Breaking and making the ancestors. piecing together the urnfield mortuary process in the Lower-Rhine-Basin, ca. 1300–400 BC

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The body and the mortuary process

4.1 Introduction

The mortuary process is set in motion with the passing of the decedent. As death turns the human agent immediately into a passive corpse, the decedent is also no longer actively involved in whatever steps follow throughout the rest of the mortuary process. The actions we see reflected in the archaeological context of the grave are solely those of the mourning community. As was argued in Chapter 2, the treatment of the dead body by the mourners reflects upon contemporary perceptions of the self (*cf.* Mauss 1938) and may hold clues about societal values deemed important by the community a decedent was part of (*cf.* Fowler 2004; 2013). This chapter will therefore focus on the treatment of the body from deathbed to the grave and explore the decision tree a corpse was subjected to in Late Bronze Age and Early Iron Age funerals. The groundwork for this part of the research is formed by the osteological analyses available for respectively 1,507 cremation graves and 21 inhumation graves. These 1,528 graves combined are derivative of 50 different cemeteries throughout the whole of the Netherlands and together represent at least 1,590[31] individuals (Tab. 4.1).

4.2 Between deathbed and pyre

The first stage of the mortuary process to be further explored is the period between death and cremation. As was argued in Chapter 3 this episode is difficult to grasp archaeologically since whatever treatment a corpse was subjected to in this stage, it did not leave any traces in the archaeological record (Section 3.2.3). No new evidence could be glanced from the present dataset to narrow down the time-window between death and cremation. The typical thumbnail fractures that predominantly occur when bones are burnt 'in the flesh' (Symes *et al.* 2008; Gonçalves *et al.* 2011, 1312; Section 3.2.3) have not specifically been recorded for any of the sites included in the present dataset. For now, the problem of the imminent decay of the dead body remains the most logical argument in favour of cremation performed within a matter of days after death occurred. In addition, Mielke, who recently worked on a reconstruction of the mortuary process for the Bronze- and Iron age in West Germany, points at Homer's Iliad (Mielke 2018, 115) where Hector's body is cremated within ten days after his death (Iliad 24, 85-87) and where the soul of Patroclus begs Achilles to cremate the body on short notice to prevent it from dwelling on Hades'

31 Some graves contained the remains of multiple individuals.

Site-code	Toponym	Examiner	N Cremations	N Inhumations
NL-BR-004	Geldrop-Genoenhuis	E. Smits	50	0
NL-BR-010	Zundert-Mencia	E. Smits	27	0
NL-BR-011	Breda-Steenakker	L. Ligthart	13	1
NL-BR-014	Someren-Waterdael III	E. Smits	34	0
NL-BR-036	Oosterhout-De Contreie	E. Smits	86	0
NL-BR-159	Hilvarenbeek-Laag Spul	*Only total weights*	68	0
NL-BR-196	Haps-Kamps Veld	*Only total weights*	82	0
NL-BR-210	Sint Oedenrode-Haagakkers	G.N. van Valk/ W.A.B. van der Sanden	39	0
NL-BR-220	Mierlo-Hout-Snippenscheut	E. Smits	40	0
NL-BR-223	Someren-Waterdael I	E. Smits	72	1
NL-GL-017	Ewijk-Keizershoeve II	S.A.M. Lemmers [CR]; B. Berk [INH]	14	4
NL-GL-019	Steenderen-Steenderdiek	E. Smits	15	0
NL-GL-022	Meteren-De Plantage	S.A.M. Lemmers [CR]; B. Berk [INH]	44	2
NL-GL-024	Groesbeek-Hüssenhoff	S.A.M. Lemmers	25	0
NL-GL-026	Huissen-Agropark	G.M.A. Bergsma	9	0
NL-GL-029	Epse-Olthof Noord	M. van der Wal	22	0
NL-GL-031	Epse-Waterdijk II	E. Smits	10	0
NL-GL-036	Lent-Lentseveld	E. Smits [CR/INH]	8	4
NL-GL-037	Lent-Steltsestraat	E. Smits [CR/INH(?)]	2	2
NL-GL-038	Lent-Zuiderveld-Oost (Ressen)	E. Smits [CR/INH]	7	2
NL-GL-039	Lent-Schoolstraat	E. Smits?	0	1
NL-GL-047	Elst-Westeraam/Parklaan	E. Smits	1	0
NL-GL-056	Zutphen-Looërenk (Meijerink)	S. Baetsen	27	0
NL-GL-060	Meteren-De Bogen	J.E. Robb	0	3
NL-GL-063	Lent-Castilliëstraat	E. Smits	2	0
NL-GL-064	Lent-Laauwikstraat-Zuid	E. Smits?	0	1
NL-GL-067	Epse-Waterdijk-West (III)	E. Smits	5	0
NL-GL-068	Twello-De Schaker	B. Veselka/M.L.P. Hoogland	9	0
NL-GL-293	Nijmegen-Kops Plateau	A.G.F.M. Cuijpers	15	0
NL-LI-006	Maastricht-Ambyerveld	S.A.M. Lemmers	78	0
NL-LI-017	Weert-Laarveld	E. Smits	26	0
NL-LI-018	Maastricht-Oosderveld	E. Smits	32	0
NL-LI-020	Weert-Kampershoek Noord	E. Smits	4	0
NL-LI-365	Roermond-Musschenberg	E. Smits	132	0
NL-LI-377	Beegden	M.L.P. Hoogland	19	0
NL-LI-385	Weert-Kampershoek	E. Smits	59	0
NL-LI-387	Sittard-Hoogveld	E. Smits	108	0
NL-LI-396	Maastricht-Withuisveld	E. Smits	18	0
NL-LI-397	Maastricht-Vroendaal	E. Smits	13	0
NL-OV-003	Mariënberg	A.G.F.M. Cuijpers	21	0
NL-OV-003II	Mariënberg II	A.G.F.M. Cuijpers	3	0

Site-code	Toponym	Examiner	N Cremations	N Inhumations
NL-OV-003III	Mariënberg III	A.G.F.M. Cuijpers	3	0
NL-OV-006	Varsen	S. Baetsen	4	0
NL-OV-025	Elsen-Friezenberg	A.G.F.M. Cuijpers	28	0
NL-OV-059	Rossum-Oranjestraat	E. Smits; G.M.A. Bergsma	84	0
NL-OV-062	De Borchert	A.G.F.M. Cuijpers	3	0
NL-OV-089	Colmschate-'t Bramelt	A.G.F.M. Cuijpers	58	0
NL-OV-092	Borne-Veldkamp/Schild Es	S. Baetsen	20	0
NL-UT-012	Wijk bij Duurstede-De Horden	M.L.P. Hoogland	52	0
NL-ZH-001	Den Haag-Hubertustunnel	E. Smits	16	0
TOTAL:			1,507	21

Tab. 4.1: The number of graves per site for which some form of osteological analysis was available. ('N Cremations' = Number of analysed cremation graves); ('N Inhumations' = Number of analysed inhumation graves).

doorstep (Iliad 23, 68-74). But as will appear from the following not for every decedent preparations for cremation were really of the essence as the present dataset shows that some individuals would never be cremated in the first place.

