thoracic vertebrae, which could have been an important reason for the development of the lesions (Levine *et al*. 2005:104). Development of saddles in more recent times might be the cause for the disappearance of this pathology. Riding gear is discussed in more detail below. Pluskowski *et al.* (2010) recorded a medio-lateral fissure on a horse vertebra from Malbork castle in Northern Poland, dating from the 18th century. They noted that saddles used in that time and place were different from pad saddles; both lighter and distributed the weight differently. The pathology recorded on the horse remains from Malbork castle were attributed to excessive riding and possibly to special activities, such as jumping with an ill-fitting saddle (Pluskowski *et al.* 2010:341).

Figure 5–10 – A medio-lateral fissure across the posterior articular surface of a thoracic vertabra. From Grímsstaðir, Suður-Þingeyjarsýsla

The vertebral pathologies discussed above, growth of osteophytes, ankylosis of vertebrae and medio-lateral fissures on articular surfaces, are indicative of stress on the animal's back.

Ankylosis has usually been attributed to repetitive strain injury, but also to old age (Bartosiewicz and Bartosiewicz 2002:819). The horses recorded in the Icelandic assemblage, however, are of different ages. The animals from Granagil, Brandsstaðir and Eyrarteigur were young at the time of death, from four to five years. The rest were both in their prime and old at the time of death. This indicates that the pathologies have more to do with excessive load bearing than advanced age. Pluskowski *et al.* (2010:340-341) have further argued that these types of pathologies are linked to prominent use for riding rather than traction.

5.1.7 Bone spavin

Bone spavin is osteoarthrosis of the distal tarsal joints, in the hind legs of horses, ultimately resulting in ankylosis (figure 5.11). It is a degenerative disorder where the articular cartilage of the synovial joints progressively deteriorates (McIlwraith and Vachon 1988; Helgi Sigurðsson 1991). As a result, pathological changes occur in the tarsal and metatarsal bones that are easily observed by zooarchaeologists. New bone (osteophytes) is formed on the margins of the tarsal joints. This can lead to full ankylosis of the distal tarsals with the proximal epiphysis of the metatarsal. The exostoses and subsequent ankylosis is a reaction to limit the movement of the inflamed tarsal joints (Baker and Brothwell 1980:117-119).

Figure 5–11 – Bone spavin in hind legs of the horse in burial IV at Hrífunes (Photo: Ívar Brynjólfsson, National Museum of Iceland).

Bone spavin may cause the animal discomfort and lameness in the hind limb. A horse may appear to be stiff, especially while walking down-hill and can refuse to perform strenuous tasks like jumping. An affected animal often tries to reduce the painful flexion of the joint, so the hind leg appears to drag, with a shorter, lower arc than a healthy limb (*Bone spavin fact sheet* n.d.). After joints have ankylosed, the animal will generally only be useful for slow work (Baker & Brothwell 1980:199). Spavin is strongly associated with age; the older the animal is the more likely it is to have developed spavin. Further, recent research on the modern Icelandic breed has shown that signs of early degenerative joint disease, perhaps a forerunner of what may develop into spavin, can be detected during autopsies of animals as young as one to four years of age (Sigríður Björnsdóttir 2002). Predisposition for spavin is probably more strongly preserved in modern Icelandic horses compared with most other breeds (Sigríður Björnsdóttir 2002:29). For example, a radiographic survey of 186 riding horses between six and twelve years of age, revealed that 30.3% showed signs of osteoarthrosis in the distal tarsal joints. Confirmed instances increased from 18.4% in six year old horses up to 54.2% in twelve year olds. The average increase in spavin being 6% for each year and there is no significant difference in frequencies between stallions, mares or geldings (Sigríður Björnsdóttir 2002). Quite a few different aetiologies behind the disorder have been considered and usually thought to be interrelated to some degree (Baker & Brothwell 1980:118; Wyn-Jones 1988:140-150). These include faulty shoeing or poor trimming, heavy work from young age and/or over an extended period of time, bad conformation resulting in uneven loading and cartilage compression, special activity or types of work resulting in unnatural movement of the tarsal joints, and lastly injuries, resulting from rotation of the lower section of the limb from the hock downwards stretching the ligaments by the tarsals and lifting the periosteum (Baker & Brothwell 1980; Butler *et al.* 2000; *Bone spavin fact sheet* n.d.; Gabel 1980; Rooney 1969). In her PhD thesis, Sigríður Björnsdóttir (2002) differentiated between and weighed the four most commonly cited aetiologies for spavin in the modern Icelandic horse:

High work load in young horses
A concentration of mechanical stress in the tarsus when the horses *tölt*
A concentration of mechanical stress in the tarsus due to a poor tarsal conformation
Inheritance

She found that the causes of bone spavin seem to be purely hereditary and not influenced by heavy riding or other use of the animals. Age and tarsal angle were significantly associated with the decease. Other factors, such as the gait *tölt*, workload and other environmental factors did not influence the prevalence of the condition (Sigríður Björnsdóttir 2002). Due to the high, seemingly genetic, tendency of bone spavin in the Icelandic breed, it is a serious limitation regarding the duration of use of the animals and is today by far the most common reason for culling horses between the age of seven and seventeen years of age (Sigríður

Björnsdóttir *et al.* 2003). It cannot be ascertained, but it is probable that the situation was similar in the Viking Age. The modern breed is thought to be a direct descendant of horses brought by the settlers and spavin has been detected in at least seventeen individual animals from Viking Age burials. If spavin was also a major cause for culling in Viking Age Iceland, then that would inevitably influence the interpretation of the burial material. This is further discussed below (pages 260-265).

5.1.8 Other pathologies

A relatively common pathology, seen in forelegs of eight horses, is the ankylosis of the accessory second and fourth metacarpals with the central third metacarpal. The most severe case is the older animal at Stærri-Árskógur. It has the metacarpal bones locked together in both front legs. Also, on the left central metacarpal there is a lump of woven bone about 25 mm in diameter on the proximal end of the posterior diaphysis, immediately between the accessory metacarpal bones. The aetiology behind the metacarpal ankylosis is unknown, as is whether it is multifactorial or not. Likely causes must be those already mentioned for bone spavin; repeated strain over an extended period of time due to workload or special activities or types of work resulting in unnatural movement of the lower forelegs. Hereditary factors resulting in bad conformation seem less likely since the accessory metacarpals do not bear weight to the same degree as the dorsal tarsal bone.

A single healed fracture can be found in the horse bone assemblage. A horse from Stóra-Sandfell has a healed fracture on the spinous process of a thoracic vertebra (figure 5.12). The animal also had two lumbar vertebrae ankylosed and lipping on three thoracics. The spinous process had broken about 2/3 of the way up, but had been allowed to heal. There is a lump of callous bone and a bend in the spinous process where the fracture occurred. The top part of the spinous process is thus curved in a slightly caudal direction instead of dorsal. It is unknown what sort of trauma to the animal’s upper back was the cause, but it is clear that the horse was allowed to live long enough for the bone to completely heal. Given that the fracture seems to have occurred on a single thoracic vertebra only, a blow to a concentrated area seems more likely than, for example, a fall on the back. A possible scenario could be a kick from another animal during a horse fight.

Figure 5–12 – A healed fracture on the spinous process of a thoracic vertebra. From Stóra-Sandfell.

Two animals have lipping on the humeri. At Kálfskinn, the animal in burial I suffered from bone spavin and had new bone growth and lipping by muscle attachments by the proximal epiphysis of the right humerus. At Ytra-Garðshorn, the horse in burial II or III has new bone growth on its left humerus, 50 mm in diameter and 11 mm thick, centrally on the medial diaphysis. The bone growth is by the attachment of the coracobrachialis. This animal from Ytra-Garðshorn had also two ankylosed lumbar vertebrae, osteophytes on five thoracic vertebrae, bone spavin in its hind legs and the spinous processes of its sacrum are ankylosed. The lipping on the humeri of the two horses is most likely due to muscle strain over an extended period of time, e.g. heavy riding. This fits well with the pathology seen in the vertebral column of the animal from Ytra-Garðshorn.

A curious phenomenon, probably what is called a ‘sternal foramen’ in both humans and animals (e.g. Kumarasamy & Agrawal 2011; Babinski *et al.* 2012; Azizi *et al.* 2012), was recorded on the horse from burial XIII at Dalvík (Brimnes) in Eyjafjörður (figure 4.18). It is a hole, 30 mm deep and 7 mm wide, through the animal’s sternum. The hole pierces through the bone in a ventral-dorsal direction and is almost perfectly round. Sternal foramen is a congenital condition of the sternum and is the result of an incomplete fusion of the sternal ossification centers. It is usually asymptomatic. Sternal foramen has very seldomly been recorded in animals (Azizi *et al.* 2012), which could be partly due to its often asymptomatic nature. The condiditon has more commonly been recorded in humans but is still considered rare. Sternal foramen has sometimes, both in humans and animals, been misinterpreted as serious trauma such as gunshot wounds (e.g. Byers 2002:341-342). So the presence of this phenomenon may cause confusion, especially when people are dealing with archaeological bone or radiographs (Kumarasamy & Agrawal 2011). Thus, it might seem at first glance that the Dalvík (Brimnes) horse had been stabbed through the sternum, either pre- or perimortem, although it is not clear what sort of implement would have caused such a wound. The clean circular shape does not confirm with a blade-tool like a knive or spear and there is no breakage or fracturing surrounding the hole. Also, it is clear that the hole is not the result of damage caused during excavation. The bone on the edge of the hole is the same colour as the rest of the sternum, which indicates that the mark has been there at least as long as the bone was in the ground, if the sternum had been punctured during excavation the periphery of the hole should be lighter in colour than the rest of the bone. Although it has been reported that in extreme instances of sternal foramen there might be other lesions associated, especially cardiac anomalies (Azizi *et al.* 2012), it is most likely that the horse in burial XIII at Dalvík (Brimnes) was not influenced by this condition in life.

5.1.9 Pathology summary

Pathological changes were recorded in a minimum of 27% of the individual horses with surviving bone. The pathological changes are indicative of repetitive strain injury and, in the case of bone spavin, possibly inheritance as well. A curious unique case is a healed fracture on the spinous process of a thoracic vertebra. The trauma to the animal's back must have been the result of a concentrated blow, since other thoracic vertebrae from the horse seem to have been unscathed. The common stress related pathologies are very likely due to load bearing or excessive riding. These pathologies were recorded in animals of varying age. It is especially notable that some individual horses had developed stress related pathologies quite young, in three instances not even skeletally adult. This indicates that at least these specific individuals were used for riding or as beasts of burden from an early age, but it could also very well be an example of how horses were generally treated in Viking Age Iceland. Of course the burial horses cannot be claimed to represent the entire horse population of the time. But the collection does at least show that horses chosen for burial had in many instances been worked excessively in life and some definitely from quite an early age.

5.1.10 Artefacts associated with riding

It is very common to find riding gear associated with horse burials. What survives of the saddles and harnesses are mostly metals, along with scant wood remains in a few instances. The material remains are buckles, bridle-bits and nails of iron, decorative fittings of copper-alloy or iron, and wood from saddles either found degraded in the grave during excavation or found pressed on thoracic vertebrae and noted during osteological analysis. A single crampon of iron has been recorded in an Icelandic burial, found with horse remains at Austarihóll. Crampons were attached to the horse's hoofs during winter for better footing in icy conditions. The rule in Iceland is that the presence of riding equipment is always associated with horse burials. There is not a single recorded instance of riding gear having been found in a grave that did not contain horse bone. It is most common for the harnesses and saddles to have been worn by the horses in the graves. The only recorded exception is burial III at Hafurbjarnarstaðir. The burial was excavated in 1868 and noted to have been undisturbed upon discoverey. A bridle-bit and the remains of a saddle were found next to the human remains along with other artefacts, but the horse had been placed by the human's feet. The riding gear had seemingly been deposited on top of weaponry buried with the deceased man.

A conservative count reveals that riding equipment for 72 individual horses (table 5.3) has been recorded. Of those, remains of bridles were recorded with 31 horses and the probable remains of saddles with 58 animals. There was an overlap in seventeen instances, where both bridle and saddle remains were found together. One horse had only a crampon. Quantifying the ratio of horses buried with riding gear is not straightforward. This is due to differences in preservation, recovery and recording between the archaeological sites. Most sites that have yielded horse remains but no riding equipment are either very poorly recorded and/or decimated to a varying degree by past 'grave robbery', erosion or modern machining.

Site	**MNI w/riding gear**	**Age at death in years**	**bridle-bit / harness**	**saddle remains**
Rangárvallasýsla				
Áslákshóll	1	?	1	
Galtalækur	1	20	1	1
Hemla	1	5-6	1	1
Hemla	1	1.5		1
Kápa	1	14-15		1
Mörk	1	5-7	1	
Rangá (eystri)	1	?	1	
Árnessýsla				
Álfsstaðir	1	12		1
Lækur í Flóa	1	min 5	1	1
Miklaholt	1		1	
Traðarholt burial II	1	4-5	1	
Traðarholt burial III	1	5-6	1	
Gullbringusýsla				
Hafurbjarnarstaðir burial III	1	min 5	1	1
Borgarfjarðarsýsla				
Snartastaðir	1			1
Vestur Húnavatnssýsla				

Þóreyjarnúpur	1	min 3.5		1
Austur Húnavatnssýsla				
Stafn	1	5-6		1
Skagafjarðarsýsla				
Austarihóll*	1	3.5 or min 5		
Brimnes	1	?	1	1
Elivogar	1	min 5		1
Enni	1	min 5		1
Miklibær	1	?		1
Sólheimar burial II	1	min 5		1
Vík	1	?	1	
Þorljótsstaðir	1	min 5		1
Öxnadalsheiði	1	min 5		1
Eyjafjarðarsýsla				
Dalvík Brimnes burial II	1	4-5		1
Dalvík Brimnes burial IV	1	min 5		1
Dalvík Brimnes burial V	1	4		1
Dalvík Brimnes burial XII	1	10+	1	
Dalvík Brimnes burial XIV	1	?		1
Garðsá	1	20		1
Sakka	1	?		1
Sílastaðir burial I	1	5		1
Sílastaðir burial IV	1	4-5	1	1
Staðartunga	1	3 or 10+		1
Stærri-Árskógur	1	2		1
Ytra-Garðshorn burial I	2	4.5-5 / min 5		2
Ytra-Garðshorn burial II	1	min 5		1
Ytra-Garðshorn burial III	1	3-3.5		1
Ytra-Garðshorn burial VI	1	min 5		1
Ytra-Garðshorn burial VII	1	10+	1	1
Ytra-Garðshorn burial X	1	10+		1
Ytra-Hvarf burial I	1	7-8 or 13-15	1	1
Ytra-Hvarf burial II	1	?		1
Suður Þingeyjarsýsla				
Baldursheimur	1	?	1	1
Glaumbær burial VI	2	4-5 / 10-11	1	2
Grímsstaðir	2	(7 horses)		2
Ingiríðarstaðir burial I	1	6-10		1
Ingiríðarstaðir burial II	1	10+	1	
Ingiríðarstaðir burial IV	1	20+	1	
Ingiríðarstaðir burial V	1	20+		1
Kálfborgará	1			1
Litlu-Núpar burial II	1	min 5	1	1
Litlu-Núpar burial VI	1	15		1
Lómatjörn	2	1.5-3.5 / min 1.5	2	1
Lómatjörn	1	min 1.5		1
Skógar	1	?	1	
Vindbelgur	1	?		1

Ytri-Neslönd	1	5+	1	1
Norður Þingeyjarsýsla				
Austara-Land	1	?		1
Daðastaðir	1	?	1	
Norður Múlasýsla				
Reykjasel	1	?		1
Sturluflötur	1	5-7	1	1
Suður Múlasýsla				
Eyrarteigur	1	4.5	1	1
Stóra-Sandfell	1	4 or min 5	1	1
Vestur Skaftafellssýsla				
Granagil	1	?		1
Hrífunes burial I	1	10-11	1	1
Hrífunes burial IV	1	10+	1	1
Total	72	–	31	58

Table 5-3 – Horses in Icelandic burials with recorded riding gear.

*horse at Austarihóll was buried with a crampon for better footing on ice

Site	MNI	Age at death	Comments
Árnessýsla			
Traðarholt burial IV	1	?	Excavated in 1880, no artifacts discovered and bone degraded.
Vestur Húnavatnssýsla			
Gljúfurá	1	?	Excavated in 1868 by locals, no artifacts discovered.
Eyjafjörður			
Dalvík Brimnes burial VI	1	?	Excavated in 1909 by D Bruun, no artifacts discovered.
Dalvík Brimnes burial IX	1	min 3.5	Excavated in 1909 by D Bruun, no artifacts discovered.
Dalvík Brimnes burial XIII	1	min 5	Excavated in 1909 by D Bruun. No riding gear discovered.
Ytra-Garðshorn burial VIII	1	5-6	Excavated in 1954-8 by Kristján Eldjárn. No riding gear discovered.
Suður Þingeyjarsýsla			
Glaumbær burial I	1	min 3.5	Excavated in 1915 by Matthías Þórðarson, no artifacts discovered.
Ingiríðarstaðir burial II	1	3-3.5	Excavated in 2009 by FSI, double horse burial, other horse w/harness.

Table 5-4 – Little disturbed burials containing horse remains with no recorded riding gear.

After correcting for the possible bias by weeding out sites that are moderately or extremely compromised, only eight horses can be fairly convincingly argued to have been buried without riding gear (table 5.4). Of those, one was buried together with and lying under another horse with riding gear (Ingiríðarstaðir). Further, two were excavated in the 19th century, in

1868 and 1880, well before detailed excavation and recording techniques became standard. They are included because the reports include statements about a lack of artefacts in seemingly little disturbed contexts. All in all, there is a high correlation between horses and riding gear occurring together in graves. *The animals were most commonly bridled and/or saddled when killed and buried.*

Kristján Eldjárn (2016:318) opined that it was impossible to infer the form and type of Icelandic Viking Age saddles from the scant surviving remains. The little that does remain can nonetheless give a general idea about the equipment used. Buckles are frequently found, also nails and sometimes bosses and other iron fragments such as loops, hooks and sheets. Buckles are either found single or in pairs. A single buckle found is most likely a girth buckle, used to fasten the wooden framed saddle to the horse´s back with a girth strap of leather around its midsection (Fern 2005; Clark 2004). When two buckles are found the girth strap could be loose from the saddle at both ends (Kristján Eldjárn 2016:317) or the second strap could be part of a more complicated harness, e.g. part of the breast girth. Examples of such leather trappings are harness mounts, found for instance at Ytra-Hvarf. The role the various fragments of loops and hooks played is more ambiguous, but is most likely connected with the body harness or reins. It is clear that the saddles were wooden framed, as can be seen by the wooden remains pressed up against the thoracic vertebrae of a horse from Ingiríðarstaðir. Also, there are wooden remains on a humerus from a double horse burial at Ytra-Garðshorn which could derive from the upper animal’s saddle. The animals in that burial were deposited with one’s hindsection on top of the other’s foresection. Wood remains, most likely from a saddle judging by their location, were also retrieved from a grave at Brimnes in Skagafjörður (Kristján Eldjárn 2016:143). It is likely that the wooden frame would have been dressed with padded leather and that a saddle cloth would have been put under it to shield the horse’s back. The form of the saddles cannot be reconstructed based on the surviving evidence. For example, it is not known if they had a high or low front bow, but the absence of stirrups does indicate that the saddles would have had to give riders a secure seating. The best preserved wooden saddle from the Viking Age is the quite plain and undecorated one recovered from the Oseberg burial mound and dated to the first half of the 9th century (Brøgger *et al.* 1917; Bonde & Christensen 1993). The form of a saddle, in conjunction with the material it is made of and how it sits on the back of a horse, can negatively influence the well-being of the animal (Levine *et al.* 2005; Ambros & Müller 1980). This has been argued for wood framed pad-saddles of the Early Iron Age, where similar vertebral pathologies have been seen on the Scytho-Siberian horses as have been recorded on the Icelandic ones (page 249).

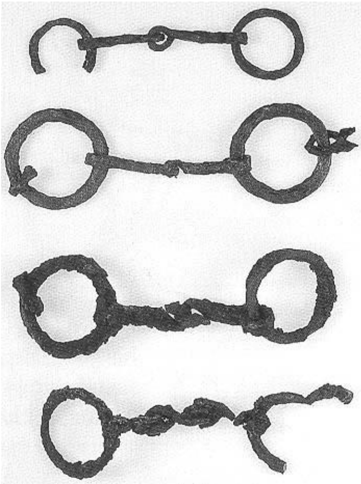


Figure 5–13 – Bridle bits from burials at Baldursheimur (top), Hafurbjarnarstaðir, Hemla and Lómatjörn (Kristján Eldjárn 2016:313).

The bridle-bits known from Viking Age Iceland are loose-ring snaffles, two cheek rings linked by a jointed mouthpiece (figure 5.13). The mouthpieces are usually made of two single jointed parts, but a three part mouthpiece is known from Lómatjörn and a figure-of-eight loop links the rings on a snaffle from Dalvík (Brimnes) in Eyjafjörður (Kristján Eldjárn 2016:313). The length of the mouthpieces varies from 9-11 cm and the cheek-rings range from 4.5-10 cm in diameter (Kristján Eldjárn 2016:312-313). Other types of surviving bridle remains are decorative studs, plates and fittings of copper-alloy or iron that were attached to the leather straps of the harness, for instance the head bridle or breast girth. Instances of this have been recorded at Ingiríðarstaðir, Sílastaðir, Ytra-Hvarf and Sakka. Perhaps the most impressive example is the elaborately decorated head-bridle at Ingiríðarstaðir with its numerous bronze studs and ornamented fittings (Roberts 2013). The head-bridle at Ingiríðarstaðir also supports the idea that organic bridle-bits, which have left no mark on the archaeological record, could have been used in some instances. No bit of iron was discovered with the horse at Ingiríðarstaðir although it is certain that it was sporting a head-bridle. This could further explain why the remains of 39 saddles have been recorded where bridle-bits have not.

Generally speaking, the riding equipment used in Viking Age Iceland and illustrated by the scant remains from burials, would have looked familiar to the modern rider.

It is noteworthy that three types of riding equipment have never been recorded in Icelandic Viking Age burial contexts; neither horseshoes, stirrups nor spurs. The lack of horseshoes is not surprising since they are believed to have been rare, at best, in Scandinavia and Iceland until after the end of the Viking Age (Gansum 2002; Kristján Eldjárn 2016:319; and even in England as well, e.g. Clark 2004:75:123). Perhaps more surprising is the absence of stirrups and spurs from the grave material. Stirrups have regularly been recorded in Scandinavian burials, at least from about AD 800 and onwards through the Viking Age (Martens 1992; Braathen 1989:140). Spurs are of a different nature than the other riding gear discussed here. They are part of a person’s dress items and as such have been found in Scandinavian burials even where no horse is recorded (Pedersen 2014:102: Braathen 1989:140; chapter 3). Despite the lack of these artafacts from Icelandic burial contexts, there do exist loose finds of four stirrups and three iron prick-spurs, all of which might possibly date back to the Viking Age (Kristján Eldjárn 2016:318-322). The seven loose finds, each from a different location, indicate that these objects did exist in Iceland although they do not turn up in graves. Spurs and stirrups are most common in a particular type of burials in Scandinavia, namely so called *ryttergraver* or 'horseman graves' (Braathen 1989; Pedersen 1997a; 1997b; 2011; 2014). This burial tradition has been suggested to originate in Denmark in the beginning of the 10th century and later to become adopted in the Vestfold area and eventually further northwards (pages 11, 57-60). Such rider graves in Norway date to the 10th and early 11th centuries. The *ryttergraver* are characterised by the presence of stirrups and spurs, along with weapons like swords and lances and seem always to be male graves. The *ryttergraver* are commonly linked with early state building and the quite standardised burial tradition over a large area has been argued to represent a cavalry like warrior-class of males. It is seldom clear if these burials included a horse, or just a man and artefacts, but the latter seems to be more common (Braathen 1989; Randsborg 1980). The characteristic *ryttergraver* are more or less associated with power centers in the western part of Scandinavia and Denmark. Other burials, more like the Icelandic ones and not as frequently containing spurs and stirrups are of course a common find, especially in Norway (chapters 3 and 6).

5.1.11 The horses in life - discussion

The pathologies observed among the burial horses mostly have to do with the distal parts of the legs and the vertebrae; with inflammations and subsequent possible ankyloses. The most common pathologies are bone spavin in the hind leg, ankylosed metacarpals in the foreleg, and in the vertebrae; growth of osteophytes, ankylosis and medio-lateral fissures on the articular surfaces. It is highly likely that similar aetiologies are the cause for each of these types of pathological changes in different individual horses, due to similar use, treatment and life cycles of the animals selected for burial. A major aetiology is inheritance, especially for bone spavin (cf. Daugnora & Thomas 2005; Sigríður Björnsdóttir 2002), but the other pathologies are most likely multicausal. Apart from genes, the factors are mainly repetitive strain injury and age. The repeated mechanical stress must be due to extensive load bearing and/or riding, perhaps exacerbated by bad conformation and/or wooden framed saddles uncomfortable to the horses. That riding was a factor is supported by the common occurrence of riding gear in the burials.

It is clear that these pathological changes represent, to a varying degree, discomfort and pain in the animal's life, especially prior to the ankylosis of joints. Not least the bone spavin, which seems to have been common in Viking Age horses in Iceland, and which is certainly frequent today in the modern Icelandic breed with well documented consequences for individual animals (Sigríður Björnsdóttir 2002; Helgi Sigurðsson 1991). Viking Age horses seem to have been ridden extensively, spavin notwithstanding. The occurrence of the affliction in the modern breed is perhaps roughly 30% in horses between six and twelve years of age (Sigríður Björnsdóttir 2002). It can be speculated whether the occurrence rate was similar in the Viking Age, but if the occurrence is higher in the surviving burial assemblage it could be argued that culling lame horses was part of the criteria for selecting animals suitable for ritual killing. That would inevitably heavily influence the interpretation of the burial material. Spavin has been a problem for horses ever since people began riding them (Schebitz 1965) and is today the most common reason for culling the animals in Iceland. Because different individual horses in the burial assemblage are not represented by the same suite of elements, it is necessary to compare only animals with surviving metatarsals and/or distal tarsals. Thus, the ratio of observed spavin in the entire burial assemblage, irrespective of age, is about 25%. This is similar to the observed prevalence in modern prime animals and indicates that culling due to spavin was not a major factor when horses were selected for burial.

Also, it is interesting to note that seriously ill animals have not been recorded in the burial record and thus seem not to have been considered fit for the burial process. For example, only one fracture was recorded and no indications of bacterial infections, malnutrition or other possible bone-altering trauma. The fracture was on the spinous process of a thoracic vertebra and had healed long before the animal's death. It seems to have been caused by an isolated blow to the animal's back, since no other similar injuries were noted on the individual's vertebrae or other elements (which were well preserved).

Perhaps most striking when analysing the life histories of the horses chosen for burial is how many of them are young animals, often buried with riding gear or showing possible stress related changes of vertebrae. The youngest known animal to have been saddled when buried is a one and a half year old yearling from Hemla. Another animal perhaps a bit older, about two years of age, was buried with a saddle at Stærri-Árskógur, about five m away from the nearest recorded human grave. At Ytra-Garðshorn two animals, between three to three and a half and between four to five years of age, were buried with a saddle each. The third young animal from Ytra-Garðshorn was also three to three and a half years at the time of death. It came from a disturbed grave in which no riding gear was found, but all other horses found at the site had riding equipment. A horse, with the distal vertebral epiphyses unfused, was found wearing a bridle-bit at Traðarholt. This animal was probably between four and five years of age. A horse of the same age and not fully grown was buried with a saddle and bridle-bit at Sílastaðir. Another animal at Sílastaðir, fully grown but young, about five to six years of age, had developed osteophytic projections beyond the end of a thoracic vertebra, a possible sign of heavy use at a very young age. A buckle was discovered in the grave which might be a girth-buckle. Pathologies probably related to riding were also discovered on three other young animals. A horse of four to five years at Kolsholt has similar osteophytic projections. At Eyrarteigur an animal with its vertebrae still fusing, perhaps about four and a half years of age, has a medio-lateral fissure on the posterior articular surface of a thoracic vertebra. The youngest documented animal with possibly stress related pathologies is a three and a half to four year old horse discovered at Granagil that has two lumbar vertebrae in ankylosis.

This treatment of young animals casts light on human-horse relations in Viking Age Iceland. Horses (at least the ones buried on grave fields) were first and foremost animals used for riding, whether for travel or racing. This is manifested in the surviving animal remains and the associated artefacts (saddles and harnesses), both as a symbolic role and as an actual one. It is highly unlikely that the saddled one and a half and two year old animals from Hemla and Stærri-Árskógur were used for riding during their short lives. Burying such immature horses with riding gear is without a doubt a symbolic act, not representative of their actual use. On the other hand, the pathologies seen on the slightly older animals are a clear indication that horses were tamed as soon as they could carry a human. It is not known if the very young saddled animals from Hemla and Stærri-Árskógur were buried with humans or on their own. The horse from Hemla could possibly have been associated with an adolescent male buried with weapons. Whether these animals were the possession of a deceased person they were buried with, donated for the burial occasion by another person or simply killed and buried by themselves is in this context not a major issue. The young horses became part of symbolic ritual expressions of abstract ideas concerning societal status and the afterlife.

Another observable feature of human-horse relations is manifested in the remains of animals seen fit for burial. All of the horse remains suitable for sexing by eye examination are male (even though some females are present as well - page 242). Some of these animals are likely to have been uncastrated males and this might have been a conscious choice. What sets stallions apart from other horses is virility and aggression. As a result those are the animals used in horse-baiting. Horse-fighting is a well-documented tradition in past (but post-Viking Age) Norse societies (Solheim 1956) and was practiced in Iceland at least until 1623 (Bjarni Vilhjálmsson 1990).[7] It is certain (because of the presence of very young animals) that not all horses buried in Viking Age graves were used in fights, but the sex of the individuals, and thus the characteristics of that sex, could have been a strong symbolic factor. The common presence of riding gear and pathologies indicate that riding horses were used in burial rituals, but some horses could nevertheless have been used in horse-baiting. A possible example of this is the horse with the healed bone fracture from Stóra-Sandfell. But also the horse burial at Grímsstaðir in Suður-Þingeyjarsýsla (page 172-181) where the *in situ* horses faced each other in the grave with their front legs suspended upwards; the layout being reminiscent of horse-fights where stallions raise themselves up on their hind legs and use their front legs as offensive weapons, kicking and biting (which can also be seen in Late Iron Age stone carving in Scandinavia - figure 4.35). Another example could be the ten year old horse elaborately buried inside a boat-shaped stone setting at Hrífunes. The horse was saddled and bridled, but buried alone and not directly associated with human remains. It is not far-fetched to imagine that it was awarded this prestige for reflecting positively on its owner during races or baiting.

	HST	HRH	SVK	GRS	ODS	VAF	AST
% horse bone of total domestic	0,4	0,2	1	4,4	0,7	1	1,9

Table 5-5 – Ratio of horse bone in assemblages of domestic species (cattle, caprine, pig and horse) found in middens at HST (Hofstaðir – ca. 940-1000), HRH (Hrísheimar – ca. 10th c.), SVK (Sveigakot – ca. 10th c.), GRS (Granastaðir – Viking Age), ODS (Oddstaðir

One of the roles horses played in Viking Iceland is exemplified by contemporary midden assemblages (table 5.5). Horse remains appear regularly as food waste in Viking Age middens, often showing clear evidence of butchery (e.g. McGovern 2009:220; Amorosi & McGovern 1995:186). It is uncertain how the horses that were eaten compare to the burial population. This is because the age and sex structures of midden assemblages are mostly unknown; horse remains from middens are generally fragmented and samples are usually quite small. That said, McGovern (2009:220-221) noted at Hofstaðir that the bone from horses eaten there was all, with an exception of a single element, from adult animals. Table

[7] Horse bating was introduced as a curious past tradition in 1930 at Þingvellir, during celebrations for the 1000 anniversary of Alþingi (figure 4.36). This took place after an horse racing event (Bjarni Vilhjálmsson 1990).

5.5 above reveals the ratio of horse bone relative to the total count of domestic animal bone (from cows, caprines, pigs and horses) from a few Viking Age farms. The sites used here are Hofstaðir (McGovern 2009), Hrísheimar (McGovern *et al.* 2006), Sveigakot (McGovern 2003), Granastaðir (Amorosi & McGovern 1995), Oddstaðir (Harrison 2012), Vatnsfjörður (Albína Pálsdóttir *et al.* 2008) and Aðalstræti in Reykjavík (Tinsley & McGovern 2001). The low ratio of horse bone at all sites is noteworthy. The Viking Age farm of Granastaðir in Eyjafjörður (Bjarni Einarsson 1995) stands out with the unusually high 4.4% ratio (table 5.5 above) of horse bone, but it is the only assemblage mentioned here which was not sieved upon excavation. It can be inferred that although horsemeat was consumed, horses were an insignificant part of Viking Age meat production and seem not to have been specifically bred for routine human consumption. Horsemeat may have been an occasional side product, while the main role was use for riding, being beasts of burden or pulling the ard. However, the fact that horsemeat was clearly eaten during the Viking Age brings to mind a famous account of the conversion to Christianity related in the Book of Icelanders. The consumption of horsemeat is mentioned as one of three exemptions allowed (for a time at least) after the conversion to Christianity. Every person had to be Christian and be baptized as such, but the 'old laws' would still apply regarding the exposure of unwanted newborns and to the eating of horsemeat. Also, people were allowed to worship the old gods in private, but suffer punishment if other people witnessed it (ÍF I 1968:17). It is curious that the consumption of horseflesh is one of three things explicitly mentioned as something which did not conform to Christianity but was seemingly important enough to be tolerated after conversion (connotations between horsemeat and pagan ritual are found in other Icelandic medieval texts, e.g. in Hákonar saga góða when King Hákon was made to eat horse flesh during a 'blót', ÍF XXVI 1941:167-172). Seen in this context, and given the low ratio of horse specimens in Viking Age middens, horsemeat might be interpreted as food that had special connotations and the low ratio could indicate that it was eaten at specific occasions or at specific times of the year. If this was not the case, then the otherwise low consumption rate of horsemeat (ca. 1% ratio of horse bone generally observed in Viking Age middens, McGovern 2009:220) would hardly have prompted this special exemption. It should be noted that even though the consumption of horse meat was generally frowned upon until the latter part of the 19^{th} century (Jónas Jónasson 1934:152), consumption of horsemeat did continue after the Viking Age. Assemblages of domestic bone dating from the middle ages and early modern times sometimes include a few horse specimens, but the ratio is generally less than 1% (e.g. Amorosi 1996:410-411, 737). Of course, the fact that horses were eaten in both medieval and modern Iceland does not exclude the possibility that such consumption had some special, or even ritual, connotations in pre-Christian society. What can be stated with certainty at this point is that horses were part of the diet in Iceland from the Viking Age and onwards, although a minor one, but they were not specifically raised for that purpose.

The economic role of the horse (and the symbolic role as well) was clearly different from other livestock. That is to say, pigs were used for food, cattle and caprines were used for both meat and secondary products, while the principal usefulness of horses was their physical strength. Horses were occasionally eaten, but their greatest importance was for riding and being beasts of burden. It is almost certain that horses were in life used for other physical work as well, like pulling the ard. This, however, is not the ideal people chose to portray in burial customs. Riding is the principal role mirrored in the burials. Riding gear is common and found even with animals too young to have been much use for riding. Pathologies that are most likely associated with riding have also been recorded in quite a few animals, some of which were young at the time of death and thus indicating use from an early age. The conceptual role of the horse and the cultural connotations of killing and burying such an animal in the Viking Age are discussed below in chapter 6.

5.1.12 Killing of horses for burial

The way horses were killed during burial rituals can be inferred from the remains of 20 individuals. Two methods of killing and one method of post-mortem butchery have been recorded that were both applied separately and in combination. These are poleaxing, throat-cutting and decapitation (table 5.6). Decapitation as a method of killing rather than post-mortem butchery, may have been applied to the horse in burial IV at Hrífunes, although that cannot be confirmed by osteological analysis of the surviving remains (page 227). It is also possible that stabbing occurred (e.g. Cross 2011:199), but that has not been recorded directly from bone specimens in Iceland although there are other indications of this. Poleaxing is when a heavy blow is given to the head with a hammer or other blunt instrument, breaking the cranium above the brain (Dobat 2006). This was probably also the mundane method of killing livestock at the farm (figure 4.42). Although only 12 individuals have been recorded with clear signs of poleaxing, many other skulls in the assemblage are heavily fragmented, which is likely to be the result of such slaughter. The nature of the killing-tool used to poleaxe the horse in burial VIII at Ytra-Garðshorn can be deduced from the trauma on its cranium (figure 5.14).

Site	MNI	Cause of death	Notes
Rangárvallasýsla			
Galtalækur	1	p / c	
Austur-Húnavatnssýsla			
Tindar	1	p	
Skagafjarðarsýsla			
Brimnes	1	d	spearhead in horse grave
Brimnes	1	d	
Eyjafjarðarsýsla			
Dalvík Brimnes - burial II	1	p / c / d	horse on top of a spearhead
Dalvík Brimnes - burial IV	1	p / d	
Dalvík Brimnes - burial V	1	d	
Dalvík Brimnes - burial VI	1	d	
Dalvík Brimnes - burial IX	1	d	
Dalvík Brimnes - burial XII	1	d	
Dalvík Brimnes - burial XIII	1	p? / d	
Böggvisstaðir	1	p	
Ytra-Garðshorn - burial VIII	1	p	
Suður-Þingeyjarsýsla			
Ingiríðarstaðir burial II	1	p	
Ingiríðarstaðir burial II	1	P / c	
Ingiríðarstaðir burial V	1	P	
Litlu-Núpar burial VIII	1	p	
Lyngbrekka (Gömlu Daðastaðir)	1	p	
Ytri-Neslönd	1	p	
Vestur-Skaftafellssýsla			
Hrífunes - burial IV	1	d	

Table 5-6 – List of horses with recorded causes of death (n20). p=poleaxed, c=throat cut, d=decapitated

The animal was poleaxed twice, since the first blow was misdirected and landed on the frontale breaking into the frontal sinus where it left a circular depression. This is the only recorded ‘miss’ in the Icelandic record. The fracture left by the first blow is ‘bowl shaped’, 60 mm in diameter at the ‘top rim’, 15 mm deep, and the flat base of the circular depression is 30 mm in diameter. The base forms the outline of the hammer-like tool used for the killing. This is the clearest evidence available for what sort of tools were used for poleaxing in Viking Age Iceland. The second blow hit the mark, shattering the parietale and interparietale, breaking the cranium on top of the brain cavity. The first blow broke the animal’s nose but would hardly have stunned it.

Figure 5–14 – Poleaxed horse cranium from Ytra-Garðshorn. Note the circular depression fracture on the frontale (below the scale). It is the shape of the hammer-tool used for the killing and represents a missed first blow to the head.

The horse must have been tethered or restrained during this debacle, otherwise it would have been impossible to control after the misguided hit. An indication of tethering at the graveside (or in the grave) came to light in the late 19th century on another site, Rangá eystri in the south of Iceland, when an iron horse restraint (a hobble) was discovered in a Viking Age grave which was, alas, poorly recorded.

A total of ten horses were recorded *in situ* as decapitated by the excavators. Of those, seven come from the burial ground of Dalvík (Brimnes) in Eyjafjörður excavated by Daniel Bruun and Finnur Jónsson (1910). They recorded the same treatment in each of the horse graves; heads had been cut off and placed on top of the animals' bodies. Another site with recorded decapitation is Hrífunes in the south (figure 4.50), where the head of a horse had in a similar way been cut off and placed on top of its middle section (Þór Magnússon 1984:25). Lastly at the other Brimnes site, in Skagafjörður, a double horse grave was excavated by Matthías Þórðarson. The horses were decapitated and the head of one placed on top of its middle section (Kristján Eldjárn 2016:142-144). Apart from this *in situ* evidence, clear signs of decapitation are generally lacking from the osteological analysis. A single possible exception is a cutmark recorded on a neck vertebra (axis) of the horse in burial II at Dalvík (Brimnes) in Eyjafjörður (pages 118-121). The cutmark could be the remnant of decapitation with a small blade, but as is discussed below is more likely to be a method of killing. Lucas and McGovern (2007) described how bulls had been decapitated by the large hall at Hofstaðir in the northeast of Iceland (pages 26-27). There, the osteological evidence suggested that the animals' heads were chopped off with a heavy blade in a powerful shearing blow (Lucas & McGovern 2007:10-11, 21-22). The chopmarks were recorded at the base of the skulls and also on some vertebrae recorded in a nearby midden. No such evidence has been noted in the assemblage of burial horses, which means that the ritual killing of horses for burial was practiced differently than the alleged ritual cattle killing at Hofstaðir. This is not surprising since the context of the two rituals was seemingly very different. Is has been argued that the bulls at Hofstaðir were decapitated ‘in a dramatic way’ as part of ritual feasting, which took place at a specific time of the year, and eaten (Lucas & McGovern 2007). The fact that the decapitation of the horses has left so little osteological mark indicates that it was practiced by a skilled person wielding a fine blade. Thus, it is not likely to have been an actual killing method but rather performed post-mortem, after poleaxing and perhaps the cutting of the throat as is discussed below.

Cutmarks on the axis, the second vertebra, have been recorded on three individual horses and always in combination with other trauma. The horse in burial II at Dalvík (Brimnes) in Eyjaförður has a deep transverse cut mark on the ventral side of the axis. The cut is narrow and deep and roughly 20 mm long. The cut’s angle extends into the bone from a dorsal to a cranial direction, indicating that whoever inflicted the wound would have stood behind and above the animal’s head. The cranium is fragmented and it is highly likely that the horse was first poleaxed because it could not have been standing upright when its throat was cut. This animal, like all others at Dalvík (Brimnes) was decapitated. The cut mark on the axis indicates that decapitation was not the method of killing this particular animal. It must have been poleaxed, bled, and subsequently decapitated. The decapitation could thus have been a part of a post-mortem ceremony ending with the head’s deposition on top of the animal’s body before interment. At Ingiríðarstaðir, a double horse burial was excavated in 2009 (pages 190-191). Both horses had been poleaxed, but the younger one, only roughly three years of age at the time of death, has a clear cutmark on the axis. The cut is transverse, 30 mm long, 1-2 mm wide and 3 mm deep, on the ventral side of the vertebra and 52 mm from the anterior joint margin. The narrow cut was inflicted with a sharp instrument. The sequence of events must be that the horse was bled after being poleaxed. In order for a blade to mark the axis the cut would have to be very deep and inflicted high up on the neck. No cut was recorded on the older animal, which was much more robust at the time of death which might have prevented the blade from marking the vertebra. A very similar method of killing was recorded at Galtalækur (pages 62-63), where an elderly horse also has a transverse cut mark on the ventral side of the axis, 23 mm long, 1 mm wide and 1-2 mm deep, and shows clear evidence of having been poleaxed. All of the cut marks are on the second vertebra, indicating that it was standard to bleed the animals high on the throat, just below the jaw line. Letting the horses bleed may have been regularly employed alongside poleaxing, but it would not always be visible in the archaeological record since the cut would have to be very deep to mark bone.

Here it can be added that stabbing as means of killing might possibly have occurred as well, even though osteological evidence of that has not been recorded. Ethnographic data from Siberia, recorded among the Yakut people who to this day ritually sacrifice horses, provides examples of this (Cross 2011:119). During the Yakut ritual killing, horses are first poleaxed and subsequently stabbed in the heart with a knife. Archaeological remnants of this could be knife marks on ribs and/or sternum. This is mentioned as a possibility because spearheads have been recorded in Icelandic horse graves on three occations, at both Brimnes sites, in Eyjafjörður and in Skagafjörður, and at Kápa in the south of Iceland as well. The presence of spears in horse graves is further discussed below (page 307).

5.2 Dogs

Dog bone has been recorded in 32 Viking Age burials (table 5.7 below). In each instance, the dog remains represent a single individual. Remains of two or more dogs have never been recorded in the same grave. Dogs were interred with both males and females. Five to seven probable female burials and eight to ten probable male burials are known to have contained dog bone, which is a similar ratio as between male and female burials altogether. Further, dog remains were recorded in two double burials that might have contained both sexes.

Site	Dog MNI	Horse MNI	Sex of human/s	Notes
Rangárvallasýsla				
Lambhagi	1	1	M?	
Árnessýsla				
Brú	1	1	M / F	
Traðarholt	1	1	M	
Gullbringusýsla				
Hafurbjarnarstaðir	1	1	M / ?	
Hafurbjarnarstaðir	1	1	F	
Hafurbjarnarstaðir	1		M	
Hafurbjarnarstaðir	1			
Barðastrandasýsla				
Berufjörður	1			
Vatnsdalur	1		F	
Austur Húnavatnssýsla				

Kornsá	1	1	F	
Skagafjarðarsýsla				
Keldudalur	1			*
Keldudalur	1			*
Þorljótsstaðir	1	1	M	
Eyjafjarðarsýsla				
Dalvík Brimnes	1		F	
Dalvík Brimnes	1	2		
Dalvík Brimnes	1			
Dalvík Brimnes	1	1		Dog head only
Kálfskinn	1	2		
Moldhaugar	1	1		
Staðartunga	1	2	M	
Suður-Þingeyjarsýsla				
Gautlönd	1		M	
Glaumbær	1		M	
Glaumbær	1			
Ingiríðarstaðir burial V	1	1 - 2	F	
Litlu-Núpar	1	1		Woollett 2004
Litlu-Núpar	1	2		
Lyngbrekka	1	1	F	
Skógar	1	1		
Norður Þingeyjarsýsla				
Daðastaðir	1		F	Dog teeth only
Norður Múlasýsla				
Hrollaugsstaðir	1	1		
Rangá	1	2		
Suður-Múlasýsla				
Vað í Skriðdal	1		M	Amorosi 1996

Table 5-7 – A list of dogs recorded in Viking burials in Iceland. *The dog bone from Keldudalur was not available for the present analysis.