4.2.1 A deviating path: The choice for inhumation

Following the event of death, the mourners were confronted with the first major decision in the mortuary process as the corpse was to be cremated or inhumed. In no less than 98-99% of the cases (3,137/3,182) people chose cremation over inhumation. The small share of inhumation graves in the present dataset however shows that there was some space to diverge from the norm of cremation. Of the 45 inhumation graves entered in the database one example appeared to date to the Late Medieval Period or Modern Era,[32] six graves probably date earlier in the Middle Bronze Age than 1300 BC[33] and about one grave some serious doubt exists whether it concerns a grave in the first place.[34] The remaining 37 graves could all be dated with certainty to the period between 1300 and 400 BC on basis of radiocarbon dates (N=14) or typo-chronological markers.

Except for one early example in the urnfield of Gasteren (Van Giffen 1945, 83-85) all other inhumation graves have been found in the southern half of the country. Here the inhumation graves predominantly date to the Early- and Middle Iron Age (Van den Broeke 2014, tab. 6), with the exception of two Late Bronze Age graves from respectively

32 'Graf 30' in the urnfield of Gasteren [NL-DR-026]. This grave was found in the top of Tumulus 36 and is said to contain inhumed remains of a 'recent' date (Van Giffen 1945, 121). In Late Medieval times and in the early Modern era it was not uncommon to use 'heathen' cemeteries like barrows and urnfields as the location to perform executions and put the unfortunate subjects on display. Sometimes the corpses of the executed persons were buried in the old barrows (Meurkens 2010).

33 All six graves in the urnfield of Gasteren [NL-DR-026]: 'Graf 59,' '60,' '108' and '110' and two secondary burials in 'Tumulus 37.'

34 'Graf 30' in the urnfield of Mariënberg [NL-OV-030]. Here a pit of 1 metre in diameter was found in the urnfield that did not contain any cremated remains. A piece of accessory pottery was placed upside-down on the bottom of the pit (Verlinde 1975a, 12; 1987, 121).

Meteren-De Bogen (Meijlink/Kranendonk 2002, 210; Bourgeois/Fontijn 2008, 51-54)[35] and Meteren-De Plantage (Veldman/Van der Feijst 2012, 57).[36] By far most inhumation graves have been found in the clayey sediments of the Dutch riverine area, more specifically in the Betuwe. Only at Someren-Waterdael I (Kortlang 1999, 149-150; fig. 8) and possibly at Breda-Steenakker (Berkvens 2004, 156-157) have inhumation graves been recorded on Pleistocene sands. With the exception of Meteren-De Bogen and Lent-Schoolstraat, practically all inhumation graves have been found in cemeteries where cremation graves were also present (See Tab. 4.1).

In short, inhumation was still being practiced at the time of the urnfields, but geographically the practice seems to have been restricted to the south of the Netherlands, with a clear centre of gravity in the Dutch riverine area. The Middle Bronze Age B/Late Bronze Age inhumation grave from Gasteren is more likely to represent the gradual transition from inhumation to cremation taking place around that time in the north of the Netherlands (Hessing/Kooi 2005, 631). With regards to their dates, the same probably also applies to the two Late Bronze Age inhumations from the area around Meteren as between 1000 and 800 BC inhumation graves seem completely absent in the region (Van den Broeke 2014, tab. 6). All other dates suggest that inhumation as an alternative way of disposing of a dead body was something predominantly practiced in the Iron Age.

Even though the discovery of inhumation graves among contemporary cremation graves concerns a quite recent phenomenon,[37] theoretical approaches to this "deviation from the norm" are still often aligned with more traditional views of the past as they are not uncommonly seen as a cultural expression of (a) people not native to the place they were buried. For example, in the early 2000's a cluster of some 20 inhumation graves, presumably all females, were excavated at Ilse-Petershagen (Nordrhein-Westfalen, Germany). The graves date to the sixth century BC (Bérenger 2000, 247) and for Southwest Germany too, inhumation graves are quite rare in this period. As some of the graves contained bronze jewellery more commonly found in Middle-/Northeast Germany and Switzerland, the women in these graves were believed to be migrants. The cemetery itself has even been published as a "Ghetto" of a people coming from over the river Rhine (Bérenger 2000). However, not all grave goods had an exotic provenance as local pottery, as well as some bronze dress pins were probably of a local origin (Bérenger 2000, 248). Strontium-isotope ($^{87}Sr/^{86}Sr$) analysis of five of the skeletons carried out later, eventually indicated that two of the sampled individuals grew up in the same region as where they were buried, while the other three displayed strontium values of a non-local origin.[38] Similar results have recently been obtained for inhumation graves in the Dutch riverine

35 [NL-GL-060; Grave_ID 1487]: Labcode GrN-15463 (Bone apatite): 2790 +/- 60 BP: 1110-818 cal. BC (95,4%); A second radiocarbon date of tooth enamel (GrN-16058) produced exactly the same date (Meijlink/Kranendonk 2002, 210). The outcome of these radiocarbon dates has been heavily debated (see Section 5.3.2.4) but it was finally concluded that this particular grave should indeed be dated to the Late Bronze Age (Bourgeois/Fontijn 2008,51-54).

36 [NL-GL-022; Grave_ID 1597]: Labcode SUERC-37112/GU-25442: 2940 +/- 30 BP; 1257-1044 cal. BC (95,4%) (Jezier/Verniers 2012, appendix 6).