5.2.1 Size and different types

Today only a single breed is known as the ‘Icelandic dog’. Like sheep, cattle and horse, its ancestors most likely arrived with the Viking Age settlers. The modern dog, though, probably has had a more complex genetic history than the livestock species. This is due to the fact that dogs are known to have been bred into various types for thousands of years and, unlike the livestock, different types of dogs were most likely brought to the island from first settlement and onwards. Estimation of shoulder height is very useful in describing the physical appearance of dogs and determining their variability or type (Clark 1995). The word ‘type’ is used here because it is perhaps misleading to speak of ‘breeds’ in the modern genetic sense (e.g. MacKinnon 2010:291; Smith 1998; Clutton-Brock 1987; Harcourt 1974). It is likely that different types of dogs, perhaps defined by place of origin or by broad characteristics in

Site	**Element**	**GL (mm)**	**Withers height (mm)**
Berufjörður	Humerus	166	**542,84**
Dalvík Brimnes (burial IV)	Femur	162	495,72
	Humerus	147	477,67
	Tibia	166	494,13
	Mean		**489,1733**
Gautlönd	Femur	182	558,52
	Femur	181	555,38
	Mean		**556,95**
Glaumbær (burial II)	Femur	174	**533,4**
Hafurbjarnarstaðir (burial III)	Femur	207	637,02
	Humerus	197	649,17
	Radius	191	626,89
	Radius	193	633,25
	Mean		**636,5825**
Hafurbjarnarstaðir (burial IV)	Femur	150,5	459,61
	Humerus	138,37	448,0691
	Humerus	137,5	445,085
	Ulna	167	470,47
	Tibia	153,3	457,046
	Mean		**456,056**
Lyngbrekka	Femur	186	571,08
	Femur	185	567,94
	Humerus	168	549,7
	Humerus	170	556,56
	Mean		**561,32**
Staðartunga	Humerus	165	**539,41**

Vatnsdalur	Femur	151,8	463,692
	Femur	152	464,32
	Humerus	137	443,37
	Humerus	136,7	442,341
	Radius	138,7	460,576
	Radius	141,3	468,844
	Ulna	164	462,13
	Mean		**457,8961**
Vað	Femur	166	508,28
	Humerus	155	505,11
	Humerus	155	505,11
	Radius	153	506,05
	Radius	150	496,51
	Tibia	174	517,49
	Tibia	175	520,41
	Mean		**506,425**
Þorljótsstaðir	Radius	146,4	**485,062**

Table 5-8 – The withers heights of dogs from Viking Age burials in Iceland, calculated with multiplication factors set out by Harcourt (1974).

behaviour or appearance, were used for different tasks. Some varieties might have been considered more suitable than other types for sheep herding, others might have been good for hunting, while some types were suitable guard dogs, etc (Smith 1998). In total, it is possible to estimate the shoulder height of eleven Icelandic Viking Age dogs using measurements of long bones (table 5.8, remains of two animals from Keldudalur in Skagafjörður were not available for the present study). The shoulder height is calculated with multiplication factors set out by Harcourt (1974). As seen in table 5.8, the type and number of elements used to estimate the withers height differs between individual dogs. This is due to differential preservation and recovery of remains. It is preferable to compare height estimates calculated from the same elements, but this is not possible here because of the low sample count and variable preservation. This has to be kept in mind when the height estimates are compared. But given the precautions, the height estimates do nonetheless show definite variation between individuals, as is illustrated in figure 5.15.

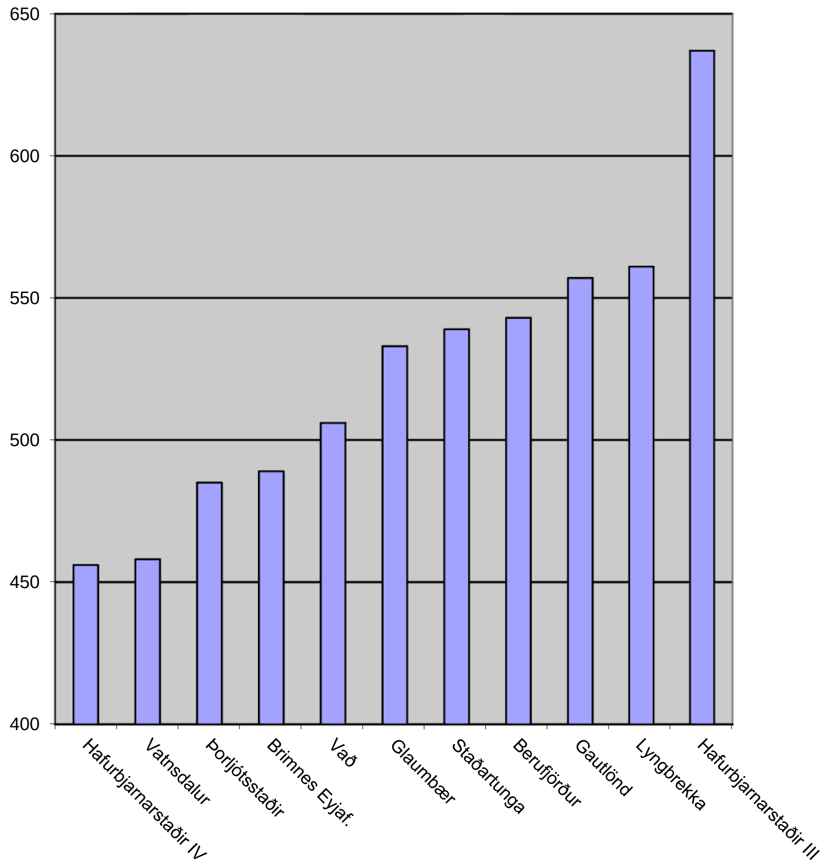


Figure 5–15 – Estimated withers height of dogs (mm) in ascending order.

Some of the difference observed might be due to sexual dimorphism between otherwise similar dogs. It is nonetheless clear from the size range that the Viking Age dogs of Iceland were not all of a uniform type. It is notable that both the smallest and the tallest dog come from the same gravefield at Hafurbjarnarstaðir. The difference between the two in shoulder height was about eighteen cm, but neither was a small animal. Dogs fulfil various roles; including being companions, rounding up sheep, some assist in hunting, some are guard dogs, they can be used for pest control, etc., and of course many dogs perform a mixture of these. It can be hypothesised that the large dog at Hafurbjarnarstaðir, with its withers height in a similar range as a male German shepherd, may have been a guard or hunting animal. While it is impossible to infer based on the difference in size alone whether the two animals buried at Hafurbjarnarstaðir were meant for different tasks in life, it is interesting that such differently sized dogs were present in the same community. This exemplifies diversity in available dog types at a single location in Viking Age Iceland and that people could select the type of dog to meet their requirements. It also suggests that the contacts or network existed in Viking Age Iceland for people to obtain the desired types of animals. The remains of two animals from the Viking Age burial ground of Keldudalur in Skagafjörður (that were not analysed for this study) are described as a 'high footed greyhound' type animal and a 'low footed' dog (Guðný Zoëga 2008:10-11). These are likely to be the remains of two clearly different types of dog as well.

5.2.2 Dogs in the grave

It was most common to bury entire and unbutchered dog carcasses, the whole animal, but there are three possible exceptions where only a part of the animal seems to have been placed in the grave. Perhaps the most definite exception is the eroding but *in situ* burial of an elderly female excavated at Daðastaðir in Norður-Þingeyjarsýsla in 1956. Many artefacts were found with the woman, including a pair of oval brooches, a trefoil brooch of *Borre*-style which could date the burial to the first half of the 10th century, over fifty beads, a ringed pin, an arm ring of copper alloy, belt clasp and a strap-end. Other artefacts were various tools. Along with these artefacts were two dog teeth found buried with the woman, mandibular first molars almost certainly originating from the same individual. The teeth are permanent (adult) dentition, but not much worn and thus probably derive from a fully-grown but not old individual. It is highly unlikely that the presence of only two teeth is due to post-depositional taphonomic factors, since a human skeleton but no other dog or other animal bone was found in the undisturbed burial (Kristján Eldjárn 1958:134-140). In the other two cases, from Dalvík (Brimnes) in Eyjafjörður and Litlu-Núpar, only a dog's head was retrieved. Burial XII at Dalvík (Brimnes) is the more secure context of the two. The dog's head was discovered by the feet of the human skeleton and adjacent was the skeleton of a horse. It is not certain that a decapitated head of a dog was placed in the grave or if this is a result of taphonomy, although the former is much more likely. Decapitation was the norm at the Dalvík (Brimnes) burial ground and all the horses are decapitated. The excavators note in their report that the human skeleton was disturbed upon excavation. The human crania was probably *in situ* at the south end of the grave cut, but the rest, although being quite complete, seemed to have shifted (Bruun & Finnur Jónsson 1910:84). In the osteological report written by Herluf Winge it is obvious that although the human skeleton is badly preserved and not complete, still all body parts are represented by the bone distribution (Bruun & Finnur Jónsson 1910:100). The poorer preservation of the human skeleton compared with the horse skeleton, which is in a good condition, might be due to anataxic processes caused by the disturbance (or robbery) of the human part of the mound, which is known to have taken place at some point previous to the archaeological investigation. The lack of dog bone might be due to the disturbance. There are two possibilities that have to be considered. First there is the possibility that the entire dog skeleton except for the head was removed from the grave in a robbing event. Secondly there is the possibility that taphic and anataxic processes caused most of the dog bone to disintegrate completely. Both of these scenarios are flawed. The first one seems unlikely because the human bone was not removed as well. It is at least not obvious why someone would remove the bone from the body of a dog, leaving the head, from a burial. The deliberate removal of human bone from Viking Age burials has been hypothesised (e.g. at Keldudalur, Guðný Zoëga 2008:25), often assumed to have been reburied in a Christian cemetery. In such a scenario, if the dog bone had been taken by mistake along with the human bone, there would presumably be little or no human bone left in burial XII at Dalvík (Brimnes), which was not the case since all major bones were recorded. There is also the possibility that the dog was simply shovelled out of the grave during a robbing event, but the head resting at the feet of the human, seemingly *in situ*, makes that unlikely. The second scenario concerning the preservation seems very farfetched. The bone that does remain, the cranium and mandible, is not badly degraded and the soil conditions would have to be quite extraordinary for robust limb bones to disintegrate entirely leaving only the head. Given these considerations it seems more likely that only a severed head was placed in burial XII at Dalvík (Brimnes). At the other site, Litlu-Núpar, a disturbed burial was excavated in 2008. The grave was surrounded by four postholes indicating an elaborate grave structure, which might even have been tented over or roofed (Lilja Björk Pálsdóttir & Rúnar Leifsson 2010:14-15). The burial contained only a dog's head and no other bone, animal or human. But a single copper alloy brooch in *Borre* style, iron knife and a few iron fragments also found point towards there having been a person originally buried in the grave. As with the previous dog's head there can be two reasons for the curious element distribution. Either only the severed head was placed in the grave originally, or later disruption to the grave removed all bone leaving only the crania and mandibles. All of the burials recorded at Litlu-Núpar are disturbed and human bone is mostly lacking (Adolf Friðriksson 2012:58; Hildur Gestsdóttir & Birna Lárusdóttir 2012:61). The human remains seem to have been removed but the animal bone left behind, which is exemplified by the presence of eight to ten horses on the gravefield. Thus, there is a possibility that every bit of the dog skeleton was removed along with the human bone in the past, leaving nothing but the cranium and mandibles. This, however, seems unlikely given that it is unclear why every trace of the animal should be meticulously removed except for the head alone. The similar occurance at Dalvík (Brimnes) gives further support for a 'single head' scenario. The apparent burial of isolated dog bone elements might contradict traditional ideas of dogs in graves being nothing but trusted companions and favourite pets. Perhaps the most obvious interpretation of the act of burying two teeth at Daðastaðir is that they are amulets, perhaps an apotropaic symbol and part of the deceased woman's personal belongings. This means that the animal whose teeth got buried was not necessarily killed as part of a funeral ceremony. The exact placement of the dog teeth within the grave is not known, but such information could have reinforced aforesaid interpretations, e.g if it could have been argued that the teeth had been placed in a pouch by the woman's belt. At any rate it is clear that the presence of two molars in a burial must have different connotations than the placing of an unbutchered carcass next to a deceased person. Similarly, if indeed only the animals' severed heads were placed in the two graves at Dalvík (Brimnes) and Litlu-Núpar, then that seems to resonate with a more symbolic meaning which, at least, goes beyond interspecies relationships on individual basis, or pet keeping. Although it is most common for dogs to be buried whole, the possible differences in element distribution do indicate that the presence of dog bone in burials does not necessarily have the same purpose or meaning in every instance.

The co-occurance of dogs and horses in burials is quite common. Of the 32 burials known to have contained dog remains, nineteen or about two-thirds also contained the remains of one or two horses. What is different between the co-occurrence of the two species in Icelandic Viking Age graves, apart from horses simply being much more common, is that unlike horses dogs were never buried on their own but always accompanied a human. This is a reflection of the cognitive status the two species occupied at the time, with horses perhaps having a wider symbolic role allowing in some instances for their own private burials after having been ritually killed. Having said that, there are two occasions where dog remains have been recorded seemingly without direct association with human bone, but both instances reflect post-depositional taphonomy, not actual burial customs. As described above, at Litlu-Núpar one of the graves contained no bone but a dog's head. This is almost certainly due to taphonomy; the burial had been 'robbed' in the past and the surviving artefacts were a person's dress items. Similarly, at Glaumbær, also in Suður-Þingeyjarsýsla, five dog teeth and a fragment of a maxilla were retreived from a tiny stone cairn on a grave-field with a total of seven burials recorded. This supposed dog burial was directly adjacent to an uprooted burial with a single human bone, which in turn was directly adjacent to a horse grave. It was concluded by Kristján Eldjárn (2016:205-206) that the partial dog remains had been a part of a larger burial also containing the human and horse remains and the illusion of different graves was facilitated by previous ‘grave robbing’ events causing severe disruptions to the site.

The spatial positioning of dogs within graves was quite regular, at least in the nine instances where this was noted by excavators. Most often, or in seven instances, the dog’s carcass had been placed by the deceased person’s feet. This was perhaps mimicking the dog curled up and resting by its owner, just as in life. In two of those instances, the bond between human and dog was even stronger. At Gautlönd in Suður-Þingeyjasýsla a man was buried lying on his side in a ‘foetal’ position, the dog having been placed under one of his knees. A similar placement of a dog is likely in burial VII at Dalvík (Brimnes) in Eyjafjörður. There the excavators inferred that the human must have been buried in a sitting position, with the dog resting between his or her legs (Bruun and Finnur Jónsson 1910:83; cf. Kristján Eldjárn 2016:283-4). It is more likely that the person had been placed lying on its side with knees crouched and the dog under one knee. Like most other things relating to pre-Christian burials, the spatial placement of dogs was not absolute and exceptions have been noted in one or two instances. In one instance it is certain that the dog did not share the human’s grave cut, although it was a part of the same burial process. This was at Litlu-Núpar in a double burial of a man and horse where the dog remains had been placed in the horse cut. In another double grave, of a woman and a horse at Lyngbrekka in Suður-Þingeyjasýsla, the placement of the dog was not secure due to a past ‘grave robbing’ event. The dog bone was discovered on top of the soil boundary between two grave cuts, with some elements spread into both cuts. But apart from these one or two exceptions the positioning of the dogs does imply closeness between man and animal.

5.2.3 A dog’s life

Even though dogs found on Viking Age burial grounds in Iceland were usually buried in close contact with humans, and many are likely to have been pets, this does not necessarily imply that the animals generally led an easy existence. As discussed above, most of them were probably used for a variety of practical purposes other than being solely a companion. But also, the affinity mirrored in the graves implies that dogs were closer to human society than other species and, as such, perhaps more susceptible to human violence than livestock.

Research on Viking Age dog bone from Hedeby, Schleswig and Starigard, towns in Northern-Europe, has shown that dogs were prone to abuse by humans (Teegen 2005). Similarly, Grimm (2008) found that in early medieval Emden (in modern Germany) trauma is more commonly seen on dog bone than on bone of other domestic species, but conversely, dogs seem also to have received a higher level of care than other domesticates. This is evident from the fact that many survived long enough to develop pathological changes to bone. Even though attitudes may often have been more emotive towards dogs than other species, the human-dog relationship could be very functional as well, as is indicated by evidence of skinning in Hedeby (Teegen 2005:36). Although Viking Age Iceland was a peripheral rural society, its disposition towards domestic animals is not likely to have been radically different from other parts of Northern-Europe. At the very least it can be assumed that attitudes towards dogs were different from attitudes towards livestock (Morey 2006). Evidence for this often-complex relationship is provided by pathologies seen on some of the dog remains preserved at the National Museum. Despite the fact that surviving remains from each individual dog are mostly very partial, evidence of trauma is seen on two individuals (from Kálfskinn and Vatnsdalur), other three have age related bone alterations (from Vað, Hafurbjarnarstaðir and Lyngbrekka) and of those five animals two also have missing teeth (from Vatnsdalur and Vað). It is interesting that the animals that had suffered trauma in life both lived long enough afterwards to heal.

The less severe instance of trauma is seen on dog remains discovered in a double human-horse burial at Kálfskinn in Eyjafjarðarsýsla. In life, the dog had suffered a spiral fracture to the lower portion of the diaphysis of the left humerus. The fracture healed well before the animal’s death (Adolf Friðriksson, *et al.* 2009b:27). Spiral fractures are torsional and occur when long bone is twisted or rotated with force (Newton 1985). It is likely that this was caused by an unnatural movement of the dog’s left foreleg while running or jumping, rather than being a result of violence.

The other instance of trauma is, on the other hand, quite likely the result of intentional mistreatment by humans. In the boat burial discovered in Vatnsdalur in Barðastrandarsýsla a dog was most likely buried with a woman accompanied by rich grave goods. The dog skeleton is well preserved and nearly complete. The animal’s stature was about 0.46 m at the shoulder (Harcourt 1974) which is similar to males of the modern Icelandic breed of sheep dogs. It was a young adult that was probably killed by poleaxing. Pathologies were recorded on the upper right foreleg and on the mandibles, both of which are most likely due to human agency. The animal suffered injury to its right shoulder which is most likely the result of someone forcefully pulling the dog's leg. The blade of the right scapula is torn proximally on the cranial edge (figure 4.5). The scapular blade tore in a ventral direction (from up to down) making a 28 mm long rift, separating a 3 – 7 mm thick 'lobe' from the rest of the blade. The lobe is curled up and still attached to the rest of the blade at its ventral end. This trauma must have taken place when the animal was very young and the scapular bone still soft, otherwise the bone would have broken instead of torn. This area of the scapula is where the supraspinatus muscle attaches. From the scapula, the supraspinatus inserts cranially on the greater tubercle of the humerus (Budras *et al.* 2007:20). This indicates that the right front leg was violently jerked, causing strain on the supraspinatus which caused the scapula to rip. The injury caused the animal problems, probably throughout its life. Evidence of that is seen on the left humerus where there is pathological lipping (or extra bone growth) on the lateral side of the proximal diaphysis and epiphysis. The new bone growth is by tendon and muscle attachments and is not seen on the right humerus. This indicates more long-term stress on the left side, which would be due to the animal shifting its weight to the left and sheltering its injured right leg for an extended period of time. Because of this, it is hard to imagine that the dog would have been a working animal. The fact that the dog lived as long as it did and ended up following a person to the grave must be a sign that it was cared for, possibly by the person it was buried with.

The dog is missing four molars from its mandibles, both left and right p2s and p4s, but curiously the p3s are still in place in between (figure 5.16). There are no empty sockets in the alveolar bone, which excludes post-mortem taphonomy as a cause. It is clear that either the alveolar bone has resorbed after tooth loss or this is a case of *hypodontia*, where the teeth failed to erupt. In case of tooth loss the teeth would either have been extracted by human hands or have fallen out due to an infection or other illness. A motivation for extracting teeth would most obviously be to prevent injury from biting. For example, according to 19th-century Icelandic ethnographic accounts the pulling of teeth was practiced if dogs were prone to bite sheep when shepherding (Jónas Jónasson 1934:179-180). It seems likely that that kind of scenario would have entailed the pulling of the canines, not the p2s and p4s, so it is unclear how this would fit the Vatnsdalur case. The loss of teeth could of course be due to some other sort of modification related to the dog's tasks, or it could even be trauma due to violence, which is also unlikely due to the symmetry of missing teeth between the two mandibles.

Infection, or orthodentics due to tooth decay, seems unlikely for three reasons. The teeth missing and the teeth remaining are mirrored in both mandibles, which would seem like an unlikely coincidence if there was an infection. Further, the reabsorbed alveolar bone is quite ‘clean’, the sockets have filled in and been replaced by porous new bone but there is no cloaca or other pathological alterations. Thirdly, the remaining teeth show no sign of caries or other dental pathology that could have caused removal of the two premolars. Hypodontia is uncommon in most wild canids, such as wolves, but conversely may be more common in domestic dogs (Hillson 2005:281) and could thus possibly be the case here. The difference between tooth loss and hypodontia should be discernible by the appearance of the alveolar bone. In instances of tooth loss and repair during life the alveolar bone is more roughened and pitted, but tends to be smoother in cases of hypodontia (Baker and Brothwell 1980:137). The alveolar bone where the p2s should be is still ‘dented’ and rough, like sockets that have not completely filled in. Where the p4s should be the alveolar bone is smoother but still porous. Thus an examination by eye makes the pulling of teeth seem more likely than hypodontia, even though the reasons for doing so are unclear. Radiographic checks of both mandibles are still necessary to exclude the possibility of the missing teeth still being buried in the jaws (Baker and Brothwell 1980:137).

Figure 5–16 – A view of the left mandible of the dog from the Vatnsdalur boat burial. Note missing teeth on either side of the p3.

An elderly dog from Vað was also missing mandibular teeth; the p2s, as well as the m2s and m3s. The dog remains were analysed by Thomas Amorosi (1996:139-141/576), who noted that the teeth had to have been pulled out of the animal’s mandible and that this would have had happened long before death since the alveoli had reabsorbed. Amorosi compared this condition to what is seen in many Inuit sled dogs where teeth have been knocked out so that the animal could not bite through reins or injure humans. This is comparable with the Icelandic ethnographic account quoted above. Also similarly, a case of *hypodontia*, that the teeth have failed to erupt, cannot be entirely excluded as a cause. A radiograph of the animal's mandibles could resolve this.

According to Amorosi (1996:139-141) the dog from Vað was old at the time of death and had age related bone changes. All bone elements are fused and fully grown and the dentition is likewise permanent. Advanced arthritis and bone lipping can be seen on articulation surfaces of many vertebrae. All lumbar and sacral vertebrae show signs of arthritis, as do the posterior thoracic and mid-cervical vertebrae. Other pathological changes include a lesion dorsally on the foramen magnum, an infection had evidently spread from the neural canal at the base of the skull. Also, the animal's hearing must have been impaired. The left auditory canal is fused over and the right one was in the process of fusing over at the time of death (Amorosi 1996:142). This shows that the dog must have been fed and accommodated despite having been unfit for work such as herding, hunting or guarding.

The two other dogs recorded with age related bone alterations come from Hafurbjarnarstaðir in the Southwest and Lyngbrekka in the Northeast. The pathologies are similar; mature animals with osteophytic growth on articulation surfaces. The individual from Hafurbjarnarstaðir had new bone formation on four vertebrae at the time of death. Callus bone was forming around the posterior articular surface of two cervical and one lumbar vertebrae, but one thoracic vertebra has callus bone around the anterior articular surface. The Lyngbrekka dog has exostoses on the proximal articulation surfaces of the humeri which is probably a sign of age related osteoarthritis. The fact that both animals were allowed to live long enough to develop these pathologies exhibits benevolent attitudes toward them even past their use for practical purposes and that they probably were the personal property of someone, possibly the person they were buried with.

The way dogs were slaughtered in burial ceremonies is unclear in most instances. This is partly due to poor preservation and sometimes to selective retrieval of specimens during excavations, but possibly also because some killing methods did not leave marks on bone. The only method recorded to date was by poleaxing. This has been observed in at least four instances (at Hafurbjarnarstaðir, Lyngbrekka, Vatnsfjörður and Vað) and in further three instances poleaxing is probably due to heavy fracturing of the cranium (at Gautlönd, Hafurbjarnarstaðir and Litlu-Núpar). It is clear nonetheless that the method of killing dogs during burial ceremonies was not always the same, although only the one method has so far been observed in the archaeological record. This is evident by a cranium with intact frontale and parietale, the parts of the skull broken by poleaxing, recorded in burial IV at Dalvík (Brimnes). This precludes poleaxing as the method of slaughter. Also, there is no mention in the excavators' report of the animal having been decapitated and no such marks can be seen on the animal's vertebrae. It is not certain how this dog died or if it was killed at all, but the obvious lack of poleaxing indicates that the ritual proceedings surrounding dog burials were not rigid or always the same, at least when it came to the killing itself.

5.3 Pigs

The only species other than horse and dog that has been found in a definitive burial context is pig. The presence of pig remains in Viking Age burials is not exclusive to Iceland; pig mandibles and teeth are well known from Scandinavian burials of the time (e.g. Price 2002:206). Other species, sheep, cattle, birds and fish, that have been recorded in bone assemblages deriving from burial sites, all come from eroded burials, or were collected around them, and as such do not have secure contexts of deposition. There is a major difference in the deposition of the pig remains into burials from the deposition of horses and dogs. First, it is much less common. Pig remains have been found in three graves; one of those is a secure burial context but the other two are not as definite. Second, the pig remains do not represent whole carcasses, rather isolated single teeth and in one instance, a mandible. These two fundamental discrepancies in deposition must represent a difference in motives and meanings behind the act. The secure context is a pig's third molar found in burial 3 at Hafurbjarnarstaðir in the Southwest. The more uncertain examples are a pig's mandible found buried with human remains at Kolkuós in the North and a pig's tooth found in a robbed stone cist along with horse teeth and a whetstone (Þór Magnússon 1967:27-28) at Vatnsdalur in the Westfjords.

The first pig element, at Hafurbjarnarstaðir, was found in 1868 when an undisturbed boat grave with two people, a horse and dog was excavated. The pig's third molar is not discussed in the report about Hafurbjarnarstaðir which was published eighty years after the excavation (Eldjárn 1949:108-122), but there is a contemporary discussion about the find in the National Museum's catalogue when the finds from the excavation were registered. There the reverend Sigurður Brynjólfsson Sívertsen records the molar wrongly as 'probably seal, walrus or bear', but does write a short taphonomic consideration where he wonders if the molar was purposefully placed in the burial or if it fell in by mistake (pages 14-15). The fact that a pig's tooth was found in a robbed grave in the Westfjords in the 1960s and a pig's mandible was discovered in a burial at Kolkuós in the 21st century makes it more likely that the molar at Hafurbjarnarstaðir was indeed a purposeful part of the burial assemblage. Also, although being from different species, two dog's molars, left and right m3s, were the only animal remains buried with a woman at Daðastaðir in the Northeast. Further, a boar tusk was recorded in a posthole the Viking Age longhouse at Hrísbrú in the southwest of Iceland, and is interpreted as a foundation deposit (Zori *et al.* 2014:171-172). There could be an analogy, perhaps of some amuletic properties, between the individual pig specimens found in burials and the pig's tooth discovered deposited in the posthole. Pig mandibles are well known from Scandinavian burials of the Viking Age. For instance, in the so-called witch's grave discovered by the Fyrkat fortress and from several graves in Birka. Price (2002:206) has hypothesised that these may have had a function relating to the grave itself rather than having been a possession of the deceased. This is because in all the Birka examples, and possibly at Fyrkat, the pig mandible was seemingly placed in the grave after other rituals had been completed, perhaps to guard the corpse or to protect the living from it (Price 2002:206). He also suggested that a tusk from a wild-boar found in a possible Viking grave in Repton in Derbyshire could have been a personal charm.

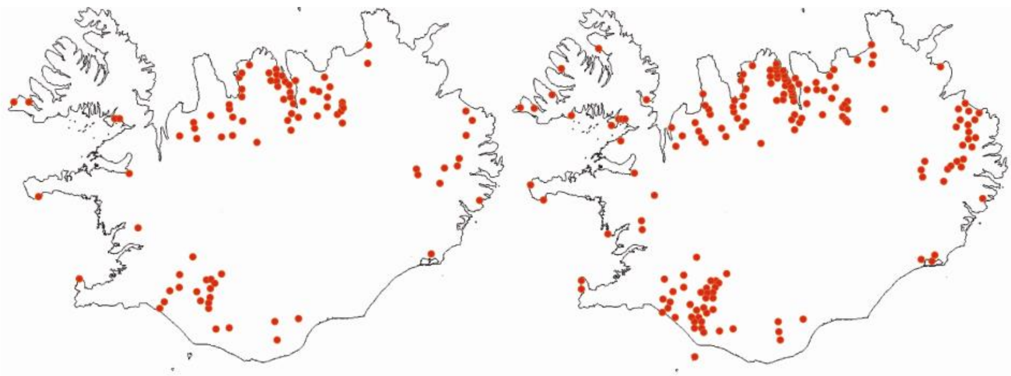
It is clear that the pig remains discovered so far in Icelandic Viking Age burials are different from the remains of horses and dogs (with the exception of the dog teeth from Daðastaðir). The horses and a majority of the dogs were specially killed for burial while the pigs are only represented by a single bone specimen each and seem more akin to artefacts than the ritually killed animals placed whole in the grave. It seems unlikely that the individual pigs were killed especially for the ceremony, like the horses and dogs, but rather that the individual pig elements were placed in the grave as part of the funerary ritual, perhaps as protective magic, or were indeed personal belongings, amulets of some sort possibly with totemic or commemorative connotations (Price 2002:206-207).

5.4 Burial traditions

The ceremonies surrounding Viking Age horse burials were not conducted in exactly the same way on every grave field. Most burials around the island have some basic elements in common, but there is variation in ritual performance (methods of killing); sequence of events during the burial process and in grave construction. Other points of interest are the post-depositional events often collectively termed 'grave robbing', that can, to some degree, also be categorised and interpreted by looking at the surviving animal remains.

5.4.1 Distribution of horse graves in Iceland

There seems to be a clear correlation between the distribution of horse graves and the overall distribution of all known Viking Age burials in Iceland (see discussion about Viking Age burial grounds without animal remains below). Horse graves are known virtually throughout Iceland but the prevalence is different between regions. The map on the left (map 5.1) exhibits burial grounds where horse remains have been found. There is a concentration of horse burials in the north of Iceland and a relatively even spread in the south and east. Conversely there is a scarcity of horse burials in the west, especially in the Vestfirðir region. Horse graves thin out towards the west, the westernmost ones being in Breiðavík (and probably in Vatnsdalur, pages 88-94). But nonetheless there are large areas evidently devoid of horse graves. This pattern in the distribution of horse burials is quite similar to the overall distribution of known Viking Age burials, as is shown on the map on the right (map 5.1).



Map 5–1 – On the left is the distribution of Viking Age burial grounds known to contain horse remains. On the right is the total distribution of recorded Viking Age burial grounds in Iceland.

The similar distribution of horse burials to the total of known Viking Age burials could be argued to reflect two scenarios, each of which could stand alone but are not mutually exclusive. Firstly that burying horses in inhumation graves was the norm all over Iceland; horses have been recorded in about 40% of the known burials. Secondly that the set of burial traditions called *kuml* (which include in some instances a horse carcass, see note on vocabulary on page 6) are more easily detectable than other possible contemporary burial practices (without mounds, artefacts, animals, etc.) which has led to an uneven distribution of recorded burials over the island and a high percentage of horses (see also discussion about distribution of burials in Bjarni F. Einarsson 1995:46-54 and in Orri Vésteinsson 2011:41-49).

The overall distribution of Viking Age burials in Iceland could thus be explained in three basic ways, based on:

Taphonomy
Demography
Burial Customs

According to the taphonomical explanations various factors have led to the discovery of more Viking Age burials in certain parts of the country than in others. The primary taphonomical factors thought to have skewed the archaeological burial record are erosion by wind and water, road construction and to some degree cultivation (e.g. Kristján Eldjárn 2016:258-261). Erosion is considered to have skewed the count of burials both positively and negatively. That is, it can have boosted the count of burials in some areas, most notably in the South where wind erosion has revealed many burials by stripping the soil off them, but also completely destroyed sites and thus obscuring the original distribution. This has for instance been mentioned in the West, where it has been hypothesised that coastal erosion might be partly responsible for the low count of burial sites (Adolf Friðriksson 2013:91). Road construction has been credited for the high number of Viking Age burials recoded in central North Iceland, in the Eyjafjörður region. In the 20th century many burial grounds were discovered when new roads were being constructed, especially in the western part of the region. And lastly a few burial grounds around the island have come to light when new land was being broken under cultivation.

Demographic explanations for the skew in the burial record (see Orri Vésteinsson 2011) are that fewer people simply inhabited the West than the rest of the island. Thus fewer burials are to be found in that part and it is statistically less likely for archaeologists to run into horse burials. In contrast, the North may have been particularly heavily settled and thus relatively many burials turn up there.

Different burial customs between regions could be the cause for the observed distribution of Viking Age graves. Namely, that the reason why fewer Viking Age burials are found in some areas (in the West particularly) is because people there used different methods and rituals when disposing of their dead. This entails that there were not necessarily fewer burials in the West, for instance, they just have a different form than the well-known burials found elsewhere. These ideas have centred on things like there having been communal burial grounds used by many farms while burial grounds elsewhere were mostly individual farm-based (Orri Vésteinsson 2011). The burial grounds in the West might have been larger, community based and thus fewer. This could entail that the right sites simply have not been excavated and there could subsequently be plenty of graves undetected. Other ideas have centred on there simply having been different funerary rituals. For example burial at sea or water which would have left little or no trace (Orri Vésteinsson 2011). Then there are ideas that the Viking Age population in the western part of Iceland simply did not bury their dead with artefacts or animals, whether that was because a higher portion of them were Christians or if they were pagans with different rituals, or at least expressed those rituals differently from the population elsewhere on the island. Whatever the reason, most of them would - according to this scenario - simply not have buried horses on grave fields or deposited many artefacts.

The observed distribution of burials and apparent correlation between horse burials and the total number of Viking Age burials is perhaps due to a combination of these three basic explanations. The actual relevance of each scenario can nonetheless be weighed and argued for or against.

It is important first of all to note how these early graves are identified in the archaeological record. The most influential work on Viking Age burial in Iceland, *Kuml og haugfé* by Kristján Eldjárn (1956; 2000; 2016), set the tone for this. The criteria Kristján Eldjárn employed were based on what was found in a grave associated with human remains. For example, if horse bone was recorded in a burial it should always and unconditionally be regarded as a Viking Age, pagan grave. Similarly, the presence of weapons, jewellery, domestic utensils, etc. allows a grave to be identified as a *kuml*. Kristján was more circumspect about the presence of mundane objects, such as small knives, which on their own would not warrant a grave to be considered pagan or pre-Christian. This given set of ideas, or paradigm, of what a Viking Age burial looks like can obviously seem very useful. It is a scale against which archaeological data can be weighted and subsequently assigned to one of two categories, either pagan or Christian. In other words, the grave is Viking Age or more recent. Unavoidably there are a few burials that fall somewhere in between, but those are almost always rejected and not considered Viking Age. The tendency to sort burials into two simple categories is most likely far too simplistic, but that interpretative framework has been tempting when faced either with burials filled with horse bone and weapons on the one hand

and simple inhumations on the other, perhaps only containing human bone. The picture is probably more complex than previously assumed. It is unlikely that burial practices were regulated on a large societal scale, so there is no reason to assume that people that died in Viking Age Iceland all underwent the same or even similar rituals during their funerals. It is thus quite probable that prototypical ideas of how we recognise Viking Age burials in Iceland have to some extent skewed the published Viking Age burial record.

Furthermore it should not be overlooked that taphonomy is often a factor when dealing with excavated material, and as such is likely to be relevant here to some extent. Taphonomy is perhaps best described as a filter between the original living community of people, animals and material things in the past and the partial archaeological remains we excavate. Taphonomic processes that blur our data can be of various kinds and it is important to assess the extent of these influences on the archaeology under analysis. In this instance the main taphopnomic influences are disturbances by road construction, erosion, etc. But even if taphonomic processes enter the equation, it is not convincing that they alone are the main reason for the recorded distribution of Viking Age burials. For instance, the Southwest of Iceland has the densest population and by far the greatest amount of construction work, but apart from Hafurbjarnarstaðir in the far Southwest no animal burials or (apart from Hvalsnes) traditional kuml have been recorded there. In fact, no such burials have been found in the entire capital area including Kjósarhreppur.

Generally, burials incorporating horse remains go hand in hand with the total distribution in each region of the island; the more numerous the horse burials the more burials in total are recorded. It would be difficult to proclaim that a "standardised Viking Age burial" must be found in more or less equal measure around Iceland, but we have for some reason found very few of them in the entire western quarter of the country. It is more likely that some of the missing Viking Age burials have been found but simply not recognised as such. Namely, burials without horses and imposing artefacts. Of course as research continues and new burial sites are being discovered, the pattern in burial topography will inevitably evolve. At present it is nonetheless unlikely that the general tendency of horse burials being few or absent in some parts of the country while being clustered in others will change much. The topography of horse graves is likely to reflect past Viking Age societies, even though taphonomy and/or demography may have had an influence as well. These traditions were seemingly strongest in northern Iceland and to some extent in the South and East. The possible reasons for this could lie with the origins of settlers and the traditions they brought with them, the diffusion of memes and how old customs got recycled (chapter 6).

Here the hypothesis is tentatively proposed that to a significant degree a *type of burial custom*, differentially concentrated around the country, has been weeded out and recorded, and others possibly been discarded as a consequence. This set of burial customs includes inhumation, the ritual killing of horses, grave goods such as weapons and jewellery and often the construction of a small mound over the shallow grave. Supporting this is the generally narrow dating of most kuml burials, including animal graves, around the middle of the 10th century which is discussed below (pages 289-292).

5.4.2 Viking burial grounds without animal remains

Animal remains have been recorded at 95 burial grounds (94 of which are more or less contextually secure). Horse bone was found at all of these burial grounds apart from three that only have recorded dog bone (Keldudalur, Gautlönd and Vað í Skriðdal). There are on the other hand 70 burial grounds where no animal bone has been recorded (see appendix 2). As is discussed above there is no difference in the geographical distribution of burial grounds with and without recorded animal remains (map 5.1).

It has been noted before that horses become relatively more common in the burial record in more recent investigations (Adolf Friðriksson 2013:108). Indeed if we look at burial grounds without recorded animal remains it can be observed that 25 were recorded in the 18th and 19th centuries, 30 in the early 20th century and only fifteen after 1950. Further it is important to note that 41 of these burial grounds were not investigated in the field but are chance finds only, most often stumbled upon due to erosion and are known today because artifacts from the burials found their way to the National Museums of Iceland or Denmark.

From the incomplete accounts about these burial sites, it seems that in 56 instances only one burial was observed. Two burials were noted on ten sites. At two sites, Innri-Fagradalur in Dalasýsla and Fellsmúli (gamli) in Rangárvallasýsla, more burials were noted on each burial ground but only one was excavated (Kristján Eldjárn 2016:65-66, 108-109). Also, at Skerðingsstaðir in Barðastrandarsýsla and Höskuldsstaðir in Austur-Húnavatnssýsla multiple graves were reported in the late 19th century but their number and characteristics are unknown (Kristján Eldjárn 2016:112, 132).

It is likely that most if not all of these grave fields contain (or at least contained in the past) more burials than those currently listed (Adolf Friðriksson 2009:13-14). Thus, apart from the fact that the majority of burials without recorded animal bone was not properly investigated or documented, we only have a (partial) view of a part of the graves possibly found within each of these burial grounds.

In light of this it cannot be stated about any of these burial grounds that they did not contain animal remains. The reason for the lack of recorded animal bone is in every instance just as likely to be taphonomical in nature, i.e. that poor and very partial recording has skewed the picture. Thus it might even be possible that horses or other animal species were buried at every kuml burial ground in Viking Age Iceland. It is at least not safe to accord the absence of animal remains from some grave fields any significance. There may have been grave fields where no animals were buried but no such has been positively identified and considering how incompletely most grave fields without animal remains have been recorded it seems more likely that absence was the exception.

5.4.3 Chronology of animal burials

The period of ritualised animal killing and burial in Iceland is traditionally thought to have lasted only just over a century. This brief spell is securely framed by two major processes. First there is the beginning of the settlement. Before the second half of the 9th century there simply were no people or animals to perform these acts. Then at the other end, around the turn of the first millennium, there is the Christianisation. It is generally assumed that the burying of animals on grave fields ceased relatively soon after the formal adoption of Christianity. This traditional view is not contradicted by the archaeology (Kristján Eldjárn 2016:473-474). The typologal dates of weapons and jewellery found in Viking Age kuml burials generally fall within the 10th century (Kristján Eldjárn 2016:475). Tephrochronology is also very useful in determining secure *terminus post quem* and *terminus ante quem* and is widely used in Icelandic archaeology. For example, a burial predating the *Landnám* tephra has never been found in Iceland. Radiocarbon dating is also more or less in line with this (table 5.9). There are nonetheless well known problems with radiocarbon analysis, which become all the more apparent when such a narrow timeframe is under investigation. Firstly there are some inherent inaccuracies to c14 dating that must be taken into account. This includes the uptake of “old” carbon associated with a marine diet which makes samples measure older than they really are. A problem of a similar sort is the freshwater reservoir effect, associated with geothermal areas such as Mývatnssveit, which can also cause anomalously early ages (Ascough *et al.* 2010; Ascough *et al.* 2012). Also, and not least, there is the plateau in the calibrated radiocarbon curve between c. AD870 – 980, which causes inaccuracy (Árný Sveinbjörnsdóttir 2010:22-24). The flaws can be remedied to some extent, but given the nature of radiocarbon dating as a timeframe bounded by considerable standard deviation, the method can give a general idea about the time period, but is not useful to throw light on possible variation within a relatively narrow time gap, like the pre-Christian era in Iceland. One of the most promising dating methods used so far on Icelandic Viking burials is the typology of beads. Elín Hreiðarsdóttir (2005) applied Callmer's (1977) typology on 44 burials, 21 of which contained recorded horse and/or dog bone. This study has given the most detailed dating of a sizable sample of burials so far. She found that a great majority of these kuml burials probably or definitely date to the middle and later part of the 10th century and a few even into the early 11th (Elín Hreiðarsdóttir 2005:165). When the date of the youngest bead in each assemblage is put into context with other strands of typological data an interesting picture emerges (table 5.9).

Site	**Horse**	**Dog**	**Human**	**Date**
Rangárvallasýsla				
Karlsnes			M	950-1000
Árnessýsla				
Álfsstaðir				960->1000[8]
Brú	1		M?/F?	960->1000
Miklaholt	1		F?	950-1000
Traðarholt				960->1000
Mýrasýsla				
Mjóidalur				950-1000
Barðastrandarsýsla				
Vatnsdalur		1	F (buried first)	950-980
Austur-Húnavatnssýsla				
Kornsá	1	1	F	950-1000
Skagafjarðarsýsla				
Keldudalur		1		920-980

[8] The late 10th century date of Álfsstaðir is based on bead typology (Elín Hreiðarsdóttir 2005:165), c14 analysis gives earlier dates: 95.4% probability 772AD (90.9%) 905AD and 922AD (4.5%) 945AD (AAR_24447 - unpublished, Orri Vésteinsson pers. comm. 14. 11. 2017).

Öxnadalsheiði	1		F	9.-10. century
Eyjafjarðarsýsla				
Dalvík Brimnes XII	1	1	1	980-1020
Dalvík Brimnes XIII	1		F	950-1000
Sílastaðir			M	10. century
Ytra-Garðshorn III	1		F?	950-1000
Ytra-Garðshorn X	1		1	920-1000
Suður-Þingeyjarsýsla				
Kálfborgará				960-1000
Norður-Þingeyjarsýsla				
Daðastaðir		1	F	10. century
Norður-Múlasýsla				
Litlu-Ketilstaðir			F?	950/60
Reykjasel	1		F	10. century
Sturluflötur	1			960->1000
Suður-Múlasýsla				
Eyrarteigur	1		M	955-1015
Vestur-Skaftafellssýsla				
Granagil	1?			950-1000
Hrífunes burial I	1			934 terminus ante quem
Hrífunes burial IV	1			934 terminus ante quem

Table 5-9 – A list of narrowly dated burials. Graves that are dated only broadly within the Viking Age are omitted. All of the burials except Karlsnes, Litlu-Ketilsstaðir and Mjóidalur belong to grave fields where animals have been recorded. The dating is based on typology of beads, brooches, weapons, c14 of bone and tephrochronology (Elín Hreiðarsdóttir 2005:165; Kristján Eldjárn 2016; Árný Sveinbjörnsdóttir et al. 2010).

The burial of ritually killed horses and dogs was not commonly practised throughout the pre-Christian period. This is a trend that seems to originate in the 10th century, with early examples such as Hrífunes and possibly Daðastaðir (Presthólahreppur)[9], and blossom in the later part of it, probably extending over the turn of the millennium. Indeed the same trend applies to the entire corpus of traditional "kuml" burials, which seem to mostly have a relatively late date within the Icelandic pre-Christian period. This further supports that the

[9] The Daðastaðir burial contained two dog teeth along with jewellery and artefacts (pages 207-208). The typological dating of the burial is based on oval brooches (Rygh 652 and 654) that were common though the 10th century, on a trefoil brooch dated to perhaps the middle of the 10th century (Kristján Eldjárn 2016:356-365) and on beads. The bead collection is more varied, it includes with a bead common until 915 and another that appears after 915 and becomes common after 950 (Elín Hreiðarsdóttir 2005:166).

animal burials were a part of the repertoire of a *type* of burial custom, as discussed above. This type of burial custom was not practised by the original settlers. It is the third and fourth generations of Icelanders, perhaps alongside their immigrant contemporaries (Price and Hildur Gestdóttir 2006), that took up the practice of burying animals with humans (Orri Vésteinsson & Hildur Gestsdóttir 2016:137-145). This practice then continued for a few decades only. The narrow dating for the tradition of killing and burying animals in Iceland is immensely important for further understanding of the custom, as is discussed on pages 311-313 and in chapter 6.

5.4.4 The internal layout of Icelandic horse burials

Two basic types of horse burials can be defined. Firstly, horses that are clearly associated with specific human remains and secondly, which is less common, horses in their own graves with no apparent association with a particular human grave. The distance between a horse grave and the nearest human grave can then vary from two up to 50 meters. The much more common context of deposition, where a horse is buried with a human body in the same burial, follows a basic outline regarding the inner arrangement of the burial, while other aspects can be quite variable. What is constant in these burials is that the animal is always found by the human's feet. The human body and the animal carcass are deposited so that their heads face in opposite directions and the animal's rump turns towards the human's feet (figure 5.17). Two possible exceptions to this rule have been noted (see discussion in chapter 4 on Kápa and Mörk, pages 65-68), both of which are quite questionable and there is no confirmed instance of a horse being deposited in another way relative to the human body.

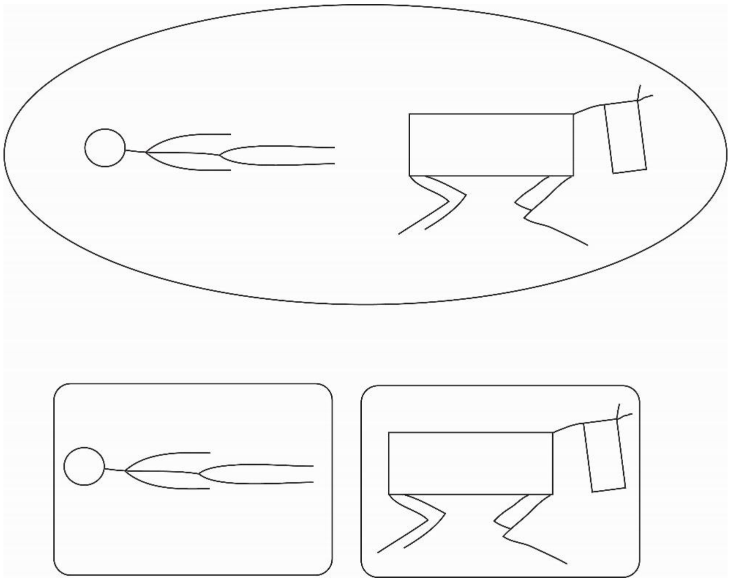


Figure 5–17 – Usual layout of horse carcass relative to human body in Icelandic Viking Age burials. Single grave cut above, two grave cut below.

When human and horse are part of the same burial, the basic internal layout described above has been recorded in two variations. Where both human and horse share one large grave cut, and where horse and human rest in two separate grave cuts adjacent to one another and divided by a small baulk of soil. In those instances the two grave cuts usually seem to be covered by the same low mound. When securely recorded, the baulk of soil separating the two graves is on average less than 0.4 m thick, but has occasionally been recorded wider, for example 0.7 m at Ljótsstaðir in Skagafjörður. Both variations, single and double grave cut burials, were practiced in all quarters of the island. Below is a further discussion about horses by themselves in their own graves (pages 298-303).

5.4.5 Double and multiple horse graves

It is most common for one horse to be buried in a grave but there are a few instances where two or more horses have been recorded in a single burial. This seems to be almost entirely restricted to the North of Iceland. Below is a list of burials where more than one horse has been noted in a single grave (table 5.10). In a few instances, when 'extra' bone elements have been recorded that boost the MNI count, the context is not secure. That is to say, there is a possibility in some cases that post-depositional taphonomic factors or simply poor recording have caused a 'primal' burial context to be 'contaminated' with external bone. If there is a small chance of this it is noted in the list above. The most dubious double horse burial is the one from Kálfskinn, but

Site	Horse MNI	Human MNI	Notes
Árnessýsla			
Álfsstaðir	2	1m	Context of second horse not secure
Skagafjarðarsýsla			
Austarihóll	2	1m?,1f?	
Brimnes	2	2?	
Sólheimar	2	1m?	Context of second horse not secure
Eyjafjarðarsýsla			
Dalvík (Brimnes) burial IV	2	1a	Context of second horse not secure
Böggvisstaðir	4	?	One horse possibly intrusive
Hámundarstaðaháls	2	0	
Kálfskinn	2	1-?	Context of second horse not secure
Sílastaðir burial I	2	1m	Context of second horse not secure
Staðartunga	2	1m	
Ytra-Garðshorn burial I	2	1m, 1?	
Ytra-Hvarf	2	1m?	
Suður-Þingeyjarsýsla			
Glaumbær	2	0	
Glaumbær	2	0	Bone not stored
Grímsstaðir	7	0	Context of three horses not secure
Ingiríðarstaðir burial II	2	2	
Ingiríðarstaðir burial IV	2	?	
Ingiríðarstaðir burial V	2	1	Extra horse bone possibly from burial above
Kálfborgará	2	0	Bone not stored
Litlu-Núpar burial II	3	0	
Litlu-Núpar burial VII	2	?	Context of second horse not secure
Litlu-Núpar burial IX	2	?	Context of second horse not secure
Lómatjörn	2	1?	
Norður-Múlasýsla			
Rangá	2	1?	Bone not stored
Suður-Múlasýsla			
Stóra-Sandfell (Mið-Sandfell)	2	1?	

Table 5-10 – List of burials where two or more horses have been recorded.

in the other instances the context is more secure. Only one of these sites is in the South of Iceland and one is in the East, all others are concentrated in the North, which might be a testament to the strenght of the tradition of ritually killing horses as part of burial customs in that quarter of the island. In three instances more than two horses have been recorded; four horses at Böggvisstaðir, seven at Grímsstaðir and three at Litlu-Núpar, all these sites are located in the North. At Böggvisstaðir, one of the four recorded animals is possibly a contamination, but the presence of at least three animals is definite. The burial at Grímsstaðir with the seven recorded horses is unique in Iceland. In Scandinavia, this high number of horses is only found in the royal ship burials. Unfortunately the burial was disturbed by bulldozing prior to investigation, but the osteological evidence joined with description of the excavation make it clear that at least four animals were located in the same grave. The other three might originate from other burial/s close by, but no trace of a second grave was found. The context of this act, of killing and burying four to seven horses, does not suggest that it was a practical act of disposing of sick animals or unwanted carcasses. The horses were of varying age, both young and older, and at least two of them were buried with riding gear. Thus, the instance at Grímsstaðir seems to be an extreme manifestation of the ritual killing tradition which is further discussed in chapter 6 below.

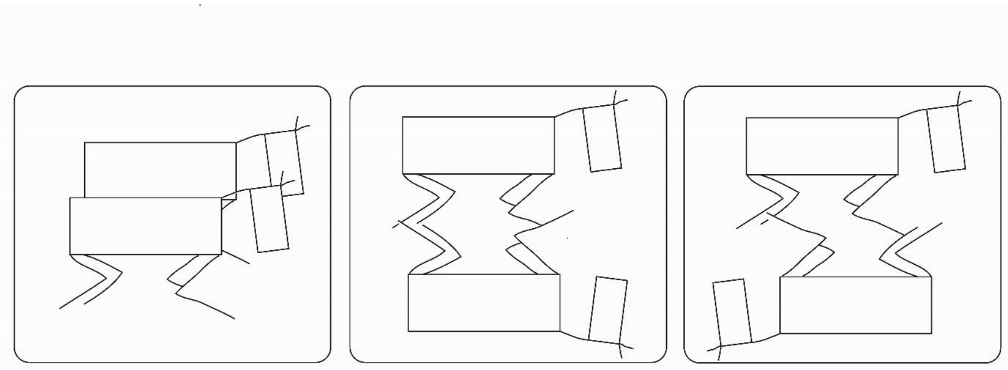


Figure 5–18 – Recorded relative positioning of horses in double burials; parallel, opposite and alternate.

Site	Relative positioning	Associated human
Skagafjarðarsýsla		
Brimnes	Parallel	Yes
Eyjafjarðarsýsla		
Ytra-Garðshorn burial I	Parallel	Yes
Suður-Þingeyjarsýsla		
Glaumbær	Alternate	No
Grímsstaðir	Opposite	No
Ingiríðarstaðir burial II	Parallel	Yes
Kálfborgará	Alternate	No
Lómatjörn	Alternate	No

Table 5-11 – Relative positioning of horses sharing a grave.

Where two horses have been found *in situ*, there have been recorded three ways in which the animals are positioned relative to one another (figure 5.18). The positioning has been documented in seven burials where the preservation was good enough (table 5.11). In three burials the horses had been deposited parallel into the grave. Their heads facing the same way, their rumps turned towards the human remains and both feet and back turning in the same direction. In these instances one of the horses is lying slightly on top of the other. In a single burial the horses were recorded opposite to each other. Their heads turning in the same direction, but faces and feet turning towards one another. Lastly, in three burials the horses had been deposited alternately into the grave. There the head of one horse might be facing north, while the head of the other faced south, but feet of both animals turned towards one another. There is an obvious pattern to the seven burials. All three horses that were deposited parallel to each other were buried with one or more humans. The other animals, whose feet turned towards one another, were all buried by themselves. The sample is of course small, but the clear pattern cannot be overlooked. This would seem to indicate that when horses are buried with a deceased person, their perceived 'role' is seen as different then when horses are killed and buried by themselves. Horses buried with a person seem to be simply 'laid out' or stacked in a row, while the others are positioned opposite each other as if to illustrate some interaction between the animals, even to invoke dynamism. The horses deposited alternately were given an interesting description in 1869 when the Kálfborgará burial was excavated. The excavator describes the horses as laid out in a 'circle' (Kristján Eldjárn 2016:195-196). The animals can be seen to be chasing each other, in an endless race in the grave. The animals at the bottom of the Grímsstaðir burial that were facing each other (figures 4.33-4.34), bring to mind possible iconographic symbolisms. The front legs were suspended upwards making the layout reminiscent of horse baiting (figure 4.36), where stallions raise themselves up on their hind legs and use their front legs as offensive weapons, kicking and biting. Similar postures can be seen on contemporary rune stones in Scandinavia and in decorative art (figure 4.35). The differential posturing of horses depending on the context, with or without a human, is a strong indication for differential symbolism between the rituals. The posturing of the horses buried by themselves gives a clue to the motives behind the sacrifice of these animals. This ritual killing and burial obviously focuses on the animals themselves and could be linked with horse tournaments and represent either a sacrifice, for example to deities or ancestors, or with some other specific ritualised aspect of *hestaat* as it might have been practised in the Viking Age, i.e. where animals were killed after competing. Horses buried without human remains are further discussed below on pages 298-303.

5.4.6 Age at death in double horse burials

Curiously there is a pattern in the age of horses that get buried together. When a burial contains two or more individuals, one is usually quite young and does not have all its elements fused. In total, 30% of all horses found in Viking Age graves are not fully grown and a majority of those come from double burials. Such immature horses would, at least today, be considered too young to have been ridden. This applies to most sites (nineteen) where more than one horse has been recorded in a single grave and aging has been possible, excluding only Álfsstaðir, Dalvík (Brimnes), Hámundarstaðaháls, Ingiríðarstaðir (burial IV) and Kálfskinn. It is highly dubious that the burial on the last site is really double (pages 138-142). It seems very likely that this trend in the age of the animals is not a coincidence. Possible reasons for the occurrence of a young animal with an adult animal are not obvious, but possible hypotheses can be divided into three main categories:

Symbolic
Social
Cost efficiency

The first set of reasons implies that there is some inherent symbolism in the young age of the second animal. If articulated, the 'meaning' of such symbolism for the practitioners of the custom could theoretically be quite varied. It could have to do with notions of the afterlife. For example, the young animal could be seen as a replacement steed for the long journey ahead. It could also have been seen as an asset, or 'walking wealth', to be taken into death. Other forms of symbolism could have to do with customs in life. I.e. that giving a young horse for taming, perhaps a promising future riding stallion, might have special connotations. The symbolism associated with this act might also be more abstract, like a sign of the circle of life or rejuvenation. Of course, one symbolic meaning does not exclude another and 'meanings' might be in many layers.

There is always the distinct possibility that any inherent symbolism might be at the back of the practitioners' minds while respect for the deceased person or her standing in society simply called for this particular custom as being the 'right thing to do' in the given circumstances. This has to do then with the possible social reasons behind the age at death patterning. For instance that the gift of a young horse had some particular connotations and implied respect for the deceased according to his or her social standing in life. Other, perhaps simpler, explanations of this sort might by that one animal was young because the person it was dedicated to was young as well or even a child. This is however not substantiated by the archaeology, but it should be noted that the burials have often been disturbed and human remains even been removed, and some of these horse burials even seem to lack direct association with human remains (see discussion about horses buried without human remains, pages 298-303).

The cost efficience hypothesis assumes that if two or more horses were to be slaughtered for burial, people tended to 'save' by not killing only tamed animals in their prime. The substitution would be a young horse that little or no time had been invested in. This hypothesis is problematic because of its reference to modern ideas of value as a foundation for a common burial custom. But if this was the reason, then it could be expected that high numbers of old and worn animals were to turn up in double horse graves, which is not the case.

The reasons for the observed age pattern are highly unlikely to be coincidental. Rather, it seems that at the core of this north Icelandic tradition was a combination of symbolic and social issues. The context, in which it was deemed appropriate to kill and bury a young horse along with an older animal, must have been generated by the will of surviving relatives to commemorate exactly in this appropriate way both personal characteristics and social standing of the deceased human. The age difference between the horses would have changed the meaning of the ritual or at least added another symbolic dimension to it.

5.4.7 Horses buried without human remains

Some of the double / multiple horse burials discussed above evidently stood alone. That is to say, even though situated on burial grounds, a few were not in direct relation to any specific human remains or human graves. This is also the case with some single horse burials; some animals were buried by themselves, often harnessed, on pre-Christian grave fields. Table 5.12 below lists the recorded instances of this.

Site	Horse MNI	Riding gear	Stone setting	Notes
Rangárvallasýsla				
Hemla	1	yes		1,5-2 year old animal w/riding gear
Eyjafjarðarsýsla				
Böggvisstaðir	4			Boat burial, human possibly removed
Garðsá	1	yes		Large grave cut, human possibly removed
Hámundarstaðaháls	2			
Stærri-Árskógur	1	yes		2 year old animal w/riding gear
Stærri-Árskógur	1			
Suður-Þingeyjarsýsla				
Glaumbær	1			
Glaumbær	2	yes		Burial disturbed
Glaumbær	2			Burial undisturbed, bone not stored
Grímsstaðir	7	yes		Context of three horses not secure
Kálfborgará	2		yes	Bone not stored
Litlu-Núpar burial II	3		yes	Bone not stored
Litlu-Núpar burial VII	2			Context of second horse not secure
Litlu-Núpar burial IX	2			Context of second horse not secure
Lómatjörn	1			Disturbed
Lómatjörn	1	yes		Disturbed
Vestur-Skaftafellssýsla				
Hrífunes burial I	1	yes	yes	
Hrífunes burial IV	1	yes		

Table 5-12 – A list of horse burials recorded without direct association with human remains.

So far eighteen 'stand alone' burials, containing a total of 33-35 animals, have been recorded on eleven grave fields. The context of these sites is variable. Some are dubious due to past disturbances and 'grave robbery' events, which may in some instances have removed all traces of human remains. Perhaps the most dubious is the boat burial at Böggvisstaðir, where three to four horses were recorded. The artefact assemblage contained what might possibly be a sword, a good indication that a human had once occupied the grave as well. The context of the other sites is more secure. For example, the burials at Hrífunes, one of which was in the centre of a boat shaped stone setting. Other 'stand alone' horse burials have also been recorded inside stone settings, at Kálfborgará and Litlu-Núpar.[10] About half of the burials are recorded to have contained riding gear, remains of harness and saddles. It is again interesting to note that the recorded instances of this custom are limited to four counties, Eyjafjarðarsýsla and Suður-Þingeyjarsýsla in the North with a total of nine grave fields and Rangárvallasýsla

[10] The best indication that a horse burial is not a direct part of human burial is when it is under a distinct mound and surrounded by a stone setting. Alternatively a large open area excavation is needed to ascertain without doubt that a human grave is not in the viscinity. Of course even though horses are buried by themselves they might be part of a specific burial process for a human, but if so, one might expect some spatial association with a specific human grave. The spatial relationship between humans and horses in the grave is discussed above on pages 292-293.

and Vestur-Skaftafellssýsla in the South with one grave field each. This is in harmony with other strands of data that indicate a variability in the prevalence of the ritual horse killing custom between geographic areas in Iceland.

Burying horses by themselves on grave fields is not isolated to Iceland. The best known, and perhaps most dramatic, examples are from 8-11th century cemeteries in Lithuania and Kaliningrad. There horses occupy their own special portion of the entire burial ground. The archaeological and osteological contexts of these burials, which number in the hundreds, have been interpreted as suggesting that the horses must have been buried alive after being purposefully exhausted by running (Bertašius & Daugnora 2001; Bertašius 2009). While the context is in many ways different from the Icelandic material, other aspects are similar, like the prevalent sex of the interred horses and that skeletally immature animals are often buried with fully adult ones (Bertašius & Daugnora 2001:393-394). These traditions could conceivably be related, but it is curious that similar 'stand alone' horse burials do not seem to have been common in Scandinavia, or have at least not been recorded to date (which might be due to bad bone preservation in Norway).

It might be argued that killing and burying a horse by itself in an elaborate way on a burial ground had different connotations than burying a horse with a human. Horse remains found in context with human remains are interpreted as being part of a ceremony revolving around the deceased person, but what if there were no human remains buried with the horse? Interpretations can be roughly divided into three main categories:

Intrinsic
Extrinsic
Reciprocal

A horse killed and buried alone, perhaps harnessed and saddled, and even within a stone setting, might have possessed some intrinsic worth beyond other horses. That is to say, obviously not all horses were granted a place of their own within the family burial ground. This animal might have been excellent for riding, it might have proven its worth in racing or even in horse baiting, etc. By its deeds the horse would have reflected positively on its owner (Rúnar Leifsson 2012a:190). Icelandic medieval literature contains quite a few references to both horse tournaments and to prized or even exceptional horses. The importance of such events in Medieval (and most likely Viking Age) Iceland is well documented, as is the prestige that a good stallion could bring (Solheim 1956). It could thus be imagined that a horse buried in the elaborate way seen at Hrífunes, or laid out in the grave in a way that is reminiscent of horse baiting like the horses at Grímsstaðir, could be such valuable animals. The connotations of killing such a valuable / preeminent animal as part of a ritual tradition and placing it in a family burial ground would have enhanced the status of the owner and of the group he or she belonged to. It is nonetheless clear, due to the results of the osteological analysis, that this ‘intrinsic worth’ hypothesis cannot be applicable to all the instances of ‘stand alone’ horse burials. A few of the horses are simply too young to fit the description of an outstanding animal. For example, the horses at Hemla and Stærri-Árskógur were both buried with riding gear but killed at the ages of about one and a half and two years respectively. Both were far too young to have been ridden in life, despite being harnessed in the grave. Three of the seven horses from Grímsstaðir were not fully grown, two were about two and a half to three years old and one about four years. However these are not the ones found *in situ*. Also, two of the four horses recorded from the boat burial at Böggvisstaðir and one of the animals from the stone setting grave at Litlu-Núpar were four to five years old at the time of death and not fully grown. This means that even though horses like the ones at Hrífunes fit the bill, several do not. Those horses, especially the very young ones buried with riding gear, must have been used in rituals as equine symbols rather than themselves having exhibited intrinsic qualities setting them apart from other individuals.

This leads to possible extrinsic interpretations. That is, although obviously playing a role, the horses themselves might not, as individuals, have been at the centre of the ceremony in which they were killed and buried. This could mean that perhaps there was not a significant difference in ‘meaning’ between a horse buried by itself or one accompanying a human. For example, it is not hard to imagine, that just as today, people in Viking Age Iceland could disappear without a trace or die abroad, and in such instances that those left behind would perform some sort of funerary rituals in the absence of a human body. Killing a steed for the afterlife and burying it in the family graveyard fits quite well into such scenarios, especially given how common the animals are in regular burial practices of the time. In a similar way, burying a horse by itself in the family plot could also have been a dedication or done in remembrance of ancestors, perhaps long deceased.

While the intrinsic and extrinsic interpretations are opposites, the third avenue of interpretation could go with either one as well as stand alone. The act of killing and burying horses by themselves might have had a reciprocal purpose. That is to say, be a sacrifice or an act of voluntarily giving up something valuable with the aim of receiving something else in return (Carter 2003). An expectation of the commitment of the receiver and of remuneration (in one form or another) obviously resonates with theories of gift exchange (Mauss 1990; Evans-Pritchard 1956). The main difference between sacrifice and gift exchange is that sacrifices are usually formally aimed at a supernatural entity but the act nonetheless takes place in human society and there resides the real chance of reciprocity, whether that is a conscious factor or not (Carter 2003). Reciprocation can come in the form of maintained or enhanced respectability, especially if the sacrifice is carried out in public. It is not the objective here to coerce the horse burial data into a given theory on politico-religious sacrifice, but rather to interpret these acts in their own cultural and historical context (e.g. discussion by Lucas & McGovern 2007). But some general points can be noted that apply to most violent sacrifices. Most notably perhaps, they often involve the interaction of a few unevenly active participants. There are those who performed the act, others are spectators, and finally there is the sacrificial animal itself which is the medium between the other two parties (Carter 2003). In these instances the sacrificial victims endure violence on behalf of others. They can be seen as symbolic surrogates (Gräslund 2004; Carter 2003). That is why, in order to get close to the essence of a violent sacrificial act, the role of the sacrificial animal in society must be understood. Why is it thought appropriate to sacrifice some animals and not others and what sort of society does the sacrificial custom reflect? Further, to understand acts like this the social position of the participants must be kept in mind, as well as how regulated the nature of their interaction could have been. Thus, it would seem most logical to view the sacrificial acts in light of the political climate of Viking Age Iceland, in which the semiotics of acts like these must have had resonance and could have carried messages from the agents involved to the surrounding society. Social inequality and power struggle (between groups and/or individuals) are bound to have been characteristic of Viking Age society in Iceland during the first decades of settlement, providing fertile ground for sacrificial rituals (Bloch 1992). An example of a possible motivation for sacrifice in such political atmosphere would be to vent violence without risking feud (e.g. Lucas & McGovern 2007). In modern society there is law enforcement and a judicial system. Violence and “retribution” are prerogatives of the state. Societies that have not developed such institutions, like Viking Age Iceland, run a risk of getting caught in a circle of revenge (e.g. Halsall 1998). In order to minimise this, violence can be aimed at an impartial sacrificial victim. Social mechanisms like this are shrouded in mysticism and often form part of religious practice. They are pointed towards a higher being which possibly needs pacifying, but are in fact cathartic, purgation of violence which simmers beneath the surface (Girard 1979). People may have reinforced their status by conducting a specific ritual where a large, valuable animal was killed and buried. By so doing they would have displayed wealth by expending an animal and in some instances riding gear, exhibiting confidence about their own social standing by conducting such a ritual and even proving their physical prowess during the killing itself.

The 'stand alone' horse burials are bound to be the result of various stimuli. Whether intrinsic or extrinsic factors, as discussed above, were more dominant, it seems highly probable that reciprocal issues were at work at the same time. These deeds reflect as much on the people behind the acts, as on the formal 'reasons' why they did them, and as such are ultimately statements of social standing and lineage in a settlement society.

5.4.8 Horse burials and gender

In early medieval archaeology, in the Norse world and indeed among the Anglo-Saxons as well, horses and weapons are often seen as male gendering types of burial goods because of their high association with male, often elite, graves (Bond & Worley 2006; Svanberg 2003; Sikora 2004; Gebühr 1994). This is in contrast with the Icelandic material presented here, where horses commonly occur in female graves. Also, while it has been noted that in south Scandinavia it was far more common that horses, and even dogs, were buried with males (Svanberg 2003:20-24), this does not seem to be the case in parts of Norway (chapter 3). In Iceland, in fact, there is not a significant difference in distribution of horses between male and female graves (v=1, significance level 0.05, tabulated Chi-square value 3.84). About 33% of known female burials and 40% of known male burials are recorded as including horse remains. This might indicate a localised evolution of the tradition in parts of Norway and in Iceland. But similar to Scandinavia, where horse burials are generally associated with the higher strata of society (Svanberg 2003:31; Sikora 2004), it is certainly likely that horse graves in Iceland were associated with landowners. In addition to horses being buried with males and females alike in Iceland, it is clear that horses were buried with people of varying age as well, both young and old (chapter 4, e.g. Galtalækur and Hemla pages 60-63). The demographic distribution of this burial ritual in Iceland might be indicative of social and political conditions during the 10th century. The horse burial tradition focused on groups or families of specific standing rather than on individual ‘strongmen’ who based their rank on undisputed inheritance. This pattern might indicate that the groups occupying (or contending for) the top of the social scale in Viking Age Iceland were smaller and more uniform than in southern Scandinavia. In other words, it is likely to be a representation of a less vertical and more loosely based social structure composed of landowning families at the top (some of whose members were buried with horses), plus their tenants, workers and slaves. In Iceland the standing of each group may have needed constant confirmation, which in turn could have been a factor in altering some of the gender based representations of status. Further, in these small contending groups, wealth and status would have been transmitted though female line of decent just as through the male one.

5.4.9 Sequence of events and site specific ritual performance

Even though many aspects of the rituals carried out during burial ceremonies are forever lost, such as the words spoken or special gestures enacted, other ceremonial details can be inferred from the material remains. This includes things like the ritualisation of killing and treatment of animal carcasses and the sequence of events during the ceremony.

Lucas and McGovern (2007) discussed theatrics during the killing of young bulls at the large Viking Age hall of Hofstaðir in the northeast of Iceland. Dramatisations of a similar sort can be inferred in some Viking Age burials. Killing methods recorded in Icelandic burials are quantified and discussed in detail above (pages 265-269). The most common method seems to have been poleaxing, the bashing in of the animals’ foreheads with a heavy blunt instrument. An imprint of an instrument used can be seen on the horse cranium from burial VIII at Ytra-Garðshorn. The horse was struck in the head with a hammer headed tool leaving a circular dynamic impact scar 30 x 30 mm in diameter. Some of the poleaxed horses also have cut marks on the axis vertebra, indicating that their throats were slit after they were stunned. The cutting of the throat would have caused a gush of blood if the animal’s heart was still beating, which may have been the desired result.

Some horses were decapitated. This has been noted on nine occasions when the horse remains were undisturbed upon investigation and the head was discovered deposited on the animal’s torso. The decapitation could be the result of one of two separate processes. It was either a form of slaughter or the head was removed post-mortem. If the decapitation was a means of slaughter, then the resemblance to the bull killing at Hofstaðir is obvious. The main difference is that at Hofstaðir the heads, or at least the horn racks, were preserved for posterity while the rest of the carcasses where presumably eaten. The horses were not eaten however and their heads followed the rest of the remains to the grave. Also, direct osteological evidence for decapitation as a means of slaughter has not been recorded as yet. It is conceivable that this is due to selective retrieval of *in situ* specimens or that, unlike at Hofstaðir, the decapitation was performed with a small blade leaving little evidence (page 267). There are strong indications on the remains of the horse from burial II at Dalvík (Brimnes) in Eyjafjarðarsýsla that the beheading was performed post-mortem. The horse was poleaxed, had its throat cut, and lastly had its head removed (pages 118-121). This may appear at first to be 'overkill', but a more likely explanation is that the removal of the head had nothing to do with the killing of the animal but rather formed a separate and subsequent part of the ritual. The head was removed for a purpose other than killing. That is to say, the severing of the head and the severed head itself probably played a specific role in the ceremony and rituals surrounding the burial. In this case the head could have been removed with a sharp knife rather than by a heavy chop like those recorded at Hofstaðir and the resulting osteological signature would be less obvious. It is noted in descriptions of these finds that the heads were regularly placed on top of the animals' torso, but not but in the right anatomical position. This further testifies to the special role of the severed head in the ritual process and even that it might not have been deposited into the grave with the rest of the carcass immediately, but served some ritual purpose through the ceremony and was only deposited before the ultimate filling in of the grave. In a sense this indicates some similarities with the bull decapitation and display at Hofstaðir, in that the head of the animal is a central element, although the specific connotations might be different. This use of horse heads in rituals could have echoes in Norse medieval literature. For instance, in the 'níðstöng' phenomenon, the placing of a severed horse's head on a pole as part of a curse (e.g. in Egils saga ÍF II 1933:171). Aspects of pre-Christian customs took on very negative connotations after Christianisation. Terms like *blót* went from meaning something like 'worshiping the gods' or 'religious feasting' (Jón Hnefill Aðalsteinsson 1997:35) to signifying a curse. A similar fate might have befallen the use of a severed horse's head in a ritual; falling into a category of un-Christian 'dark magic'. Indeed, Saxo Grammaticus (Elton 1905:281) describes in book five of the *Gesta Danorum* the ritual sacrifice and decapitation of a horse which ends with the animal's head being placed on a pole. Ceremonial decapitation is quite well known in the archaeology of the Viking world outside Iceland. At the alleged Viking Age sacrificial grove at Frösö in Sweden several severed heads were recorded of species such as elks, deer, cattle, caprines and pigs. These were excavated from under the church floor and surrounding the stem of a large birch tree, along with complete carcasses of a few bears, bones of reindeer, squirrels and teeth from horses and dogs (Price 2002:61). Perhaps a more analogous example is the decapitation of all thirteen horses found on board and by the side of the Oseberg ship. There the heads had been collected and stored separately from the rest of the carcasses. Onboard were further recorded three decapitated dogs and the severed head of an ox (Brøgger *et al.* 1917; Shetelig 1937b). It is likely that all decapitated horses recorded in Icelandic burials had been previously stunned, despite the fact that poleaxing has not been confirmed in every instance due to heavy fracturing of many crania. Decapitation therefore seems not to have been the primary killing method in any of the Icelandic cases. This is however not the case with all of the dogs. Most dogs seem to have been poleaxed, but at least one was decapitated without being stunned in advance. This was recorded in burial XII at Dalvík (Brimnes) in Eyjafjarðarsýsla, where a single, unfractured, head of a dog was recorded by the feet of the deceased person. The rest of the dog's carcass was not deposited into the grave, indicating again a special significance in the decapitated head itself.

There is one possible case of a human decapitated for burial. At Hafurbjarnarstaðir, burial V was shared by a male, armed with a spear, and a dog. The 19th century description of the excavation reports that the man had been decapitated and his head placed 'between his ischia' (Icel. *sett milli þjóa*). Kristján Eldjárn thought that the remark was evidence of the burial having been disturbed and that the interpretation was inspired by Saga literature and local folklore (Kristján Eldjárn 1949:117). Kristján's criticism is not necessarily warranted. A recent excavation of a Viking Age to medieval Christian cemetery at Hofstaðir in Mývatnssveit has revealed an undisturbed grave of a man who had another person's head, which had been removed post-mortem, placed between his legs (page 81). This, in conjunction with the fact that there is no mention in the original Hafurbjarnarstaðir excavation report of other bone being disarticulated (Sigurður Guðmundsson 1874:72-75), strengthens the argument for the 19th century report being correct in the original interpretation. Possible reasons for the removal of a dead person's head, whether at Viking Age Hafurbjarnarstaðir or at Hofstaðir, are bound to be very different from the animal decapitations. The most common sense argument would be fear of the individual returning from the dead to pester the living, resulting in post-mortem impairment of the body. This phenomenon, of taking pre-emptive measures in order to make a dead person stay in its own realm, is well known in Icelandic medieval literature (e.g. Eyrbyggja saga regarding the corpse of Þórólfur bægifótur, ÍF IV

1935:93-95, 169-170), indicating that ideas like this were actual in early Icelandic society. Tore Artelius (2005) has written about how the local Viking Age community in southern Västergötland in Sweden protected itself against the strange and dangerous during a burial ceremony of a woman in the 10th century. After cremation, the remains of the woman, and associated grave-goods, were deposited into the top of an older Migration Period burial mound. Subsequently five spears were thrust vertically through the cremated remains and into the soil beneath. Among the artefacts found were ten knives, all except one scattered about the burnt remains, the last knife was especially deposited in the top of the fill covering the remains. Artelius' interpretation was that the living had been taking action against the dead, protecting themselves against the woman (Artelius 2005).

The use of spears as possible ritual tools in the woman's burial in Västergötland may resonate in three Icelandic horse burials, although the intended significance of their use and deposition is likely to be different due to the dissimilar contexts. A spearhead was found in a circular grave of a single horse at Lómatjörn (pages 201-203). Another instance of a spearhead in a single horse burial comes from the South of Iceland, from the site of Kápa. Unfortunately, the positioning of the spears within the graves at Lómatjörn or Kápa was not recorded by the excavators. At Brimnes in Skagafjörður however, an iron spear was carefully recorded in an undisturbed double horse grave. The spearhead was noted to have been stuck vertically into the ground. It is more likely that the spear was an intended part of the original burial construction rather than a later taphonomic disturbance as suggested in the original report (pages 103-105). The placing, or thrusting, of a spear into a horse grave during a burial ritual would have added another layer of meaning to the ceremony. A practice of this sort is well known from many of the chamber graves in Birka (Gräslund 1980:30-31). It was first observed by Hjalmar Stolpe in the late 19th century. He recorded that in each of two burials (Bj. 834 and 842) a spear had been thrust into the wooden platform carrying the horse remains. Gräslund (1980:30-31) argues that this practice, the sticking of a spear into the wall or internal feature, was evident in many other chamber burials in Birka. She further elaborates on the supposed significance placed on the spear itself by discussing burial Bj. 605B, where a spearhead was stuck in the wall, but the burial seemed to have been partially extended to accommodate the three m long shaft, rather than the shaft being shortened by a small amount (Gräslund 1980:31). This raises the question if the shaft of the spear in the Brimnes horse burial might have stood vertically out of the low mound and thus have been visible even after the grave was covered.

An important feature of the animal burials is the rigid structure and repetitiveness. The actions surrounding each burial event are not random or dependent upon specific circumstances. This is manifested in broad correlations seen over the whole corpus of animal burials, and more distinctively, the intra-site patterns are clearly formalised indicating specific localised traditions. The intra grave field correlation in funerary rituals is materialised, for example, in the modes of killing and treatment of carcasses, but also in intra-site standardisation of burial layouts. The first to raise this aspect of individual grave fields in Iceland was Sigurður Guðmundsson (málari) in 1874 when discussing the burial ground at Hafurbjarnarstaðir:

Hefði hér verið grafnir óbótamenn, og hundar og hestar lagðir í gröf með þeim til háðúngar, þá hefði þeir naumast verið ***lagðir með svo fastri reglu*** *við fætur líkanna, eins í öllum dysjunum, heldur mundi þeim hafa verið fleygt reglulaust einhversstaðir hjá þeim, eða helst ofan á þau*.

If evildoers had been buried here, and dogs and horses placed in the grave with them for ridicule, then they would hardly have been ***placed with such rigid regularity*** *at the feet of the corpses, the same in each burial, but rather tossed randomly anywhere in their vicinity, or preferably on top of them* (translated by author).

What Sigurður Guðmundsson noted in the 19th century holds true today. Horses and dogs are deposited into burials in a set way, for example relative to the human body. This feature is discussed in detail above (pages 274-277 and 292-293). Moreover, the killing and handling of horse carcasses within *each* site was in a similar way structured and maintained over time. It follows that the custom of decapitation is limited to specific burial grounds in Iceland. In fact, all recorded instances are confined to three burial grounds, to Dalvík (Brimnes) in Eyjafjörður and Brimnes in Skagafjörður in the north, and to Hrífunes in the south. All horses within each of these three sites had had their heads removed prior to being buried. Other Viking Age burial grounds in Iceland also seem to have intra-site standardisation regarding ritual killing, although not including post-mortem decapitation. These materialisations of structured intra-site and also broader inter-site traditions in regard to animals are evidence of truly ritualised behaviour. These are manifestations of ‘rituals’ in the most elementary sense of the word (Fogelin 2007:58, reiterating Bell 1997). Specifically they incorporate:

Formalism. Animal killing on burial grounds seems to employ a more restricted set of action than people use in everyday life.
Traditionalism. These rituals are archaic or even anachronistic. The practise goes back centuries in Scandinavia, whether the inherent meaning was similar or not, but was only adopted in Iceland decades after the beginning of the settlement.
Invariance. Each killing follows a strict, repetitive pattern consistent within the respective site (and follows a broader pattern between sites). I.e. what people did with the animal's heads during the rituals at Dalvík (Brimnes) and Hrífunes cannot be known, but it was significant enough to be repeated again and again in the same way in both places.
Sacral symbolism. The killings take place on burial grounds, which indicates that the symbolism behind the acts is sacred in some way.
Performance. Because the acts are most often a part of a funerary process, they almost certainly involved public performance or display of ritual actions

The conventionalisation of the way horses were treated during funerary rituals reveals two important features of Icelandic burial ceremonies involving animals which cannot be overlooked, namely *bloodiness* and *theatrics*. The bashing in of heads and cutting of throats was evidently the way horses should be killed during burial rituals. This resonates with Jan de Vries' (1956:415) deduction that the original, pre-Christian, meaning of the verb *að blóta* was to shed blood for ritual purposes. Along those lines, blood of ritually killed animals (and indeed of humans as well) is one of *the* recurrent motifs in medieval written accounts that concern pagan rituals in the Norse world (Jón Hnefill Aðalsteinsson 1997:189-220; Turville-Petre 1964:151, 251).

Perhaps the best example of the dramatics involved in the ritual killing tradition, aside from the standardised bloodiness, is the practice of decapitation recorded on the three burial grounds (and possibly the spears found in horse burials on three burial grounds as well). These illustrate purposeful and repeated acts that go far beyond mere killing of an animal to be buried with a human. Further, the fact that it was very common in general for horses to be harnessed and saddled when buried shows that the animals wore a 'costume' for the ceremony which added additional depth and meaning to the whole scene. All these traces of theatrics that can be observed in the archaeological record and the structured way in which they are replicated again and again reveals that the ritual performance itself was fundamental. It is thus not only the animal itself, horse or dog, which holds significance but the process itself during the ritual.

The theatrical elements and intricacies of the rituals discussed above obviously indicate that these funerary processes were not just a matter of killing an animal and covering it with soil. More was involved than first meets the eye. Through closer examination other things can be inferred concerning the origins, motives and meanings behind the acts. It is difficult to infer the possible duration of the ceremonies, whether they took minutes, hours or days (or even longer). The structured nature of the rituals indicates that particular sequences of events must have been followed. That alone reveals the importance placed on the ceremony and makes it likely that the affair was at least not rushed. When this is further viewed with the intricacy of, for instance the post-mortem decapitation, the sense of a prolonged process is strengthened. Although we obviously have no idea what was done with the severed heads of these animals prior to burial, what can be noted on some sites is the basic order of events, what happened before what. Inferences like that are made based on stratigraphy and are obviously very interesting because they allow for deeper understanding of the ritual process during individual burial events. For instance, by studying the plan of burial VIII at Ytra-Garðshorn (figure 4.29) it can be discerned that the horse was buried before the spear was deposited next to the man. This is evident by the fact that the spearhead extended over the fill of the horse grave. In Icelandic Viking Age burials, spears were placed with the shaft to the side of the dead human and the spearhead faced “downwards” toward the feet (Kristján Eldjárn 2016:306). This corresponds with the positioning of the spearhead in burial VIII. The animal was brought to the side of the open grave and killed by poleaxing. The significant trauma on the horse’s cranium indicates that it was poleaxed with two hits to the forehead. It is very likely that its throat was subsequently cut, although there is no osteological evidence of that. After this the horse carcass was covered with soil. Only after this had taken place was the weapon deposited with the human. This raises the question if the horse was killed and buried before the human body itself was laid to rest in its part of the grave. Comparing the sequence of deposition between different sites can be revealing. Even if the sequences seem to have been quite rigid within particular cemeteries, they were not necessarily so between different sites. If a clear difference can be shown it would mean that the burial rituals themselves were not uniform between different communities. Further, it could mean that each group was not following an identical rule of practice, but rather building on some *ideals*. Perhaps the most obvious example of this is the selective use of decapitation. But this could also be the case when

Dalvík (Brimnes) in Eyjafjörður is compared with Ytra-Garðshorn. In burial II at Dalvík (Brimnes) it is definite that the human was deposited first (figure 5.19), because the horse rested partly on top of the man's legs (Bruun and Finnur Jónsson 1910:72), which seems to be in opposition with burial VIII at Ytra-Garshorn where the horse had been covered with soil ahead of the spear which accompanied the human body.

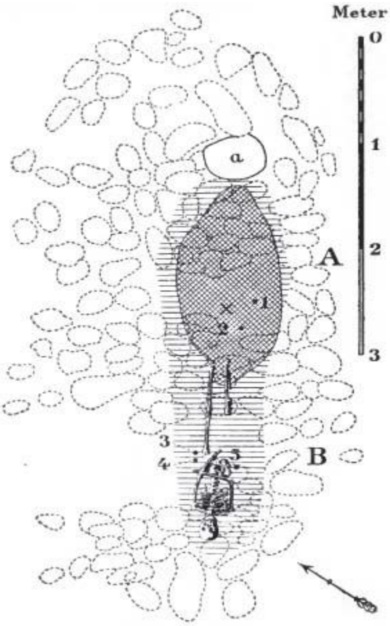


Figure 5–19 – Burial II at Dalvík (Brimnes). A are horse remains, partly resting on top of the feet of the human remains B (Bruun and Finnur Jónsson 1910:70).

Below the observed trends in ritual performance are viewed in context with other strands of data previously discussed, such as the distribution and dating of Viking burials, as well as with osteological data.

5.4.10 The burial traditions in context

The generic kuml burials, which include animal burials, are not spread uniformly over Iceland. For example, the main concentration of horse burials is in the North of the country and there is a relatively even spread in the South and East, but a striking scarcity in the West (pages 284-288). It is argued above that the reason for the prevalence in horse burials in the North has to do with people's particular preference for the tradition. That this *set* of burial customs was not practiced to the same degree in the western quarter of Iceland, but what sort of burial rituals people in those areas preferred is not clear. The traditional kuml burials are those of people in the upper layer of society (see discussion on pages 303-304), while others, further down the social ladder, are hitherto mostly invisible in the archaeological record. It follows that it is particularly the burial practices of the elite in the West that are missing. It could be that at least some of them were cremated or many could simply have been Christian and buried accordingly. One of the reasons this has not been picked up by archaeologists until recently might be because people have been looking for the 'kuml ideal' in the West, which with a few spectacular exceptions, was simply not practiced to the same degree. In other words, ritual animal killing formed part of a cultural expression more dominant in other parts of Iceland. This is not surprising, since it would have been quite peculiar if pre-Christian burial customs had been uniform across Iceland in the Viking Age when there was no official doctrine dictating how rituals should be performed nor an establishment like the Church to keep ritual behaviour coordinated. Indeed, even though there is intra-site homogeneity in animal burial rituals at the grave fields where they were practiced, there is in some instances discernible inter-site variability even if the rituals seem to be based on similar ideals at the different sites.

Animal burials in Iceland are a feature of the 10th century and particularly of the latter part. Thus, the people interred with animals were perhaps third and fourth generation Icelanders, but it has also been shown that some were immigrants born abroad. A recent study of strontium isotopes in human bones has shown that out of 83 Viking Age burials in Iceland 32 individuals are identified as immigrants (Price & Hildur Gestsdóttir 2006). The presence of these 10th century settlers who were honoured in death as part of the upper class can be accounted for in two basic ways. Firstly it seems straightforward to think that ambitious families in Iceland may have sought spouses from the old countries. This would have enhanced status and perhaps given legitimacy to any claims for influence. It could also have proven fruitful to establish a link with the social elite in the older societies abroad (Orri Vésteinsson & Hildur Gestsdóttir 2016). Another and slightly different scenario might be that a new social elite was imported *en masse* in the 10th century. These would have been landowners from overseas settling down in the colony after a few decades of preparatory work had been performed by lower classes. This would then account for the lack of traditional 'kuml' burials in the preceding 9th century. I.e. it was not a lack of people but a lack of an upper class (e.g. Nordeide 2011). Both of these scenarios are sensible explanations to account for the presence of immigrants in elaborate 10th century burials and it is of course quite possible that a combination of the two is at work. In either case, what stands out is the emergence of new social elite in the late 10th century, many members of which were born abroad. At the very least, even if the elite was not newly introduced, it becomes visible at this time in the archaeological record. This is a major milestone in the development of a specifically Icelandic society (Orri Vésteinsson 2014).