37 All inhumation graves in the present dataset have only been excavated *after* 1990.

38 Except for a press release by an unknown author of the Landschaftsverband Westphalen Lippe on July 11, 2006 no publication on the strontium-isotope analyses of the Ilse-Petershagen skeletons could be found. The press release is a short publication of the results in itself an can still be consulted online: https://www.lwl.org/pressemitteilungen/mitteilung.php?urlID=16194

area (Kootker *et al.* 2017). The 23 sampled individuals are derivative of seven different cemeteries and all date to the Early- and Middle Iron Age.[39] Of the total 23 individuals, twelve exhibited strontium values of a local signature (Kootker *et al.* 2017, 102) and four individuals displayed a geological signature of areas adjacent to the Dutch riverine area (*idem.*). The remaining seven individuals (males and females) however displayed $^{87}Sr/^{86}Sr$ ratios that are more common to the Loess region of South Limburg in the southern Netherlands and the boulder clays in the north of the country (*idem.*).

The strontium-isotope analyses in both cases have indeed shown that not all people would eventually be buried in the same region as where they were born and that these places of origin could in fact be a long way away. However, these analyses also show that half the inhumed individuals were born and raised in the same region as where they were buried. The practice of inhumation, as deviating from the norm of cremation, can thus not solely be explained as representing (a) foreign people. In the case of the Dutch riverine area even more so, since in the regions the strontium-isotope signals point at as the place of origin for the non-local individuals, cremation was also the norm at the time. For the cemetery of Ilse-Petershagen it has been suggested that the presence of both locally as non-locally raised individuals among the decedents could be explained by the possibility of different generations being represented among the dead. In this scenario, the non-local signal represents the migrant generation, whilst the local signal concerns the following generations, born and raised in the region of Ilse-Petershagen. Even though this scenario cannot be excluded, the difficulty with such a thesis is that it builds entirely upon the presumption that both burial rites as well as grave goods are direct representations of a culture or (a) people. It is not argued here that the otherness in the way a corpse was treated cannot reflect a new idea that was brought into a community by people from abroad. Clearly the Late Bronze Age/Early Iron Age world was a connected one, with trade networks over long distances (Cunliffe 2008, fig. 8.2). It is however argued here that this otherness does *not* necessarily reflect the need to express one-self in a culturally different way. Whether or not new ideas about death and burial were brought in from elsewhere, these new (or other) ideas must in some way have been reworked into a *local* discourse that *local* communities were susceptible to.

4.2.2 Preparing the body for cremation

As in the Late Bronze Age and Early Iron Age 98-99% of the decedents would eventually be cremated, in the days following death the mourners would have been busy with the preparations for this fiery occasion. Perhaps the dead body was washed and dressed in special clothing or covered with a shroud. For none of these treatments did the present dataset produce any new evidence. Only the burnt pieces of metal jewellery retrieved from a small portion of the graves (see Section 5.5) suggest that corpses were indeed dressed up nicely for cremation.

It is unfortunate that so little of what happened in the time leading up to cremation in some way managed to precipitate in the archaeological record as these would have been

39 Twelve graves are also included in the present dataset: three individuals come from the cemetery of Ewijk-Keizershoeve II [NL-GL-017]; one from Meteren-De Bogen [NL-GL-060]; one from Meteren-De Plantage [NL-GL-022]; two from Lent-Zuiderveld-Oost (Ressen) [NL-GL-038]; one(?) from Lent-Laauwikstraat-Zuid [NL-GL-064]; two from Lent-Lentseveld [NL-GL-036]; and two from Lent-Steltsestraat [NL-GL-037].

intense times for a mourning community (*cf.* Metcalf/Huntington 1991). Prayers, laments, tears, respects paid, story-telling, songs and feasts were probably all part of this intense stage of the mortuary process but went forever lost in time. Fortunately, the next step in the mortuary process left us more clues to work with.

4.3 The cremation process

The cremation ritual must have been a pivotal stage in the mortuary process as it was in this episode where a body still recognisable as a formerly living member of the community was transformed into an abstract heap of calcined bones. Interesting details about this fiery metamorphosis of the body can still be deduced from the cremation graves under study. Details that reflect upon the metaphorical journey made by the decedent from a former living person to whatever role she or he was envisioned to fulfil in death.

4.3.1 The location of the pyre

A first notable aspect about the cremation rite is that it added another locality to the mortuary process. This additional locality appears from the fact that none of the decedents in the present dataset had been buried at the location of the pyre.[40] Apparently, the location for cremation and the location for burial were considered two different stations along the journey of the dead person. However, as will appear later on (Section 4.3.2 and 6.3.1), pyre-debris regularly travelled along with the cremated remains of the decedent, finally to be deposited together in the context of the grave. Clearly, pyre-debris were seen as a meaningful substance and even though the acts of cremation and interment were performed at two separate locations, the pyre could definitely enter the domain of the grave (Section 6.3).

So if not in the same place as the final interment, where was the cremation rite then to be performed? Unfortunately, the present dataset did not produce any newly recovered pyres at all. Only at the cemetery of Geldrop-Genoenhuis (Hissel *et al.* 2007) have features been uncovered that could be related to the cremation process. Here, directly west of the cemetery, some 31 features were found that show clear signs of heating. It must be noted here that no radiocarbon dates are available for the features concerned. The excavators distinguish between ‘fiery pits’ and ‘fiery places’ (Hissel 2007, 112). The former concern cut features containing charcoal rich, dark fills while the latter include zones of pink, heated sand still penetrating some 15 centimetres deep (*ibid.*, 113). The exact measurements of these fiery places are not mentioned in the report, but the scale of the presented map (*ibid.*, fig. 7.18) suggests that most of them measure between one and three metres in diameter. According to the excavators these fiery places are too small to represent actual pyres (*ibid.*, 113). However, when taking into account that the excavated level finds itself several decimetres underneath the original prehistoric surface and that the original pyres would have been located on top of this old surface, these fiery places could indeed represent the locations of pyres. The modest penetration in the subsoil of the effects of fire induced by cremation has been attested in modern experiments with cremation as well (McKinley 1997, 134). A location of the pyre close or even in the cemetery itself is also in accordance with the few sites outside the present dataset where pyre locations have been

40 One possible exception is formed by a grave at the cemetery of Weert-Laarveld [NL-LI-017; Grave_ID 544] (see Section 6.3.1 for more details).

observed (*e.g.* Hissel *et al.* 2012; Fontijn *et al.* 2013a). In addition, particles of burnt loam and metal slag collected from some of the graves in the present dataset could suggest that the cremation rite was performed in locations that were also used for the production of pottery and metal (see Section 5.7.4).