It is noteworthy that horse burials were popular in Norway at the time they appear in the Icelandic archaeological record (chapter 3) and they are similarly known in other contemporary North Atlantic colonies as well (e.g. Harrison 2008:158-160). This quite sudden, relatively late and short-lived, manifestation of a dramatic pagan tradition in Iceland was thus not an insular invention. In light of this, it is interesting to study the rituals themselves as well as the remains of individual animals. Both similarities and differences in how horse killing rituals were performed across Iceland, probably reflect how groups of people, or families, interpreted a ritual ideal in their own way. This may be a testament to how recently the custom had developed society-wide acceptance in Iceland before it was abandoned. That the ritual killing in burial customs had more to do with status symbolism than a sudden urge to commemorate favourite animals, is evident from the zooarchaeological remains. Sexing of individual horses indicates that males were preferred for the rituals and a third of them were killed at a very early age. Many of the horses were way too young to have been used for riding in life even if buried with riding gear. It is thus obvious that the horses had, at least in many instances, extrinsic symbolism associated with them. It was the *idea* of the male horse, rather than the individual animal itself which was at the core of the act. The animals were killed following a structured tradition; their blood was spilled, on some sites other post-mortem rituals followed, and lastly they were interred. The main concern seems to have been the ritual itself and the associated symbolism.

What this reveals is that certain families or households began practicing these structured killing rituals in the 10th century, most likely in order to culturally define themselves, to align with a particular Norse identity and perhaps to make clear boundaries with others. Thus, as is further discussed in the next chapter, ritual horse killing and burial can be seen as a material reflection of *culture politics*.

6 Horse burials and Viking Age society in Iceland

...The implication is that cultural process is primarily selective in nature, and that human innovation tends not to transcend a cultural tradition, or, at least, not on a grand scale. In other words, a cultural tradition would appear to place fundamental constraints either on the nature of innovations, and/or on the uptake of those innovations. It seems that new ideas are derived not from the contemplation of 'necessity' but from old ideas. (Cullen 2000:133).

The inhumation of horses on burial grounds was well known in all Viking Age societies in the North Atlantic and the horse burial tradition adopted in 10th century Iceland shares many similarities with the late Iron Age horse graves of Norway. Many of these similarities are identified in the present study. When horse rituals enter the archaeological record of Iceland in the 10th century (pages 289-292) they were very fashionable all over the Norse areas of Norway and there seems to have been a *rise* in their popularity. Horse rituals in Iceland and in the other North Atlantic colonies are thus an example of a contemporary trend in burial customs shared with neighbouring Norse societies. It is notable that in the 10th century, at least in Norway and Iceland, horses were buried with both men and women in more or less equal measure. This had not always been so in Norway, but horse rituals began to cross gender boundaries towards the end of the 9th century and became common with both sexes in the 10th. Thus, during the course of the Viking Age horse rituals in burial customs stopped being associated primarily with males of certain rank and became suitable for women as well, although most certainly continuing to be associated with people of higher social standing. Also notable is that the inclusion of riding gear is a common feature of horse graves in all regions and across genders. Due to differences in recording and bone analysis, some aspects of the burial record in Iceland cannot at this stage be compared with Norway or the other Norse societies in the North Atlantic. In the present study the entirety of the surviving Icelandic animal bone collection has been analysed, while a comparably detailed recording of the assemblages remains to be carried out in neighbouring regions. Little has been published about zooarchaeological remains from burials and in some instances, e.g. in Norway, bone analysis is limited by poor preservation. Due to this the sex and age of the ritually killed animals is better known in Iceland than elsewhere, as is the manner of their slaughter.

Similarly it is often not clear how the human and animal were placed relative to each other in burials outside Iceland, or if this was as consistent as seen in the Icelandic burial record. I have not come across a 'stand-alone' horse burial in the Norwegian record, but their existence cannot be readily dismissed.

It has been the general perception since at least the middle of the 20th century that horse burials were relatively more common in Viking Age Iceland than in the neighbouring countries. As a result the debate about horse-burials has been dominated by attempts to explain this difference. This study has shown that this is a false problem as horse-killing was in fact equally common in Norway as in Iceland (chapter 3). As is discussed in chapter 2 different hypotheses have been put forth to account for this perceived over-abundance of horses in Icelandic Viking Age graves *vis-à-vis* Norway:

The classic interpretation is that it was due to a lack of material wealth and a great number of horses on the island (e.g. Kristján Eldjárn 1981; Orri Vésteinsson 2000). Namely, that the animals were an alternative to other grave goods.
In a more recent interpretation emphasis is placed on the horse as an individual and on the animal's relationship with the deceased or their relatives. The horse is then seen either as a favourite animal closely bound to the person being buried or being particularly prized for its prowess in life and regarded in similar ways as a human being (Þóra Pétursdóttir 2010). According to this view, the great number of horses in Icelandic burials would indicate a particularly strong relationship between humans and horses in Viking Age Iceland.
Lastly, the horse is seen to enjoy a special position in Icelandic society and to be a liminal being which is able to mediate between different conceptual spheres (Loumand 2006). According to this the animal represents important means to transfer the deceased to the other world.

The new data presented here undermines all these hypotheses, either by reconfiguring the premises they rest on or by revealing them to be too simplistic. The first one, regarding cost efficiency is improbable (Rúnar Leifsson 2012a) because horses were as common in burials in Norway as in Iceland and the rituals had direct roots stretching at least 500 years back in time (chapter 3). The second one, individual horses as special animals, does not hold up either when faced with the zooarchaeological data. The animal bone analysis indicates that a large part of the horses used in burial rituals were much too young to have been ridden in life even if they were harnessed and saddled in the grave (pages 261-262). This reveals that neither the most prized steeds nor favourite horses were being routinely used for burial. The horses must have been a symbolic element of the ritual, chosen as representatives of their species rather than for their prowess in life. The third line of interpretation, horses as liminal beings and the reading of horse graves as 'a journey in death', is unsatisfactory. Less than half of recorded Viking Age burials in Iceland are known to have contained a horse. This simple fact, that not everyone was accompanied by a horse even if others on the same burial ground did, means that having a horse in the grave (or anything else specifically) was at least *not considered a necessity* for entering an afterlife. Maintaining that it was is bound to lead down a slippery slope, as it would entail having to explain why some people got a lift to the other world while others were left behind in horseless graves. If we rule out that placing a horse 'as a liminal being' in the grave was a *necessity,* rather an act aimed at easing the deceased's passage than being the premise, then the decision whether or not to utilise this highly symbolic act in each burial event would clearly have been dependent on other factors as well.

As is shown with the following discussion concerning 'meaning', an all-encompassing explanation is *simply not feasible*. The reasons governing when and why a horse was deposited with a human (or by itself) on a burial ground are clearly more multifarious. This is demonstrated for example by the varying context of deposition. On some sites most graves contained horse remains, while on others only a minority did and then there are sites where horses were buried by themselves (chapter 4). Here, new lines of questioning can be considered given the fresh perception of the burial record presented in this work. Such as, why are horse burials differentially distributed over Iceland? How do we explain the narrow timeframe of the practice? On burial grounds where horse rituals were performed, why did not everyone get a horse in their grave? This line of questioning ties in with issues of identity, political developments and 'meaning' discussed below.

6.1 Ritual survival, meaning and materiality

Single explanations of ritual behaviour, however satisfying to the observer, seem to me to deny the nature of symbolism itself and its use in human society to express the accepted and approved as well as the hidden and denied, the rules of society and the occasional revolt against them, the common interest of the whole community and the conflicting interests of different parts of it. The use of symbols in ritual secures some kind of emotional compromise *which satisfies the majority of the individuals who compose a society and which supports its major institutions* (Richards 1982:169)

The practice of ritual horse killing and burial in 10th century Iceland can be seen to have had ‘meanings’ on more than one level (e.g. Richards 1982:169; Bell 1997:135-137; Robb 1998:341-342), both on the surface as well as others more embedded. On the surface there are the overt, or explicit, reasons behind the ritual. These are likely to have involved some spiritual or even cosmological elements, perhaps notions of afterlife and could possibly have been steered by certain characteristics of the deceased and influenced by the grief of relatives. Secondly there are the powerful but unspoken meanings embedded in the act itself, the materiality of practicing these rituals. These are the theatrics of the act, bloody and noisy, with props such as a poleaxe or hammer and a knife, and almost certainly performed in front of an audience (e.g. Carver 1995:121). The violent and visceral drama probably helped making it self-perpetuating and is a likely reason why the animal killing rituals became quickly popular in (at least) parts of Iceland. These aspects may also be a major reason why animal killing in burial customs seem to have stopped after Christianisation. Lastly, and perhaps more importantly for the present study, are the social dimensions involved which are more unique to Iceland than any other aspect of the animal killing rituals.

The ‘surface meaning’ was derived from old customs in Norway. It is associated with the self-rationalising logic in people’s minds of why it was appropriate in some instances to kill horses, or other animals, and bury them. This had in many instances nothing to do with the individual animal itself, its relationship with its owner, nor its possible prowess in life (chapter 5). The age distribution of the killed horses (and possibly the sex ratio) suggests that there was some other semantic structure behind the rituals in which the chosen animals acted as symbolic representatives. Even though attributes of individual animals may in some instances have influenced the selection of the ‘victim’ it was not the leading cause behind the killing itself. This in turn indicates that there were some rooted ideas involved. These spiritual or cosmological ideas are of course very likely to have evolved or changed through time in Norway, during all the centuries ritual horse killing was practised there. But in the 10th century these ideas are likely to have been comprehensible across the North Atlantic. This can be inferred from the fact that horse rituals appear in all the North Atlantic colonies at a time when they seem to have been on the rise in Norway. But the expressed symbolism may nonetheless have been varied and even ambiguous. Because the rituals performed in the 10th century were a continuation of centuries of practice without regulated doctrine, the ‘surface meaning’ must have been culture specific to the time and place. Even though some semantic structures incorporated in the acts themselves may have endured due to the continuous practice of the ritual horse killing, there is no reason to assume that the metaphysical or transcendental ideas of late Iron Age society in Scandinavia would have been static for half millennium, any more than e.g. those of our own society from AD 1500 to the present day. Hence it is important to keep in mind that traditions such as these are not set in stone, their meaning does not necessarily stay the same and as a result they do not pass down generations unchanging (e.g. Andrén 2005:120-1; Rúnar Leifsson 2012a). They should rather be seen as dynamic and have the potential to evolve and change, whether the agents and participants are aware of it or not (e.g. Humphrey & Laidlaw 1994). The ritual horse killing tradition was a process that took account of past symbolisms and could be creatively reinterpreted hand in hand with societal developments (Handler & Linnekin 1984; Bell 1997:210-252). This is in harmony with what some anthropologists and religious historians have pointed out, that rituals should not be *”seen as preserving or enacting stable sets of religious beliefs [...] People constantly choose to remember, forget, or recreate elements of their religion through ritual practices”* (Fogelin 2007:58 with reference to Bell 1992 and 1997). Even within the narrow timeframe of ritual horse killing in Viking Age Iceland there was quite a range in ritual performance between different sites, such as how the animals were killed; if they were buried with a human body or by themselves, etc. (chapter 4). This indicates *site specific re-interpretations* of old symbolisms. Given all the possible hypothetical ideas people have put forth as interpretation for the rituals (chapter 2) it is quite certain that the ideology as a whole was much more complex and multi-stranded. It is simply not enough to refer to the relationship between a person and his or her favourite animal, nor is it enough to refer only to the religious ideas that people may have had, even though both of these aspects might have played an important role (Rúnar Leifsson 2012a:190). It is not even necessarily so that the people performing the rituals in each and every case had at the top of their minds some ‘rational explanations’ as to why they were performing the acts or what was the expected outcome. It may simply have been the right or normal thing to do in that given situation. For example, emotive factors are obviously highly important in funeral processes. Emotions can often be argued to be more influential in burial ceremonies than, for example, a need to reflect the deceased’s identity in life or to incorporate his/her personal belongings (Williams 2007; Gilchrist 2008:121). When a custom has been established within a community as the expected thing to do in certain circumstances it becomes self-perpetuating. Modern funerals are usually practiced according to local customs, which people tend to follow without fully articulating 'why' (e.g. Walter 2005). In essence the Icelandic horse rituals of the 10th century were drawn from centuries of practice in the ancestral lands. These were old symbolic structures that people of the time could commonly relate to and that were important components of the self-consciousness of individuals and perhaps more so of a *group-consciousness* of the wider society (e.g. Handler & Linnekin 1984). The rituals were most certainly comprised of many threads woven widely through society and people's personal experiences while at the same time being a constant *reinterpretation of old ideas*.

In the same vein *ritual acts can remain similar in form over long periods of time* even though their meaning might develop (Fogelin 2007:58). This means that at least in some instances there must be something in the ritual actions *themselves* which maintains their ongoing practice. Here it is proposed that the powerful impact that ritual animal killing and burial had on practitioners and onlookers was a significant contribution to the 'survival' of these traditions for more than half a millennium in Scandinavia and in the colonies towards the end of that period. The impression of the ritual acts, in conjunction with the context in which they were practised, helped to make them self-perpetuating irrespective of their 'meaning' at any given time, although that would obviously have had importance as well. Still today the dynamism of the rituals is clearly apparent in the archaeological record. As is discussed in chapter 5 (pages 304-311), the animal killing rituals were violent, probably shrouded in theatrics and very likely performed in front of an audience gathered to attend the funeral (Price 2008, 2010 and 2014). The way the animals were killed and the post-mortem treatment of the carcasses which can be noted on some sites, like ceremonial decapitation, is revealing of a bloody (even violent) ritual performance, which must have impacted (and impressed) onlookers. The zooarchaeological analysis indicates a structured way in which the ritual killings took place, with uniformity within each burial ground and some broader constants between different sites. This reveals that roles enacted by the practitioners during the ritual at each site must also have been fairly set. That is to say, the ritual seems to have been a cultural drama performed in order to affect participants and audience (e.g. Bowie 2000:159-161). This again would be reinforced by various political and social elements, such as status, identity, etc. which are ultimately exclusive in nature. In order to own horses for use in killing rituals, people had to have access to land for grazing, which narrows the range of possible practitioners of the rite. Further, the uptake of such dramatic burial rituals in 10th century Iceland would have illustrated quite directly cultural affiliations of the practitioners. If this ritual killing tradition is seen as a meme, then its ‘survival value’ (Dawkins 2006:193) would be bound by the fact that it had an impact on people and was reinforced by context; it was linked with the death of relatives and reserved for exclusive groups. The meme survived and spread through imitation (Dawkins 2006:194), but the *replication* was not always identical which explains why differences in performance can be noted even between contemporaneous sites in Iceland. People seem to have been drawing on an ideal which explained how the rituals should be performed and within that framework developed specific versions. The self-perpetuating dimension of the animal ritual killing and burial tradition is an important aspect for understanding why it was adopted in Iceland in the first place, and also why it was so common in certain areas of the country and not in others.

The importance of violent spectacles in Viking Age rituals has been recognised by previous authors. Price (2010:136; 2014) noted that violent and bloody scenes were an integral part of some Viking Age funerals as well as of other communal rituals. Writing from a socio-political standpoint, Lucas and McGovern (2007) argued that ritualised violence of this sort that took place at regular communal gatherings at the monumental hall of Hofstaðir in northeast Iceland, served to draw attention away from potential tension and interpersonal conflict during the public meetings and feasting. Lucas and McGovern (2007) used Girard’s (1979) theory of sacrifice as a metaphorical form of scapegoating, channelling violence away from internal conflicts and onto a common victim. In his thesis *Violence and the Scared*, Girard is writing specifically about *sacrifice,* which is a term not necessarily appropriate for the ritual animal killing discussed in the present thesis (in chapter 1 it is discussed how all sacrificial killing is ritual killing, but not all ritual killing is sacrificial). Nevertheless, a *cathartic* element such as this should not be overlooked when thinking about ritual animal killing as part of funerals. Burial customs can touch on many aspects of life, including politics and various forms of social tensions (Insoll 2004:67-70, 154). An example of this is the location of Viking Age burial grounds in Iceland. The grave fields are not on a community scale, but rather single-farm based. Within each farm the grave fields can be variously situated. Sometimes they are situated close to the home field, often they are close to roads between neighbouring farms and sometimes grave fields are even on boundaries between farms (Adolf Friðriksson 2009:10-12). This single farm pattern might reflect the claim of specific groups to the land that the graves demarcate and might be seen to act as an affirmation of ownership. This resonates with other types of archaeological data, for example in the northeast of Iceland where an extensive system of boundary walls dating back to the Viking Age demarcates extensive tracts of land far up into the heaths (Árni Einarsson 2015; Árni Einarsson *et al.* 2002). In modern society we have police and courts of justice and violence and revenge (or retribution) is a prerogative of the state. Societies that do *not* possess such public institutions, like settlement period Iceland, can find themselves in danger if tensions run too high (e.g. Halsall 1998). Girard (1979:284) noted that there is *no real difference between rites of passage and rites intended to maintain the status quo*. In both instances the only purpose is to ensure stability or at least a minimum of disturbance. This is because *if the door is opened to admit change, there is always the risk that violence and chaos will force entry* (Girard 1979:284). Communities can thus develop various outlets, where tensions are vented in a way that does not call for violence or retributions, but still transmits information concerning social standing, honour, and so on. In the case of burials the outlet comes in a time of potentially critical, or at least uncertain, times of change. The violent ritual killing during funerals could in this way be seen as a way to reinforce social standing and maintain stability in a newly settled land where power structures are not firmly rooted (see chapter 6.2). The ordaining of violence is in public and is aimed against an individual that will not retaliate or be retaliated for. It has been argued that social instruments like this are often shrouded in mysticism and rationalized through some belief system. They are aimed towards a supernatural entity but are in fact a form of *catharsis*, an outlet of tensions (or even violence) that simmers behind the curtain of civility and can easily brake out in human interaction, especially during times of uncertainty (Girard 1979). In a wider context we can view sacrificial ceremonies in light of politics, in the interaction of social inequality and power struggle (Bloch 1992). In its basic form sacrifice is the act of giving up something of value, something worth keeping, voluntarily by an individual or a group. This resonates with theories of gift exchange (Mauss 1990; Evans-Pritchard 1956), even to the extent that giving up of valuables (making a sacrifice) anticipates obligation by the receiver and a promise of reward. The ritual killing takes place in human society and it is in human society where the real chance of a reciprocal reward is to be found (Carter 2003), whether those doing the deed are consciously aware of that or not. The *expected* reciprocation is not necessarily in material form, it is more likely to be enhanced respect and a more secure standing in society for the group or family the deceased belonged to.

6.2 Revealing dynamics in 10th century Iceland

It would not be warranted to state that ritual horse killing and burial was ‘the same’ in Iceland as in Norway, despite the similarities discussed previously and even if the intended symbolism of the acts may well have been similar. Rather it seems that old traditions, which were at their height of popularity in the old country, were recycled in 10th century Iceland to meet specific needs. Social memory is constantly reproduced according to the needs of the present and is often formalised through acts and rites (Lowenthal 1985:210; Connerton 1989 & 2006). This can be a vehicle to legitimise status and authority as well as a way to consolidate social identity (Hobsbawm 1983:9). Ritual animal killing in burial customs are acts and rites of this nature that are detectable in the archaeological record. Traditions can be selected and changed by the agents involved but they are still for the most part limited by heritage constraint and they run from a reservoir of older ideas (Cullen 1996:133). So the traditions brought to Iceland in the Viking Age originated in previous experiences but were selected and adapted to new situations and to the changing needs of a society under formation. These materialized symbolic processes can thus be used as indicators for changes or adaptations in society, which is especially promising when dealing with the first decades of settlement in Iceland when a new society was in the making on a previously uninhabited island, quite remote from old centres of power and social institutions. Icelandic Viking Age society was different from Norway in that it was a new-founded colony, only a few decades old. Iceland was rapidly settled in the latter part of the 9th century and in the beginning of the 10th (Orri Vésteinsson & McGovern 2012), but recorded Viking Age (and horse) burials in Iceland mostly date from the middle to late 10th century and even the early 11th. Horse rituals in burial customs were thus *not* an unbroken tradition from first settlement, but were practised for a relatively short period of a few decades prior to the conversion to Christianity (pages 289-292). Seen in this light, it is highly unlikely that ritual horse killing and burial was simply a cultural norm that the first settlers brought with them, in the sense that we do not stop brushing our teeth even if we move to another country. Rather the sudden advent of these rituals, and subsequent disappearance, is representative of conscious actions taking place at certain developmental stages of the new society. The rise of horse rituals in 10th century Iceland is in this sense a manifestation of the social turmoil of the period. Religion, ritual and symbols are key elements of social cohesion in unstable societies (e.g. Turner 1969, Bowie 2000:167) and in times of social stress it is not uncommon for groups to articulate a shared past (Connerton 2006). Thus the short-term popularity of horse rituals in Iceland is very enlightening. It reveals socio-political competition and a clash of identities in the new society. After the initial period of quite rapid settlement (Orri Vésteinsson & McGovern 2012), Icelandic society got more structured in the course of the 10th century. Alþingi was established around 930, laws were adopted and the organisation of authority and justice was developed and formalised over the entire island (*Íslenzk fornrit* I 1968:6-13; Orri Vésteinson 2009). It is in this time and until the Conversion that the ritual killing tradition flourished. Horse rituals carried with them important statements about identity and status. The ready adoption of horse rituals in the 10th century is likely to derive from two major incentives, which are not mutually exclusive. Ritual horse killing and burial may have been viewed as a primarily Norwegian custom, which appealed to early Icelanders because it originated in, and was characteristic of, the old country. Also, the incentive might primarily have been the pagan connotations of ritual horse killing, i.e. that it was 'non-Christian'. These two emphases are reflective of two, mutually supportive, ambitions.

The former ambition would be the desire of an upper stratum (who controlled the access of horses and other livestock to grazing) in Iceland to affirm themselves in a new society, their perceived roles and aspirations. An absolutely fundamental prerequisite for the practising of ritualised horse killing is access to land for grazing. People who do not have that access cannot own horses (or dispense them during funerals). It follows that horse rituals very likely carried a message of land ownership, and hence of societal status, even if some servants or slaves might well have had some livestock of their own (dependent on landowners' goodwill). Supporting this, it has been argued that recorded Viking Age burials in Iceland in general do not represent the population as a whole but the upper part of the social scale (Orri Vésteinsson & Hildur Gestsdóttir 2016). By recycling horse killing rituals known from the land-owning class of the old country, people wanted to legitimate their position as part of a land-owning class in Iceland. But the demographic distribution of horse burials in Iceland was somewhat different from the Norwegian burials, where a greater part was probably those of a more established upper class (e.g. Dommasnes 1982; Solberg 2000; Nordeide 2011), while the Icelandic ones might have been more distributed among emerging local elite aspiring to inclusion in the better established and generally richer and more exclusive Norwegian elite. Indeed some of the people discovered in 10th century Viking Age burials in Iceland were born abroad (Price and Hildur Gestsdóttir 2006; Orri Vésteinsson & Hildur Gestsdóttir 2016). This evidence of immigrants in *kuml* burials might be a case of a later settlement of higher classes, landowners resettling to Iceland to claim land which their minions had already broken, or be the result of Icelanders seeking marriage with 'respectable' people from the old country. This ambition might be compared with the building of chapels on farms in the Middle Ages, a popular trend after the Conversion (e.g. Orri Vésteinsson 1998:21-23) and one which may well have had as much to do with social ambitions as with people's pious disposition.

The second ambition concerns identity more specifically and the kind of society people performing the rituals wanted to construct and maintain. A formation of Norse ethnicity in Iceland has recently been discussed by another author (Orri Vésteinsson 2014), who sees the transformation in material culture in the 10th century as reflecting the forging of a collective identity. According to the current state of research, the material culture of the first decades of settlement was largely non-descript and had a general North European Iron Age character whereas after c. 925 AD the material culture became decisively Norse (Orri Vésteinsson 2014). Three-aisled halls replaced sunken feature buildings and Norse decorative art and objects proliferated all over the island. The generic *kuml* burials also become common during this period and were practiced until about the turn of the millennium or shortly thereafter. This ethnic signalling through material culture and rituals represents a stepping-stone in the development of Icelandic society. It is a sign that people had become affluent enough to invest in this sort of symbolism, that there was a need for a unifying ethnic identity and that people had started displaying (and negotiating) a societal pecking order through material culture. Other important societal developments, e.g. the hierarchical system of assemblies, were taking place at the same time. The blueprint for this cultural paradigm was sought in Norway and probably reinforced by the arrival of the 10th century immigrants which have been recorded in burials (Orri Vésteinsson & Hildur Gestsdóttir 2016). It is likely that there was a societal pressure on people to conform, which is why quite homogenous Norse architecture and material culture seems to have appeared in all regions of Iceland in the 10th century (Orri Vésteinsson 2014). But the ingredients for forging a collective identity were not solely sought in Scandinavian traditions, Christianity was highly important as well. It is notable that symbolism of Norse ethnicity only appears in the material culture a few decades before the formal conversion in c. 1000 AD, by which time the new religion must already have started taking root. Christianity may have infiltrated the developing Icelandic social structure more easily than it did in the more rooted Scandinavian societies. The early and comprehensive conversion of Iceland relative to Scandinavia certainly could reflect a looser attachment to pagan tradition in the colony (Orri Vésteinsson 2016). But some reaction against Christianisation is still likely to have occurred in Iceland (e.g. Orri Vésteinsson 2007; Lucas 2009), just as has been noted in the late Viking Age Scandinavia (e.g. Nordeide 2006). The two major strands of influence on Icelandic Viking Age identity were not always compatible and hence there were certain traditions that were easily agreed upon and others that were not. For example, Norse architecture and material culture was adopted around the island whereas certain pagan rituals were not. Horse burials are perhaps the best example of this, as they are differentially distributed over Iceland and were practiced for a limited time only (pages 284-292). The geographical and chronological distribution of horse burials in Iceland was probably strongly influenced by an effort to construct a conservative Norse identity as well as by the resulting friction between competing paradigms. In other words, the distribution could reflect actual variations in cultural affiliation in the 10th century (see Bjarni Einarsson 1995:46-60). As is discussed in chapter 5 (pages 284-288) the recorded distribution is unlikely to be the result of taphonomy or Viking Age settlement patterns. People in the North of Iceland, and a significant part of the communities in the East and South, invested more in maintaining these pagan animal killing traditions than people living in the western part of the island. A reason for this could be that cultural conservatism (or even unionism *vis-à-vis* some powers abroad, e.g. Jón Jóhannesson 1956:55-56; Orri Vésteinsson 2009:318-319) was stronger in the areas where these rituals were an obvious a part of 10th century society. The lack of this symbolism in the western quarter of Iceland indicates that society there had for some reason less need for a clear pagan definition. The society in the West seems in this light to have been less pressured by the encroaching new paradigm, but whether that was due to Christianity having stronger roots in the area cannot be inferred here. What can be said on the other hand, is that by adopting animal killing rituals, the upper crust of society in those respective areas made bold statements about their pagan roots. The most obvious reason for doing so would be to contrast themselves and their cultural identity with the Christian paradigm. The 'pagan camp' would in this way reinforce a certain social structure, of which it was a part and had an interest in maintaining. This would then not be so much about legitimizing people's place in society, but rather of being in defence of society itself, of traditional values in face of an emerging shift in paradigms and power relations. The message of Þorgeir Ljósvetningagoði's speech at Lögberg as recounted by Ari fróði reverberates here; in order for there to be social cohesion there needs to be one law (*Íslenzk fornrit* I 1968:17). This interpretation is in accordance with the chronological limits of the rituals. They were 'reinvented' in 10th century Iceland, although based on ideals known from Norway. This again partly explains the similarities noted in *kuml* (and horse) burials around Iceland. A ritual ideal was adopted, in which the ritual killing of horses (and sometimes dogs) was a predominant part. The uniformity in the cultural paradigm was necessary in order to build a unified identity. It was a symbolism that people could widely adopt and agree upon. This ideal was perhaps less nuanced than that practiced in the old homelands, but can rather be seen as the lowest common denominator (Orri Vésteinsson 2014).

As a meme the ritual killing tradition seems to have been highly self-perpetuating. Apart from being a vessel for ideas concerning identity and status, the tradition's theatrical elements and bloody dramatics very likely helped to increase its popularity and wider adoption. Inclusive in the violent drama were cathartic elements which served to reduce stress in the community (e.g. Lucas and McGovern 2007) in the absence of public institutions and rooted power structures. The most powerful statements being made were that the groups performing animal killing rituals were legitimate land-owning families, like the traditional elites in the old country. They were influencing and actively constructing the evolving society around them by maintaining identity based on traditional values, as well as trying to secure their own positions within that new society by emphasizing ties to the old country through traditional customs. But this defence of traditional society and opposition to the emerging shift in power relations only held out for a few decades. This is dramatically evident in the archaeological record. In the 11th century (and after the Conversion) elaborate burial customs involving ritual animal killing stopped being practised, indicating that the forging of a common identity across Iceland was proving to be successful. Further, the fact that people stopped killing horses and dogs as part of funerary rituals, and ceased the *kuml* tradition altogether so soon after its initial adoption, indicates *ritual failure* (see Koutrafouri and Sanders 2013). Either these funerary rituals were not achieving what they were intended to do or they did not function any more in a changing society. It could simply be that the destruction of wealth and bloody theatrics were in the end thought to be vulgar and too plainly self-aggrandizing on part of those who aspired to belong to the upper crust of the new society. It could also be that as society got more stable and the social structure more formalised that the need for these powerful rituals quickly vanished. The horse burials had served a purpose during a critical stage in the development of a new society but *with less societal stress the incentive for ritual killing dissipated*. Either way it is clear that with the formal adoption of Christianity, and the accompanying social institutions and structure of society, new methods presented themselves of negotiating status in a more formal and perhaps less dramatic way, and within this framework more suitable burial rituals took over.

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Appendix 1 – Recorded animal bone specimens by site

C/M: context/museum number

Abbreviations and zones are based on Harland *et. al.* 2003

Age at death is based tooth eruption and wear and epiphysial fusion (Silver 1969; Habermehl 1975 Getty 1975, Levine 1982; Strand *et al.* 2007, Sisson 1914 and Hillson 2005).

Sexing based on morphology of pelvis Getty 1975

Biometrics are given in mm

Element abbreviations

Abbreviation	Element	Abbreviation	Element	Abbreviation	Element	Abbreviation	Element
23t	tarsal second and third, fused	cub	cuboid-navicular	m/t4	metatarsal fourth	ses	sesamoid
ang	angular	culn	carpal ulnar (triquetrum)	m/t5	metatarsal fifth	sha	shaft
astr	astragalus	d	dentary	mand	mandible	skull	skull
at	atlas	DP2	deciduous premolar second	mandibular molar	mandibular molar	StBrae	sternabrae
ax	axis	fem	femur	max	maxilla	t1	tarsal first (first cuneiform)
axB	axis (bird)	fib	fibula	max+	maxilla + teeth	t2	tarsal second (second cuneiform)
bac	Baculum	hcfrag	horncore fragment	maxm	maxillary molar	t3	tarsal third (third cuneiform)
C	Canine	hum	humerus	maxp	maxillary premolar	t4	tarsal fourth (cuboid)
c1	carpal first (trapezium)	humB	humerus (bird)	molar	molar	tar	tarsal
c2	carpal second (trapezoid)	hyo	hyoid	P2	premolar second	tcen	central tarsal
c3	carpal third (capitate)	I	incisor	pat	patella	thor	thoracic vertebrae
c4	carpal fourth (hamate)	ic	intercostal cartilage	pel	pelvis	tib	tibia
cacc	carpal accessory (pisiform)	isoteeth	isolated teeth	phal	phalanx	tibio	tibiotarsus
calc	calcaneum	lumb	lumbar vertebrae	phal1	phalanx first	ui	unidentified
can	cancellous tissue	m/c	metacarpal	phal2	phalanx second	uif	unidentified fish
carp	carpal	m/c2	metacarpal second	phal3	phalanx third	uim	unidentified mammal
caud	caudal vertebrae	m/c3	metacarpal third	prox femoral epi	proximal femoral epiphysis	ulna	ulna
cerv	cervical vertebrae	m/c4	metacarpal fourth	px	premaxilla	ulnaB	ulna (bird)
cint	carpal intermediate (lunate)	m/c5	metacarpal fifth	rad	radius	unlong	unidentified longbone
cl	cleithrum	m/p	metapodial	rad/uln	radioulna	v	vertebra
coraB	coracoid (bird)	m/p2	metapodial second	radius and ulna	radius and ulna	vert	vertebra
crad	carpal radial (scaphoid)	m/t	metatarsal	rib	rib	vertep	vertebral epiphysis
cran	cranial fragments	m/t1	metatarsal first	sac	sacrum	vo	vomer
cran frag	cranial fragment	m/t2	metatarsal second	scap	scapula		
crania	crania	m/t3	metatarsal third	scl	supracleithrum		

Galtalækur, Landmannahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
10493	horse	rib	5					
10493	horse	crania	1	b				Possibly poleaxed. 7 mm gap between P4 & P3 in r max. Age at death 20 yrs. Canines
10493	horse	mand	1	b	1234567BCDE			All teeth present except r i1. Age at death 20 yrs. Canines
10493	horse	at	1	b		f	f	
10493	horse	ax	1	b		f	f	Cut mark laterally across ventral side. 22,7 mm long, 1 mm wide, 1-2 mm deep
10493	horse	cerv	1	b		f	f	
10493	horse	thor	1	b		f	f	
10493	horse	thor	1	b		f	f	Callus bone lumps on the ventral edge of both articular surfaces.
10493	horse	lumb	1	b				Two lumbar vertebrae fused together by the transverse processies
10493	horse	sac	1	b		f	f	
10493	horse	m/c	1	l	12345678	f	f	GL:217, Bd:47,5, Bp:46,7, SD:20,2. m/c2 fused
10493	horse	m/t	1	l	12345678	f	f	GL:266, Bd:47,4
10493	horse	m/t	1	r	12345678	f	f	GL:266, Bp:46,1, Bd:47,1
10493	horse	m/p	1					Accessory m/p
10493	horse	m/p	1					Accessory m/p
10493	horse	phal1	1	r	123	f	f	GL:81:, Bp:52,7, Bd:45,8
10493	horse	phal1	1	l	123	f	f	GL:77, Bd:50,6, Bp:42,2
10493	horse	phal2	1	b	123	f	f	GL:46, Bd:49,7, Bp:49,3
10493	horse	phal2	1	b	123	f	f	GL:44, Bd:46,5, Bp:47,9
10493	horse	phal3	1	b	12	f		
10493	horse	phal3	1	b	12	f		
10493	horse	phal3	1	b	12	f		
10493	horse	astr	1	l	1234			
10493	horse	cint	1	r				
10493	horse	carp	1	l				magnum
10493	horse	crad	1	l				
10493	horse	tcen	1	l				
10493	horse	tar	1	l				Triquetral Pyramidal
10493	horse	tar	1	r				Triquetral Pyramidal
10493	horse	pel	1	l	123456789ABC	f	f	male
10493	horse	pel	1	r	123456789ABC	f	f	male
10493	horse	fem	1	r	123456789AB	f	f	GL:384, Bd:89,5, Bp:115
10493	horse	fem	1	l	123456789AB	f	f	GL:384, Bd:90,4
10493	horse	tib	1	r	123456789A	f	f	GL:353, Bd:72,9
10493	horse	tib	1	l	123456789A	f	f	
10493	horse	hum	1	r	123456789AB	f	f	GL:287, Bd:83,2, BT:75,6, Bp:93
10493	horse	hum	1	l	123456789AB	f	f	GL:287, Bp:91. Much lighter in colour than r hum
10493	horse	radius and ulna	1	l		f	f	GL(total):414, GL(rad):331, Bp:82,4, Bd:72,1
10493	horse	radius and ulna	1	r		f	f	GL(total):414, GL(rad):330, Bp:81,6, Bd:72,4

Hemla, Vestur-Landeyjahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
12072	horse	I	1					White in colour and very weathered. Infundibulum open and occlusal surface oval
12072	horse	I	1					White in colour and very weathered
12072	horse	I	1					White in colour and very weathered
12072	horse	molar	1					Very weathered
12072	lm	cran frag	1					
12072	uim	uim	2					Weathred
11338a	horse	rib	14					
11338a	horse	mand	1	r	1BCDE			White and very weathered. All molars present and real root has started to form on m3
11338a	horse	mand	1	l	1BCDE			White and very weathered. All molars present and real root has started to form on m3
11338a	horse	maxm	5					
11338a	horse	cran frag	1					small fragment
11338a	horse	pel	1	r	1234568			LAR: 60,2. LA: 71,9. White and weathered. Obturator foramen oval, Ischio-Acetabular ramus robust
11338a	horse	pel	1	l	123456789A			LAR: 57,2, LA: 65. Obturator foramen oval, Ischio-Acetabular ramus robust
11338a	horse	fem	1	r	123456789AB	f	f	White in colour and very weathered
11338a	horse	fem	1	l	123456789AB	f	f	GL:376
11338a	horse	tib	1	l	123456789A	f	f	GL:335. Weathered and white in colour.
11338a	horse	tib	1	r	123456789A	f	f	Weathered and white in colour.
11338a	horse	scap	1	l	123456789	f	f	
11338a	horse	scap	4	l	123567		f	Weathered scapula in 4 fragments
11338a	horse	hum	1	l	123456789AB	f	f	
11338a	horse	hum	1	r	123456789AB	f	f	Weathered and white in colour.
11338a	horse	rad	1	l	123456789K	f	f	GL:325. Radius is very weathered
11338a	horse	cerv	1	b		f	f	
11338a	horse	cerv	1	b		f	fg	
11338a	horse	cerv	1	b		f	fg	
11338a	horse	thor	1	b		f	f	
11338a	horse	thor	1	b		f	f	
11338a	horse	thor	1	b		f	f	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		f	f	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		f	fg	
11338a	horse	thor	1	b		u	u	
11338a	horse	thor	1	b		f	u	
11338a	horse	vertep	1	b			u	distal thor epi
11338a	horse	vertep	1				u	distal epi

11338a	horse	vertep	1			u		prox epi
11338a	horse	sac	1	b		f	f	
11338a	horse	pat	1	r				Brúnni en podials og tær
11338a	horse	astr	1	l	1234			White and weathered
11338a	horse	cint	1	l				Lunate. White and weathered
11338a	horse	carp	1	l				Magnum. White and weathered
11338a	horse	crad	1	l				Scaphoid. White and weathered
11338a	horse	ses	1	r				White and weathered
11338a	horse	phal1	1	l		f	f	White and weathered
11338a	horse	phal2	1	l		f	f	White and weathered
11338b	horse	max+	1	b				Dp2, dp3 og dp4 present on left and right and very worn. M1 and m2 are erupted on both sides (not m3) but with very little wear. Wheathered.
11338b	horse	cran frag	1					Perioticum, white and weathered
11338b	horse	mand	1	b	12457ACD			Dp2, Dp3 og Dp4 present and m1 and m2 are erupted. White and weathered
11338b	horse	I	2					Both incisors unworn. White and weathered
11338b	horse	pel	1	r	123456789AB			LAR: 55, Lfo: 67,2. Male morphology. White and weathered
11338b	horse	pel	1	r	123456789AB			Lfo: 60,2. White and weathered
11338b	horse	fem	1	l	235678	u	u	White and weathered
11338b	horse	tib	3	l	123456789A	u	fg	3 frags, white and weathered
11338b	horse	tib	1	r	6A		fg	White and weathered
11338b	horse	scap	1	r	123456789	f	f	White and weathered
11338b	horse	scap	1	r	12345		f	
11338b	horse	hum	2	r	123456789AB	u	f	2 frags, white and weathered
11338b	horse	hum	1	l	3456789AB	u	f	White and weathered
11338b	horse	rad	1	l	12578	f		White and weathered
11338b	horse	ulna	1	r	BCD			White and weathered
11338b	horse	ulna	1	l	BCD			White and weathered
11338b	horse	ulna	1	l	BCD			Brown in colour and eroded
11338b	horse	phal1	1	b	123	f	f	White and very weathered
11338b	horse	phal2	1	b	123	f	f	White and very weathered
11338b	horse	phal3	1	b	12	f		White and very weathered
11338b	horse	pat	1	l				Eroded
11338b	horse	StBrae	1	b				
11338b	horse	cint	1	r				Lunate
11338b	horse	cacc	1	r				Pisiform
11338b	horse	m/p	1					accessory, 2nd or 4th, weathered
11338b	horse	m/p	1					accessory, 2nd or 4th, weathered
11338b	horse	cerv	1	b		u	u	White and eroded
11338b	horse	cerv	1	b		u	u	White and eroded
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	

11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	thor	1	b		u	u	
11338b	horse	lumb	1	b		u	u	
11338b	horse	lumb	1	b		u	u	
11338b	horse	lumb	1	b		u	u	
11338b	horse	sac	1	b		u	u	Fusing on transverse processies, articular surfaces unfused
11338b	horse	thor	1	b		f	f	
11338b	horse	thor	1	b		f		
11338b	horse	thor	1	b		f	f	
11338b	horse	lumb	1	b		f	f	possibly thoracic
11338b	horse	lumb	1	b		f	f	
11338b	horse	vertep	19					9 distal and 10 proximal unfused epiphyses
11338b	horse	rib	20					
11338b	uim	unlong	5					
11338b	uim	uim	6					
11338b	uim	can	2					
11338b	cow?	cerv	1	b		u		Different texture from the horse bone, much better preserved and with more organic material
11338b	cow	molar	1					Brown in colour and unworn
11338b	cow	molar	1					White and weathered
11338b	cow	molar	1					White and weathered
11338b	sh/g	rad	1	l	1256789K	f	u	Different texture from the horse bone, much better preserved and with more organic material
11338b	sh/g	ulna	1	l	BCDEF	u		articulates with radius above and has same texture
11338b	sh/g	molar	1					M3, white and weathered

Kápa á Almenningum, Vestur-Eyjafjallahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
2434	horse	maxMol	2					White and weathered
2434	cow	m	2					m3 (Grant: d) and m1 or 2 (Grant: e). White and weathered
2434	pig	m	1					m3, unworn, white and weathered
9088	horse	cranfrag	4	b				
9093a	horse	m/c	1	r	12345678	f	f	Both accessory m/cs fused with m/c3. Weathered. GL: 220 (eroded)
9093b	horse	I	6					worn, age at death ca. 15 yrs
9093b	horse	C	1					

Mörk, Landmannahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11920	horse	m/c	1	r	12345678	f	f	White, "brittle" and very weathered. M/c2 fused with m/c3
11920	horse	phal1	1	b	123	f	f	GL:78,7. White and weathered
11920	horse	molar	1					Probably m1 or m2, no real root, Length 82,5 mm
11920	horse	molar	1					Probably m1 or m2, no real root, Length 75,2 mm

Álfsstaðir, Skeiðahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
13478	horse	ax	1	b		f	f	
13478	horse	C	2					
13478	horse	cerv	1	b		f	f	
13478	horse	cerv	1	b		f	f	
13478	horse	cerv	1	b		f	f	
13478	horse	cerv	1	b		f	f	
13478	horse	cerv	1	b		f	f	
13478	horse	cerv	1	b		f	f	
13478	horse	fem	1	l	123456789AB	f	f	GL: 380 (eroded)
13478	horse	fem	1	r	236789AB		f	
13478	horse	hum	1	l	3456789AB		f	
13478	horse	hum	1	l	123456789AB	f	f	
13478	horse	hum	1	r	123456789AB	f	f	
13478	horse	I	9					Age at death 12 yrs
13478	horse	lumb	1	b		f	f	
13478	horse	lumb	1	b		f	f	
13478	horse	lumb	1	b		f	f	
13478	horse	m/c	1		125678	f		
13478	horse	m/t	1	r	125678	f		
13478	horse	mandibular molar	8					
13478	horse	max+	1					
13478	horse	pat	1	l				
13478	horse	pat	1	r				
13478	horse	pel	1	l	1234567AB	f	f	Male morphology
13478	horse	pel	1	r	1234567ABC	f	f	Male morphology
13478	horse	phal1	1	b	123	f	f	
13478	horse	phal1	1	b	123	f	f	
13478	horse	rad	1	r	346789K		f	
13478	horse	rib	8					
13478	horse	sac	1	b		f	f	
13478	horse	scap	1	l	12345		f	
13478	horse	scap	1	l	1234567		f	
13478	horse	scap	1	r	123567		f	
13478	horse	t2	1					lipping on anterior side of bone
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	

13478	horse	thor	1	b		f	f	
13478	horse	thor	1			f	f	
13478	horse	thor	1	b		f	f	
13478	horse	thor	1	b		f	f	
13478	horse	tib	1	l	1234789A	f		
13478	uim	ui	4					
13478	horse	vert	1	b		f	f	
13478	horse	vert	1	b		f	f	
13478	horse	vert	1	b		f	f	
13478	horse	vert	1	b		f	f	

Fagriskógur, Þjórsárdalur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
14884	horse	I	1					unworn
14884	sh/g	m	2					white and weathered

Hólaskógur, Gnúpverjahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
13.7.78	horse	maxm	5					5 molars, white and weathered
13.7.78	horse	mandibular molar	2					2 mandibular molars, white and weathered. Real root well developed
13.7.78	horse	pel	1	r	1234568AB			Very weathered and mossgrown. Lfo: 71,6 mm