4.3.2 Building the pyre

Despite the lack of well-preserved pyre sites, the charcoal particles present in cremation graves can still tell which types of wood would have been preferred for the construction of pyres. Even though only a small portion of the graves in the present dataset had been examined for the presence of charcoal[41] a surprisingly broad variation of wood types springs from this sample.[42] Oak (*Quercus*) seems to have been the dominant type of fuel[43] but alder (*Alnus*) and birch (*Betula*) also often come about. In addition, other trees like ash (*Fraxinus*), willow (*Salix*), maple (*Acer*), lime (*Tilia*) and even pine (*Pinus*)[44] are occasionally represented as well. These latter species always in combination with one of the three dominant wood types. The same applies to small trees and shrubs such as hazel (*Corylus*), buckthorn (*Rhamnus Cathartica*) and heather (*Calluna*). Finally, in the cemetery of Den Haag-Hubertustunnel several graves yielded burnt seeds of barley (*Hordeum vulgare*), blackthorn (*Sprunus spinosa*), hazelnut (*Corylus*) and juniper (*Juniperus*). These latter species might as well represent pyre goods rather than fuel or an accelerant.

The use of oak for building funeral pyres seems like a logical choice since oak has a high calorific value and as a result of which has the quality to burn long. For a cemetery in West Germany it could even be established that the oak logs were freshly chopped (Mielke 2018, 117; Tegtmeier 2006) which is also presumed to prolong the burning process (Wahl/Wahl 1983). The variety in types of wood that was used in addition to- or in combination with oak perhaps indicates that people would have made do with whatever fuel was available at the time someone died. Another explanation is that different types of wood served different purposes in the cremation process such as main fuel and accelerant. In addition, adding shrubs and evergreens such as juniper to the cremation fire perhaps masked the nasty odours of burning flesh a bit. It should however also be considered that at the time certain plants and trees were ascribed certain powers or represented certain qualities that cannot be assessed archaeologically. Birch, for one, is in mythology often associated with renewal and purification. At the Gaelic feast of Samhain, for instance, bundles of birch twigs are used to drive out the spirits of the old year.

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41 353 graves coming from 35 different cemeteries.

42 Number of graves per site for which wood determinations are available: Den Haag-Hubertustunnel [NL-ZH-001]: six graves; Geldrop-Genoenhuis [NL-BR-004]: six graves; Huissen-Agropark [NL-GL-026]: one grave; Maastricht-Ambyerveld [NL-LI-006]: one grave; Wijk bij Duurstede-De Horden [NL-UT-012]: four graves; Rossum-Oranjestraat [NL-OV-059]: 17 graves.

43 For the present dataset oak (*Quercus*) was attested at four sites and comes about in high percentages of charcoal sums. A the cemetery of Rossum-Oranjestraat [NL-OV-059], for instance, two thoroughly examined samples yielded percentages of respectively 71% and 87% of oak (Bottema/Gillavry 2008, 89). Outside the present dataset a dominance of oak has been observed at Weert-Boshoverheide (Hissel 2012, 127) and Oss-Zevenbergen (Van der Vaart *et al.* 2013, table 5.1). In Belgium (De Mulder 2011, 151) and West Germany (Mielke 2018, 117) too, oak seems to have been the dominant type of wood.

44 Pine (*Pinus*) was also found in one of the post holes at this particular site. The presence of pine (*Pinus*) was deemed rather surprising as it is a type of wood that is believed not to occur in the Netherlands as late as the Iron Age (Bottema/Gillavry 2008, 92-93).

As there is a general lack of well-preserved late prehistoric pyre sites in Northwest Europe (*e.g.* McKinley 1997, 132) for a reconstruction of the pyres themselves not uncommonly is turned to vase paintings from Classical Greece (De Mulder 2011, fig. 6.18; Mielke 2018, 117). Here, pyres are generally depicted as rectangular blocks built-up from logs stacked alternatingly on top of each other. When compared to modern evidence from South-East Asia (see for example fig. 8.2 in De Mulder 2011) these Greek vases seem to depict a general and probably also the most straightforward way of building a funeral pyre. It seems therefore safe to assume the funeral pyres in the Late Bronze Age and Early Iron Age in the Lower-Rhine-Basin too would have resembled these examples form Classical Greece or modern India for that matter.

4.3.3 Cremation

With the completion of the pyre, the stage was finally set for the cremation rite itself. At some point the corpse would have been brought out with the necessary decorum and placed on top of the stacked wood. Whether it were multiple persons who ignited the fire or just one, and whether these persons concerned relatives, friends, leaders or perhaps even a priest cannot be assessed archaeologically. What can be assessed is the intensity and thoroughness of the cremation process itself. This is an interesting aspect of the cremation rite as it shows whether the cremation fire was merely seen a cleansing ritual or that is was the complete transformation of the body that was envisioned. If the latter was indeed the case, one would expect to see this thoroughness reflected by the cremated remains.

The intensity of the cremation process is measured in grades of combustion or burn stages as devised by Joachim Wahl (1983; 2008) with 'I' indicating the lowest grade and 'V' the highest. The five grades of combustion, the temperatures these represent and the associated state and qualities of the bones are presented in Figure 4.1 (Lemmers 2011, fig. 7). For the present dataset, details about the grade of combustion were available for some 1,117 graves. Overall, cremations seem to have been performed rather thoroughly as almost 95% of the dataset shows combustion grades of IV and V (Tab. 4.2). This means that for the vast majority of cremations the pyres would have reached temperatures on and above 650-700 °C, for 30% of dataset even on and above 800 °C (Tab. 4.2; Wahl 2008, table 9.1). We can see these high combustion grades for the entire period of study and throughout the whole of the present day Netherlands. A very small minority shows varying degrees of burning with lower thresholds (Tab. 4.2). In most of these cases the pyres would still have reached high temperatures, but not the whole body seems to have endured these extreme heats for the entire cremation process. Instable pyres collapsing early during cremation could be an explanation for varying degrees of burning as body parts may have shifted towards the edges of the fire. It is remarkable though, that many of the cremation graves in the latter group come from the Dutch riverine area where also inhumation graves make up large portions of the composition of the cemeteries concerned: substantial shares of cremation graves found at Ewijk-Keizershoeve II, Meteren-De Plantage, Huissen-Agropark, Lent-Lensteveld, Lent-Steltsestraat and Lent-Castilliëstraat find themselves in this category (see Tab. 4.1).