Kolsholt, Villingaholtshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1958.117	horse	mand	1	l	1234567BCDE			I2, P2,P3,P4,M1,M2,M3. I2 little worn: occlusal surface is flat and oval and enamel on posterior occlusal surface is just in wear.
1958.117	horse	mand	2	r	1234567BCDE			P2,P3,P4,M1,M2,M3. No real root. M3:76,2, M2: 82 mm
1958.117	horse	I	1	l				4 frags of the same incisor, probably left i3. Little worn, anterior occlusal surface just in wear, posterior occlusal surface unworn
1958.117	horse	fem	1	l	123456	f		
1958.117	horse	scap	1	r	123457		f	
1958.117	horse	m/t	1	l	12345678	f	f	GL:267. Bp:49,2
1958.117	horse	phal1	1	b	123	f	f	GL:76,9
1958.117	horse	phal1	1	b	123	f	f	GL:79,3. Bp:49,8
1958.117	horse	cran frag	1	b				Occipitale. 34:80,6. 35:96,3. 36:33,3.
1958.117	horse	axis	1	b		f	u	
1958.117	horse	cerv	1			fg	u	
1958.117	horse	thor	1			fg	u	
1958.117	horse	thor	1			fg	fg	
1958.117	horse	thor	1	b		fg	u	
1958.117	horse	thor	1	b		fg	u	
1958.117	horse	thor	1	b		f	fg	
1958.117	horse	thor	1	b		f	u	
1958.117	horse	thor	1	b		fg	fg	Light in colour and very well preserved
1958.117	horse	thor	1	b		fg	u	
1958.117	horse	thor	1	b		f	u	
1958.117	horse	thor	1	b		fg	fg	Nodule/Osteophyte on ventral side of proximal articular surface. Proximal epi is nearly fused, only a thin line visible dorsally (posterior much less fused)
1958.117	horse	thor	3					3 thoracic vertebral epiphyses
1958.117	horse	rib	31					
1958.117	cow	m/c	1					Very weathered diaphysis, anterior scratched (by sand or gravel?)
1958.117	cow	m/t	1		5678			Very weathered diaphysis, with lichens and some moss
1958.117	sh/g	tib	1	r	56A		f	Very weathered
1958.117	sh/g	molar	1	l				Mandibular m3: 10H
1958.117	lm	rib	1					
1958.117	mm1	rib	5					
1958.117	mm1	unlong	6					
1958.117	uim	uim	1					

Lækur í Flóa, Hraungerðishreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
Lækur	horse	hum	1	r	3456789A		f	Prox epi broken off, rest in 3 pieces, fracture line is white in colour
Lækur	horse	ui	15					Small frags, white fracture lines
Lækur	horse	m/c	1	r	1256	f		Proximal part, might be part of m/c below. White fracture line
Lækur	horse	m/c	1	r	3478		f	Distal part, might be part of m/c above. White fracture line
Lækur	horse	fem	2	l	236789AB		f	Broken in 2 pieces, fracture line white. Femur frag below might be part of same bone
Lækur	horse	fem	1	l	12345	f		Femur frag above might be part of same bone. Fracture line white
Lækur	horse	tib	4	r	123456789A	f	f	Broken into 4 pieces which fit together.Fracture lines are white
Lækur	horse	m/t	1	r	12345678	f	f	GL:266 mm. Bp:48,9 mm (bit eroded)
Lækur	horse	pat	1	l				Very eroded, mostly cancellous bone.
Lækur	horse	m/p	1					2nd or 4th
Lækur	horse	calc	1	r	12345	f		Damaged by shovel on distal part during excavation. GL:102 mm.
Lækur	horse	calc	1	l	2345			
Lækur	horse	astr	1	l	1234			
Lækur	horse	astr	1	r	1234			
Lækur	horse	t4	1	r				cuboid.
Lækur	horse	tar	1					Grand Cuneiform
Lækur	horse	tar	1	r				Navicular
Lækur	horse	cacc	1	l				Pisiform
Lækur	horse	cacc	1	r				Pisiform
Lækur	horse	cint	1	r				Lunate
Lækur	horse	thor	1	b		f	f	Damaged by shovel on posterior articular surface during excavation
Lækur	horse	thor	1	b		f	f	
Lækur	horse	thor	1	b		f	f	
Lækur	horse	thor	1	b		f	f	
Lækur	horse	vert	1					frag
Lækur	horse	vert	1					frag
Lækur	horse	phal1	1	b	123	f	f	GL:79
Lækur	horse	phal1	1	b	123	f	f	GL:83,6
Lækur	horse	phal1	1	b	123	f	f	GL:83,1
Lækur	horse	phal1	1	b	123	f	f	GL:79,5
Lækur	horse	phal2	1	b	123	f	f	
Lækur	horse	phal2	1	b	123	f	f	
Lækur	horse	phal2	1	b	123	f	f	
Lækur	horse	phal2	1	b	123	f	f	
Lækur	horse	phal3	1	b	1	f		
Lækur	horse	tib	1	l	89			
Lækur	horse	unlong	1					
Lækur	horse	scap	1	r	12			
Lækur	horse	tib	1	l	1			

Traðarholt, Stokkseyrarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1841	horse	cran frag	1					
1841	horse	mandibular molar	10					Real root little or not formed, exept on p2 (crown: 43,8)
1841	horse	maxm	2					Real root little or not formed
1841	horse	I	5					Occlusal surface flat and oval, infundibulum wide open
1841	horse	lumb	1	b		fg	u	
1841	horse	pel	1	l	12345678AB			Obturator foramen seems oval and Ischiatic arch angled.
1841	horse	pel	1	r	1235			
1841	horse	fem	1	l	23456789AB	f	f	
1841	horse	tib	1	l	123456789A	f	f	GL:331
1841	horse	m/t	1	l	12345678	f	f	GL: 253
1844	horse	mandibular molar	7					Real root
1844	horse	maxm	6					Real root
1844	horse	I	2					infundibulum almost worn to mark
1844	horse	lumb	1	b		f	f	
1844	horse	rib	9					
1844	horse	fem	1	l	236789AB		f	
1844	horse	tib	1	l	123456789A	f	f	GL:362, Bd:74,6
1844	horse	tib	1	r	123456789A	f	f	GL:359, Bd:72,1. A bit more eroded than tibia above
1844	horse	m/t	1	l	12345678	f	f	GL:264, Bp:50,3, Bd:47,9
1844	horse	m/t	1	r	12345678	f	f	GL:265, Bp:51,2, Bd: 47,2, SD:24,7
1844	horse	hum	1	l	123456789AB	f	f	SD:37,4 mm
1844	horse	hum	1	r	3456789AB		f	
1844	horse	rad	1	l	123456789K	f	f	GL:337, Bd: 72,1, Bp: 82,6
1844	horse	rad	1	r	123456789K	f		
1844	horse	m/c	1	l	12345678	f	f	GL:218, Bp:49,7
1851	dog	tib	1	r	2			
1851	dog	hum	1	l				distal half of diaphysis
1851	uim	unlong	1					
1853	horse	scap	1	r	12345679			
1853	horse	phal1	1	b	12	f		

1853	horse	carp	1	r				Magnum
1853	uim	cran frag	1					
1853	uim	uim	2					
1853	lm	vert	1					small frag
1853	lm	rib	2					

Þórðarholt, Þjórsárdalur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
12562	cow	m/c	1		125678	f		very weathered, white and fractured
12562	cow	maxMol	3					weathered
12562	cow	m	1					r m3, Grant: e
12562	cow	m	1					p4, Grant: c
12562	horse	m	2					very weathered, white and fractured
12562	sh/g	m	5					1 molar complete, rest fragments
12562	lm	cran frag	1					
12562	lm	unlong	1					
12562	lm	m						
12562	uim	m	17					frags
12562	uim	uim	7					frags

Hafurbjarnarstaðir, Miðneshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
642	pig	maxm	1	r				M3, unerupted, Gl:30,1
571	horse	max+	1	r				M3, M2, M1, P4. Real root well formed on M3. Light in colour
571	horse	rad	1	l	123456789K	f	f	GL:305, Bd:78,0, Bp:80,8. Light in colour
571	horse	hum	1	r	123456789AB	f	f	GL:270, Bp:94,9. Light in colour
570a	dog	rad	1	r	1234	f	f	GL:191 mm
570b	dog	rad	1	l	1234	f	f	GL:193
572a	dog	crania	1	b				Parietale, temporalis, occipitale and perioticum. Does not seem to have been poleaxed. 25: 41,8; 38: 64,7
572b	dog	mand	1	l	13			M1 little worn. 13: 21,8 mm; 18: 61,6 mm
572b	dog	fem	1	l	123456	f	f	GL:207, Bp:44,4, DC:22,1
572b	dog	hum	1	r	1234	f	f	GL:197, Dp:47,4, Bd:37,3
572b	dog	m/t2	1	r	123	f	f	
13683b	dog	cran frag	18	b				
13683b	dog	max+	1	r				M2 og m3. Wear on m2
13683b	dog	mand	1	l	123			Canine, p4, m1 og m2 (carnassial). M2 quite worn. #13(m3): 19,45. #18:36,4. #7:73,77. #8:64,26
13683b	dog	mand	1	r	123			P4, m1, m2, m3. M2 in wear
13683b	dog	at	1	b				
13683b	dog	cerv	1	b		f	f	Callus bone around ventral half of posterior articular surface
13683b	dog	thor	1	b		f	f	
13683b	dog	thor	1	b		f	f	
13683b	dog	thor	1	b		f	f	
13683b	dog	thor	1	b		f	f	Some callus bone by anterior articular surface
13683b	dog	thor	1	b		f	f	
13683b	dog	lumb	1	b		f	f	
13683b	dog	lumb	1	b		f	f	
13683b	dog	lumb	1	b		f	f	Some callus bone ventrally of posterior articular surface
13683b	dog	sac	1	b		f	f	
13683b	dog	rib	22					
13683b	dog	scap	1	l	123		f	GL(HS):120,3, GLP:26,4, SLC:20,7
13683b	dog	hum	1	l	1234	f	f	GL:138,37, Dp:32,3, Bp:25,3
13683b	dog	hum	1	r	1234	f	f	GL:137,5, Dp:32,2, Bd:26,5
13683b	dog	rad	1	r	1234	f	f	
13683b	dog	ulna	1	l	1234	f		GL:167
13683b	dog	ulna	1	r	1234	f		
13683b	dog	fem	1	l	123456	f	f	GL:150,5, Bp:32,7, Bd:26,6
13683b	dog	tib	1	l	123456	f	f	GL:153,3, Bp:29,6, Bd:18,8
13683b	dog	pel	1	l	123	f	f	GL:129
13683b	dog	pel	1	r	123	f	f	GL:130
13683b	dog	fib	1	l				
13683b	dog	astr	1	l				

13683b	dog	calc	1	l		f	f	
13683b	dog	astr	1	r				
13683b	dog	calc	1	r		f	f	
13683b	dog	t4	1					Cuboid
13683b	dog	tar	1	l				Navicular
13683b	dog	tar	1	r				Navicular
13683b	dog	tar	1	r				Lateral cuneiform
13683b	dog	carp	1	r				Triquetral
13683b	dog	m/c3	1	l	123	f	f	GL:53,3
13683b	dog	m/c5	1	r	123	f	f	
13683b	dog	m/t2	1	l	123	f	f	GL:51,8
13683b	dog	m/t2	1	r	123	f	f	
13683b	dog	m/c3	1	l	123	f	f	GL:58,1
13683b	dog	m/t3	1	r	123	f	f	
13683b	dog	m/t4	1	l	123	f	f	GL:60,8
13683b	dog	m/t4	1	r	123	f	f	GL:60,9
13683b	dog	m/t5	1	l	123	f	f	
13683b	dog	m/t5	1	r	123	f	f	GL:57,1
13683b	dog	phal1	1			f	f	
13683b	dog	phal1	1			f	f	
13683b	dog	phal2	1			f	f	
13683b	dog	phal2	1			f	f	
13683b	dog	phal2	1			f	f	
13683b	dog	phal3	1					
13683b	sh/g	calc	1	l	12345	f		GL:55,9
13683b	cow	maxm	1					
13683b	uim	unlong	1					
13683b	uim	unlong	1					
13683b	uim	unlong	1					
13683b	uim	vert	1					
13683b	uim	vert	1					
10/10.38	horse	scap	1	r	12345		f	White and weathered
10/10.38	sh/g	ax	1	b		f	f	White and weathered
10/10.38	lm	pel	1	r	26			Ischium, equus or bos
13/11.38	seal	tib	1	r		u	u	White
13/11.38	seal	fib	1	r		u	u	White
13/11.38	seal	pel	1	r			u	
13/11.38	seal	cerv	1	b		u	u	
13/11.38	seal	m/t1	1	l		u	f	White
13/11.38	seal	m/t2	1	l		u	f	White
13/11.38	seal?	rib	1			u	u	White
13/11.38	seal?	cran frag	2					White
13/11.38	seal	t4	1	r				cuboid
13/11.38	horse	at	1	b		f	f	White
13/11.38	horse	cerv	1	b		f		White and weathered
13/11.38	lm	cerv	1	b				possibly equus
13/11.38	lm	rib	2					White
13/11.38	sh/g	tar	1	l				Central tarsal
13/11.38	sh/g	hum	1	l			f	
13/11.38	sh/g	hum	1	l			u	
13/11.38	uim	unlong	1					
13/11.38	dog	lumb	1	b		f	f	White

13/11.38	seal	thor	1	b		u	u	
31/5.47	seal?	cran frag	1	l				
31/5.47	uim	cran frag	1					
31/5.47	uib	humB	1	l	123	f	f	GL:104
3/5.39	lm	rib	8					
3/5.39	seal	fib	1	l		u	u	
3/5.39	sheep	pel	1	r	1234568			
3/5.39	sheep	hum	1	r	78		f	polished texture
3/5.39	sheep	calc	1	r	12345	f		
3/5.39	sheep	calc	1	l	123	f		
3/5.39	sh/g	rad	1	r	1257	f		
3/5.39	sh/g	rad	1	l	5			
3/5.39	sh/g	scap	1	r	123			
3/5.39	sh/g	fem	1	l	78		f	polished texture
3/5.39	sh/g	hum	1	r	B			polished texture
3/5.39	sh/g	m/t	1					polished texture
3/5.39	sh/g	m/t	1					polished texture
3/5.39	sh/g	rad	1	r	8K			Weathered
3/5.39	cow	m/p	1				f	Weathered
3/5.39	horse	DP2	1	r				max molar, very worn
3/5.39	horse?	tar	1	l				cuboid
3/5.39	horse?	tar	1	l				Triquetral Pyramidal
3/5.39	lm	tar	1					
3/5.39	uim	unlong	29					All frags have polished texture
3/5.39	uim	uim	5					
3.5.1939	ma	cl	1		BCD			

Barðastrandarsýsla

Berufjörður, Reykhólahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
4483	dog	hum	1	l	1234	f	f	GL:166; Dp:39.2; Bd:(eroded)24.2
4483	dog	hum	1	r	234		f	
4489	horse	maxm	8					No real roots. Age at death 5-7 yrs
4483	dog	rad	1	l	12	f		
4483	dog	scap	1	l	12		f	
4483	dog	tib	1	l	123	f		
4483	uim	ui	6					Probably dog, rib frags and more
4483	dog	ulna	1	r	123	f		

Hringsdalur (2008), Ketildalahreppur

C	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
110	sheep	fem	1	l	145	fg		
110	uim	ui	1					
111	mm1	cran frag	1					
111	mm1	ui	8					
111	ma?	scl	1	r	AB			
114	cow	phal2	1		2	u	u	
114	lm	rib	1					
114	mm1	rib	1					
114	uib	coraB	1	l	12			
114	uib	ui	9					
114	uim	can	7					
114	uim	uim	20					
114	uim	unlong	1					
114	uim	can	4					
114	uim	uim	9					
114	uim	cran	2					

Vatnsdalur, Patreksfjarðarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1964:136	dog	at	1	b		f	f	
1964:136	dog	ax	1	b		f	f	
1964:136	dog	cerv	1	b		f	f	
1964:136	dog	cerv	1	b		f	f	
1964:136	dog	cerv	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b		f	f	
1964:136	dog	thor	1	b				
1964:136	dog	thor	1	b				
1964:136	dog	vert	1			f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	sac	1	b		f	f	
1964:136	dog	cran frag	34					
1964:136	dog	rib	34					
1964:136	dog	pel	2	l	123	f	f	
1964:136	dog	pel	1	r	123	f	f	
1964:136	dog	scap	1	l	123		f	HS:119, GLP:23,1, SLC:17,3
1964:136	dog	scap	1	r	123		f	The blade is torn in a ventral direction proximally on the cranial edge, making a 28 mm long rift, separating a 3 – 7 mm thick lobe from the rest of the blade. The lobe is curled up and still attached to the rest of the blade at its ventral end. HS:117,7, GLP:23,5, SLC:17,8
1964:136	dog	hum	1	r	1234	f	f	GL:137, Dp:31,8, Bd:24,5, Bp:23,0
1964:136	dog	hum	1	l	1234	f	f	Lipping on lateral side of proximal diaphysis and epiphysis. GL:136,7, Bd:24,6

1964:136	dog	rad	1	r	1234	f	f	GL:138,7
1964:136	dog	rad	1	l	1234	f	f	GL:141,3, Bp:14,3, Bd:17,8
1964:136	dog	fem	1	l	123456	f	f	GL:152, Bp:29,9, DC:14,8
1964:136	dog	fem	1	r	123456	f	f	GL:151,8, Bp:29,9, DC:14,8
1964:136	dog	tib	1	l	123456	f	f	
1964:136	dog	tib	2	r	123456	f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal1	1	b		f	f	
1964:136	dog	phal2	1	b		f	f	
1964:136	dog	phal2	1	b		f	f	
1964:136	dog	phal2	1	b		f	f	
1964:136	dog	phal2	1	b		f	f	
1964:136	dog	phal2	1	b		f	f	
1964:136	dog	phal2	1	b		f	f	
1964:136	dog	phal3	1	b		f		
1964:136	dog	phal3	1	b		f		
1964:136	dog	phal3	1	b		f		
1964:136	dog	phal3	1	b		f		
1964:136	dog	m/t5	1	r		f	f	
1964:136	dog	m/t3	1	r	123	f	f	
1964:136	dog	m/t3	1	l	123	f	f	
1964:136	dog	m/c4	1	l	123	f	f	
1964:136	dog	m/c5	1	l	123	f	f	
1964:136	dog	m/c5	1	r	123	f	f	
1964:136	dog	m/c2	1	r	123	f	f	
1964:136	dog	ulna	2	l	1234			GL: 164
1964:136	dog	StBrae	4					
1964:136	dog	caud	6	b				
1964:136	dog	astr	1	l	1234			
1964:136	dog	astr	1	r				
1964:136	dog	calc	1	l		f		
1964:136	dog	calc	1	r		f		
1964:136	dog	t4	1	l				cuboid
1964:136	dog	t4	1	r				cuboid
1964:136	dog	tar	1	r				Lateral cuneiform
1964:136	dog	tar	1	l				navicular
1964:136	dog	tar	1	r				navicular
1964:136	dog	c4	1	l				hamate
1964:136	dog	bac	1	b				
1964:136	dog	m/c	1	r				accessory m/c

1964:136	dog	I	1					worn
1964:136	dog	fib	1	l			f	distal part
1964:136	dog	rib	13	b				
1964:136	dog	m/t5	1	l	123	f	f	GL:52,1, light in colour and well preserved
1964:136	dog	m/c3	1	r	123	f	f	GL: 52,6
1964:136	dog	m/t2	1	r	123	f	f	GL: 49,4
1964:136	dog	m/t4	1	r	123	f	f	GL:57,5
1964:136	dog	m/c4	1	r	123	f	f	GL:51,8
1964:136	dog	m/c2	1	l	123	f	f	metapodial, probably m/c2, GL:45,2
1964:136	dog	phal	1	b		f	f	phal1or2. GL:16,8
1964:136	dog	phal	1	b		f	f	phal1or2. Eroded.
1964:136	dog	phal	1	b		f	f	phal1or2. GL:20,6
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	lumb	1	b		f	f	
1964:136	dog	max+	1	l				p3, p4, m1 present. M1 and p3 unworn, p4 little worn
1964:136	dog	max+	1	r				P3,p2,p1 present. P2 and p1 unworn, p3 little worn
1964:136	dog	maxm	2	r				p4, m1. P4 little worn and articulates with maxilla above. M1 unworn
1964:136	dog	C	2	b				Unworn
1964:136	dog	molar	1					
1964:136	dog	I	5					
1964:136	dog	mand	1	r	123			C, p3, m1, m2 present. Canine and p3 unworn, m1 and m2 little worn. P2 and p4 are missing, not post-mortem taphonomy since the alveolar bone has resorbed. The alveolar bone where the p2 should be is dented and rough,where the p4 should be the alveolar bone is smoother but still porous. 1 (mandible broken anteriorly):110,1; 18:43,5; 13: 19,3; 20: 14,3
1964:136	dog	mand	1	l	123			C, p3, m1, m2 present. Canine and p3 unworn,

								m1 and m2 little worn. P2 and p4 are missing, not post-mortem taphonomy since the alveolar bone has resorbed. The alveolar bone where the p2 should be is dented and rough,where the p4 should be the alveolar bone is smoother but still porous. A tooth is visible in a small hole in the alveolar bone between C and p3. 1 (mandible little bit broken anteriorly):117,2; 18:42,5; 13:19,2; 20:14,8
1964:136	gm	vo	1	b	ABCD			broken distally
1964:136	horse	maxm	4					3 molars and 1 Incisor wrapped in paper, "above ground" written on 1 molar. The teeth are weathered, cracked and light in colour. Molars have real roots.
1964:136	mm1	unlong	1					
1964:136	mm1	ui	2					
1964:136	uib	axB	1	b		f	f	
1964:136	uib	cerv	1	b		f	f	
1964:136	uib	cerv	1	b		f	f	
1964:136	uib	cerv	1	b		f	f	
1964:136	uib	coraB	1	l	12			GL:43,8, Bb:17,7. Light in colour
1964:136	uib	coraB	1	l	1			Frag from smaller coracoid than above
1964:136	uib	fem	1	l	12	f		Light in colour
1964:136	uib	tibio	1	r	12		f	Light in colour and well preserved
1964:136	uib	ulnaB	1	l	12	f		
1964:136	uib	tibio	1	r	2			
1964:136	uib	ui	2					
1964:136	uif	v	1	b				
1964:136	uif	uif	1					
1964:136	uim	uim	13					
1964:136	uim	ui	3					
1964:136	wolffish	t	2					
1964:136	uim	rib	1					
1964:136	uim	uim	3					
1964:136	uim	hcfrag	1					

1967:341	lm	rib	15					
1967:341	uim	ui	11					
1967:341	horse	sac	1	b		f	f	well preserved
1967:341	uib	humB	1	l				white and bit weathered
1967:341	lm	cerv	1	b		f	f	probably equus
1967:341	lm	vert	2				f	
1967:341	lm	ic	3					
1967:341	lm	StBrae	1					
1967:341	sh/g	calc	1	r	12345	f		White and looks modern
1967:341	uim	uim	5					smaller bag
1967:341	mm1	rib	1					smaller bag
1967:341	mm1	unlong	1				f	smaller bag
1967:341	mm1	cran frag	1					smaller bag
1967:341	lm	caud	1	b		f	f	smaller bag. Equus?
1967:341	wolffish	t	7					
1968_óskr	lm	ic	4					
1968_óskr	lm	rib	50					
1968_óskr	lm	rib	1					4 cutmarks, butchery
1968_óskr	horse	scap	1	l	123		f	
1968_óskr	horse	at	1	b		f	f	Light in colour
1968_óskr	horse	cerv	1	b		f	f	
1968_óskr	horse	cerv	1	b		f	f	
1968_óskr	horse	thor	1	b		f	f	
1968_óskr	horse	thor	1	b		f	f	
1968_óskr	horse	thor	1	b		f	f	
1968_óskr	horse	thor	1	b		f	f	
1968_óskr	horse	thor	1	b				
1968_óskr	horse	thor	1	b				
1968_óskr	horse	thor	3	b		f	f	medio-lateral fissure across the posterior articular surface of all verts. Quite a lot of lipping, on all vertebrae, osteophytic projections extending beyond the end of each vertebra toward the adjacent one, the beginnings of vertebral ankylosis
1968_óskr	horse	lumb	1			f	f	lumb 1. osteophytic projections extending toward the adjacent vert
1968_óskr	horse	lumb	1	b		f	f	lumb 1. osteophytic projections extending toward the adjacent vert
1968_óskr	horse	lumb	1	b		f	f	lumb 3. medio-

								lateral fissure across the posterior articular surface . toward the adjacent vert
1968_óskr	horse	lumb	1	b		f	f	lumb 4. osteophytic projections extending toward the adjacent vert
1968_óskr	horse	lumb	1	b		f	f	lumb 5 and 6 fused
1968_óskr	horse	sac	1	b		f		
1968_óskr	uim	uim	2					
1968_sumar	human	cerv	1	b		f	f	
1968_sumar	dog	phal1	1	b		u	f	Weathered
1968_sumar	dog	m/t2	1	l	123	f	f	GL:49,5
1968_sumar	lm	rib	4					
1968_sumar	human	culn	1	l				probably human triquetrum
1968_sumar	uim	can	2					
1968_sumar	uim	uim	10					
1968_sumar	lm	ic	6	b				
1968_sumar	wolffish	t	12					
29.11.1968	uib	fem	1	r	12	f		
29.11.1968	mm1	unlong	1					
1970:012	horse	ax	1	b		f	f	Very well preserved, greasy, looks modern
1970:012	horse	cerv	1	b		f	f	Well preserved
1970:012	horse	thor	1	b		f	f	Light in colour
1970:012	horse	thor	1	b				Light in colour, looks modern
1970:012	horse	thor	1	b			f	Light in colour, looks modern
1970:012	horse	caud	1	b		f	f	Light in colour
1970:012	horse	caud	1	b		f	f	Light in colour
1970:012	horse	caud	1	b		f	f	
1970:012	horse	rib	7	b				
1970:012	lm	ic	7	b				3 cutmarks on longest ic
1970:012	lm	vert	1	b				Light in colour
1970:012	uim	uim	10					
1970:012	gad	px	1	r	ABC			Light in colour
1970:012	wolffish	px	1					

Vestur-Húnavatnssýsla

Þóreyjarnúpur, Kirkjuhvammshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
10435a	horse	tib	1	r	123456789A	f	f	good texture, GL:355, Bd:69,4. Lipping on lateral side of proximal epiphysis

Brandsstaðir, Bólstaðarhlíðarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1967081	horse	at	1	b		f	f	
1967081	horse	calc	1	r	12345	f		
1967081	horse	calc	1	l	12345	f		
1967081	horse	cerv	1	b		fg	fg	
1967081	horse	cerv	1	b				
1967081	horse	fem	1	r	9AB			
1967081	horse	m/c	1	r	12345678	f	f	GL:239; Bd:49; Bp:51
1967081	horse	m/c	1	b	12345678	f	f	GL:241; Bd:48.2; Bp:51
1967081	horse	m/c2	1	r				
1967081	horse	m/t	1	l	12345678	f	f	GL:276
1967081	horse	mand	1	l	27			C present. Age at death 5-7 yrs (2 & 3 I)
1967081	horse	rad	1	r	123456789K	f	f	GL:342; Bd:74.2; Bp(eroded):78.2
1967081	horse	rad	1	l	125	f		
1967081	horse	sac	1	b		fg	fg	
1967081	horse	scap	1	l	23		f	
1967081	horse	thor	1			f	fg	
1967081	horse	tib	1	l	456789A	f	f	
1967081	horse	tib	1	r	56789A		f	
1967081	horse	ulna	1	r	ABCDEFGHJ	f		
1967081	horse	ulna	1	l	ABC	f		

Stafn, Bólstaðarhlíðarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11494	horse	m/t	1	r	12345678	f	f	GL:258
11494	horse	C	1					Weathered
11494	horse	P2	1	r				right manibular p2. Crown 42 mm.
11494	horse	P2	1	l				Left maxillary p2. Crown 50 mm. Occlusal surface unevenly worn
11494	horse	maxm	1	l				Crown 54,6
11494	horse	maxm	1	l				Crown 65,1
11494	horse	I	6					Back edge of 4 is recently in occlusion, the other 2 are more triangular but still quite oval/flat and wide open. Age at death 5-6 yrs

Tindar, Svínavatnshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
12093	horse	mand	1	b	1234567BCDE			Canines worn. All molars present. 1 incisor: left I3 with mark worn away. 20 yrs (at least)
12093	horse	maxm	1	r				Worn, crown: 28 mm
12093	horse	maxm	3	l				m1, m2, m3. worn
12093	horse	I	2					Very worn, no marks
12093	horse	m/t	1	r	12345678	f	f	GL:273, Bp:50,1
12093	horse	m/c	1	r	12345678	f	f	GL:228 (a bit eroded)
12093	horse?	hyo	1	b				
12093	horse?	rib	1					

Skagafjarðarsýsla

Austarihóll, Haganeshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
None	horse	astr	1	l	1234			
None	horse	astr	1	r	1234			
None	horse	calc	1	l	12345	f		
None	horse	calc	1	l	12345	fg		
None	horse	calc	1	r	2345			
None	uim	cran frag	1					
None	horse	fem	1	r	123456789AB	f	f	
None	horse	fem	1	l	123456789AB	f	f	
None	horse	fem	1	l	123456789AB	u	f	
None	horse	fem	1	r	2356	u		
None	horse	lumb	1	b		f	f	
None	horse	lumb	1	b		f	f	
None	horse	lumb	1	b		f	f	
None	horse	lumb	1	b		f	f	
None	horse	lumb	1	b		u	u	
None	horse	m/t	1	l	12345678	f	f	GL:271; Bp:48,1
None	horse	m/t	1	r	12345678	f	f	
None	horse	m/t2	1	l				
None	horse	m/t4	1	l				
None	horse	pel	1	l	1234567ABC	f	f	
None	horse	pel	1	r	1234567ABC	f	f	
None	horse	pel	1	l	123456789ABC	f	f	
None	horse	pel	1	r	12345679ABC	f	f	
None	horse	phal1	1	b	123	f	f	
None	horse	sac	7	b		f	f	
None	horse	sac	6	b		u	u	
None	horse	scap	1	r	123457		f	
None	horse	t2	1	l				
None	horse	t2	1	r				
None	horse	t3	1	l				
None	horse	t3	1	r				
None	horse	tib	1	r	123456789A	f	f	
None	horse	tib	1	l	569A		f	
None	horse	tib	1	r	5689A		f	
None	horse	tib	1	l	56A		f	
1964:270	uim	ui	1					Wood remains on bone
None	uim	ui	8					
none	horse	vert	1	b		u	u	

Elivogar, Seyluhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	AGE	NOTES
15690	horse	cran frag	2						
15690	uim	rib	1						
15690	horse	m/c	1	l	12345678	f	f	a	GL:214, Bp:45,2
15690	horse	m/c	1	r	12345678	f	f	a	GL:214
15690	horse	m/t	1	l	125678	f		a	
15690	horse	astr	1	r	1234				
15690	horse	calc	1	r	12345	f		a	
15690	horse	tcen	1	r					
15690	horse	tar	1	l					
15690	horse	cint	1	r					
15690	horse	carp	1	l					carpal, magnum
15690	horse	crad	1	r					
15690	horse	phal1	1		123	f	f	a	
15690	horse	phal1	1	b	23		f	a	
15690	uim	ui	2						
15690	horse	cerv	1	b		f	f	a	
15690	horse	cerv	1	b		f	f	a	
15690	horse	thor	1	b		f	f	a	
15690	horse?	pel	1	r	123	f	f	a	Lighter in colour than rest of assemblage

Enni, Viðvíkurhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11720	horse	rib	29					Frags of varying size
11720	horse	thor	1	b		f	f	
11720	horse	thor	1	b		f	f	
11720	horse	thor	1	b		f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	thor	1			f	f	
11720	horse	lumb	1			f	f	
11720	horse	lumb	1			f	f	
11720	horse	sac	1	b		f	f	
11720	horse	ax	1	b		f	f	
11720	horse	cerv	1	b		f	f	
11720	horse	cerv	1			f	f	
11720	horse	cerv	1	b		f	f	
11720	horse	cerv	1	b		f	f	
11720	horse	pel	1	r	57A			
11720	horse	pel	1	l	57A			
11720	horse	scap	1	r	1234567		f	Fragmented
11720	horse	fem	1	l	12345	f		
11720	horse	pat	1	r				
11720	horse	mand	4	r	1356BCDE			Fragmented. M3, m2, m1 and p4 in place. Adult but not old.
11720	horse	crania	15	b				Fragmented. 5 molars with real root.

Grafargerði, Hofshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11526	sh/g	fem	1	l	789AB		f	
11526	mm1	unlong	1				f	
11526	mm1	vert	1	b				
11526	uim	uim	3					
11526	horse	cerv	1	b		f	f	
11526	horse	thor	1	b		f	f	
11526	horse	thor	1	b				
11526	horse	crad	1	l				
11526	horse	carp	1	l				Magnum
11526	sheep?	pel	1	l				Fragment of ilium

Ljótsstaðir, Hofshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
None	horse	I	1					Probably I3. In wear but infundibulum still open and occlusal surface quite oval
None	horse	I	1					I1 or 2. Quite worn, but also eroded
None	horse	C	1					Weathered
None	horse	radius and ulna	1	r		f	f	GL(rad):326, Bp:81,7
None	horse	m/c	1	l	12345678	f	f	M/c2 is fused with m/c3. GL:211. Bp:45,9
None	horse	m/c	1	r	125678	f		M/c2 and 4 fused with m/c3
None	horse	astr	1	l	1234			
None	horse	phal1	1	l	123	f	f	GL:75. Bp:48,9
None	horse	phal1	1	b	123	f	f	
None	horse	phal2	1	b	123	f	f	
None	horse	pat	1	r				
None	horse	tib	1	l				Small frag of proximal tibia
None	uim	uim	2					

Sólheimar, Staðarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
15688	horse	m/t	1	r	12345678	f	f	
15688	horse	m/c	1	l	12345678	f	f	GL:210
15688	horse	m/c	1	r	12345678	f	f	GL:210
15688	horse	m/c	1	l	12345678	f	f	M/c2 fused with m/c3. GL:230, Bp:50,6
kuml2	horse	m/t	1	r	12345678	f	f	m/t2 fused with m/t3. GL:269, Bp:48,4
kuml2	horse	m/t4	1	r				articulates with m/t above
kuml2	horse	phal1	1	b	123	f	f	
kuml2	horse	phal1	1	b	123	f	f	
kuml2	horse	phal1	1	b		f	f	
kuml2	horse	phal1	1	b	123	f	f	
kuml2	horse	phal2	1	b	123	f	f	
kuml2	horse	phal2	1	b	123	f	f	
kuml2	horse	phal2	1	b	123	f	f	
kuml2	horse	phal3	1	b	1	f		
kuml2	horse	thor	1	b		f	f	
kuml2	horse	calc	1	l	12345	f		
kuml2	horse	calc	1	r	12345	f		
kuml2	horse	astr	1	l	1234			
kuml2	horse	astr	1	r	1234			
kuml2	horse	t2	1	l				grand cuneiform
kuml2	horse	t3	1	l				navicular
kuml2	horse	t2	1	r				grand cuneiform
kuml2	horse	t3	1	r				navicular
kuml2	horse	t4	1	l				cuboid
kuml2	horse	t4	1	r				cuboid
kuml2	horse	ses	1					
kuml2	uim	uim	1					
kuml2	uim	cran frag	2					

Þorljótsstaðir, Lýtingsstaðahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
14012b	horse	at	1	b				good texture
14012c	dog	rad	1		r	f	f	good texture. GL:146,6

Öxnadalsheiði, Akrahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1962:209	horse	23t	1	r				Grand cuneiform og navicular fused
1962:209	horse	astr	1	l	1234			
1962:209	horse	astr	1	r	1234			
1962:209	horse	calc	1	r	12345	f		
1962:209	horse	calc	1	l	12345	f		
1962:209	lm	cerv	1	b				probably equus, white and weathered. A note is tied to the bone: "Horse bone, found in gravel pit near the kuml at Öxnadalsheiði"
1962:209	horse	cint	1	l				Lunate
1962:209	horse	fem	1	r	123456789AB	f	f	Weathered and with lichen. GL(eroded):353
1962:209	horse	fem	1	l	123456789AB	f	f	GL(eroded):362 mm
1962:209	horse	m/p	1					accessory
1962:209	horse	m/p	1					accessory
1962:209	horse	m/p	1					accessory
1962:209	horse	m/p	1					accessory
1962:209	horse	m/p	1					accessory
1962:209	horse	m/t	1	r	12345678	f	f	eroded
1962:209	horse	m/t	1	l	12345678	f	f	eroded
1962:209	horse	phal	1	b		f		
1962:209	horse	phal1	1	b	123	f	f	
1962:209	horse	phal1	1	b	123	f	f	
1962:209	horse	t4	1	l				cuboid
1962:209	horse	t4	1					cuboid
1962:209	horse	tar	1	l				Grand cuneiform
1962:209	horse	tar	1	l				Navicular
1962:209	horse	tar	1	r				Lateral cuneiform
1962:209	horse	thor	1	b		f	f	3 thoracic vertebrae fused together
1962:209	horse	thor	1	b		f	f	
1962:209	horse	tib	1	r	123456789A	f	f	GL:323, Bd(a bit eroded):667
1962:209	horse	tib	1	l	123456789A	f	f	GL:320 mm

Dalvík (Brimnes), Svarfaðardalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
5845	dog	fem	1	l	3456	f	f	
5845	dog	ulna	1	l	123	f		
5845	uim	ui	1					
5845	horse	m/p	1					accessory, 2 or 4
5845	horse	m/p	1					accessory, 2 or 4
5846	horse	rib	35	b				
5846	horse	mand	1	b	123456			All molars still in mandible. Right m3, m2, m1 and pm4 have no real roots (visible due to damage on mandible)
5846	horse	I	1					infundibulum is wide open
5846	horse	I	1					infundibulum is wide open
5846	horse	I	1					infundibulum is wide open
5846	horse	I	1					infundibulum is wide open
5846	horse	I	1					infundibulum is wide open
5846	horse	I	4					
5846	horse	cran frag	7	b				
5846	horse	maxm	12					Real roots either not formed or very small
5846	horse	at	1	b				
5846	horse	ax	1	b		f	u	transverse cut mark on ventral side, 20,3 mm long
5846	horse	cerv	1	b		fg	u	
5846	horse	cerv	1	b				eroded
5846	horse	cerv	1	b		fg	u	
5846	horse	thor	1	b		fg	u	
5846	horse	thor	1			fg	u	
5846	horse	thor	1	b		fg	u	
5846	horse	thor	1	b		fg	u	
5846	horse	thor	1			f	u	
5846	horse	thor	1	b		f	u	
5846	horse	thor	1	b		fg	u	
5846	horse	thor	1	b		fg	u	
5846	horse	thor	1					
5846	horse	thor	1	b		fg	u	
5846	horse	vertep	1					thoracic
5846	horse	lumb	1	b		u	u	
5846	horse	lumb	1			fg	u	
5846	horse	pel	1	l	12345678AB	f	f	Ischiatic arch rather shallow/flat and eroded, but Obturator foramen is oval
5846	horse	fem	1	l	123456789AB	f	f	
5846	horse	fem	1	r	1			
5846	horse	pat	1	l				
5846	horse	tib	1	r	123456789A	f	f	GL:330; Bd:65,4
5846	horse	tib	1	l	123456789A	f	f	GL:334; Bd:64,7
5846	horse	calc	1	r	12345	f		

5846	horse	astr	1	r	1234			
5846	horse	calc	1	l	12345	f		
5846	horse	astr	1	l	1234			
5846	horse	m/t	1	l	12345678	f	f	GL:260; Bp:45,8
5846	horse	m/t	1	r	12345678	f	f	GL:262; Bp:45,1
5846	horse	m/p	1					accessory 2 or 4
5846	horse	scap	1	l	123456789		f	
5846	horse	scap	1	r	123456789		f	GLP:83,9; LG:56,1; BG:45,3
5846	horse	hum	1	l	123456789AB	f	f	
5846	horse	hum	1	r	123456789AB	f	f	
5846	horse	radius and ulna	1	r		f	f	
5846	horse	radius and ulna	1	l		f	f	GL(total):399; GL(radius):328
5846	horse	carp	1	l				
5846	horse	carp	1	l				
5846	horse	carp	1	l				
5846	horse	carp	1					
5846	horse	carp	1	r				
5846	horse	carp	1	r				
5846	horse	carp	1	r				
5846	horse	carp	1					
5846	horse	m/c	1	l	12345678	f	f	GL:219
5846	horse	m/c	1	r	12345678	f	f	
5846	horse	phal1	1	b	123	f	f	GL:75
5846	horse	phal1	1	b	123	f	f	GL:75
5846	horse	phal1	1	b	123	f	f	
5846	lm	vert	1	b				
5849	horse	crania	1	b				All molars, canines, no incisors. Parietale fractured. Interparietale og occippitale missing.
5849	horse	at	1	b				
5849	horse	ax	1			f		
5849	horse	cerv	1	b		f	f	
5849	horse	cerv	1	b		f	f	
5849	horse	cerv	1	b			f	
5849	horse	thor	1	b		f	f	
5849	horse	thor	1			f	f	
5849	horse	thor	1	b		f	f	
5849	horse	rib	2					
5849	horse	pel	1	r	123456789AB	f	f	Whiter than other bones in same number. Obturator foramen oval, Ischiatic arch broken but seems angled
5849	horse	pel	1	l	1234567AB	f	f	
5849	horse	fem	1	l	23456789AB	f	f	
5849	horse	fem	1	r	12356789AB	f	f	damaged during excavation on anterior side
5849	horse	radius and ulna	1			f	f	GL(rad):319
5849	horse	calc	1	l	12345	f		

5849	horse	hum	1	r	23456789AB	f	f	
5849	horse	tib	1	r	123456789A	f	f	GL:341; Bd:70,3
5849	horse	m/c	1	r	12345678	f	f	GL:213
5849	horse	m/t	1	r	12345678	f	f	
5849	horse	mandibular molar	1					Real root, crown height: 35 mm. Not m3
5849	horse	m/t	1	l	12345678	f	f	Better preserved than other long bones in box. GL:257; Bd:47,8; Bp:46,7
5849	cow	rad	1	l	349K		f	
5849a	horse	cran	3					
5849a	horse	I	1					fractured
5849a	horse	I	1					fractured
5849a	horse	I	1					fractured
5849a	horse	vert	1					very eroded
5849a	horse	vert	1					very eroded
5849a	horse	vert	1					very eroded
5849a	horse	vert	1					very eroded
5849a	horse	rib	6					
5849a	horse	tib	1	r	1234789A	f		Whiter than other bones in same number
5849a	horse	pel	1	r	5			
5849a	horse	astr	1	l	1234			
5849a	horse	phal1	1	b	123	f	f	
5849a	horse	phal1	1	b	123	f	f	
5849a	horse	phal1	1	b	123	f	f	GL:81
5849a	horse	phal2	1	b	123	f	f	
5849c	dog	hum	1	r	1234	f	f	
5849c	uim	cran frag	1					
5850	dog	crania	1	b				12:66,6.
5850	dog	mand	1	r	12			m1 and m2 are worn
5850	dog	scap	1	l	12		f	
5850	dog	scap	1	r	12		f	
5850	dog	hum	1	l	1234	f	f	GL:147
5850	dog	rad	1		123	f		
5850	dog	ulna	1	r	123	f		
5850	dog	cerv	1	b		f	f	
5850	dog	cerv	1	b		f	f	
5850	dog	thor	1	b		f	f	
5850	dog	thor	1	b		f	f	
5850	dog	sac	1	b		f	f	
5850	dog	pel	1	l	123	f	f	
5850	dog	pel	1	r	123	f	f	
5850	dog	fem	1	r	123456	f	f	GL:165, Bd:29,0
5850	dog	tib	1	r	123456	f	f	GL:166
5850	dog	fem	1	l		f	f	GL:162
5850	uim	ui	10					
5850	dog	m/p	1					
5850	dog	m/p	1					