Especially noteworthy in this regard are 'Inhumation 4' and 'Cremation 10' from the cemetery of Ewijk-Keizershoeve II as these graves both contained burnt and unburnt bone. 'Inhumation 4' was in bad shape but still showed some clear burn marks (600 °C or higher) on the *viscerocranium* (Lemmers *et al.*, 2012, 139). Surprisingly, the *neurocranium*

Burn stages	I		II		III	IV		V		
Temperature (°C)	100°	200°	300°	400°	500°	600°	700°	800°	900°	>1000°
Colour	Yellowish-White, ivory	Glassy	Brown/ dark-brown	Black	Grey, bluish-grey	Milky white, slightly chalky		White (surface is beige or grey when bone has been laying in the earth)		
Comments	Looks like unburned bone	~1% shrinkage due to loss of water and organic substances	No further shrinkage until ~750°C	Near complete charring of organic materials	Inner compact bone may still be black	Chalky surface, bone is light and very fragile, bone continues to shrink		Smooth surface, when cool, bone becomes very hard. Parabolic heat induced tearing and shrinkage of bone (~10-12%)		
Hardness	Decreases						Transitional phase Structure is not defined "chalky"		Increases	
Comparative materials					Glass becomes soft and malleable	Glass becomes a thick liquid		Melting point of silver	-Max temp. Achieved by burning wood -Melting point of gold -Melting point of glass -Melting point of bone	

Fig. 4.1: The grades of combustion, associated temperatures and qualities of the bones (Lemmers 2011, fig. 7 which is based on Trautmann 2006, fig. 18; Wahl 2008, table 9.1; Herrmann 1988, fig. 274).

Grade of combustion	N graves	% graves
I-IV	11	0,98
I-V	1	0,09
II-IV	2	0,18
II-V	5	0,45
III-IV	23	2,06
III-V	15	1,34
IV	322	28,83
IV-V	400	35,81
V	338	30,26
Total:	1117	100,00

Tab. 4.2: Grades of combustion as observed for 1,117 cremation graves in the present study.

was completely undamaged by fire (*ibid.*, 141). In this inhumation grave also some cremated remains were present that belonged to another individual, probably a non-adult (*ibid.*, 143-144). 'Cremation 10,' on its turn, contained several unburnt skull fragments and a few vertebrae of the neck were also clearly unburnt, while other parts of the same skeleton must have endured temperatures on and above 800 °C (*ibid.*, 141). For both graves a cremation process whereby parts of the same skeletal regions turned out to be so differently exposed to fire is difficult to reconstruct. Manipulation of the cremation process by poking and pulling the corpse could be considered an option for 'Cremation 10.' The person buried in 'Inhumation 4' was perhaps deliberately only partly exposed to fire. The fact that only the *viscerocranium* showed severe burn marks remains striking in this respect. By rephrasing the Latin in the previous sentence a bit, it appears that this person's face was literally, and presumably deliberately, burnt off.

Only incidentally cremation graves from other regions in the Low Countries show signs of lower grades of combustion and they practically always form the exceptions in the cemeteries they were retrieved from. For instance, of the 96 graves from the urnfield of Roermond-Mussenberg that have been included in this study, only three graves showed some indication for partially lower combustion grades. The graves from the urnfield of Beegden in general also show somewhat lower combustion grades (III-IV), but these still find themselves in the higher segment of the category with lower thresholds, between 550-700 °C (Roymans/Hoogland 1999, 76).

Overall, throughout the Late Bronze Age and Early Iron Age cremations were carried out thoroughly and indeed a complete transformation of the corpse was envisioned. 95% of the analysed graves testify to average temperatures reached during the cremation process of 650 °C and higher. The remainder also shows high combustion grades but at the same time displays more variation in- and lower thresholds of the burning stages involved in the cremation process. Most of these cases have been attested for Iron Age cemeteries in the Dutch riverine area where inhumation graves also make up substantial shares of the composition of the cemeteries concerned. These observations altogether might suggest that a different treatment of- and attitude towards the dead body developed, or was introduced for that matter, in this specific region in the course of the Iron Age.

4.4 Between cremation and interment

4.4.1 Sifting through the pyre-debris…

Evidence from modern open air cremations suggest that, when allowed to burn out, the pyre would have smothered for another two to eight hours (McKinley 1989, 67; Parker Pearson 1999, fig. 1.1). Historical sources from the last millennium BC, such as Homer's Iliad (Iliad 24, lines 789-794) and accounts on Hittite funerary rituals (Otten 1958), point at the possibility cremation fires were doused with the necessary decorum, using liquids like wine and beer (Mielke 2018, 118). Whether the cremation fire was extinguished intentionally or not, what followed next would have been the collection of the cremated remains. As archaeologists we must however bear in mind that the cremated remains we encounter in the context of the grave not so much reflect upon that point in time when the bones were collected from the pyre-debris but rather the state of- and the way in which these cremated remains were finally interred (also see Section 3.2.5). Still, whatever happened to the cremated remains in between cremation and interment, their treatment remains pivotal in our understanding of contemporary attitudes towards the dead person's body. It is exactly at this stage in the mortuary process where the *representativeness* of the cremated remains in relation to the dead person's former body starts to play an essential part.

4.4.2 Selection, taphonomy or a bit of both?

Perhaps the most remarkable characteristic of cremation graves unearthed in archaeological excavations concerns the on average low total weights of cremated remains that are usually retrieved from these graves (*e.g.* Wahl 1982, 25; McKinley 1989, 69; 1997, 137). Total weights of only a few hundred grams instead of the expected thousand plus (Section 3.2.5) are often recorded and not seldomly interpreted as reflecting a deliberate partial selection of cremated remains from the pyre-debris (*e.g.* Wahl 1982, 25) if not as '*pars pro toto*' symbology (*e.g.* Veselka/Lemmers 2014). Clearly the total weights of cremated remains are being assessed to state something about the representativeness of the dead person's body after cremation. But where do these expected total weights of cremated remains in (pre)historic graves actually come from? And what other factors than deliberate selection could be of influence on the amount of cremated remains we encounter in these graves?