5850	horse	m/c2	1	r				
5853	horse	m/c	1	r	12345678	f	f	GL:216; Bd:44,5; Bp:48,8
5854b	horse	max+	1	r				m3, m2, m1, pm4 og pm3. Real root on pm3, crown 40 mm
5854b	horse	fem	1	l	2356789AB	f	f	
5856	horse	rib	42					
5856	horse	pel	9					broken during excavation
5856	horse	crania	13					
5856	horse	maxm	9					real root on molars
5856	horse	mand	1	l	123456BCDE			
5856	horse	ax	1	b		f	f	
5856	horse	cerv	1	b		f	f	
5856	horse	cerv	1	b		f	f	
5856	horse	cerv	1	b		f	f	
5856	horse	thor	1	b		f	f	
5856	horse	thor	1			f	f	
5856	horse	thor	1	b		f	f	
5856	horse	thor	1	b		f	f	
5856	horse	thor	1	b		f	f	
5856	horse	thor	1	b		f	f	
5856	horse	thor	1	b		f	f	
5856	horse	thor	1			f	f	
5856	horse	thor	1	b		f	f	
5856	horse	lumb	1	b		f	f	
5856	horse	lumb	1			f	f	
5856	horse	lumb	1	b		f	f	
5856	horse	sac	2	b		f	f	
5856	horse	lumb	1	b		f	f	
5856	horse	fem	1	r	123456789AB	f	f	GL:393; Bp:116,1
5856	horse	fem	1		123456789A	f	f	
5856	horse	tib	1	r	123456789A	f	f	GL:355; Bp:75,4
5856	horse	hum	1	r	123456789AB	f	f	
5856	horse	radius and ulna	1	r		f	f	GL(total):410; GL(rad):336; Bp:81,9; Bd:73,6
5856	horse	radius and ulna	1	l		f		
5856	horse	calc	1	l	12345	f		
5856	horse	astr	1	l				
5856	horse	pat	1	l				
5856	horse	carp	1					
5856	horse	phal2	1	b	123	f	f	
5856	horse	phal3	1	b	12	f	f	
5856	horse	m/p	1					Accessory 2 or 4
5856	horse	m/p	1					Accessory 2 or 4
5856	horse	m/p	1					Accessory 2 or 4
5856	horse	m/p	1					Accessory 2 or 4
5856	horse	m/p	1					Accessory 2 or 4
5856	horse	thor	1	b		f	f	Medio-lateral fissure on posterior articular surface. Osteophytic

								growth on the ventral side of posterior and anterior joints
5856	horse	thor	1	b		f	f	Medio-lateral fissure on posterior articular surface. Osteophytic growth on the ventral side of posterior and anterior joints
5856	horse	thor	1	b		f	f	Medio-lateral fissure on posterior articular surface. Osteophytic growth on the ventral side of posterior and anterior joints
5856	horse	thor	1	b		f	f	A fissure runs horisontally across the posterior articular surface, just below the middle of the joint and another fissure runs vertical from the dorsal edge of the articular surface and ventrally to join the horisontal one, thus resembling a upsidedown T. Osteophytic growth on the ventral side of posterior and anterior joints
5856	horse	scap	1	r	12345679		f	
5856	horse	scap	1	l	12345679		f	
5856	horse	calc	1	r	12345	f	f	
5856	horse	astr	1	r	1234			
5856	horse	t2	1	r				Central tarsal. Callus bone has formed around anterior and lateral part of the distal joint surface.
5856	horse	t3	1	r				Third tarsal. Callus bone has formed around anterior and lateral part of the proximal joint surface. Some callus is starting to form on the anterior edge of the distal surface as well
5856	horse	m/t	1	r	12345678	f	f	Some callus bone around the anterior edge of the proximal articulation surface. GL:273, Bp:51,5 (might be slightly skewed due to spavin), Bd:50,7
5856	horse	m/c	1	l	12345678	f	f	Damaged during excavation. GL:230, Bp:48,7
5856	horse	m/c	1	r	12345678	f	f	GL:232
5856	horse	carp	1	l				
5856	horse	carp	1	l				
5856	horse	carp	1	l				
5856	horse	carp	1	l				
5856	horse	carp	1	r				
5856	horse	carp	1	r				
5856	horse	carp	1	r				
5856	horse	ses	1					
5856	horse	ses	1					
5856	horse	ses	1					
5856	horse	ses	1					navicular
5856	horse	phal1	1		123	f	f	
5856	horse	phal1	1	b	123	f	f	
5856	horse	phal1	1	b	123	f	f	
5856	horse	phal2	1	b	123	f	f	
5856	horse	phal2	1	b	123	f	f	
5856	horse	phal3	1	b	12	f		
5856	horse	phal3	1	b	12	f		

5856	horse	ses	1					navicular
5856	horse	ui	1					sternal foramen, 7 mm in diameter
5856	horse	ui	13					
5856	horse	caud	1	b				
5856	uim	ui	1					
6041	dog	mand	2	l	12			m2, m1, p2, canine. M1 unworn, canine little worn
6041	dog	max	2					2 frags, no teeth

Dalvík (Böggvisstaðir), Svarfaðardalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
12118	horse	23t	1	l				Spavin. Central and third tarsals fused
12118	horse	astr	1	r	1234			
12118	horse	astr	1	l				
12118	horse	astr	1	r	1234			
12118	horse	at	1	b		f	f	
12118	horse	ax	1	b		f	f	
12118	horse	C	1					worn
12118	horse	C	1					worn
12118	horse	C	1					
12118	horse	C	1					
12118	horse	C	1					
12118	horse	calc	1	l	2345			
12118	horse	calc	1	l	12345	f		
12118	horse	carp	1					
12118	horse	carp	1					
12118	horse	carp	1					
12118	horse	cerv	1	b				
12118	horse	cerv	1	b		f	f	
12118	horse	cerv	1	b		f	f	
12118	horse	cerv	1	b		f	f	
12118	horse	cerv	1	b		f	f	
12118	horse	cerv	1	b		f	f	
12118	horse	cerv	1	b		f	fg	
12118	horse	cerv	1	b		f	fg	
12118	horse	cerv	1	b		f	fg	
12118	horse	cerv	1	b		f	fg	
12118	horse	cerv	1	b		f	u	
12118	horse	crania	1	b				possible poleaxe
12118	horse	fem	1	r	123456 789AB	f	f	
12118	horse	fem	1	r	123456 789AB	f	f	GL:360 (eroded)
12118	horse	fem	1	l	79AB		f	
12118	horse	fem	1	l	45	f		
12118	horse	hum	1	l	123456 789AB	f	f	GL:279; Bp:87,7; Bd:73,1
12118	horse	hum	1	l	123456 789AB	f	f	GL284; Bp:87,8; Bd:77,1
12118	horse	I	7					older
12118	horse	I	1					Age at death 5 yrs at most
12118	horse	I	1					Age at death 5 yrs at most
12118	horse	I	1					Age at death 5 yrs at most
12118	horse	I	1					Age at death 5-6 yrs
12118	horse	I	1					older
12118	horse	I	1					older
12118	horse	I	1					older
12118	horse	I	1					
12118	horse	lumb	1	b		f	fg	
12118	horse	lumb	1	b		f	fg	
12118	horse	lumb	1	b		f	fg	
12118	horse	m/c	1	l	123456 78	f	f	m/2 and m/4 fused with m/3. GL:219; Bp:49,2
12118	horse	m/c	1	r	123456	f	f	m/2 and m/4 fused with m/3. GL:219;

					78			Bp:46,7; Bd:45,7
12118	horse	m/c	1	r	12345678	f	f	
12118	horse	m/c	1	l	12345678	f	f	
12118	horse	m/c	1	l	12345678	f	f	
12118	horse	m/p	1	b	3478		f	
12118	horse	m/p	1					2nd or 4th
12118	horse	m/t	1	r	12345678	f	f	
12118	horse	m/t	1		3478		f	
12118	horse	m/t	1	r	125678	f		Spavin. Central and third tarsals are fused to the m/t. Callus lump on on proximal epiphysis.
12118	horse	m/t	1	l	12345678	f	f	Spavin.
12118	horse	mand	2	b	1234567BCDE			Canines.Mandibles worn. Age at death perhaps 20 yrs.
12118	horse	mandibular molar	1	l				M3.Real root not yet formed
12118	horse	mandibular molar	1	l				M1 or m2.Real root beginning to form.
12118	horse	mandibular molar	1					Real root beginning to form.
12118	horse	mandibular molar	1					Real root beginning to form.
12118	horse	maxp	1					Older
12118	horse	pat	1	l				
12118	horse	pat	1	r				
12118	horse	pat	1	r				Poor texture, prob. r side
12118	sheep	pel	1	r	12345678A	f	f	Lighter colour and much better texture than rest of assemblage
12118	horse	pel	1	l	246B			
12118	horse	pel	1	r	12346	f	f	
12118	horse	pel	1	r	246	f	f	
12118	horse	pel	1		145			
12118	horse	pel	1	r	13			
12118	horse	pel	1	r	57A			
12118	horse	pel	1	r	A			
12118	horse	phal1	1	b	123	f	f	
12118	horse	phal1	1	b		f	f	GL:83
12118	horse	phal1	1	b	123	f	f	
12118	horse	phal1	1	b		f	f	
12118	horse	phal1	1	b	123	f	f	
12118	horse	phal1	1	b	123	f	f	
12118	horse	phal1	1	b	12	f		
12118	horse	phal1	1	b		f	f	
12118	horse	phal1	1	b				Prob. phal1, very eroded.
12118	horse	phal2	1	b	123	f	f	
12118	horse	phal3	1	b	1	f		
12118	horse	rad	1	r	123456789K	f	f	GL:329
12118	horse	rad	1	l	1256789K	f		
12118	uim	rib	25					
12118	horse	sac	1	b		f	u	
12118	horse	sac	1	b		f	f	
12118	horse	scap	3	l	123457		f	

12118	horse	scap	1	r	235		f	
12118	horse	scap	1	r	123		f	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	u	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	u	
12118	horse	thor	1	b		f	fg	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b		f	f	
12118	horse	thor	1	b				
12118	horse	thor	1	b		f		
12118	horse	thor	1					
12118	horse	thor	1	b				
12118	horse	thor	1	b		f		
12118	horse	tib	1	l	123478	f		
12118	horse	tib	1	r	12347	f		
12118	horse	tib	1	l	5689A		f	
12118	horse	tib	1	r	56		f	
12118	horse	tib	1	l	347	f		
12118	uim	ui	133					
12118	horse	ulna	1	r	ABC	f		
12118	horse	ulna	1	r	BCE			
12118	horse	ulna	1	r	ABC	f		
12118?	horse	crania	1	b				Crania fractured but unclear if poleaxed. Young animal, M3 erupted but no real root.
12118?	horse	m/c	1	r	12345678	f	f	m/c2 fused with m/c3. Lump of callus bone on medial diaphysis. GL:221; Bp:45,2
12118?	horse	mand	1	b	1234567BCDE			Canines present. Age at death perhaps 7 yrs.
12118?	horse	mandibular molar	1	l				pm2 from mandible above
12118?	horse	pat	1	l				
12118?a	horse	carp	1					
12118?a	horse	carp	1					

12118?a	horse	carp	1					
12118?a	horse	cran frag	2					
12118?a	horse	hum	1	r	123456789AB	f	f	
12118?a	horse	hyo	1					
12118?a	horse	I	1					Little worn. Occlusal surface oval, star large and oblong
12118?a	horse	I	1					Little worn. Occlusal surface oval, star large and oblong
12118?a	horse	I	1					Little worn. Occlusal surface oval, star large and oblong
12118?a	horse	I	1					Little worn. Occlusal surface oval, star large and oblong
12118?a	horse	I	1					Little worn. Occlusal surface oval, star large and oblong
12118?a	horse	I	1					Little worn. Occlusal surface oval, star large and oblong
12118?a	horse	I	1					
12118?a	horse	I	1					
12118?a	horse	I	1					Unworn
12118?a	horse	I	1					Unworn
12118?a	horse	m/c	1	r	12345678	f	f	
12118?a	horse	m/p	1					m/p 2 or 4
12118?a	horse	mand	1	b	27			Canines. Age at death 7 yrs at most
12118?a	horse	mandibular molar	1					Young animal, long molar w little real root
12118?a	horse	mandibular molar	1					Young animal, long molar w little real root
12118?a	horse	mandibular molar	1					Young animal, long molar w little real root
12118?a	horse	mandibular molar	1					Young animal, long molar w little real root
12118?a	horse	mandibular molar	1					Young animal, long molar w little real root
12118?a	horse	mandibular molar	1					Young animal, long molar w little real root
12118?a	horse	maxm	1					
12118?a	horse	phal1	1	b	123	f	f	
12118?a	horse	rad	1	r	349K		f	
12118?a	horse	rib	2					
12118?a	uim	unlong	1					
12118?b	horse	m/c	1	r	12345678	f	f	
12118?b	horse	m/t	1	r	12345678	f	f	
12118?b	horse	maxm	1					Real root

Litli-Dunhagi, Arnarneshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1963.153	cow	sac	1	b		f		Very well preserved anterior part. Chopped or sawed
1963.153	horse	phal1	1	r	123	f	f	Very well preserved. Part of distal epiphysis sawed off.
1963.153	horse	fem	1	r	23456789AB	fg	f	
1963.153	horse	hum	1	r	123456789AB	fg	f	
1963.153	horse	m/p2	1					m/p2 or 4
1963.153	horse	rad	1	l	12567	f		
1963.153	lm	rib	1					
1963.153	horse?	lumb	1	b		f	f	

Garðsá, Öngulstaðahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
15223	horse	rib	7	b				frags
15223	horse	mand	1	b	12457B			Both I1 and r I2 present, age at death ca. 20 yrs. Canines
15223	horse	mandibular molar	4					Real root well developed
15223	horse	maxm	6					
15223	horse	I	3					Worn
15223	horse	cran	4					small frags from posterior side
15223	horse	scap	1	r	235		f	
15223	horse	hum	1	r	3456789A		f	
15223	horse	rad	1	l	125678	f		
15223	horse	m/c	1	r	125678	f		
15223	horse	m/c	1	l	12345678	f	f	GL:220, Bp:50,9
15223	horse	pel	1	l	1234567AC	f	f	
15223	horse	pel	2		1234567AC	f	f	
15223	horse	fem	1	l	236789AB		f	
15223	horse	fem	2	r	23456789AB	f	f	Trochanter majus missing, Head boken off but fits rest of bone
15223	horse	astr	1	l	1234			
15223	horse	m/t	1	l	12345678	f	f	
15223	horse	m/t	1	r	5678			
15223	horse	phal1	1	b	123	f	f	
15223	horse	phal1	1	b	123	f	f	
15223	horse	phal2	1	b	123	f	f	
15223	horse	phal	1	b				
15223	horse	ax	1	b		f	f	
15223	horse	vert	1	b				frag
15223	horse	vert	1	b				frag
15223	horse	vert	1					frag
15223	horse	vert	1	b				frag
15223	horse	vert	1	b				frag
15223	horse	lumb	1	b				
15223	horse	cerv	1	b		f	f	
15223	horse	thor	1	b		f	f	
15223	horse	thor	1	b		f	f	
15223	horse	thor	1	b		f	f	
15223	horse	lumb	1	b		f	f	
15223	horse	lumb	1	b		f	f	
15223	horse	lumb	1	b		f	f	

Hámundarstaðaháls, Árskógshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11435	horse?	rib	7					
11435	horse	ax	1	b		f	f	
11435	horse	thor	1			f	f	
11435	horse	thor	1	b		f	f	
11435	horse	thor	1			f	f	
11435	horse	lumb	1	b		f	f	
11435	horse	sac	1	b		f	f	
11435	horse	pel	1	b	123456789ABC	f	f	Male morphology
11435	horse	fem	1	l	123456789AB	f	f	Eroded
11435	horse	fem	1	r	123456789AB	f	f	Eroded
11435	horse	tib	1	l	123456789A	f	f	Eroded
11435	horse	tib	1	l	123456789A	f	f	Eroded
11435	horse	tib	1	r	123456789A	f	f	Eroded
11435	horse	m/t	1	r	12345678	f	f	GL:256
11435	horse	m/t	1	l	12345678	f	f	GL:258
11435	horse	scap	1	l	123456789		f	Eroded
11435	horse	scap	1	r	123456789		f	Eroded
11435	horse	scap	1	l	123456789		f	
11435	horse	scap	1	r	123456789	f	f	Eroded
11435	horse	hum	1	l	123456789AB	f	f	GL:271
11435	horse	hum	1	r	123456789AB	f	f	Eroded
11435	horse	m/t	1	l	12345678	f	f	Eroded
11435	horse	m/c	1	r	12345678	f	f	
11435b	seal	pel	1	l		fg	u	
11435b	seal	scap	1	r			f	
11435b	cow	tib	1	l		u	u	

Hraukbær, Glæsibæjarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1995	sh/g	rad	1	l	349K		fg	
1995	sh/g	rad	1	l	125	f		
1995	sh/g	phal1	2	b		u	f	prox epi loose
1995	sh/g	phal1	1			f	f	
1995	sh/g	phal	1				f	1st or 2nd distal dia and epi
1995	mm1	uim	6					

Kroppur, Hrafnagilshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
None	sh/g	tib	1	r	7			
None	cow	rib	1					
None	cow	carp	1	r				Magnum
None	lm	vert	1	b		f		Frag of anterior vertebral centra
None	lm	uim	1					

Sílastaðir, Glæsibæjarhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
13702	sh/g	tib	1	l	12347	f		
13702	horse	rib	15					
13702	horse	mand	1	r	1267BCDE			All molars. Incisors 2 og 3 (occlusal surface flat, oval and infundibulum open – ca. 5 yrs). Socket for canine, but tooth missing.
13702	horse	max+	1	r				5 molars, p3,p4,m1,m2,m3. Real root started to form on p3 (crown 63 mm)
13702	horse	thor	1	b		f	f	Lipping ventrally on posterior and anterior articular surfaces
13702	horse	thor	1	b		f	f	
13702	horse	thor	1	b		f	f	
13702	horse	lumb	1	b		f	f	
13702	horse	lumb	1	b		f	f	
13702	horse	vert	1					
13702	horse	sac	1	b		f	f	
13702	horse	pel	1	l	12345689B			Acetabulum frags of ilium, pubis and ischium. Male characteristics of Ischio-Pubic form, Obturator foramen, Medial Pubis
13702	horse	pel	2					2 frags of ilium
13702	horse	fem	1	l	123456789AB	f	f	GL:368, SD:38,15, DC:54,6
13702	horse	fem	1	r	6789A		f	Bd:86,7
13702	horse	pat	1	r				
13702	horse	tib	1	r	123456789A	f	f	GL:333
13702	horse	tib	1	l	123456789A	f	f	
13702	horse	astr	1	l	1234			
13702	horse	calc	1	l	2345			
13702	horse	calc	1	r	12345	f		
13702	horse	t2	1	l				Grand cuneiform, articulates with navicular below
13702	horse	t3	1	l				navicular, articulates with grand cuneiform above
13702	horse	m/t	1	l	12345678	f	f	
13702	horse	m/t	1	r	12345678	f	f	
13702	horse	m/t	1	l	125678	f		
13702	horse	m/t	1		3478		f	
13702	horse	m/t	1	r	12345678	f	f	
13702	horse	phal1	1	b	123	f	f	
13702	horse	phal1	1	b	123	f	f	
13702	horse	phal1	1	b		f		
13702	horse	phal2	1	b	123	f	f	
13702	horse	phal2	1	b	123	f	f	
13702	horse	scap	1	l	123456789		f	
13702	horse	scap	1	r	123456789		f	GLP:88,6, BG:40,9, SLC:63,4
13702	horse	hum	1	l	23456789AB	f	f	
13735	horse	m/p	1					Accessory metapodial, eroded
13735	lm	ui	14					
13735	horse	rib	1					
13735	horse	rib	2					
13735	horse	cran frag	5					
13735	lm	sha	2					

13735	lm	uim	4					
13735	lm	vert	1	b		u	u	
13735	lm	vertep	3	b			u	
13735	horse	cint	1	l				lunate
13735	horse	carp	1	l				magnum
13735	horse	crad	1	l				scaphoid
13735	horse	tar	1	l				Grand cuneiform
13735	horse	ui	1					carpal/tarsal eroded
13735*	horse	maxm	7					
13735*	horse	mand	1	r				6 molars, little developed real root, broken
13735*	horse	mand	1	l				5 molars, m3 missing, broken
13735*	horse	I	5					occlusal surface oval and flat, infundibulum open
13735*	horse	cerv	6			fg	fg	
13735*	horse	thor	5			fg	fg	
13735*	horse	lumb	1					
13735*	horse	sac	1			f	f	
13735*	horse	rib	3					
13735*	horse	scap	1	l				
13735*	horse	scap	1	r				
13735*	horse	hum	1	l		f	f	
13735*	horse	hum	1	r		f	f	
13735*	horse	rad	1	l		f	f	
13735*	horse	rad	1	r		f	f	
13735*	horse	ulna	1	l		f		
13735*	horse	tar	2	r				grand cuneiform og navicular
13735*	horse	tar	2	l				grand cuneiform og navicular
13735*	horse	phal1	3					
13735*	horse	phal2	1					
13735*	horse	phal3	1					
13735*	horse	m/t	2			f	f	
13735*	horse	m/c	1			f	f	
13735*	horse	calc	1	l				
13735*	horse	calc	1	r				
13735*	horse	astr	1	l				
13735*	horse	astr	1	r				
13735*	horse	tib	1	l		f	f	
13735*	horse	tib	1	r		f	f	
13735*	horse	fem	1	l		f	f	
13735*	horse	fem	1	r		f	f	
13735*	horse	pel	1	l		f	f	male characteristics of ob.for. and pubis
13735*	horse	pel	1	r		f	f	male characteristics of ob.for. and pubis

* Bones part of the National Museum's permanent exhibition

Staðartunga, Skriðuhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11716	horse	rib	29					
11716	dog	rad	1	l	12	f		Light and weathered. Might belong to dog 11717
11716	horse	cran frag	1	r				right temporalis
11716	horse	pel	1	l	123456789ABC			Male characteristics of Ischio-Pubic form, Obturator foramen, Medial Pubis. Lfo: 58,3, LA:65,4, LAR:56,0
11716	horse	fem	3	l	123456789AB	u	fg	
11716	horse	pat	1	l				
11716	horse	tib	1	r	123456789A	fg	fg	
11716	horse	fem	1	r	2356789AB	u	fg	
11716	horse	m/t	1	l	12345678	f	f	
11716	horse	m/t	1	r	12345678	f	f	
11716	horse	m/p	1					2 or 4
11716	horse	hum	2	l	23456789AB	u	f	
11716	horse	thor	1	b		fg	u	
11716	horse	thor	1	b		fg	u	
11716	horse	thor	1	b			u	
11716	horse	thor	1	b			u	
11716	horse	thor	1	b			u	
11716	horse	lumb	1	b		fg	u	
11716	horse	lumb	1	b		fg	u	
11716	horse	sac	1	b		u		
11716	horse	thor	1	b				
11716	horse	thor	1	b				
11716	horse	thor	1	b				
11716	horse	vert	1					
11716	horse	cerv	1	b				
11716	horse	calc	1	l	12345	f		
11716	horse	calc	1	r	12345	f		
11716	horse	scap	1	l	12345679		f	
11716	horse	scap	1	l	89			
11716	horse	I	2					Adult
11716	horse	ax	1	b		f	f	
11716	horse	cerv	1	b		f	f	
11716	horse	cerv	1	b				
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	thor	1	b		f	f	
11716	horse	lumb	1	b			f	
11716	horse	lumb	1	b			f	
11716	horse	lumb	1	b			f	
11716	horse	sac	1	b		f	f	
11716	horse	hum	1	l	123456789AB	f	f	SD:33,8

11716	horse	radius and ulna	1	l		f	f	GL(total):401
11716	horse	tib	1	r	12356789A	f	f	GL:338, Bd:65,8
11717	dog	mand	1	l	12			Canine and all molars except m3 (no incisors). M1 og m2 in slight wear. Canine eroded but seems unworn. 13:21,1, 14:19,9, 19:25,6, 20:19,6
11717	dog	vert	1	b				
11717	dog	lumb	1	b		f		
11717	dog	hum	1	r	1234	f	f	GL:165, Dp:37,2
11717	dog	hum	1	l	234		f	
11717	dog	fem	1	r	23456	f	f	
11717	dog	tib	1	r	123456	f	f	GL:160 (a bit eroded)

Stærri-Árskógur, Árskógshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
7708a	horse	tib	1	r	56789A	u	fg	distal epiphysis just beginning to fuse
7708a	horse	m/t	2	r	12345678	f	f	GL(two pieces fitted together):266
7708a	horse	hum	1	l	3456789AB		f	eroded
7708a	horse	tib	1	l	56789A	u	fg	distal epiphysis just beginning to fuse
7708a	horse	fem	2	r	789AB		u	
7708a	horse	fem	1	r	2356	u		Probably same element as femur above
7708a	horse	pel	1	r	1234568			Obturator foramen oval
7708a	horse	pel	1	l	123457A			
7708a	horse	calc	1	l	2345	u		
7708a	horse	astr	1	l	1234			
7708a	horse	lumb	1	b		u	u	6th lumb
7708a	horse	sac	1	b		u	u	
7708a	horse	scap	1				u	
7708a	lm	uim	1					unfused fragments
7709b	horse	hum	1	r	123456789AB	f	f	Weathered. GL:291
7709b	horse	tib	1	r	123456789A	f		Weathered
7709b	horse	rad	1	l	123456789K	f	f	
7709b	horse	m/t	2	l	12345678	f	f	
7709b	horse	m/c	1	l	12345678	f	f	GL:218 mm. Accessory m/cs were fused but have broken off
7709b	horse	m/c	1	r	12345678	f	f	Accessory m/cs were fused but have broken off
7709b	horse	phal2	1	b	123	f	f	White and weathered
7709b	uim	cran frag	1					
7709b	lm	vert	1	b		u	u	
7709b	lm	vert	1					
7709b	horse	t4	1	l				cuboid
7709b	horse	tar	1	l				Grand cuneiform, weathered
7709b	horse	tar	1	l				navicular, weathered
7709b	lm	pel	1					frag of ilium
7709b	lm	pel	1	l				frag of iscium and 1/4 af acetabulum. Weathered
7709b	lm	uim	3					
7709b	lm	prox femoral epi	1	r	4	u		weathered

Ytra-Garðshorn, Svarfaðardalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
15487a	horse	fem	1	l	123456789AB	f	f	GL:363
15487a	horse	fem	1	r	123456789AB	f	f	GL:370
15487a	horse	fem	1	l	123456789AB	f	f	
15487a	horse	tib	1	r	123456789A	f	f	GL:341
15487a	horse	tib	1	l	123456789A	f	f	GL:341
15487a	horse	m/c	1	r	12345678	f	f	m/c 2 fused with m/c3
15487a	horse	m/t	1	l	12345678	f	f	GL:256, Bp:47,5
15487a	horse	m/t	1	r	12345678	f	f	GL:256
15487a	horse	radius and ulna	1	l		f	f	
15487a	horse	radius and ulna	1	r		f	f	
15487a	horse	calc	1	r	12345	f		GL:101,7
15487a	horse	astr	1	r	1234			
15487a	horse	astr	1	l	1234			
15487a	horse	tar	1	r				navicular
15487a	horse	tar	1	r				Grand cuneiform
15487a	horse	tar	1	l				navicular
15487a	horse	phal1	1	b	123	f	f	GL:80,4
15487a	horse	phal1	1	b	123	f	f	GL:84,7, Bp:51,5, Bd:44,2
15487a	horse	phal2	1	b	123	f	f	GL:44,5
15487a	horse	phal2	1	b	123	f	f	GL:46,8
15487a	horse	cran frag	1	b				occipitale
15487a	horse	at	1	b		f	f	
15487a	horse	ax	1	b		f	f	
15487a	horse	I	5					Ca. 5 yrs
15487b	horse	tib	1	l	123456789A	f	f	
15487b	horse	tib	1	r	123456789A	f	f	GL:320
15487b	horse	lumb	2	b		f	f	lumb 1 and 2, fused
15487b	horse	cran frag	1					occipitale
15487b	horse	radius and ulna	1	l		f	f	
15487b	horse	rad	1	r	123456789K	f	f	GL:302
15487b	horse	m/c	1	l	12345678	f	f	
15487b	horse	fem	1	r	123456789AB	f	f	
15487b	horse	at	1	b		f	f	
15487b	horse	phal1	1	b	123	f	f	
15487b	horse	phal1	1	b	123	f	f	
15487b	horse	calc	1	l	2345			
15487b	horse	calc	1	r	2345			
15487b	horse	astr	1	r	1234			
15487b	horse	hum	1	r		f	f	GL:284
15487b	horse	hum	1	l	123456789AB	f	f	
15487b	horse	m/t	1	r	1256	f		Navicular, Grand cuneiform, cuboid and m/t 2 fused with m/t3
15487b	horse	m/t	1	l	1256	f		Navicular, Grand cuneiform, cuboid

								and m/t 2 fused with m/t3
15487abc	horse	rib	33					
15487abc	horse	cint	1	r				lunate
15487abc	horse	carp	1	l				magnum
15487abc	horse	carp	1	r				magnum
15487abc	horse	crad	1	l				scaphoid
15487abc	horse	crad	1	r				scaphoid
15487abc	horse	c4	1	r				hamate
15487abc	horse	t4	1	l				cuboid
15487abc	horse	tar	1	r				Triquetral Pyramidal
15487abc	horse	pat	1	r				
15487abc	horse	phal3	1	b	12	f		
15487abc	horse	phal3	1	b	12	f		
15487abc	horse	StBrae	1	b				
15487abc	horse	cran frag	2					2 frags of perioticum
15487abc	horse	m/p	1					accessory, 2 or 4.
15487abc	horse	m/p	1					accessory, 2 or 4.
15487abc	horse	m/p	1					accessory, 2 or 4.
15487abc	horse	ulna	1	r	ABCDE	f		
15487abc	horse	pel	1	r	123456789ABC			Male morphology. Lfo:66,3 mm
15487abc	horse	pel	2	l	123456789ABC			Male morphology
15487abc	horse	scap	2	r	123456789		f	
15487abc	horse	scap	1	l	1234579		f	
15487abc	horse	scap	1	r	123456789		f	
15487abc	horse	scap	2	l	1234679		f	
15487abc	horse	hum	1	r	123456789A B	f	f	humerus marked "a". GL:260, SD:31,6. Wooden remains (37x37x2 mm) are stuck to the bone, distally on medial side of diaphysis, right above epiphysis
15487abc	horse	hum	1	l	12345678AB	f	f	
15487abc	horse	ax	1	b		f		anterior part of centre
15487abc	horse	cerv	1	b		f	fg	
15487abc	horse	cerv	1	b		f	f	
15487abc	horse	cerv	1	b		f	fg	
15487abc	horse	cerv	1	b		f	fg	
15487abc	horse	cerv	1	b		f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	

15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1			f	fg	
15487abc	horse	thor	1	b		f	fg	
15487abc	horse	thor	1	b		f	f	
15487abc	horse	thor	1	b		f	f	
15487abc	horse	thor	1	b		f	f	
15487abc	horse	lumb	1	b		f	fg	1 or 2
15487abc	horse	lumb	1			f	fg	1 or 2
15487abc	horse	lumb	1	b		f	fg	
15487abc	horse	lumb	1	b		f	f	
15487abc	horse	vert	1				f	
15487abc	horse	vert	1	b			f	
15487abc	horse	vert	1	b				
15487abc	horse	sac	1	b		f	f	eroded
1956aukaks	horse	hum	1	r		fg	f	
1956aukaks	horse	hum	1	l	3456789AB		f	
1956aukaks	horse	m/t	1	l	12345678	f	f	GL:267
1956aukaks	horse	m/t	1		3478		f	
1956aukaks	horse	m/c	1		345678		f	eroded
1956aukaks	horse	m/c	1		3478		f	eroded
1956aukaks	horse	rad	1	r	125678	f		
1956aukaks	horse	ulna	1	r	BCDE			articulates við radius above
1956aukaks	horse	rad	1	l	125678	f		
1956aukaks	horse	ulna	1	r	BCDE			articulates við radius above
1956aukaks	horse	fem	1	r	6789AB		f	
1956aukaks	horse	fem	1	l	5	u		eroded
1956aukaks	horse	pel	1	l	1236			acetabulum
1956aukaks	horse	pel	1	l	7A			frag of ilium
1956aukaks	horse	pat	1					very eroded
1956aukaks	horse	rib	1					
1956aukaks	horse	phal1	1	b	123	f	f	GL:75,3
1956aukaks	horse	phal1	1	b	123	f	f	GL:77,8
1956aukaks	horse	phal2	1	b	123	f	f	GL:43,4
1956aukaks	horse	phal2	1	b	123	f	f	
1956aukaks	horse	thor	1	b		fg	u	
1956aukaks	horse	thor	1	b		fg	u	
1956aukaks	horse	vert	1	b		fg	u	
1956aukaks	horse	vert	1	b		fg	u	
1956aukaks	horse	vert	1			fg	u	
1956aukaks	horse	lumb	1	b		fg	u	
1956aukaks	horse	lumb	1			fg	u	
1956aukaks	horse	sac	1	b		fg	u	eroded fragment
1956stóriks	horse	rib	25	b				
1956stóriks	horse	pel	1	r	123456789ABC			Pubis missing. Obtur foramen oval. Iscium eroded

1956stóriks	horse	scap	1	r	123456789		f	
1956stóriks	horse	scap	1	l	123456789		f	
1956stóriks	horse	fem	1	r	123456789AB	f	f	GL(eroded):365
1956stóriks	horse	tib	1	r	123456789A	f	f	GL(eroded):336
1956stóriks	horse	m/t	1	r	12345678	f	f	Woven nodules laterally on proximla articular surface. GL:265
1956stóriks	horse	m/t	1	l	12345678	f	f	GL:265
1956stóriks	horse	m/p	1					accessory m/p, 2 or 4.
1956stóriks	horse	hum	1	l	123456789AB	f	f	GL(eroded):277. New bone growth on medial diaphysis
1956stóriks	horse	hum	1	r	123456789AB	f	f	
1956stóriks	horse	radius and ulna	1	l	123456789K	f	f	
1956stóriks	horse	radius and ulna	1	r		f	f	
1956stóriks	horse	phal1	1	b	123	f	f	
1956stóriks	horse	pat	1	r				eroded
1956stóriks	horse	calc	1	r	12345	f		GL(eroded):102,6
1956stóriks	horse	astr	1	r	1234			
1956stóriks	horse	tar	1	r				Navicular
1956stóriks	horse	at	1	b		f	f	
1956stóriks	horse	cerv	1	b		f	f	
1956stóriks	horse	cerv	1	b		f	f	
1956stóriks	horse	cerv	1	b		f	f	
1956stóriks	horse	cerv	1	b		f	f	
1956stóriks	horse	lumb	1	b		f	f	
1956stóriks	horse	sac	1	b		f	f	spinous tubercles fused
1956stóriks	horse	lumb	2	b		f	f	Lumb 1 and 2 fused
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	Thor 11, osteophytic projections dorsally on vert, extending both anteriorly and posteriorly
1956stóriks	horse	thor	1	b		f	f	Thor 12, osteophytic projections dorsally on vert, extending both anteriorly and posteriorly

1956stóriks	horse	thor	1	b		f	f	Thor 13, osteophytic projections dorsally on vert, extending both anteriorly and posteriorly
1956stóriks	horse	thor	1	b		f	f	Thor 14, osteophytic projections dorsally on vert, extending both anteriorly and posteriorly
1956stóriks	horse	thor	1	b		f	f	Thor 15, osteophytic projections dorsally on vert, extending both anteriorly and posteriorly
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1956stóriks	horse	thor	1	b		f	f	
1958_6kuml	horse	hum	1	l	23456789AB	f	f	
1958_6kuml	horse	hum	1	r	234568AB	f	f	
1958_6kuml	horse	radius and ulna	1	l		f	f	prox ulna broken. GL(rad):ca 315
1958_6kuml	horse	rad	1	r	12567	f		
1958_6kuml	horse	crad	1	r				scaphoid
1958_6kuml	horse	pel	1	r	1234578A			
1958_6kuml	horse	fem	1	r	123456789AB	f	f	
1958_6kuml	horse	tib	1	r	123456789A	f	f	
1958_6kuml	horse	tib	1	l	123456789A	f	f	GL:321
1958_6kuml	horse	m/t	1	l	12345678	f	f	
1958_6kuml	horse	m/t	1	r	12345678	f	f	
1958_6kuml	horse	calc	1	l	12345	f		
1958_6kuml	horse	calc	1	r	235			
1958_6kuml	horse	astr	1	r	1234			
1958_6kuml	horse	cerv	1	b		f	f	
1958_6kuml	horse	cerv	1	b		f	f	
1958_6kuml	horse	cerv	1	b		f	f	
1958_6kuml	horse	cerv	1	b		f	f	
1958_6kuml	horse	lumb	1	b		f	f	
1958_6kuml	horse	lumb	1	b		f	f	
1958_6kuml	lm	unlong	1					very weathered diaphysis
1958_7kuml	horse	rad	1	r	125678	f		
1958_7kuml	horse	maxm	2					real root
1958_7kuml	horse	mand	5	l	1			5 frags. M3, ,m2, m1 and p4. All with real roots, m1 crown: 44 mm
1958_7kuml	horse	l	1					frag
1958_7kuml	horse	phal1	1	b	123	f	f	
1958_7kuml	horse	phal1	1	b	123	f	f	GL:82,7, Bd:45,9
1958_7kuml	horse	phal1	1	b	123	f	f	
1958_7kuml	horse	phal1	1	b		f		
1958_7kuml	horse	phal2	1	b	123	f	f	eroded

1958_7kuml	cow	astr	1	r	1234			Cut (medial) and chop (lateral) on dorsal side, possibly damage by shovel
1958_7kuml	horse	tar	1	r				navicular
1958_7kuml	horse	m/c	1	r	12345678	f	f	GL:221
1958_7kuml	horse	m/p	1					accessory m/p 2 or 4
1958_7kuml	horse	fem	1	r	123456789AB	f	f	
1958_7kuml	horse	fem	1	l	1236789AB	f	f	eroded
1958_7kuml	horse	tib	1	l	123456789A	f	f	
1958_7kuml	horse	tib	1	l	123456789A	f	f	
1958_7kuml	horse	pat	1	r				
1958_7kuml	horse	m/t	1	r	12345678	f	f	m/t2 fused with m/t3
1958_7kuml	horse	m/t	2	l	12345678	f	f	
1958_8kuml	horse	crania	1	b				Parietale and Interparietale broken (ploleaxed). Also, the Frontale is fractured after a blow. There is a circular depression on the frontal sinus, 'bowl shaped', 60 mm in diameter at the 'top rim', 15 mm deep, and the flat base is 30 mm in diameter. Incisors and canines have fallen out. Right molars: p1, p2, p3, m1, m2, m3. Left molars: p2, p3, p4. 36:35,1, 34(eroded):78,1
1958_8kuml	horse	radius and ulna	1	l		f	f	GL(total):402, GL(rad):320, Bp:79,6, Bd:70,8
1958_8kuml	horse	rad	1	r	123456789K	f	f	GL:325
1958_8kuml	horse	tib	1	l	123456789A	f	f	GL:344
1958_8kuml	horse	fem	1	l	123456789AB	f	f	
1958_8kuml	horse	scap	1	r	123456789		f	
1958_8kuml	horse	scap	2	l	123456789		f	
1958_8kuml	horse	thor	1	b		f	f	fusion line barely visible on distal epi
1958_8kuml	horse	phal1	1	l	123	f	f	GL:77,3
1958_8kuml	horse	phal1	1	b	123	f	f	GL:79,2
1958_8kuml	horse	thor	1	b		f	f	
1958_8kuml	horse	astr	1	l	1234			
1958_8kuml	horse	carp	1	l				magnum
1958_8kuml	horse	m/t	2	l	12345678	f	f	Bp:46,5, Bd:46,9
1958_8kuml	horse	m/t	1	r	12345678	f	f	GL:264
1958_8kuml	horse	m/c	1	r	12345678	f	f	GL:222, Bp:47,8
1958_8kuml	horse	rib	2	b				

1958_8kuml	horse	cacc	1					pisiform
1958_8kuml	horse	hum	1	l	123456789AB	f	f	GL:280
1958_8kuml	horse	hum	1	r	123456789AB	f	f	GL:282
1958_8kuml	horse	thor	1	b		f	f	fusion line barely visible on distal epi
1958_8kuml	horse	thor	1	b		f	f	
1958_8kuml	horse	thor	1	b		f	f	
1958_9kuml	horse	fem	1	l	2356789AB	u	fg	
1958_9kuml	horse	m/t	2	r	12345678	f	f	
1958_9kuml	horse	m/t	1	l	125678	f		
1958_9kuml	horse	lumb	1	b		u	u	
1958_9kuml	horse	sac	1	b		u	u	
1958_9kuml	horse	astr	1	l	1234			
1958_9kuml	horse	pat	1	r				
1958_10kuml	horse	mand	2	r	12			5 molars in mandible (p2,p3,p4,m1,m2), m3 loose. M3 crown: 53
1958_10kuml	horse	mand	1	l	1BCD			5 molars in mandible (p2,p3,p4,m1,m2). M2 crown: 42
1958_10kuml	horse	tib	1	r	123456789A	f	f	
1958_10kuml	horse	m/t	1	r	12345678	f	f	osteophytes medial/anterior on prox diapysis and epiphysis. m/t2 fused with m/t3
1958_10kuml	horse	m/c	1	r	12345678	f	f	
1958_10kuml	horse	hum	1	l	123456789AB	f	f	
1958_10kuml	horse	hum	1	r	3456789AB		f	
1958_10kuml	horse	radius and ulna	1	r		f	f	
1958_10kuml	horse	rad	1	l	123456789K	f	f	GL:328

Ytra-Hvarf, Svarfaðardalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
14224a	horse	max+	1	l				P3,P4,M1,M2,M3. Real root well formed
14224a	horse	max+	1	r				P3,P4,M1,M2,M3. Real root well formed
14224a	horse	mand	1	r	1BCDE			M3,M2,M1 in mandible, P4 and P3 loose. Real root well formed. P4 crown: 33 mm
14224a	horse	mandibular molar	1	l				P4 crown: 29 mm
14224b	horse	max+	1	l				P2,P3,P4,M1,M2,M3. Real root beginning to form on M2 and M3. M3 crown: 61 mm, M2 crown: 61 mm
14224b	horse	max+	1	r				P4,P3,P2,M1,M2 in maxilla
14224b	horse	mandibular molar	5	r				5 right mandibular molars that probably come from the same individual. P3,P4,M1,M2,M3. Real root forming in all molars except m3
14224b	horse	mandibular molar	5	l				5 left mandibular molars that probably come from the same individual. P3,P4,M1,M2,M3. Real root forming in all molars except m3
14224b	horse	I	1					Weathered and fractured. Infundibulum open and occlusal surface quite oval
14224b	horse	I	1					Weathered and fractured. Infundibulum open
14224b	horse	I	1					Weathered and fractured. Infundibulum open
14224	horse	thor	1	b		f	f	Osteophytic projections on ventral side by proximal articular surface
14224	horse	thor	1	b		f	f	
14224	horse	thor	1	b			f	
14224	horse	hum	1	r	123456789AB	f	f	GL:279(a bit eroded), HT:59,0
14224	horse	hum	1	l	123456789AB	f	f	GL:265 (a bit eroded), HT: 48,2 mm
14224	horse	radius and ulna	1	r		f	f	
14224	horse	rad	1	l	12567	f		
14224	horse	tib	1	l	123456789A	f	f	GL:350, Bd:72,4
14224	horse	m/p	1		468		f	
14224	horse	scap	1	r	357			
14224	horse	sac	1	b		f	f	BFcr: 41,9
14224	horse	sac	1	b		f	f	BFcr: 51,1
14224	horse	unlong	5					
14224	horse	rib	1					
14224	horse	cran frag	1					
14224	horse	mandibular molar	3	l				Fractured, real roots well formed

Gautlönd, Reykdælahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
None	dog	crania	2	b				Two frags: maxilla and occipitale. Left p4, m1, m2, right p4, m2. Adult but not old.
None	dog	mand	1	l	123			1)144, 2)140, 4)128, 7)84,6, 8)78,4, 13)22,1, 18)52,2, 19)23,5, 20)19,2. P4 in wear. Adult but not old.
None	dog	pel	1	b	123	f	f	GL(left):145, GBTi:101,2, SBI:67,3, GBA:80,2, SB:9,7, Lfo(left):27,1, Lfo(right):27,6, LS(left):47,1, LS(right):45,8, LA:(both)29,4, LAR(both):20,6.
None	dog	scap	1	l	123		f	SLC:24, GLP:28,8, BG:16,4
None	dog	fem	1	l	123456	f	f	GL:182, Bp:37,9, Bd:32,1,
None	dog	fem	1	r	123456	f	f	GL:181, Bp:38,2, SD:12,5
None	dog	hum	1	r	1234	f	f	Dp:40,1, Bp:31,9, SD:12,3
None	dog	hum	1	l	1234	f	f	Dp:39,9, SD:12,2
None	dog	ulna	1	l	1234	f		
None	dog	rib	3					
None	lm	uim	2					
None	lm	thor	1			f	f	lighter in colour than dog elements
85	dog	C	1	r				Almost no wear. GL: 40,3
714	dog	C	1	l				Almost no wear.
715	uim	ui	1					Either from Gautlönd or Baldursheimur, context unclear. Piece of enamel 24 x 9 mm

Glaumbær, Reykdælahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
6929	dog	max+	1	r				P4, m1 and m2. Little worn.
6929	dog	max+	1	l				P4 and m1. Little worn.
6918	horse	fem	1	r	123456789AB	f	f	Labelled 6918a. GL:389
6918	horse	m/t	1	r	12345678	f	f	Labelled 6918b. Callus bone formation on anterior proximal epiphysis, around the anterior articulation surface, 5-6 mm thick.
6918	horse	m/c	1	r	12345678	f	f	Labelled 6918c. GL:237. M/c2 and m/c4 fused with m/c3.
6933	horse	radius and ulna	1	l		f	f	Labelled 6933c. GL(rad):317
6933	horse	tib	1	r	123456789A	f	f	Labelled 6933d
6933	horse	mand	1	l	1BCDE			Labelled 6933a. All 6 molars. Large real root on p3, crown height 38,5 mm
6933	horse	maxm	1					Labelled 6933b
6933	horse	I	1					Labelled 6933b. Young animal, occlusal surface oval
6933	horse	mandibular molar	1					Labelled 6933b. Young animal, no real root and little wear on occlusal surface. Age at death 4-5 yrs
6933	horse	maxm	2					Labelled 6933b. No real root and little wear on occlusal surface. Age at death 4-5 yrs
6923	dog	fem	1	r	123456	f	f	GLC:174
6923	dog	pel	1	r	123	f	f	
6923	dog	hum	1	r	1234	f	f	
6923	dog	ulna	1	l	123	f		
6923	dog	calc	1	l		f		
6923	dog	lumb	1	b		f	f	
6923	dog	vert	1	b		f	f	Soil cemented around vertebra, needs to be cleaned by conservator
6923	dog	rib	1					

Grímsstaðir, Skútustaðahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1967213 (box1)	horse	rib	32	b				
1967213 (box1)	horse	mand	5	b				5 frags which might be from different individuals. One fragment, a piece of left mandible, has an unerupted m3.
1967213 (box1)	horse	cran frag	9	b				
1967213 (box1)	horse	hum	1	l	123456789AB	f	f	GL:280, BP:89,6, SD:35,03
1967213 (box1)	horse	hum	1	l	123456789AB	f	f	GL:291, SD:37,3
1967213 (box1)	horse	hum	1	r	123456789AB	f	f	GL:285, SD:38,4
1967213 (box1)	horse	fem	1	r	123456789AB	f	f	GL:382, SD:40,2, Bd:89
1967213 (box1)	horse	fem	1	l	123456789AB	f	f	GL:382, SD:38,7, Bd:88
1967213 (box1)	horse	fem	1	r	123456789AB	f	f	SD:41,6
1967213 (box1)	horse	fem	1	r	123456789AB	f	f	GL:386, SD:41,7
1967213 (box1)	horse	fem	1	l	789A		f	
1967213 (box1)	horse	fem	1	l	6789A		f	
1967213 (box1)	horse	tib	1	r	123456789A	f	f	GL:348, Bd:65,8, SD:30,1
1967213 (box1)	horse	tib	1		123456789A	f	f	GL:345, Bd:71,5, SD:30,4
1967213 (box1)	horse	tib	1	r	123456789A	f	f	GL:336, Bd:64,9, SD:25,7
1967213 (box1)	horse	tib	1	l	5		f	
1967213 (box1)	horse	phal1	1	r	123	f	f	GL:83, Bp:50,9, Bd:42,7
1967213 (box1)	horse	phal1	1	r	123	f	f	GL:74, Bp:45,9, Bd:37,4
1967213 (box1)	horse	phal1	1	b	123	f	f	
1967213 (box1)	horse	phal1	1	b	123	f	f	
1967213 (box1)	horse	phal1	1	b	123	f	f	
1967213 (box1)	horse	phal2	1	b	123	f	f	GL:43
1967213 (box1)	horse	phal2	1	b	123	f	f	GL:44
1967213 (box1)	horse	phal3	1	b	12	f		
1967213 (box1)	horse	phal3	1	b	12	f		
1967213 (box1)	horse	phal3	1	b		f		
1967213 (box1)	horse	pel	1	r	123456789ABC	f	f	Male morphology
1967213 (box1)	horse	pel	1	l	123456789ABC	f	f	Male morphology
1967213 (box1)	horse	pel	1	r	13458A	f	f	
1967213 (box1)	horse	pel	1	l		f	f	Ischio-Acetabular ramus is gracile, possibly female?
1967213 (box1)	horse	pel	1	r	1234567A	f	f	

1967213 (box1)	horse	fem	1	r	236			
213 (box2)	horse	cran frag	1					Occipitale
213 (box2)	horse	cran frag	1					Occipitale
213 (box2)	horse	cran frag	1					
213 (box2)	horse	max+	1	l				p2 (frag), p3, p4, m1, m2 and m3. M3 not erupted
213 (box2)	horse	max+	1	r				m2,m1,p4. M3 not erupted
213 (box2)	horse	max+	1	l				M3, m2, m1, p4, p3. Real roots have started to develope, but not on m3
213 (box2)	horse	max+	1	r				M3, m2, m1, p4. Real roots have started to develope, but not on m3
213 (box2)	horse	max+	1	b				Both sides but only left teeth: p2, p3, p4, m1. Real root well developed. M1 crown height: 30,3
213 (box2)	horse	max	1	b				Anterior most part of maxilla, no teeth present
213 (box2)	horse	mand	1	b	1234567BCDE			Both sides, but right broken off anterior of p2. Right: m3,m2,m1,p4. Left: m3,m2,m1,p4,p3,p2. Socket fyrir canine. No real root on m3
213 (box2)	horse	mand	1	r	1267BCDE			m3,m2,m1,p4,p3,p2. Canine. I1, I2. Occlusal surfaces on incisors are oval and flat
213 (box2)	horse	mand	1	l	1BCDE			M3,m2,m1,m4,p3. No real root on m3
213 (box2)	horse	mand	1	l	16			
213 (box2)	horse	maxm	3					
213 (box2)	horse	mandibular molar	1	l				left p2 w/real root
213 (box2)	horse	I	5					5 worn incicors, occlusal surface triangular and mark nearly gone on 3, completely gone on one.
213 (box2)	horse	I	6					6 lightly worn incisors, occlusal surface very flat and narrowly oval, cups wide and deep. Only one incisor has outer edge in occlusion
213 (box2)	horse	C	2					
213 (box2)	horse	pel	1	r	12345678ABC	f	f	Ischio-Acetabular ramus quite gracile
213 (box2)	horse	pel	1	l	26B			
213 (box2)	horse	scap	1	r	123456789		f	
213	horse	scap	1	r	1234567		f	

(box2)									
213 (box2)	horse	scap	1	r	1234567		f		
213 (box2)	horse	scap	1	l	12345		f		
213 (box2)	horse	scap	1	l	123456789		f		
213 (box2)	horse	scap	1	l	123456789		f		
213 (box2)	horse	radius and ulna	1	l		f	f	GL(rad):328	
213 (box2)	horse	rad	1	l	123456789K	f	f		
213 (box2)	horse	rad	1	l	123456789K	f	f	GL:338	
213 (box2)	horse	ulna	1	l	ABCDE	f			
213 (box2)	horse	ulna	1	l	ABCDE	f			
213 (box2)	horse	hum	1	l	23456789AB	f	f		
213 (box2)	horse	m/c	1	l	12345678	f	f	GL:221, Bp:44,2	
213 (box2)	horse	m/c	1		12345678	f	f		
213 (box2)	horse	m/c	1		3478		f		
213 (box2)	horse	m/t	1	l	12345678	f	f		
213 (box2)	horse	m/t	1	r	12345678	f	f		
213 (box2)	horse	calc	1	l	2345			Light in colour and weathered	
213 (box2)	horse	calc	1	r	12345				
213 (box2)	horse	pat	1						
213 (box2)	horse	tcen	1	r					
213 (box2)	horse	at	1	b					
213 (box2)	horse	cerv	1	b		f	fg		
213 (box2)	horse	lumb	1	b		f	f	Two lumbar vertebrae fused on right edge of articular surface	
213 (box2)	horse	lumb	1	b		f	f	Two lumbar vertebrae fused on the right transverse processies (left missing). Fissure across distal articular surface of the posterior vertebrae	
213 (box2)	horse	lumb	1	b		fg	u		
213 (box2)	horse	thor	1			fg	u		
213 (box2)	horse	lumb	1				u		
213 (box2)	horse	sac	1	b		u		Proximal epi plate is unfused and fusin lines are clear between segmants of sacrum.	
213 (box2)	horse	sac	1	b		f	f		
213 (box3)	horse	rib	6	b					
213	horse	lumb	1	b		u	u	Probably the 5th	

(box3)								
213 (box3)	horse	hum	1	l	3456789AB	u	f	
213 (box3)	horse	hum	1	r	3456789AB	u	f	
213 (box3)	horse	fem	1	l	236789AB	u	f	
213 (box3)	horse	fem	1	r	236789AB	u	fg	
213 (box3)	horse	tib	1	l	123456789A	fg	f	GL:331, Bd:62,5
213 (box3)	horse	tib	1	r	123456789A	fg	f	GL:333
213 (box3)	horse	rad/uln	1	r	123456789KABCDEF	f	fg	GL:309. Bd:65,4, Bp:72,4
213 (box3)	horse	rad/uln	1	l	123456789KBCDEF	f	fg	GL:310
213 (box3)	horse	pel	1	l	12345678AB			Gracile
213 (box3)	horse	m/t	1	l	12345678	f	f	GL:261, Bd:43,4, SD:21,4
213 (box3)	horse	m/t	1	l	12345678	f	f	GL:263, Bp:48,6, Bd:46,9, SD:23,9. Lighter in colour than other specimens in this box
213 (box3)	horse	m/t	1	l	12345678	f	f	Bone formation (Osteophyte) around the proximal articular surface. M/t 2 and m/t4 are fused to m/t3. Some nodules on articular surface
213 (box3)	horse	m/t	1	r	12345678	f	f	GL:265, Bd:47,2
213 (box3)	horse	m/c	1	l	12345678	f	f	m/c2 and m/t4 fused to m/t3. GL:216, Bp:45,8
213 (box3)	horse	m/c	1	r	12345678	f	f	GL:217, Bp:46,9
213 (box3)	horse	scap	1	r	123456789		f	
213 (box3)	horse	scap	1	l	123456789		f	
213 (box3)	horse	scap	1	l	123456789	f	f	
213 (box3)	horse	scap	1	r	12345679		f	
213 (box3)	horse	scap	1	l	679			
213 (box3)	horse	hum	1	r	123456789AB	f	f	GL:300
213 (box3)	horse	hum	1	l	123456789AB	f	f	GL:300, Bp:90, Bd:77
213 (box3)	horse	fem	1	l	123456789AB	f	f	GL:399, Bp:116,5, Bd:85
213 (box3)	horse	rad/uln	1	r	123456789KABCDEFGHJ	f	f	GL(rad):336, Bd:69,2
213 (box3)	horse	rad/uln	1	l	123456789KABCDEFGHJ	f	f	GL(rad):339, Bp:75,9, Bd:67,5
213 (box3)	horse	tib	1	r	123456789A	f	f	GL:344
213 (box3)	horse	tib	1	l	123456789A	f	f	GL:344, Bd:69,8
213 (box3)	horse	tib	1	l	123456789A	f	f	GL:351, Bd:71,3
213 (box3)	horse	ax	1	b		f	f	
213	horse	cerv	1	b		f	f	

(box3)								
213 (box3)	horse	thor	1	b		f	f	
213 (box3)	horse	thor	1	b		f	f	
213 (box3)	horse	thor	1			f	f	
213 (box4)	horse	rib	50					Frags of varying size
213 (box4)	horse	cerv	1	b		f	f	
213 (box4)	horse	cerv	1	b		f	f	
213 (box4)	horse	cerv	1	b		f	f	
213 (box4)	horse	cerv	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	
213 (box4)	horse	thor	1	b		f	f	Medio-lateral fissure across distal articular surface, length 28 mm, breadth 6 mm, depth 2 mm. Bone formation around the posterior articular surface
213 (box4)	horse	thor	1	b		f	f	Bone formation ventrally on posterior articular surface
213 (box4)	horse	thor	1	b		f	f	Bone formation ventrally on anterior articular surface
213 (box4)	horse	thor	1	b		f	f	Bone formation ventrally on posterior articular surface
213 (box4)	horse	23t	1	l				Spavin. Navicular, grand cuneiform, cuboid and lateral cuneiform fused
213 (box4)	horse	astr	1	l	1234			
213 (box4)	horse	astr	1	l	1234			
213 (box4)	horse	astr	1	r	1234			
213	horse	calc	1	l	12345	f		

(box4)								
213 (box4)	horse	calc	1	l	12345	f	f	
213 (box4)	horse	calc	1	r	12345	f		
213 (box4)	horse	tcen	1	l				
213 (box4)	horse	t3	1	l				
213 (box4)	horse	tcen	1	r				
213 (box4)	horse	t3	1	r				
213 (box4)	horse	c4	1	r				Hamate
213 (box4)	horse	cint	1	l				Lunate
213 (box4)	horse	cint	1	r				Lunate
213 (box4)	horse	carp	1	l				Magnum
213 (box4)	horse	carp	1	r				Magnum
213 (box4)	horse	cacc	1	l				Pisiform
213 (box4)	horse	cacc	1	r				Pisiform
213 (box4)	horse	crad	1	l				Scaphoid
213 (box4)	horse	t4	1	r				cuboid
213 (box4)	horse	tar	1	l				Triquetral Pyramidal
213 (box4)	horse	tar	1	r				Triquetral Pyramidal
213 (box4)	horse	ses	1					distal
213 (box4)	horse	ses	1	l				proximal
213 (box4)	horse	ses	1	l				proximal
213 (box4)	horse	ses	1	r				proximal
213 (box4)	horse	m/p	1					Accessory
213 (box4)	horse	m/p	1					Accessory
213 (box4)	horse	m/p	1					Accessory
213 (box4)	horse	m/p	1					Accessory
213 (box4)	horse	phal1	1	b	123	f	f	
213 (box4)	horse	phal1	1	b	123	f	f	
213 (box4)	horse	phal1	1	b	123	f	f	
213 (box4)	horse	phal1	1	l	123	f	f	GL:81,5, Bp:55, Bd:41,9
213 (box4)	horse	phal1	1	l	123	f	f	GL:77,2,
213 (box4)	horse	phal1	1	r	123	f	f	GL:81,6, Bp:50,9
213 (box4)	horse	phal1	1	b	123	f	f	GL:83,3, Bp:50,3
213 (box4)	horse	phal1	1	l	123	f	f	
213 (box4)	horse	phal1	1	b	123	f	f	

213 (box4)	horse	phal2	1	b	123	f	f	
213 (box4)	horse	phal2	1		123	f	f	
213 (box4)	horse	phal2	1	b	123	f	f	
213 (box4)	horse	phal2	1	b	123	f	f	
213 (box4)	horse	phal2	1	b		f	f	
213 (box4)	horse	phal2	1	b		f	f	
213 (box4)	horse	phal3	1	b	12	f		
213 (box4)	horse	phal3	1	b	12	f		
213 (box4)	horse	phal3	1	b	12	f		
213 (box4)	horse	phal3	1	b	12	f		
213 (box4)	horse	phal3	1	b		f		
213 (box4)	horse	phal3	1	b	12	f		
213 (box4)	horse	phal3	1	b	12	f		
213 (box4)	horse	pat	1	l				
213 (box4)	horse	pat	1	r				
213 (box4)	horse	prox femoral epi	2	l				Trochander majus and head. Young animal
213 (box4)	horse	prox femoral epi	2	r				Trochander majus and head. Young animal
213 (box4)	horse	at	1	b				
213 (box4)	horse	ax	1	b			u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		fg	u	
213 (box4)	horse	thor	1	b		u	u	
213 (box4)	horse	lumb	1	b		u	u	
213 (box4)	horse	lumb	1	b		u	u	
213	horse	lumb	1	b		u	u	

(box4)								
213 (box4)	horse	lumb	1	b		u	u	
213 (box4)	horse	lumb	1	b		u	u	
213 (box4)	horse	lumb	1	b		u	u	
213 (box4)	horse	vert	1			u	u	prob. thoracic
213 (box4)	horse	vert	1	b		u	u	thoracic?
213 (box4)	horse	sac	1	b		u	u	
213 (box4)	horse	cran frag	5					
213 (box4)	horse	maxm	3					
213 (box4)	horse	mand	5	r	34567BCD			Fragmented. 4 molars, no real root, 2 incisors, lttle worn, occlusal surface oblong and oval, cup wide
213 (box4)	horse	thor	1	b		f	f	
213 (box5)	horse	mand	1	l	1A			P2 (unworn), dp3 (very worn and p3 visible underneath), dp4.
213 (box5)	horse	maxm	2	l				P2 and p3, unworn
213 (box5)	horse	I	1					Unworn
213 (box5)	horse	cerv	1	b		u	u	
213 (box5)	horse	cerv	1	b		f	fg	
213 (box5)	horse	thor	1	b		fg	u	
213 (box5)	horse	thor	1	b			fg	
213 (box5)	horse	thor	1	b		fg	u	
213 (box5)	horse	thor	1	b			u	
213 (box5)	horse	m/c	1	l	12345678	f	f	GL:215, Bp:42,9
213 (box5)	horse	scap	1	l	123456789		f	
213 (box5)	horse	hum	1	r	123456789AB	fg	f	
213 (box5)	horse	hum	1	l	3456789A		f	
213 (box5)	horse	hum	1	l	2	u		Unfused prox epi, could belong to humerus above
213 (box5)	horse	fem	1	r	123456789AB	fg	f	

Ingiríðarstaðir, Aðaldælahreppur

C	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
2008/5	horse	cranfrag	1	b				
2008/5	horse	mandible	2	b	1234567BCDE			M3 erupted, incisors in wear but quite oval in shape, canines
2008/5	horse	I	3					maxillary, in wear but still oval in shape
2008/5	horse	at	1	b				
2008/5	horse	ax	1	b				
2008/5	horse	cerv	1	b		f	f	
2008/5	horse	cerv	1	b		f	f	
2008/5	horse	cerv	1	b		f	f	
2008/5	horse	cerv	1	b		f	f	
2008/5	horse	thor	1	b		f	f	wood remains attached
2008/5	horse	thor	1	b		f	f	wood remains attached
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	thor	1	b		f	f	
2008/5	horse	lumb	1	b		f	f	3 lumbar vertebrae fused together.New bone has developed around the articular processes and to a much lesser extent on the centrum epiphyses. Probably the three anterior most lumbar vertebrae
2008/5	horse	rib	6	b				
2008/5	horse	hum	1	r	123456789AB	f	f	BT 70,5, SD 38,2
2008/5	horse	hum	1	l	78AB			
2008/5	horse	rad	1	r	123456789K	f	f	GL 314, BFd 60,1, Bp 78,1, BFp 72,07
2008/5	horse	ulna	1	r		f	f	
2008/5	horse	crad	1	l				scaphoid
2008/5	horse	cint	1	l				lunate
2008/5	horse	culn	1	l				triquetrum
2008/5	horse	cacc	1	l				pisiform
2008/5	horse	c2	1	l				trapezoid
2008/5	horse	c3	1	l				capitate
2008/5	horse	c3	1	r				capitate

2008/5	horse	c4	1	l				hamate
2008/5	horse	m/c	1	r	12345678	f	f	
2008/5	horse	m/c	1	l	12345678	f	f	GL 213, Bp 46,5, Bd 47,5, Dp 33,2
2008/5	horse	m/c2	1	l				
2008/5	horse	m/p	1					accessory, 2 or 4
2008/5	horse	fem	1	r	123456789AB	f	f	SD 39,4
2008/5	horse	fem	1	l	123456789AB	f	f	
2008/5	horse	pat	1	l				
2008/5	horse	tib	1	r		f	f	fragmented
2008/5	horse	tib	1	l	123456789A	f	f	Bd 71,6, Dd 45,9
2008/5	horse	calc	1	r				
2008/5	horse	calc	1	l				
2008/5	horse	ast	1	r				
2008/5	horse	tcen	1	l				navicular
2008/5	horse	t3	1	l				grand cuneiform
2008/5	horse	tcen+t3	1	r				navicular and grand cuneiform fused
2008/5	horse	m/t+t4	1	r		f	f	cuboid is fused with m/t. GL 260 (skewed because of pathology), Bp 52,5, Bd 43,3, SD 28,4
2008/5	horse	m/t	1	l		f	f	GL 252, Bp 47,4, SD 28,8
2008/5	horse	m/t2	1	r				
2008/5	horse	m/t4	1	r				
2008/5	horse	phal1	1			f		GL 77,5, SD 33,0, BP 50,2, Bd 44,8, Bfd 43,1
2008/5	horse	phal1	1			f		GL 81,3, SD 32,9, Bp 50,7, Dp 37,1, Bd 42,1, BFd 41,2
2008/5	horse	phal1	1			f		eroded
2008/5	horse	phal1	1			f		GL 78,0, Bd 44,2, Bp 50,4, SD 33,1
2008/5	horse	phal2	1			f		GL 48,6, SD 42,5, Dp 32,2, Bp 51,4, Bd 45,4
2008/5	horse	phal2	1			f		eroded
2008/5	horse	phal2	1			f		Bp 49,1, Bd 48,4, GL 45,4
2008/5	horse	phal2	1			f		GL 48,9, Bd 43,3, Bp 49,6, SD 41,2
2008/5	horse	phal3	4					
2008/5	horse	ses	2					proximal
2008/5	horse	ses	1					distal
2008/5	uim	uim	2					frags
421	uim	tib	1	l		f		very eroded
421	horse	pel	1	l	123456789ABC	f	f	Badly preserved. Quite gracile/thin, but eroded. Orbturator foramen oval, Medial pubis triangular
421	horse	tib	1	l	123456789A	f	f	GL:338, Dd:46,8
421	uim	vert	1					eroded horse thoracic?
421	horse	pat	1	l				
421	uim	vert	1	b				eroded horse lumbar?
421	uim	ui	1					
421	uim	ui	1					

421	uim	rib	1					
421	uim	ui	1					
421	horse	thor	1				f	eroded
421	horse	vert	1					eroded
421	horse	ui	1					
421	horse	I	1	b				Occlusal surface triangular, mark worn away
430	horse	thor	1	b		f	f	
430	horse	fem	1	r	236789AB		f	
430	horse	tib	1	r	123456789A	f	f	GL:342, Dd:43 (eroded)
430	horse	pel	1	l	123456789ABC	f	f	male morphology
430	horse	pel	1	r	123456789ABC	f	f	male morphology, articulates with pelvis above
430	horse	fem	1	r	123456789AB	u	f	
430	horse	tib	1	r	123456789A	fg	f	
430	horse	m/t	1	r	12345678	f	f	GL:267, Bp:44,6, Dp:45,3
430	horse	m/c	1	l	12345678	f	f	GL:225; Bp:48,86; Bd:45,14
430	horse	m/c2	1					
430	horse	m/c4	1					
430	horse	phal1	1	l	123	f	f	Left frontleg. GL:83; Bp: 49,41; Bd:42,81; SD:33,16
430	horse	phal2	1	l	123	f	f	Left frontleg. GL:46; Bp:48,71
430	horse	phal3	1	l	12	f		Left frontleg.
430	horse	ses	1	l				Left frontleg.
430	horse	ses	1	l				Left frontleg.
430	horse	ses	1	l				Left frontleg. Navicular
430	horse	phal3	1	b	1	f		
430	horse	m/t	1	r	12345678	f	f	GL:273
430	horse	t3	1	r				
430	horse	t2	1	r				
430	horse	t4	1	r				
430	horse	tar	2	r				
430	horse	calc	1	r	12345			eroded
430	horse	astr	1	r	1234			eroded
430	horse	m/c2	1					
430	horse	m/c4	1					
430	horse	phal1	1	r	123	f	f	Right hindleg
430	horse	thor	1	b		f	f	
430	horse	thor	1	b		f	f	
430	horse	rib	3					
430	horse	thor	1	b		f	f	
430	horse	rib	2					
430	horse	thor	1	b		f	f	
430	horse	thor	1	b		f	f	
430	horse	thor	1	b		f	f	
430	horse	rib	17					

430	horse	thor	1	b		fg	u	
430	horse	rib	10	b				
430	horse	vertep	1	b			u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	rib	8					
430	horse	vert	2					
430	horse	astr	1	l	1234			
430	horse	t3	1	l				
430	horse	t2	1	l				
430	horse	tar	1					eroded
430	horse	thor	1	b			u	eroded
430	horse	thor	1	b			u	eroded
430	horse	phal2	1	b		f	f	
430	horse	fem	1	r	15			
430	horse	ui	2					
430	horse	pat	1	r				
430	horse	thor	1	b		u	u	
430	horse	thor	1	b		u	u	
430	horse	thor	1	b		u	u	
430	horse	ui	4					
430	horse	vert	1	b				
430	horse	vertep	1					
430	horse	vertep	1					
430	horse	rib	2					
430	horse	calc	1	l	12345	fg		
430	horse	phal1	1	b	123	f	f	eroded
430	horse	astr	1	r	1234			
430	horse	phal2	1	b	123	f	f	
430	horse	phal3	1	b	1			
430	horse	phal1	1	b	123	f	f	
430	horse	phal2	1	b	123	f	f	
430	horse	phal3	1	b	1			
430	uim	vert	1	b		u		
430	uim	vert	2					
430	uim	vert	1			u		eroded
430	uim	ui	1					eroded
430	horse	pat	1	l				eroded
430	uim	ui	1					
430	uim	ui	5					

430	uim	isoteeth	1					eroded
430	uim	ui	10					
430	uim	isoteeth	2					
430	horse	I	3					
430	uim	ses	1					
430	uim	ui	2					
430	uim	ui	11					
430	uim	rib	1					
430	uim	rib	1					
430	uim	rib	2					
430	uim	ui	1					
430	uim	rib	2					
430	horse	m/t2	1	r				
430	horse	m/t4	1	r				
430	horse	calc	1	r	12345	fg		
430	horse	t4	1	r				
430	horse	t3	1	r				
430	horse	t2	1	r				Central tarsal
430	horse	t1	1	r				
430	horse	m/t	1	l	12345678	f	f	GL:265, Bp:46,4, Dp:44,3
430	horse	m/t2	1	l				
430	horse	m/t4	1	l				
430	horse	tib	1	l	123456789A	fg	f	
430	horse	sac	1	b		u		frag
430	horse	lumb	1	b		u	u	
430	horse	lumb	1	b		u	u	
430	horse	lumb	1	b		u	u	
430	horse	tib	1	l	123456789A	f	f	GL:344, Db:66,4, Dd:45,1
430	horse	fem	1	l	123456789AB	u	fg	
430	horse	ses	1					
430	uim	ui	1					
430	horse	m/t	1	l	12345678	f	f	GL:272, Bd:44,6, Dd:35,4, Bp:47,5, Dp:46,2
430	horse	phal1	1	l	123	f	f	
430	horse	phal2	1	l	123	f	f	
430	horse	m/t2	1					
430	horse	m/t4	1					
430	horse	calc	1	l	12345	fg		
430	horse	astr	1	l	1234			
430	horse	t2	1	l				center tarsal
430	horse	t3	1	l				
430	horse	t4	1	l				
430	horse	ses	1					
430	horse	at	1	b				On the dorsal side, right of centre, are metal and some organic remains attached to the bone

430	horse	at	1	b				
430	horse	ax	1	b				Transverse cut mark on ventral side
430	horse	cran frag	3					occipitale
430	horse	cerv	1	b				
430	horse	cerv	1	b		fg	u	
430	horse	cerv	1	b		u	u	
430	horse	cerv	1	b		fg	u	
430	horse	cerv	1	b		fg	u	
430	horse	hum	1	l	123456789AB	fg	f	
430	horse	radius and ulna	1	r		f	fg	
430	horse	m/c	1	r	12345678	f	f	GL:224, Bp:48,2, Dp:30,6, Bd:46,4
430	horse	m/c2	1	r				
430	horse	m/c4	1	r				
430	horse	cacc	1	r				
430	horse	c1	1					
430	horse	c4	1					
430	horse	cint	1					
430	horse	carp	7					
430	horse	phal1	1		123	f	f	
430	horse	phal2	1		123	f	f	
430	horse	phal3	1		1	f		
430	horse	phal1	1		123	f	f	
430	horse	phal2	1			f	f	
430	horse	scap	1	r	123456789	f	f	
430	horse	scap	1	r	123456789	f	f	SLC:60,6, GLP:93,4
430	horse	m/c	1	l	12345678	f	f	GL:228, Bp:48,1, Dp:35,8, BD:48,5
430	horse	m/c2	1	l				
430	horse	m/c4	1					
430	horse	phal1	1		123	f	f	
430	horse	phal2	1		123	f	f	
430	horse	cacc	1					
430	horse	c1	1					
430	horse	c4	1					
430	horse	cint	1					
430	horse	carp	4					
430	horse	m/c	1	r	12345678	f	f	GL:228, Bp:48,2, Dp:34,7. m/c2 and 4 are fused
430	horse	carp	10					
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	thor	1	b		fg	u	
430	horse	rib	1					
430	horse	rib	1					
430	horse	rib	2					

430	horse	thor	1	b		fg	u	
430	horse	rib	1					
430	horse	rib	1					
430	horse	rib	1					
430	horse	rib	1					
430	horse	rib	1					
430	horse	rib	1					
430	horse	rib	1					
430	horse	can	2					
430	horse	hum	1	r	123456789AB	u	f	
430	horse	scap	1		123456789	f	f	GLP:126,1
430	horse	radius and ulna	1	l		f	f	Ulna unfused proximally. GL(total):400, GL(radius):331, BFd:59,3, Bd:70
430	horse	hum	1	l	123456789AB	f	f	GL:289, BT:73,9, SD:36,4
430	horse	radius and ulna	1	l		f	f	GL(total):408, GL(radius):331, BFd:60,5
430	horse	cacc	1					
430	horse	carp	2					
430	horse	radius and ulna	1	r		f	f	GL(total):407, GL(radius):330, Bp:79,6
430	horse	hum	1	r	123456789AB	f	f	GL:293, BT:77,6, SD:36,3
430	horse	ax	1	b		f	f	
430	horse	cerv	1	b		f	f	
430	horse	cerv	1	b		f	f	
430	horse	cerv	1	b		f	f	
430	horse	cerv	1	b		f	f	
430	horse	scap	1	l	123456789	f	f	GLP:95,5, SLC:61,3
430	horse	crania	1	b				I2, I3 and M3 are erupting. Ca 3-3 ½ yrs. Fractured on frontale
430	horse	mand	1	b	1234567BCDE			I2, I3, C and M3 are erupting. Ca 3-3 ½ yrs
430	horse	hyo	1					
430	horse	crania	1	b				Canines. Fractured on parietale
430	horse	mand	1	b	1234567BCDE			10+ yrs
530	horse	maxm	1	l				crown: 50 mm
532	horse	I	1	l				left I3. Infundibulum wide open, oval, lingual edge recently in ocllusion, ca 5 yrs
580	horse	mand	1	b				small frag from anterior most part
580	horse	hum	1	r	789A			
524	uim	uim	1					
530	horse	maxm	1					crown: 52 mm
530	horse	hum	1	l	789A			
530	lm	unlong	1					
534	horse	maxm	2					
534	horse	maxm	2					No real root

545	horse	mandibular molar	1					badly preserved
545	horse	molar	1					enamel frags
545	horse	molar	1					very degraded
545	horse	molar	1					very degraded
545	horse	molar	1					very degraded
549	horse	molar	1					degraded, no real root
549	horse	molar	1	b				degraded, no real root
554	horse	maxm	1					No real root
554	horse	m/t	1	l	125678	f		
558	horse	molar	1					very degraded
558	horse	molar	1	b				degraded
558	lm	molar	5					
558	uim	molar	1					
569	horse	I	1					enamel frags
569	horse	molar	1					degraded, no real root
569	uim	uim	1					
569	uim	molar	1					
569	lm	molar	1					very degraded
580	horse	cran frag	38					
580	horse	mand	1	l	1			4 molars, crown nearly worn down, ca. 20 yrs
580	horse	mand	1	r				4 molars, crown nearly worn down, ca. 20 yrs
580	horse	mand	1	l	45			condyle & coranoid process
580	horse	mand	1	r	45			condyle & coranoid process
580	horse	maxm	4					crown nearly worn down
580	horse	maxm	4					crown nearly worn down
580	horse	rad	1	r	67			
580	uim	uim	4					enamel
580	uim	unlong	1					enamel
261	horse	rib	1	b				
261	lm	rib	1	b				
579	sh/g	mand	1	r	1BCD			loose find
586	horse	scap	1	l	1235	f		from human grave
586	uim	uim	1					
596	horse	crania	1	b				All molars (except r P2), 2 canines. Molars and canines very worn.20+ yrs. Probably poleaxed but further broken during post-depositional disturbance
596	horse	mand	1	b	1234567BCDE			Right mandible and anterior most part of left. Left and right I2s and I3s, both canines, all right molars. Teeth very worn, age at death 20+ yrs
596	horse	fem	1	r	123456789AB	f	f	GL:381
621	horse	cerv	1	b		f	f	

621	horse	cerv	1	b		f	f	
621	horse	cerv	1	b		f	f	
621	horse	thor	1	b		f	f	medio-lateral fissure across posterior epiphysis and osteophytes ventrally
621	horse	thor	1	b		f	f	
621	horse	thor	1	b		f	f	
621	horse	rib	1	b				
621	lm	rib	1	b				
621	lm	rib	2	b				
621	lm	rib	1	b				
621	sh/g	tib	1	r	5689A		f	
630	horse	at	1	b		f	f	
630	horse	rib	1					
630	lm	rib	2					
630	horse	rib	1	b				
630	lm	rib	2	b				
630	horse	cacc	1	r				pisiform
630	horse	cint	1					lunate
630	horse	t4	1	r				cuboid
630	horse	ses	1					
630	uim	cran frag	3					
261	horse	rib	2	b				
261	horse	rib	3					
535	horse	I	1					Eroded and fractured, occlusal surface quite oval
579	uim	cran frag	1					
579	lm	uim	1					
581	uim	uim	1					
581	uim	uim	3					
583	uim	uim	1					enamel
586	lm	uim	1					
586	uim	uim	1					
586	dog	mand	1	r	1			m1 and m2. almost no wear on m1
586	sh/g	maxm	1					m2, m1, p4, p3
596	horse	I	2					very worn
596	horse	maxm	1					worn
596	horse	molar	1					very worn
596	horse	C	1					worn
596	horse	C	1					very worn
596	horse	ax	1	b		f	f	
596	horse	cerv	1	b		f	f	
596	horse?	sac	1	b				small frag
596	horse	sac	1	b		f		frag
596	horse	sac	5	b				frag
596	horse	rib	2					

596	horse	scap	1	r			f	SLC:61; GLP:90
596	horse	scap	1	l	123456789		f	SLC:61; GLP:90
596	horse	cub	1	l				cuboid
596	horse	fem	1	r	123456789AB	f	f	GL:389; Bd:96; SD:36
596	horse	fem	1	l	123456789AB	f	f	GL:399; Bd:94; Bp:117; SD:37
596	horse	tib	1	r	123456789A	f	f	GL:356; Bd:70; SD:30
596	horse	m/t	1	l	12345678	f	f	Both accessory m/ts fused. GL:279; Bd:47; Bp:48; SD:23
596	horse	m/t	1	r	12345678	f	f	GL:274; Bd:47; SD:24
596	uim	uim	1					
596	uim	uim	2					
596	uim	uim	1					
596	lm	uim	15					
596	lm	unlong	1					
596	dog	thor	1	b		fg	u	
600	lm	can	1	b				
601	lm	cran frag	1					
621	horse	I	1	b				very worn
621	horse	cerv	1	b		f	f	
621	horse	thor	1	b		f	f	medio-lateral fissure across posterior epiphysis and osteophytes ventrally
621	horse	thor	1	b		f	f	
621	horse	thor	1	b		f	f	
621	horse	thor	1	b		f	f	
621	horse	thor	1	b		f	f	
621	horse	rib	1	b				
621	horse	rib	1	b				
621	uim	rib	6	b				
621	uim	rib	10					
621	horse	c4	1	l				hamate
621	horse	c4	1	r				hamate
621	horse	cacc	1	l				pisiform
621	horse	carp	1	r				magnum
621	horse	cint	1	l				lunate
621	horse	tib	1	l	123456789A	f	f	GL:358; Bp:97; Bd:73; SD:31
621	horse	ses	1					proximal
630	horse	hyo	1	b				
630	horse	cerv	1	b		f	f	
630	horse	thor	1					osteophytes ventrally by posterior epiphysis
630	horse	thor	1	b		f	f	
630	horse	thor	1	b				
630	horse	thor	1	b		f	f	
630	horse	thor	1	b		f	f	osteophytes ventrally by both epiphyses
630	horse	thor	1	b				periarticular osteophytes,

								significant new bone browth on and above articular processes
630	horse	thor	1	b		f	f	periarticular osteophytes, significant new bone browth on and above articular processes
630	horse	thor	1			f	f	
630	horse	thor	1	b		f	f	
630	horse	lumb	1	b		f	f	
630	horse	lumb	1	b		f	f	periarticular osteophytes, significant new bone browth by posterior epiphysis
630	horse	lumb	1	b		f	f	lumb 4 and 5 fused on aricular surfaces and transverse proccessies
630	horse	rib	5	b				
630	horse	rib	1					
630	horse	rib	1	b				
630	horse	rib	3	b				
630	horse	rib	1					
630	horse	rib	1					
630	horse	rib	1					
630	horse	rib	1					
630	horse	rib	1	b				
630	horse	rib	1					
630	horse	rib	1					
630	horse	rib	1					
630	lm	rib	3					
630	horse	rib	1	b				
630	horse	rib	1	b				
630	horse	rib	1					
630	horse	rib	1					
630	horse	rib	1					
630	lm	rib	30	b				
630	horse	ic	5					
630	lm	ic	2					
630	horse	ic	5					
630	horse	StBrae	1					
630	lm	StBrae	2					
630	horse	StBrae	1	b				
630	horse	hum	1	l	123456789AB	f	f	GL:295; Bd:73; Bp:88; SD:36
630	horse	hum	1	r	123456789AB	f	f	GL:295
630	horse	radius and ulna	1	l		f	f	GL(total):415; GL(rad):343; Bp:78; Bd:73
630	horse	radius and ulna	1	r		f	f	GL(total):411; GL(rad):345; Bd:75; Bp:79
630	horse	c1	1	l				Trapezoid
630	horse	carp	1	l				magnum
630	horse	cint	1	r				lunate

630	horse	cint	1	r				lunate
630	horse	crad	1	r				scaphoid
630	horse	crad	1	l				scaphoid
630	horse	m/c	1	l	12345678	f	f	Both accessory m/c fused. GL:231; Bd:49; Bp:50; SD:21
630	horse	m/c	1	r	12345678	f	f	Both accessory m/c fused. GL:231; Bp:51; SD:21
630	horse	pat	1	r				
630	horse	pat	1	l				
630	horse	astr	1	l	1234			
630	horse	t4	1	r				cuboid
630	horse	ses	1	r				proximal forelimb
630	horse	ses	1					distal
630	horse	ses	1					distal
630	horse	ses	1					proximal
630	horse	ses	1					proximal
630	horse	ses	1	b				distal
630	horse	ses	1	l				proximal
630	horse	ses	1	l				proximal
630	horse	ses	1	l				proximal
630	horse	ses	1	r				proximal
630	horse	phal1	1	b	123	f	f	GL:84; Bp:56; Bd:47
630	horse	phal1	1	b	123	f	f	GL:83; Bp:53; Bd:42
630	horse	phal1	1	b	123	f	f	GL:80; Bp:51; Bd:42
630	horse	phal1	1	b	123	f	f	GL:80; Bp:49; Bd:42
630	horse	phal2	1	b	123	f	f	GL:47
630	horse	phal2	1	b	123	f	f	GL:47
630	horse	phal2	1	b	123	f	f	GL:48
630	horse	phal2	1	b		f	f	GL:48
630	horse	phal3	1	b		f		
630	horse	phal3	1	b	12	f		
630	horse	phal3	1	b	12	f		
630	horse	phal3	1	b	12	f		
630	uim	uim	1					
630	lm	uim	1					
630	dog	thor	1	b		u	u	
None	horse	pel	1	r	123456789ABC	f	f	male morphology
None	horse	pel	1	l	123456789ABC	f	f	male morphology

Litlu-Núpar, Aðaldælahreppur

C/M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
6948a	horse	cran frag	14	b				Frags of temporalis, parietale, occipitale, petrosum, etc.
6948a	horse	cerv	1	b		f	f	
6948a	horse	thor	1	b		f	f	
6948a	horse	lumb	1	b		f	f	
6948a	horse	thor	1	b		f	u	light in colour and weathered
6948a	horse	thor	1	b		f	u	light in colour and weathered, fractured
6948a	horse	thor	1	b		f	u	light in colour and weathered
6948a	horse	thor	1	b		f	u	light in colour and weathered
6948a	horse	cerv	1	b		f	fg	
6948a	horse	mand	1	l	456			
6948a	horse	mand	1	r	5			
6948a	horse	rib	3					
6948a	horse	pel	1	l	1234567AB			Pubis missing, ishium broken
6948a	horse	pel	2	r	157A			
6948a	horse	pel	1	r	1234689B			Obturator foramen oval
6948a	lm	pel	1	l	26			
6948a	horse	pel	1	r	57A			
6948a	horse	fem	1	l	789AB		f	
6948a	horse	tib	1	l	1234789	f		
6948a	horse	rad	1	l	125789K	f		
6948a	horse	astr	1	l	1234			Eroded and broken
6948a	horse	crad	1	l				Scaphoid
6948a	horse	phal2	1	b	123	f	f	Eroded
6948b	horse	pel	1	l	12345679AB			Too eroded for sexing, ilium, acetabulum, ischium, but pubis broken off
6948b	horse	pel	1	r	57AC			
6948b	horse	hum	1	r	123456789AB	f	f	BT:72,4 mm
6948b	horse	radius and ulna	1	r		f	f	GL(total):421 mm, GL(rad):888 mm (ca)
6948b	horse	m/c	1	l	12345678	f	f	m/c2 fused with m/c3. GL:236, BP:49,8, SD:20,5
6948c	horse	mand	2	b	1267BCDE			Fractured and eroded. All molars present
6948c	horse	max+	9					Fragment of maxilla with 3 molars, another 8 molars are loose in same bag. Real roots well formed. Crown height of m1 or m2: 40 mm
6948c	horse	I	12					All 12 incisors, both max and mand. Age at death ca. 10-12 yrs
6948d	horse	mand	8	b	1267BCDE			11 molars, Right canine. No real root on m3s and little real root on rest of molars
6948d	horse	I	1					broken
6948d	horse	maxm	2	l				no real root on one, little on the other
050	horse	phal3	1	b	1	f		
150	horse	fem	1	l	123456789AB	f	f	GL:390; Bp:111,9; Bd:81,57

150	horse	astr	1	r	1234			GH:56,3; LmT:54,84; GB:56,1
150	horse	phal1	1	r	123	f	f	GL:81,76; SD:32,27; Bd:41,21;
150	horse	phal3	1	b	12	f		
150	horse	maxm	1	r				
150	mm1	thor	1	b				eroded, dog?
151	horse	thor	1	b		f	f	
151	horse	maxm	1					
151	horse	maxm	1					
151	horse	C	1					
151	horse	cub	1	l				cuboid
154	horse	phal2	1	b	123	f	f	eroded
154	horse	phal3	1	b	1	f		
154	horse	sac	1	b		f	f	
154	uim	can	1					frag
154	uim	unlong	1					frag
160	horse	astr	1	l	1234			eroded
161	horse	astr	1	r	1234			GH:56,48; LmT:56,24; GB:62,39
161	horse	ses	1	l				
161	horse	phal2	1	b	23		f	
161	horse	phal3	1	b	2			frag
167	horse	phal3	1	b	1	f		
167	horse	l	1					frag
167	horse	ax	1	b		f	f	
167	horse?	thor	1			f	f	
168	horse	phal1	1	b	123	f	f	
168	horse	phal1	1	b	123	f	f	
180	horse	pat	1	l				
192	uim	rib	1					
197	horse	calc	1	l	12345	f		
197	horse?	thor	1	b		f	f	
197	horse?	rib	1					
198	dog	crania	1	b				All permanent teeth present, some wear not much
198	dog	mand	1	l	123			
198	dog	mand	1	r	1			
199	uim	can	1					
200	uim	uim	10					
200	uim	unlong	1					possibly frag of horse phal1
200	uim	uim	3					
201	horse	molar	1					
201	uim	can	1					
223	uim	uim	1					
224	horse?	cran	6	b				
224	uim	can	4					
?/2008	horse?	m/p	1		56			

?/2009	horse	calc	1	r	12345	f		
?/2009	horse	carp	1	l				
?/2009	horse	carp	1	r				
?/2009	horse	carp	1	r				
?/2009	horse	carp	1	l				
?/2009	horse	carp	1	l				
?/2009	horse	l	1					
?/2009	horse	l	1					
?/2009	horse	l	1					
?/2009	horse	m/p	1					Accessory, 2 or 4
?/2009	horse	m/p	1					Accessory, 2 or 4
?/2009	horse	m/t2	1	r				
?/2009	horse	pat	1	r				
?/2009	horse	pel	1	l	123456789ABC	f	f	male morphology
?/2009	horse	phal1	1	b	123	f	f	
?/2009	horse	phal1	1	b	123	f	f	
?/2009	horse	phal2	1	b	123	f	f	
?/2009	horse	phal3	1	b	1	f		
?/2009	horse	rib	2					
?/2009	horse	ses	1					
?/2009	horse	ses	1					
?/2009	horse	ses	1					distal sesamoid
?/2009	horse	ses	1					
?/2009	horse	tar	1	l				
?/2009	horse	tar	1	l				
?/2009	horse	thor	1	b		f	f	
?/2009	horse	thor	1	b		f	f	
?/2009	horse	tib	1	r	12356789A	f	f	eroded
?/2009	uim	ui	1					
?/2009	horse	uim	1					
?/2009	horse	ulna	1	r	ABCDE	f		
306	horse	carp	1	r				
306	uim	vert	1	b				frag
308	horse	m/t	1	r	12345678	f	f	eroded
308	horse	rad	1	r	123456789K	f	f	GL:319; Bd:68,2; BFd:59,2
308	uim	rib	2	b				
325	horse	astr	1	l	1234			
325	horse	astr	1	r	1234			
325	horse	at	1	b		f	f	
325	horse	ax	1	b		f	f	
325	horse	calc	1	l	12345	f		
325	horse	carp	1	l				
325	horse	carp	1	r				
325	uim	carp	1	r				
325	horse	cerv	1	b		f	f	