4.4.2.1 Cremation weights as a proxy to the representativeness of cremated remains?

For the present dataset track was kept of which reports paid attention to the representativeness of the cremated remains and which osteological studies and total weights put forward in these respective studies had been cited.[45] As Table 4.3 shows, the figures cited range substantially: between 1,001.5 grams and 4,000 grams. What also springs from this table is that not uncommonly the cited figures have been adjusted a bit or have even been wrongfully cited (Tab. 4.3). The article by Silva *et al*., for one, does not even deal with cremated remains but with a population of dry, unburnt skeletons (Silva *et al.* 2009). Also, in some reports the average weights are taken as the basis for the argument concerning the representativeness of cremated remains while others take the highest weights available. Only seldom is pointed at the ranges obtained in the archaeological samples or the experiments with modern populations that were central to the cited studies.

Two works that have formed an important pioneering basis for the study of cremated remains from archaeological contexts concern Wahl's 1982 *"Leichenbranduntersuchungen. Ein Überblick über die Bearbeitungs- und Aussagemöglichkeiten von Brandgräbern"* and McKinley's 1989 *"Cremations: Expectations, methodologies and realities."* Both works were aimed to effectuate a basic understanding among archaeologists of the methods applied in osteological analysis of cremated remains and the potential of these analyses (McKinley 1989, 65). However, the discipline has grown and widened substantially ever since,[46] as have the "expectations" originally put forward in these works. McKinley, for one, originally mentioned expected total weights of burnt bone left after cremation of an adult individual between 1,600 and 3,600 grams, with an average weight of 3000 grams (McKinley 1989, 66). In her earlier cited article (Section 3.2.5) that was published not much later, the lower threshold of the expected weights had however already shifted to 1227.4 grams (McKinley 1993, 285), 1,001.5 grams when the 2 millimetre fraction is removed from the remains (*idem.*). About archaeological adult collections she states that weights my vary between as little as 200 grams and as much as 2000 grams with an average of 800 grams (McKinley 1989, 69). Wahl points at the same range of variation for archaeological populations, between 200 and 2,500 grams for adult individuals (Wahl 1982, 25). In addition he briefly mentions 'give or take' 2,500 grams as the outcome of several experiments on modern populations in modern crematoria (Wahl 1982, 20; note 58). In a more recent article, Wahl adjusted the expected upper threshold for the weights of cremated remains from archaeological contexts to 2,000 grams (Wahl 2008, 149).

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45 For twelve of the 75 cemeteries included in the present dataset authors paid attention to the representativeness of the cremated remains.

46 In the course of this PhD-project alone, at least four edited volumes completely dedicated to the study of cremated remains were published (Kuijt *et al.* 2014; Schmidt/Symes 2015 [2nd edition]; Thompson 2015; Cerezo-Román *et al.* 2017).

What is most apparent in the works of both Wahl and McKinley is the huge variation in the total weights of the cremated remains observed for adult individuals. This variation clearly not only counts for archaeological populations (*e.g.* McKinley 1989, 69; Wahl 1982, 25) but also for modern populations where individuals had been cremated in modern crematoria under controlled circumstances (*e.g.* Evans 1963, 85; McKinley 1993, 285). An important cause for the variation in weight for both populations already lies in the variation of bone mass present in every living person (Väänänen/Härkönen 1996). Variation is thus to be expected in any case. With regards to archaeological populations both Wahl and McKinley add that total weights are dependent on many factors that are not of influence on specimens from modern crematoria. They both point at taphonomic processes taking place in the ground, the varying visibility of the remains after cremation, weather conditions during cremation such as wind, rain and draught and the uneven distribution of heat over the pyre (McKinley 1989, 66-67; Wahl 1982, 24-25). Taking into account these factors, it is to be expected that archaeological populations on average indeed show lower total weights of cremated remains than is the case for modern crematoria. '*Archaeological populations*' are specifically mentioned here since the on average lower cremation weights are not even typical for the Late Bronze Age and Early Iron Age, but can in fact be observed for the entire timespan from the Bronze Age (*e.g.* Theunissen 2009, 93) up to the Roman Period (*e.g.* Wahl 2008, 149).

In addition, Harvig and Lynnerup have recently argued that both mass and volume[47] of cremated remains are not only heavily reduced by taphonomy but also by (post-)excavation handling of the cremated remains (Harvig/Lynnerup 2013, 2719-2720). By assessing the volume of cremated remains digitally inside four CT-scanned Late Bronze Age urns they were able to establish that between 55 and 66% of *in situ* cremated remains still consisted out of so-called *trabecular* bone (Harvig/Lynnerup 2013, 2719). Trabecular- or *cancellous* bone concerns the more spongy parts of the skeleton and can be found at the ends of long bones (epiphyses), the interiors of vertebrae, ribs, flat bones of the skull and the scapulae.[48] Due to its porous structure trabecular bone is substantially more voluminous but also much lighter and weaker than the much denser *cortical*[49] bone. As a result of which trabecular bone suffers substantially more from taphonomic processes in the ground as well as from handling during (micro-)excavation (Harvig *et al.* 2012). For the four urns in their study only between 41 and 63% of the digitally measured *in situ* volume of the cremated remains was eventually retrieved after micro-excavation (Harvig/Lynnerup 2013, table 2). Harvig and Lynnerup therefore argue that both mass as volume of cremated remains after excavation cannot simply be correlated with data obtained in modern crematoria (Harvig/Lynnerup 2013, 2719) and that whole cremated bodies are probably represented more often than is generally believed in osteoarchaeology (*ibid.*, 2713).

In conclusion, using total weights of cremated remains as a proxy to representativeness is problematic as these weights are dependent on too many factors not related to acts

47 'Volume' as an additional proxy to weight in assessing the representativeness of the cremated remains has a long tradition in Scandinavian archaeology (Harvig/Lynnerup 2013, 2713) but is, perhaps surprisingly, never considered as such in Dutch archaeology. For none of the sites included in the present dataset had the volume of cremated remains been presented.

48 Encyclopaedia Britannica; Entry: 'Cancellous bone'

49 The strong parts of the skeleton, such as the long bones consist for an important part of this much denser type of bone.

Cited study	Ascribed weights in excavation reports	True weight in cited study
Kunter 1989, 417 (combined with Silva *et al*. 2009)	1,600-4,000 g	Female: 1,600 g (mean); Male: 1,850 g (mean); (modern crematoria)
McKinley 1993	1,001.5-2,422.5 g	p.285: 1,001.5-2,422.5 g (modern crematoria after removing 2mm fraction)
McKinley 1994, 77	1,500-3,000 g	p.75: 1,600-3,000 g (modern crematoria as observed by Evans 1963, 85: 1,600-3,600 g)
Silva *et al.* 2009, 628 (combined with Kunter 1989)	1,600-4,000 g	3,850 g is the mean weight of the unburnt male skeleton
Smits 2006, 10-11	1,500-2,700 g	Table 1-2: Female: 1,616 – 1,840 g; Male: 1,843-2,700 g (Based on average weights in Herrmann 1976; Wahl 1982; Holck 1986; Snyder *et al.* 1975; Kunter 1989; McKinley 1993)
Smits 2006, 11	1,500-3,000 g	*idem.*
Smits/Hiddink 2003, 150-151	Female: 1,500 g; Male: 1,800 g	Female: 1,711.3 g; Male: 1,841.6 g (Based on mean weights in Herrmann 1976 who looked at a large sample (F: 226; M: 167) in modern crematoria)
Smits/Hiddink 2003, 150-151	1,500-2,700 g	*idem.*
Wahl 1982, 25	2,500 g	p. 25: "...Jedoch liegt die Variationsbreite bei Einzelbestattungen von Erwachsenen zwischen 200 und 2500 Gramm..."
Wahl 2008, 149	2,000 g	p. 149: "...The complete cremation remains of an adult may weigh up to 2,000 g or more. It was the exception rather than the rule that prehistoric or early historic cremations reached this weight..."
No study was cited	1,500-2,500 g	*Not applicable*.
No study was cited	only 30-40% is put in the grave	*Not applicable*.

Table 4.3: This table is meant to illustrate the discrepancy occurring between osteological studies and excavation reports when in the latter the former are being cited to refer to the expected total weights of cremated remains in cremation graves. The basis for this table is formed by the excavation reports on the sites selected for the present study. Every row represents a single citation in one of these excavation reports (hence some studies occur several times in column 1). Column 1 lists the osteological studies cited in a given excavation report; Column 2 lists the weights mentioned in that same excavation report while Column 3 lists the 'true' weights as they are published in the original osteological study that was cited. As the last two rows indicate, sometimes is not even bothered to bring up an osteological study at all. Publishers and site names have been deliberately kept out of this table.

of selection. Large variations are to be expected and the lower weights in the spectra obtained thus not necessarily reflect selection. Clearly, extreme low weights beneath 100 grams indeed indicate not all cremated remains entered the grave (Wahl 1982, 24), but writing off the entire spectrum of variation underneath the kilogram as selective deposition is not a statement that can simply be made on basis of the on average lower total cremation weights alone.

4.4.2.2 Cremation weights as a stochastic variable: expectation models

The variation in total weights can also be used to an advantage in assessing whether or not selection of cremated remains was part of the mortuary process in the Late Bronze Age and Early Iron Age. In the above it has been established that (1) variation in total weights is to be expected in both archaeological and modern populations and that (2) archaeological populations will generally show lower total weights than modern populations (Harvig/Lynnerup 2013). Despite the expectantly lower total weights for archaeological populations, one would however still expect this variability to show a normal distribution when the amount of cremated remains left after cremation was not affected by selection. In this view the variation in cremation weights is approached as a calculation of probability where the cremation weights themselves serve as the stochastic variable. If it was indeed the norm that the cremated remains retrieved from the pyre-debris were interred as complete as possible, one would expect a graph plotted for the cremation weights in the present dataset to show a bell curve (normal) distribution. If it was however the norm that only a selection of the cremated remains was to be interred, one would expect such a graph to show a clear peak in the first quartiles of the curve.

Before subjecting the present dataset to the suggested analysis, some variables need to be taken into account first. The intactness of the grave, for one, should be considered when assessing the total weights of cremated remains. As in the Netherlands most cemeteries are located on Pleistocene sands that have since the last glacial not seen any additional sedimentation, graves are usually located in vulnerable locations just underneath the present day surface. As a result of which many graves have been “decapitated” by agricultural activities since the Late Medieval Period onwards and not uncommonly only a handful of cremated remains or less is retrieved from the bottoms of the pits and urns concerned (Section 3.4). As modern ploughs reach some 40 centimetres deep considerable amounts of cremated remains might be missing from the grave. For the present dataset an assessment of the intactness of the graves had only been carried out for a minority of the selected cemeteries. In order to solve this uncertain factor the graves for which a reasonable certainty existed as to their intactness were marked as a reference group (also see Section 3.3.4). Only the burial pits that still reached substantially deep with clear undamaged concentrations of cremated remains and urns that still possessed their rim or had their lids still in place have in the end been qualified as ‘*intact*’ graves.[50]

Other variables that should be considered when assessing the total weight of cremated remains are the number of individuals buried in one grave and the age of the decedent. Logically infants produce lower total weights of cremated remains than adult individuals and the remains of two adult individuals will weigh more than the remains of just one adult individual. Therefore, in the final assessment double graves and non-adults should be excluded from the analysis.

4.4.2.3 Cremation weights in the present dataset

For 1,507 graves in the present dataset the total weights of the cremated remains had been published. The lowest weight in this dataset is 0.1 grams while the highest weight is 3,407 grams. The latter weight is in fact exceptional and was produced by an urn grave from Beegden containing the remains of at least seven(!) individuals (Roymans/Hoogland 1999, 76). For 1,453 graves the MNI was ‘1’ and 128 graves could with a fair amount of certainty be designated as ‘intact’ graves. For 941 of ‘MNI=1’ graves the age of the decedent could roughly be estimated, respectively for some 713 adult individuals and 228 non-adults (<15 years old).

50 128 graves qualified as ‘intact’ graves. 111 examples concern urn graves.