325	horse	cerv	1			f	f	
325	horse	cerv	1	b		f	f	
325	horse	cran	17					fragments
325	horse	crania	1	b				Parietale and part of frontale and temporalis broken, probably perimortem
325	horse	hum	1	l	123456789AB	f	f	GL:275
325	horse	hum	1	r	123456789AB	f	f	GL:273; BT:70,6; SD:33,3
325	horse	hyo	1					
325	horse	lumb	1	b		f	f	
325	horse	lumb	1	b		f	f	
325	horse	lumb	1	b		f	f	
325	horse	lumb	1	b		f	f	
325	horse	lumb	1	b		f	f	
325	horse	lumb	1	b		f	f	
325	horse	m/c	1	r	12345678	f	f	m/c2 fused to m/c3. GL:220; Bp:47,7; Bd:46,3; SD:30,4
325	horse	m/c	1	l	12345678	f	f	m/c2 fused with m/c3. GL:220; Bp: 47,7; Bd:48,9; SD:30,3
325	horse	m/t	1	l	12345678	f	f	GL:261; Bp:45,2; Bd:45,3
325	horse	mand	1	b	1234567BCDE			All molars, canines and incisors present. Teeth worn, age 15 yrs at least. Left P2: EDH:7,4mm; EDW:3,4mm
325	horse	pat	1	l				
325	horse	pel	1	r	123456789ABC	f	f	male morphology
325	horse	phal1	1	b	123	f	f	
325	horse	phal2	1	b		f	f	
325	horse	phal2	1	b	123	f	f	
325	horse	phal2	1	b	123	f	f	
325	horse	phal3	2	b	12	f		
325	horse	phal3	1	b	12	f		
325	horse	radius and ulna	1	l		f	f	GL:316; Bp: 77,0; BFp:71,3
325	horse	rib	2					
325	horse	rib	1					
325	horse	rib	2					
325	uim	rib	1					
325	horse	rib	2					
325	horse	rib	1					
325	horse	rib	1					
325	horse	rib	1					
325	horse	rib	1					
325	horse	rib	1					
325	horse	rib	1					
325	uim	rib	1					
325	horse	rib	1					
325	uim	rib	1					
325	uim	rib	3					

325	uim	rib	2					
325	uim	rib	1					
325	uim	rib	7					
325	uim	rib	1					
325	uim	rib	3					
325	uim	rib	1					
325	uim	rib	1					
325	uim	rib	2					
325	uim	rib	1					
325	uim	rib	1					
325	uim	rib	1					
325	uim	rib	1					
325	uim	rib	1					
325	uim	rib	1					
325	uim	rib	2					
325	uim	rib	1					
325	uim	rib	1					
325	horse	rib	1					
325	horse	rib	1					
325	uim	rib	1					
325	uim	rib	2					
325	horse	sac	1	b		f	f	
325	horse	scap	1	r	12345679		f	
325	horse	scap	1	l	123456789		f	
325	horse	ses	1					
325	horse	ses	1					
325	horse	ses	1					
325	horse	tar	1	l				
325	horse	thor	1			f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	thor	1	b		f	f	
325	horse	tib	1	l	123456789A	f	f	GL:334
325	uim	ui	1					
325	horse	uim	1					
325	uim	uim	1					

325	uim	uim	1					
325	uim	uim	23					various frags
344	horse	m/p	1					Accessory, 2 or 4, small prox frag
344	horse	uim	1					
?/2010	horse	mand	1	r	1BCDE			All molars
?/2010	horse	hum	1	r	3456789A		f	
?/2010	uim	uim	3					frags
?/2010	horse	radius and ulna	1	r		f	f	
?/2010	horse	m/t	1	r	12345678	f	f	
?/2010	uim	uim	2					frags
?/2010	uim	uim	3					frags
?/2010	uim	uim	1					frag
001	uim	uim	1					frag
363	horse	scap	1	r	12345		f	
363	horse	radius and ulna	1	l		f	f	Deep cut/spade mark just beneath proximal articular surface, two smaller cuts/striations above. Area around cuts is white and recently damaged. Most likely damage from excavation
363	horse	tib	1	l	123456789A	f	f	
363	uim	uim	2					frags
363	uim	uim	2					frags
363	horse	fem	1	r	45	f		
379	horse	mand	1	l	16BCDE			M3,M2,M1,P4. Real roots well formed. P4 crown: 39,7 mm
379	horse	mandibular molar	1	l				P3. Real root well formed. Crown: 22,7 mm
379	horse	maxm	6	r				All 6 molars, loose in the same context, real roots
379	horse	hum	1	l	3456789AB		f	
379	horse	rad	1	r	125678	f		
379	horse	ulna	1	r	C			Articulates with við radius above
379	horse	scap	1	r	1234567		f	
379	horse?	ui	1					
379	horse	m/t	1	l	12345678	f	f	t3 fused with proximal epiphysial articular surface. Accessory m/t2 also fused with m/t3
379	horse	tcen	1	l				Navicular was fused with grand cuneiform above but has broken off
379	horse	m/t	1	r	12345678	f	f	tcen, t3 and t4 fused with m/t3. M/t4 is also fused. A lot of bone growth on anterior surface of epiphysis and tarsals, nodules of woven bone
379	horse	maxm	6	l				All 6 molars
379	horse	I	3					worn, perhaps 20 yrs
379	horse	I	1					worn, perhaps 20 yrs
382	horse	scap	1	l	12345		f	
382	horse	scap	1	l	12345		f	

Lómatjörn, Grýtubakkahreppur

M*	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
A	horse	rad	1	r	1256789K	f	u	
A	horse	rad	1	l	1256789K	f	u	
A	horse	m/c	1	l	12345678	f	f	GL:220. Bp:48,7
A	horse	m/c	1	r	12345678	f	f	
A	horse	m/t	1	r	12345678	f	f	GL:261. Bp:44,7
A	horse	m/t	1	l	12345678	f	f	Bone labelled "a"
B	horse	m/t	1	l	12345678	f	f	Bone labelled "b". GL:276. Bp:53,7. SD:25,5
B	horse	m/t	1	r	12345678	f	f	GL:276. Bp:52,6. SD:26,1
B	horse	m/c	1	r	12345678	f	f	GL:227
B	horse	m/c	1	l	12345678	f	f	
C	horse	m/c	1	r	12345678	f	f	GL:225. Bp:47,1
C	horse	m/t	1	r	12345678	f	f	Grand Cuneiform, navicular and cuboid (central, third and fourth) are fused with m/t. Spavin
C	horse	m/t	1	l	12345678	f	f	Bone labelled "c". Grand Cuneiform, navicular and cuboid (central, third and fourth) are fused with m/t
D	horse	m/t	1	r	12345678	f	f	Bone labelled "d". GL:268
D	horse	m/c	1	r	12345678	f	f	

*No museum number, but the bones in the Lómatjörn box are in four bundles, marked A-D.

Lyngbrekka (Gömlu Daðastaðir), Reykdælahreppur

C	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
	dog	astr	1	l				
	dog	at	1	b				
	dog	ax	1	b				
	dog	calc	1	l				
	dog	cerv	1	b		f	f	
	dog	cerv	1	b		f	f	
	dog	cerv	1	b		f	f	
	dog	cerv	1	b		f	f	
	dog	cerv	1	b		f	f	
	dog	cran frag	8	b				
	dog	cran	1	b				Heavy wear on the carnassials and the incisors, the dog is adult and quite aged. Cranium is broken, a large fracture is on the distal brain cavity. The fracture line is mostly dark which points to breakage in antiquity. The fracture could have happened when the burial was robbed, but it seems unlikely because the zygomatic arch and the nasal cavity (both of which are more fragile parts of the cranium) are unbroken. Probably slaughter by poleaxing.
	dog	fem	1	l	123456	f	f	GL: 186, SD: 11.82, Bp: 40.94, Bd: 30.73
	dog	fem	1	r	123456	f	f	GL: 185, SD: 11.96, Bp: 40.22, Bd: 30.91
	dog	hum	1	l	1234	f	f	GL: 168, SD: 11.94 Bp: 44.05, Bd: 32.2. Some lipping on the proximal articulation surface, might be the first stages of age related osteoarthritis
	dog	hum	1	r	1234	f	f	GL: 170, SD: 11.92, Bp: 44.06, Bd: 32.07. Some lipping on the proximal articulation surface, might be the first stages of age related osteoarthritis
	dog	lumb	1	b		f	f	
	dog	lumb	1	b		f	f	
	dog	lumb	1	b		f	f	
	dog	lumb	1	b		f	f	
	dog	mand	1	l				Dental eruption and wear indicative of an adult
	dog	mand	1	r				Dental eruption and wear indicative of an adult
	dog	m/p	1					
	dog	m/p	1					
	dog	m/p	1					
	dog	pel	1	l	123			
	dog	pel	1	r	123			
	dog	rad	1	l	1234	f	f	
	dog	rad	1	r	1234	f	f	
	dog	rib	36					fragments

	dog	scap	1	l	123	f	f	
	dog	tar	1					
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	thor	1	b		f	f	
	dog	tib	1	l	123456	f	f	
	dog	tib	1	r	123456	f	f	
	dog	ulna	1	r	1234			
	uim	uim	20					
	horse	astr	1	l	1234			
	horse	astr	1	r	1234			
	horse	at	1	b				
	horse	ax	1	b				
	horse	calc	1	l	12345			
	horse	calc	1	r	12345			
	horse	C	1					
	horse	carp	6					
	horse	cerv	1	b		f	f	
	horse	cerv	1	b		f	f	
	horse	cerv	1	b		f	f	
	horse	cerv	1	b		f	f	
	horse	cran	1	b				All the maxillary teeth show moderate to heavy wear. Canines are present. The braincase is severely broken distally and the fracture outline is dark in colour, the same as the surrounding bone. The break probably occurred whilst the cranium was still protected by soft tissue because no scratch marks surround the break. The horse was probably poleaxed
	horse	fem	1	l	123456789AB	f	f	GL: 400, SD: 41.14, Bd: 88.68
	horse	fem	1	r	123456789AB	f	f	GL: 398, SD: 42.06
	horse	hum	1	l	123456789AB	f	f	GL 295
	horse	pel	1	l	123456789ABC			
	horse	pel	1	r	123456789ABC			
	horse	lumb	1	b		f	f	4th
	horse	lumb	1	b		f	f	5th and 6th fused together. No osteoarthritis can be seen on the articulation surfaces and no

								extra bone growth or calcification seems to have taken place on either ventral or dorsal surfaces. The fusion could be due to ongoing stress on the lower back
	horse	mand	1	b				All the mandibular teeth show moderate to heavy wear
	horse	m/c	1	l	12345678	f	f	2nd and 4th are fused with the 3rd. GL: 224, Bp: 49.4, Bd: 48.2, SD: 23.1
	horse	m/c	1	r	12345678	f	f	2nd and 4th are fused with the 3rd. GL: 224, Bp: 49.3, Bd: 47.5, SD: 22.9
	horse	m/p	3					accessory
	horse	m/t	1	l	12345678	f	f	GL: 271, Bp: 48.3, Bd: 48.5, SD: 25.7
	horse	m/t	1	r	12345678	f	f	GL: 267 [eroded], Bp: 44.2, SD: 25.1
	horse	pat	1	l				
	horse	pat	1	r				
	horse	phal 1	1		123	f		GL: 78.6, Bp: 51.8, Bd: 40.6, SD: 19.4
	horse	phal 1	1		123	f		GL 83.5, Bp 51.2, Bd 43.3, SD 19.7
	horse	phal2	1	b	123	f		GL: 44.9, Bp: 49.32, Bd: 42.24 [eroded]
	horse	phal2	1	b	123	f		GL: 44.01, Bp: 50.65, Bd: 47.19
	horse	phal2	1	b	123	f		GL: 45.66, Bp: 51.78, Bd: 48,34
	horse	phal2	1	b	123	f		GL: 46.73, Bp: 48.29, Bd: 44,56
	horse	phal3	1	b	12			
	horse	phal3	1	b	12			
	horse	phal3	1	b	12			
	horse	radius and ulna	1	l	123456789K	f	f	GL: 335, SD: 27.82, Bp: 80.85, Bd: 73.51
	horse	radius and ulna	1	r	123456789K	f	f	GL 334, SD 27.31, Bp 80.72
	horse	rib	42					fragments
	horse	sac	1	b		f	f	
	horse	scap	1	l	123456789	f		
	horse	scap	1	r	123456789	f		
	horse	ses	2					
	horse	tar	4					
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	

	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	thor	1	b		f	f	
	horse	tib	1	l	123456789A	f	f	GL: 356, Bd: 73.7, SD: 29.7
	horse	tib	1	r	123456789A	f	f	GL: 353, Bd: 72.7, SD: 28.4

Ytri-Neslönd, Skútustaðahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1960	horse	crania	1	b				12 molars, 2 canines, 2 wolf teeth. Posterior part of frontale broken of.
1960	horse	mand	1	b	1234567BCDE			12 molars, left canine, left incisor 1
1960	horse	at	1	b		f	f	
1960	horse	cerv	1	b		f	f	
1960	horse	cerv	1	b		f	f	
1960	horse	cerv	1	b		f	fg	
1960	horse	cerv	1	b		f	fg	
1960	horse	cerv	1	b		f	fg	
1960	horse	thor	1			f	f	
1960	horse	thor	1	b		f	f	
1960	horse	thor	1	b		f	f	
1960	horse	thor	1	b		f	f	
1960	horse	thor	1	b		f	fg	
1960	horse	thor	1	b		f	fg	
1960	horse	sac	1	b		f	f	
1960	horse	rib	1					
1960	horse	scap	1	r	123456789		f	
1960	horse	hum	1	l	123456789AB	f	f	GL:284, BT:75,3, Bd:82,5, SD:32,7
1960	horse	hum	1	r	123456789AB	f	f	GL:284, SD:32,8
1960	horse	radius and ulna	1	r		f	f	GL:(alls)408, GL(rad) um 330, Bd(rad):79,4
1960	horse	phal1	1	b	123	f	f	GL:79
1960	horse	phal1	1	b	123	f	f	GL:81
1960	horse	phal2	1	b	123	f	f	
1960	horse	pel	1	b	123456789ABC	f	f	Male morphology
1960	horse	fem	1	l	123456789AB	f	f	GL:382, SD:38,7
1960	horse	fem	1	r	123456789AB	f	f	GL:388, Bp:114, Bd:95,5, SD:38,4
1960	horse	tib	1	l	123456789A	f	f	GL:338, Bd:71,1
1960	horse	tib	1	r	123456789A	f	f	GL:341, Bd:70,7, Bp:97,6

Norður-Þingeyjarsýsla

Grímsstaðir á Fjöllum, Fjallahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
139	horse	phal1	1	l	123	f	f	GL:83,7, Bd:44,7, Bp:53,4. White, weathered and moss-grown anteriorly.
139	lm	thor	1	b				Part of spine
139	lm	unlong	1					
139	uim	ui	2					
139	uim	unlong	1					
139	sh/g	molar	3					3 molars, fractured and weathered
139	sh/g	m/c	1		5678			very weathered
139	sh/g	m/c	1		5678			very weathered
139	sh/g	rad	1	l	123456789K	f	f	Weathered. GL:159, Bp:32,8, Bd:28,3
139	sh/g	rad	1	l	123456789K	f	f	Weathered. GL:149, Bp:27,9, Bd:25,2
139	sh/g	hum	1	l	789AB			Weathered.
139	sh/g	ulna	1	r	BCD			Weathered.
139	sh/g	phal1	1	b	123	f	f	Weathered.
139	lm	pel	1	l	26B			
139	lm	pel	1	r	57A			White, weathered and partly moss-grown
139	uim	unlong	1					

Daðastaðir, Presthólahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
15691	dog	mandibular molar	1	l				m1, adult but not old
15691	dog	mandibular molar	1	r				m1, adult but not old

Norður-Múlasýsla

Hrollaugsstaðir, Hjaltastaðahreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
10.9.59a	horse	cerv	1	b		f	f	
10.9.59a	horse	tib	1	l	123456789A	f	f	GL:338. Bd:71,1
10.9.59a	horse	m/t	1	l	12345678	f	f	Two tarsals fused on prox aricular surface. Total length 286. GL m/t: 259
10.9.59b	horse	fem	2	l	2346789A	u	f	
10.9.59b	horse	tib	1	l	123456789A	fg	f	GL:305
10.9.59b	horse	m/t	1	l	12345678	f	f	GL:225
10.9.59b	horse	m/t	1	r	12345678	f	f	GL:226
10.9.59b	horse	phal1	1	b	123	f	f	GL:67 (eroded)

Sturluflötur, Fljótsdalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
5591	horse	maxm	1	l				Crown 61 mm
5591	horse	maxm	1	r				Crown 61,2. Small real root
5591	horse	mandibular molar	1	l				Crown 59,7. Small real root.
5591	horse	mandibular molar	1	l				Crown 68,5. Small real root
5591	horse	cerv	1	b			f	
5591	horse	cerv	1	b			f	
5591	horse	cerv	1	b		f	f	
5591	horse	thor	1	b		f	f	
5591	horse	tib	1	r	56A		f	
5591	horse	astr	1	r	1234			
5591	horse	calc	1	r	345			

Suður-Múlasýsla

Eyrarteigur, Skriðdalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1995:358	horse	tib	1	r	123456789A		f	very eroded and light in colour
1995:358	horse	fem	1	r	123456789AB	f	f	very eroded and light in colour
1995:358	horse	tib	1	l	123456789A	f	f	very eroded and light in colour
1995:358	horse	fem	1	l	123456789AB	f	f	very eroded and light in colour
1995:358	horse	rad	1	r	123456789K	f	f	very eroded and light in colour
1995:358	horse	scap	1	l	123456789		f	
1995:358	horse	mand	1	r	12BCDE			Very eroded. All molars present, no real roots on m3 and p4. Alveolae for canines.
1995:358	horse	hum	1	r	123456789AB	f	f	Eroded
1995:358	horse	m/t	1	r	125678	f		Eroded
1995:358	horse	m/c	1	r	12345678	f	f	Gl:223. M/c2 fused with m/c3.
1995:358	horse	pel	1	l	123456789ABC			Very eroded. Obturator foramen is oval.
1995:358	horse	vertep	1	b			u	In separate box marked "Horse - by lower tooth row". Dist vert epi.
1995:358	horse	phal3	1	b	12	f		In separate box marked "Horse - by lower tooth row".
1995:358	horse	phal3	1	b	1	f		In separate box marked "Horse - by lower tooth row".
1995:358	horse	vertep	1	b			u	In separate box marked "Horse - by lower tooth row". Dist vert epi. unfused.
1995:358	uim	ui	20					In separate box marked "Horse - by lower tooth row".
1995:358	horse	mandibular molar	1	l				very eroded and light in colour. Little real root.
1995:358	horse	C	1					
1995:358	horse	I	7					Little worn, age at death ca. 5 yrs
1995:358	uim	ui	2					In a little box marked "Below A"
1995:358	horse	ses	1					In a little box marked "Below A". Distal
1995:358	horse	max	2					2 small frags from anterior most part
	horse	astr	1	r	1234			Light and weatherd
1995:358	horse	cint	1	r				Lunate
1995:358	horse	cacc	1	r				Pisiform
1995:358	horse	crad	1	r				scaphoid
1995:358	horse	c4	1	r				hamate
1995:358	horse	carp	1	r				magnum
1995:358	horse	tar	1	r				grand cuneiform
1995:358	horse	tar	1	r				navicular
1995:358	horse	tar	1	l				navicular
1995:358	horse	pat	1					Possibly right
1995:358	horse	ses	1	b				distal
1995:358	horse	phal1	1	b	123	f	f	very eroded

1995:358	horse	phal2	1	b	123	f	f	eroded
1995:358	uim	uim	1					26 mm
1995:358	horse	m/t	1	l	12345678	f	f	Weatherd
1995:358	horse	radius and ulna	1	l		f	f	GL(rad):331
1995:358	horse	hum	1	l		f	f	GL:283, SD:36,1
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	m/c	1	l	12345678	f	f	GL:224
1995:358	horse	mand	1	l	1BCD			Very weathered, p4,m1,m2 present. No real root on p4.
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	mand	1	l	136E			M3 present, no real root
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	cerv	1	b		f	u	
1995:358	horse	sac	1	b		f	f	Fusion lines visible between joints, but ant og post epi fused.
1995:358	horse	pel	1	r	123456789AB			Very weathered. Oval obturator foramen and triangular pubis
1995:358	horse	cerv	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	lumb	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	Medio-lateral fissure across distal articular surface
1995:358	horse	cerv	1	b		f		
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	phal1	1	b	123	f	f	GL:78,5
1995:358	horse	phal2	1	b	123	f	f	GL:46,1
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	scap	1	r	123456789		f	
1995:358	horse	phal3	1	b	12	f		
1995:358	horse	vert	1	b		f		
1995:358	horse	calc	1	l	12345	f		
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	phal1	1	b	123	f	f	GL:73,5
1995:358	horse	phal2	1	b	123	f	f	GL:46,4
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					

1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	m/p	1					accessory m/p
1995:358	horse	m/p	1					accessory m/p
1995:358	horse	thor	1	b		f	fg	
1995:358	horse	rib	1					
1995:358	horse	ax	1	b		f		
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	m/p	1					accessory m/p
1995:358	horse	m/p	1					accessory m/p
1995:358	horse	mand	1	l	3456			
1995:358	horse	rib	1					
1995:358	horse	rib	1					
1995:358	horse	lumb	1	b		f	fg	
1995:358	horse	thor	1	b		f	fg	
1995:358	uim	uim	1					
1995:358	uim	calc	1	r		f		light and weathered
1995:358	uim	cerv	1	b		f	u	light and weathered
1995:358	uim	rib	1					
1995:358	uim	rib	1					
1995:358	uim	rib	1					
1995:358	uim	rib	1					

Stóra-Sandfell, Skriðdalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1982.057	horse	at	1	b		f	f	
1982.057	horse	ax	1			f	f	
1982.057	horse	cerv	1	b		f	f	
1982.057	horse	cerv	1	b		f	f	
1982.057	horse	thor	1	b		f	f	
1982.057	horse	thor	1	b		f	f	Lipping ventrally on posterior and anterior articular surfaces
1982.057	horse	thor	1	b		f	f	Lipping ventrally on posterior and anterior articular surfaces
1982.057	horse	thor	1	b		f	f	
1982.057	horse	thor	1	b		f	f	
1982.057	horse	thor	1	b		f	f	
1982.057	horse	thor	1	b		f	f	
1982.057	horse	lumb	1	b		f	f	
1982.057	horse	rib	13					frags
1982.057	horse	cerv	1	b		f	u	
1982.057	horse	thor	1	b		f	fg	
1982.057	horse	thor	1	b		f	u	
1982.057	horse	thor	1	b		f	fg	
1982.057	horse	thor	1	b		f	u	
1982.057	horse	thor	1			fg	u	
1982.057	horse	thor	1	b		f	u	
1982.057	horse	thor	1	b		f	u	
1982.057	horse	thor	1	b		f	u	
1982.057	horse	thor	1	b				Spinous process only, vertabral centrum missing. Spinous process swollen above centre, nodules stick out of posterior swollen mass. Probably healed fracture
1982.057	horse	lumb	1	b		fg	u	
1982.057	horse	sac	3	b		f	f	3 frags, do not fit, white fracture lines
1982.057	horse	lumb	1	b		fg	u	
1982.057	horse	lumb	1			f	u	
1982.057	horse	lumb	1	b		f	f	2 lumbar vertebrae fused on left transverse processes (right ones are missing)
1982.057	horse	pel	2	r	12345678AB	f	f	2 pieces, Acetabulum/ischium and ilium. Too broken and eroded for sexing, although obturator foramen seems oval.
1982.057	horse	pel	1	l	1234567AB	f	f	2 pieces, Acetabulum/ischium and ilium. Too broken and eroded for sexing
1982.057	horse	fem	1	r	123456789AB	f	f	GL: 370 mm (a bit eroded)
1982.057	horse	fem	1	r	236789AB		f	fracure line white
1982.057	horse	fem	2	l	23456789AB	f	f	

1982.057	horse	tib	1	l	123456789A	f	f	GL:338 mm (eroded distally)
1982.057	horse	tib	1	r	2347	f		fracture line white
1982.057	horse	scap	1	l	12345679		f	
1982.057	horse	scap	1	r	1234567		f	
1982.057	horse	scap	1	l	89	f		
1982.057	horse	hum	2	l	123456789AB	f	f	
1982.057	horse	hum	1	r	123456789AB	f	f	
1982.057	horse	rad	1	l	123456789K	f	f	GL:331 mm
1982.057	horse	ulna	1	l	BCDE			fits radius above
1982.057	horse	radius and ulna	1	r		f	f	GL(rad):324 mm
1982.057	horse	m/p	1	b			f	Eroded frag of distal metapodial.
1982.057	horse	phal1	1	b	123	f	f	
1982.057	horse	m/t	1	l	1345678	f	f	GL:264
1982.057	horse	m/c	1	r	12345678	f	f	GL:217
1982.057	horse	m/c	1	l				GL:218
1982.057	horse	phal1	1	b	123	f	f	
1982.057	horse	phal1	1	b	123	f	f	
1982.057	horse	phal1	1	b	123	f	f	GL:79,3
1982.057	horse	phal2	1	b	123	f	f	
1982.057	horse	phal2	1	b	123	f	f	
1982.057	horse	phal2	1	b		f	f	GL:46,3
1982.057	horse	astr	1	l	1234			
1982.057	horse	carp	1	r				Magnum
1982.057	horse	tar	1	r				Navicular
1982.057	horse	rib	35					small frags
1982.057	horse	sac	2	b				small frags
1982.057	horse	m/p2	1					2 or 4
1982.057	horse	thor	1	b		f	f	Nodule ventrally on posterior articular surface.
1982.057	horse	thor	1	b		f	u	
1982.057	horse	thor	6	b				frags of spinous processies
1982.057	horse	thor	1	b		f	f	
1982.057	horse	vertep	7				u	7 unfused posterior vert epi
1982.057	horse	phal3	1	b	12	f		
1982.057	uim	uim	42					

Snæhvammur, Breiðdalshreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
3932	horse	scap	1	l	12345		f	
3932	horse	rib	4					
3932	horse	tib	1	r	3			
3932	horse	hum	1	l	2	f		
3932	horse	ulna	1	l	ABC	f		
3932	horse	rad	2	r	12578	f		
3932	horse	cerv	1	b		f	f	
3932	horse	cerv	5					5 small frags
3932	lm	unlong	1					diaphysis, eroded
3932	lm	unlong	1					frag
3932	lm	ui	4					
3932	lm	pel	1					
3932	lm	hum	1	l				Probably a frag of posterior diaphysis

Granagil, Skaftártunguhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
11526	horse	astr	1	l	1234			
11526	horse	astr	1	r	1234			
11526	uim	can	1					
11526	horse	hum	1	l	256789AB	f	f	
11526	horse	hum	1	l	345678		f	
11526	horse	hum	1	r	345678		f	
11526	horse	hum	1	r	5678		f	
11526	horse	l	1					weathered
11526	horse	m/c	1	l	12345678	f	f	
11526	horse	m/c	1	r	12345678	f	f	
11526	horse	m/p	1					m/3 distal epi
11526	horse	phal1	1	b	23			
11526	horse	phal2	1	b	123	f	f	
11526	horse	rad	1	l	123456789K	f	f	
11526	horse	rad	1	r	123456789K	f	f	
11526	horse	rad	1	l	349K		f	
11526	horse	rib	5	b			f	
11526	horse	scap	1	l	12345679		f	
11526	horse	scap	1	l	123		f	
11526	horse	scap	1	r	123		f	
11526	horse	ses	1	r				
11526	horse	tib	1	r	56789A		f	
11526	horse	tib	1	l	56		f	
11526	horse	ulna	1	r	ABCDE	f		
6419b	horse	crad	1	r				
6419b	uim	cran	3					
6419b	horse	m/c	1	r	12345678	f	f	
6419b	horse	mand	1	b	7			
6419b	horse	mandibular molar	2					
6419b	horse	maxm	1					real root
6419b	horse	pel	1	r	1246	f	f	
6419b	horse	rad	1	r	1256789K	f	f	
6419b	horse	rad	1	l	349K		f	poor preservation
6419b	horse	scap	2	l	12345		f	two frags
6419b	uim	uim	4					
6419b	horse	ulna	1	r	ABCDE	f		
6419b	uim	unlong	1					
not listed	horse	astr	1	r	1234			
not listed	horse	astr	1	l				
not listed	horse	calc	1	r	2345			
not listed	horse	calc	1	l	12345	f		
not listed	horse	carp	1	l				Magnum
not listed	horse	cerv	1	b		u	u	
not listed	horse	fem	1	l	123456789AB	f	f	
not	horse	hum	1	l	123456789AB	f	f	

listed								
not listed	horse	hum	1	r	2B	f		
not listed	horse	lumb	1	b		u	u	Two lumbar vertebrae fused together. Epiphyses unfused but the two vertebrae are fused together on additional joints on the transverse processies
not listed	horse	maxm	1					
not listed	horse	pel	1	r	12345678AC	f	f	
not listed	horse	phal1	1	b	123	f	f	
not listed	horse	phal1	1	b	123	f	f	
not listed	horse	phal2	1	r	123	f	f	
not listed	horse	rad	1	r	3489K		f	
not listed	horse	sac	1	b		fg	fg	Fusing lines very clear and distinct
not listed	horse	tar	1	l				Grand cuneiform
not listed	horse	thor	1	b		u	u	
not listed	horse	tib	1	l	56A		f	
not listed	horse	vert	1	b		u	u	weathered
not listed	horse	vert	1	b		u	u	weathered
not listed	horse	vert	1	b		u	u	weathered
not listed	horse	vert	1	b		u	u	weathered

Hrífunes, Skaftártunguhreppur

M	SPECIES	ELEMENT	COUNT	SIDE	ZONES	PROXFUS	DISTFUS	NOTES
1968.260a	horse	fem	1	l	123456789AB	f	f	Light in colour and weathered. Seems to have been exposed above ground. GL 371 (eroded)
19.10.82	horse	crania	1	b				Occipitale, interparietale, parietale, teporalis (part), a bit of frontale, mostly right side. Fracture line is white.
19.10.82	horse	cran frag	26					
19.10.82	horse	uim	20					
19.10.82	horse	max+	1	r				M3, M2, M1, P4, P3. Real root well formed on P3. Iron remains are on the buccal side on P4 and P3, perhaps the remains of a harness
19.10.82	horse	max+	1	l				M3, M2, M1, P4, P3, P2
19.10.82	horse	max+	1	b				Anterior part of maxilla with all 6 Incisors and onecanine. Age at death about 12 years
19.10.82	horse	mand	1	r	126BCDE			M3, m2, m1, P4, p3, p2
19.10.82	horse	mand	1	l	123456BCDE			M3, m2, m1, P4, p3, p2
19.10.82	horse	at	1	b		f	f	
19.10.82	horse	ax	1	b		f	f	
19.10.82	horse	cerv	1	b		f	f	
19.10.82	horse	cerv	1	b		f	f	
19.10.82	horse	cerv	1	b				
19.10.82	horse	cerv	1					
19.10.82	horse	vertep	1				f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	rib	3					
19.10.82	horse	StBrae	1					
19.10.82	horse	hyo	1					
19.10.82	uim	ic	1					
19.10.82	horse	C	1					max
19.10.82	horse	C	1					mand
19.10.82	horse	mand	1	b	7			Anterior part with all 6 incisors and left canine. Age at death at least 12 yrs
19.10.82	horse	cint	1	r				Lunate
19.10.82	horse	ses	1	r				proximal, forelimb
19.10.82	horse	c4	1	r				hamate
19.10.82	horse	tar	1	r				Triquetral Pyramidal
19.10.82	horse	ui	1					
19.10.82	horse	rib	42					
19.10.82	horse	ic	12					
19.10.82	horse	StBrae	4					
19.10.1982	horse	pel	1	b	12345678ABC			Ischio-acetabular ramus robust, obturator foramen oval. Lfo left: 70,6. LAR left: 61,2. LAR right: 61
19.10.82	horse	scap	1	r	123456789	f	f	
19.10.82	horse	scap	1	l	124567			
19.10.82	horse	maxm	1	r				P2. Iron remains on the buccal side

19.10.82	horse	hum	1	l	12456789AB	f	f	GL:281 (eroded), Bp: 94,1
19.10.82	horse	hum	1	r	123456789AB	f	f	GL:286. Bp:92,7. SD:36,4
19.10.82	horse	radius and ulna	1	r		f	f	GL(rad):331. Bd:74,8
19.10.82	horse	radius and ulna	1	l		f	f	GL(total):406. GL(rad):331. Bp:81,9. Bd:74,6
19.10.82	horse	fem	2	r	12345789AB	f	f	Broken in two
19.10.82	horse	fem	1	l	24568	f		
19.10.82	horse	pat	1	r				
19.10.82	horse	tib	2	r	123456789A	f	f	Broken in two
19.10.82	horse	tib	1	l	123456789A	f	f	
19.10.82	horse	m/c	1	l	12345678	f	f	M/c2 fused with m/c3. GL:221. Bp:50,4. Bd:49,1
19.10.82	horse	m/c4	1	l				Accessory
19.10.82	horse	m/t	1	r	12345678	f	f	GL:266. Bp:49,1. Bd:48,5. M/t4 is fused with m/t3
19.10.82	horse	m/t	1	l	12345678	f	f	GL:266. Bd:50,5
19.10.82	horse	m/t2	1	l				Accessory
19.10.82	horse	m/t2	1	r				Accessory
19.10.82	horse	m/t4	1	l				Accessory
19.10.82	horse	phal1	1	b	123	f	f	GL:85. Bp:54,4. Bd:46,2
19.10.82	horse	phal1	1	l	123	f	f	GL:85. Bp:54,6
19.10.82	horse	phal1	1	b	123	f	f	GL:85. Bp:55,5. Bd:45,3
19.10.82	horse	phal1	1	l	123	f	f	GL:85. Bp:54. Bd:45,3
19.10.82	horse	phal2	1	b	123	f	f	
19.10.82	horse	phal2	1	b	123	f	f	
19.10.82	horse	phal2	1	b	123	f	f	
19.10.82	horse	phal2	1	b	123	f	f	
19.10.82	horse	phal3	1	b	12	f		
19.10.82	horse	phal3	1	b	1	f		
19.10.82	horse	phal3	1		12	f		
	horse	calc	1	l	12345	f	f	GL:111,4
19.10.82	horse	calc	1	r	12345	f	f	GL:112,5
19.10.82	horse	astr	1	l	1234			
19.10.82	horse	astr	1	r	1234			
19.10.82	horse	23t	1	l				Grand cuneiform and navicular fused. Spavin
19.10.82	horse	23t	1	r				Grand cuneiform and navicular fused. Spavin
19.10.82	horse	ses	1					
19.10.82	horse	ses	1					
19.10.82	horse	cint	1	l				Lunate
19.10.82	horse	carp	1	l				Magnum
19.10.82	horse	carp	1	r				Magnum
19.10.82	horse	cacc	1	l				Pisiform
19.10.82	horse	cacc	1	r				Pisiform
19.10.82	horse	crad	1	l				Scaphoid
19.10.82	horse	crad	1	r				Scaphoid
19.10.82	horse	t4	1	l				Cuboid
19.10.82	horse	c4	1	l				hamate
19.10.82	horse	tar	1	l				Triquetral Pyramidal
19.10.82	horse	c1	1	l				Trapezoid
19.10.82	horse	c1	1	r				Trapezoid
19.10.82	horse	ses	1	l				proximal
19.10.82	horse	ses	1	l				proximal

19.10.82	horse	ses	1	l				proximal
19.10.82	horse	ses	1	r				proximal
19.10.82	horse	ses	1	r				proximal
19.10.82	horse	ses	1	r				proximal
19.10.82	horse	cerv	1	b		f	f	
19.10.82	horse	cerv	1	b		f	f	
19.10.82	horse	cerv	1	b		f	f	
19.10.82	horse	cerv	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b			f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	
19.10.82	horse	thor	1	b		f	f	Lipping on ventral side of both proximal and distal articular surface
19.10.82	horse	thor	1	b		f	f	Lipping on ventral side of both proximal and distal articular surface
19.10.82	horse	thor	1	b		f	f	Lipping on ventral side of distal articular surface
19.10.82	horse	thor	1	b				
19.10.82	horse	thor	1	b				
19.10.82	horse	vert	1					
19.10.82	horse	lumb	1	b		f	f	
19.10.82	horse	lumb	1	b			f	
19.10.82	horse	sac	1	b		f	f	Six vert in sacrum
19.10.82	horse	caud	1	b		f	f	
19.10.82	horse	caud	1	b		f	f	
19.10.82	horse	caud	1	b		f	f	
1958.133	horse	max+	1	r				P3,P4,M1,M2. Real root well developed
1958.133	horse	mand	1	r	1BCD			P3,P4,M1,M2. Real root well developed
7.3.59	horse	m/t	1	r	12345678	f	f	GL:270
7.3.59	horse	tib	1	r	123456789A	f	f	GL:346. Bd:71,9
7.3.59	horse	tib	1	l	123456789A	f	f	GL:345. Bd:72,2

Appendix 2 – Burial grounds without recorded animal bone

Site	Hreppur	Year excavated	# of known burials	Distur-bance	Research	Arte-facts	Weapons	Jewellery	Notes
Vestmanna eyjar									
Kornhóll (Skansinn)		1968-92	2	yes	yes	yes	yes	yes	
Rangárvalla sýsla									
Áslákshóll	Vestur-Eyjafjalla hreppur	1909	1	wind erode d	no	yes	yes		possibly harness
Dufþaksholt	Hvolhreppur	1940	1	yes	yes	yes			scant remains
Efri-Rauðalækur	Holtahreppur	1902	1	?	no	yes	yes		only artefacts reported, no bone
Fellsmúli (gamli)	Landmanna hreppur	1888-1930	7	?	no				only one burial investigated, no burial goods
Gamla-Berjanes	Vestur-Landeyja hreppur	1912	1	wind erode d	no			yes	two brooches only, no bone reported
Hábær	Djúpár hreppur	1919-58	1		no		yes		
Húsagarður (gamli)	Landmanna hreppur	1850-98	1	wind erode d	no	yes	yes		
Karlsnes	Landmanna hreppur	1932	1	wind erode d	yes	yes	yes	yes	
Knafarhólar	Rangárvalla hreppur	18.öld	1	wind erode d	no		yes		bone and two brooches reported
Laufahvammur	Rangárvalla hreppur	1880-90	1	wind erode d	no		yes		
Skarðstangi	Landmanna hreppur	1989	1	wind erode d	yes	yes			
Stóra-Hof	Rangárvalla hreppur	1885	1		no	yes			horse bone was reported in a burial mound in the same area, could be from the same grave field
Strandarhöfuð	Vestur-Landeyja hreppur	1951	1	yes	yes	yes			scant remains
Árnessýsla									
Búrfellsháls	Gnúpverja hreppur	1928	1	wind erode d	no		yes		bones and an axe reported
Gaukshöfði	Gnúpverja hreppur	upphaf 19. aldar	1	wind erode d	no		yes		artefacts only, no bone reported
Kaldárhöfði	Grímsnes hreppur	1937	1		yes	yes	yes	yes	boat burial
Selfoss		1958-62	2	yes	yes	yes		yes	
Skeljastaðir	Gnúpverja hreppur	1939	2	wind erode d	yes	yes			possibly two burials, both badly eroded, no bones
Snæfoksstaðir	Grímsnes hreppur	1829	1		no		yes		bones and an axe reported
(unknown location) Miklaholtshellir	Hraungerðis hreppur	snemma á 19. öld	1	yes	no		yes		

Þjórsárdalur	Gnúpverja hreppur	1864	1	?	no			yes	artefacts only, no bone reported
Gullbringusýsla									
Gerðarkot	Miðnes hreppur	1854	1	yes	no	yes			
Borgarfjarðar sýsla									
Skógar í Flókadal	Reykholtsdals hreppur	1903	1	wind eroded	no			yes	two brooches only, no bone reported
Mýrasýsla									
Borgarnes	Borgar hreppur	1866	1		no				
Mjóidalur	Norðurárdals hreppur	1837	1		no	yes	?	yes	
Straumfjörður	Mýrahreppur	1872	1	wind eroded	no	yes	yes		
Snæfellsnes sýsla									
Öndverðarnes	Breiðavíkur hreppur	1962	1	yes	yes	yes	yes		
Dalasýsla									
Innri-Fagradalur	Saurbæjar hreppur	1882	3		yes				one burial investigated, contained rust and bone fragments
Barðastrandar sýsla									
Brjánslækur	Barðastrandar hreppur	ca. 1900	2		no		?		
Skerðingsstaðir	Reykhóla hreppur	1898	?		yes				A few burials excavated, containing nothing but "occaisonal human bone" (icel. "einstaka mannabein")
Vestur-Ísafjarðarsýsla									
Höfði	Mýrahreppur	1818	1	sea eroded	no	yes	yes		probably a boat grave
Norður-Ísafjarðarsýsla									
Tyrðilmýri	Snæfjalla hreppur	1932-5	2		no				no artefacts
Vestur-Húnavatnssýsla									
Gröf á Vatnsnesi	Kirkjuhvamms hreppur	1935	1	yes	yes				Discovered and damaged during gravel mining
Urriðaá	Ytri-Torfustaða hreppur	1946-61	2	yes	yes				Discovered and damaged during gravel mining, no artefacts
Austur-Húnavatnssýsla									
Hof	Áshreppur	ca. 1847	1	wind eroded	no				two brooches only, no bone reported
Höskuldsstaðir	Vindhælis hreppur	1844-62	?		no	yes	yes		very unclear description

Sauðanes	Torfalækjar hreppur	1835	1		no			yes	brooch and human bone
Smyrlaberg	Torfalækjar hreppur	1954	1	wind eroded	yes	yes			
Skagafjarðar sýsla									
Skíðastaðir	Lýtingsstaða hreppur	1946	1	yes	yes				bulldozed
Syðri-Hofdalir	Viðvíkur hreppur	1951	1	yes	no			yes	bulldozed, a brooch reported
Eyjafjarðarsýsla									
Björk	Öngulstaða hreppur	1909-1939	2		no			yes	
Bringa	Öngulstaða hreppur	1937	1	yes	yes		yes		
Hrísar	Svarfaðardals hreppur	1916	1		no	yes		yes	finds sent to National Museum without description of burial
Lækjarbakki	Svarfaðardals hreppur	1909	1		yes				
Möðruvellir	Arnarnes hreppur	1839	1		no	yes		yes	
Syðri-Reistará	Arnarnes hreppur	1936-1940	2	wind eroded	no				
Ytri-Tjarnir	Öngulstaða hreppur	1925-6	1	yes	no		yes	yes	
Suður-Þingeyjarsýsla									
Laufás	Grýtubakka hreppur	1901	1	yes	no		yes		remains of a sword "flushed out of a ravine" (icel. framskolað úr gili) along with "bits of human bone" (icel. "rusli af mannabeinum")
Draflastaðir	Hálshreppur	1952	1	wind eroded	yes				
Framdalir	Bárðdæla hreppur	1899	1		no		yes		weapons (sword and spear) only, no bone reported
Vindbelgur	Skútustaða hreppur	1902	1		no	yes	yes		spear-head, fragment of buckle and eleven iron nails (possibly the remains of a saddle) only, no mention of bone
Norður-Þingeyjarsýsla									
Grásíða	Keldunes hreppur	1941	1	wind eroded	yes	yes	yes		
Ærlækur	Öxarfjarðar hreppur	1974	1	wind eroded	no	yes			decimated by wind erosion

Norður-Múlasýsla									
Aðalból	Jökuldals hreppur	1890	1		yes				
Bakki	Skeggjastaða hreppur	1936	1		no	yes			
Blöndugerði	Tungu hreppur	1942-85	2	yes	yes				1942 burial not investigated. 1985 burial pushed off a cliff by a bulldozer
Dalir	Hjaltastaða hreppur	1895	1		no		yes		artefacts (spear and axe) only, no bone reported
Hóll	Hjaltastaða hreppur	1920	1	wind eroded	no			yes	five brooches only, no bone reported
Hrólfsstaðir	Jökuldals hreppur	1996	1		yes	yes			
Ketilstaðir	Hjaltastaða hreppur	1938	1	yes	yes	yes		yes	
Surtsstaðir	Hlíðar hreppur	1945	1	wind eroded	yes				
Valþjófsstaðir	Fljótsdals hreppur	1801	1	wind eroded	no			yes	
Suður-Múlasýsla									
Brennistaðir	Eiðahreppur	1950	1	yes	yes	yes	yes	yes	
Fljótsbakki	Eiðahreppur	ca. 1900	1	yes	no	yes			
Gilsárteigur	Eiðahreppur	1949	2	yes	yes	yes			
Ormsstaðir	Eiðahreppur	1966	1	yes	yes	yes		yes	
Austur-Skaftafellssýsla									
Álaugarey	Nesja hreppur	1934	1	yes	yes	yes		yes	
Einholt	Mýrahreppur	1979	1		yes	yes		yes	
Vestur-Skaftafellssýsla									
Flaga	Skaftártungu hreppur	1829	1	wind eroded	no	yes		yes	two brooches only, no bone reported