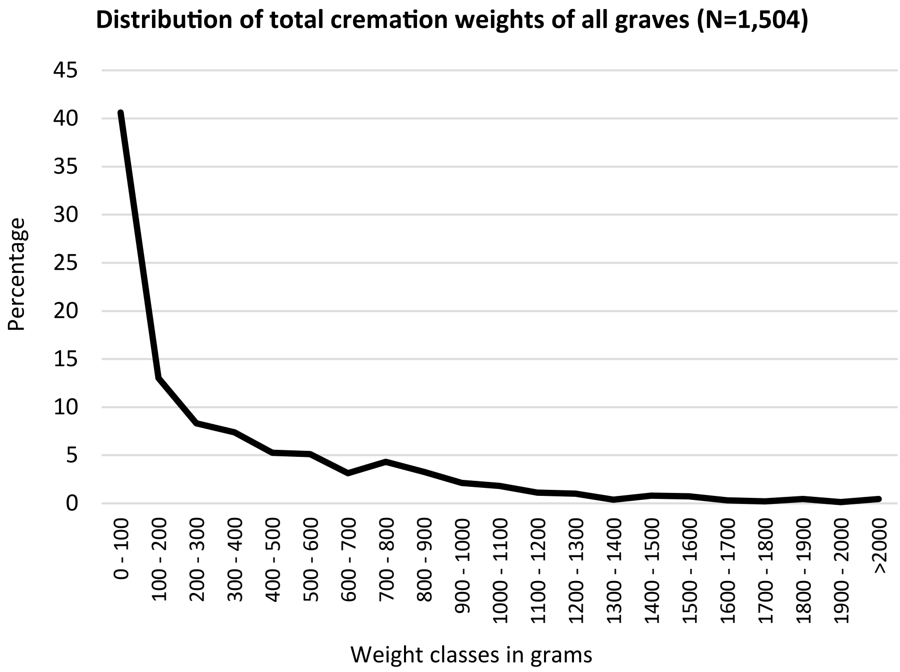

Fig. 4.2: Graph showing the distribution of cremation weights for all graves in the present dataset for which total weights of cremated remains had been published (N=1,504) regardless of intactness, MNI and age.

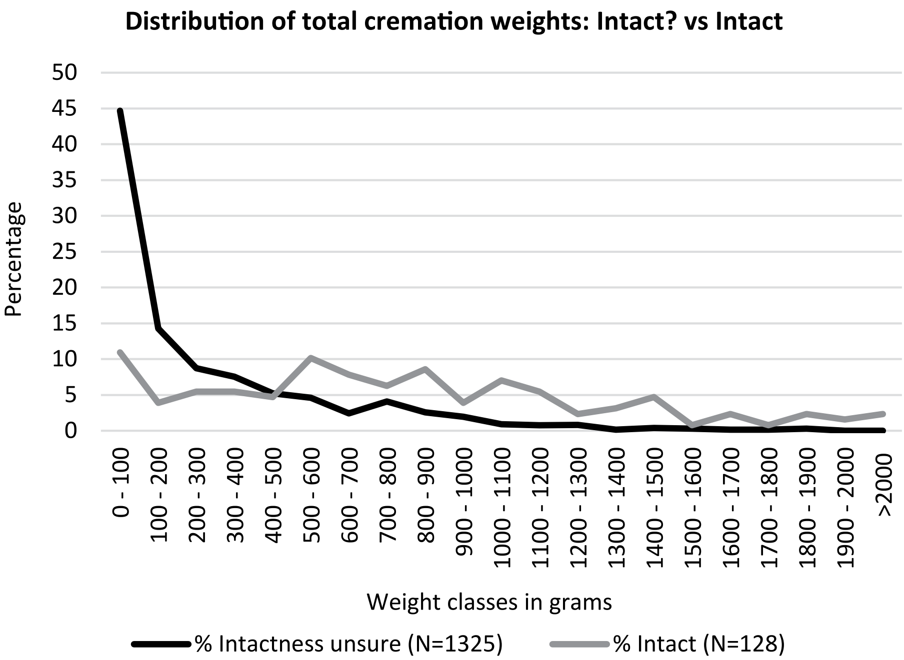

Fig. 4.3: Graph showing the distribution of cremation weights for all 'MNI=1' graves in the present dataset divided into 'Intact' graves and 'Intactness unsure' (Intact?) graves. In this graph still all age categories are represented.

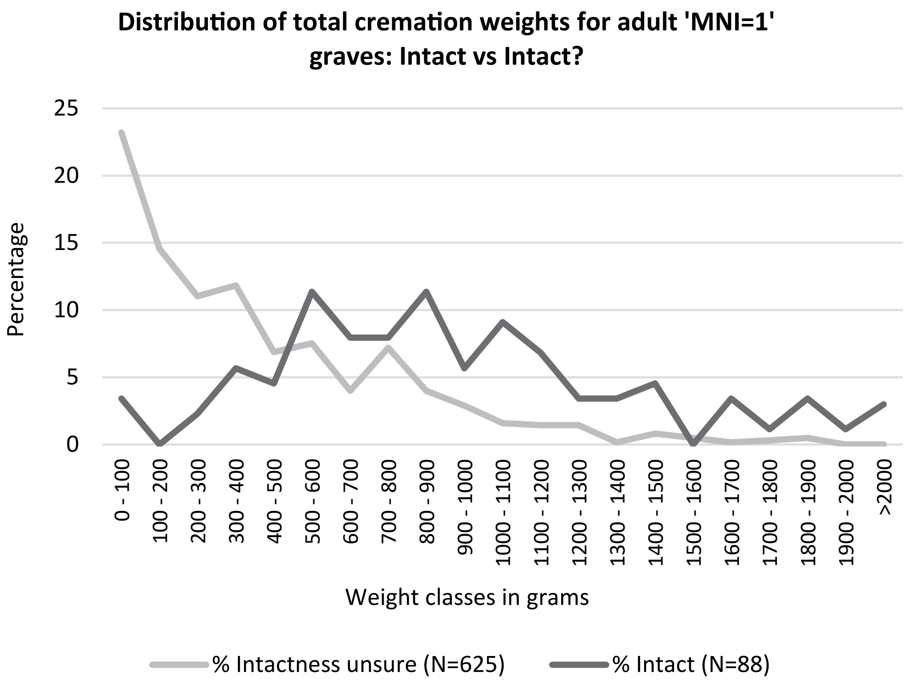

Fig. 4.4: Graph showing the distribution of cremation weights for all adult 'MNI=1' graves in the present dataset divided into 'Intact' graves and 'Intactness unsure' (Intact?) graves.

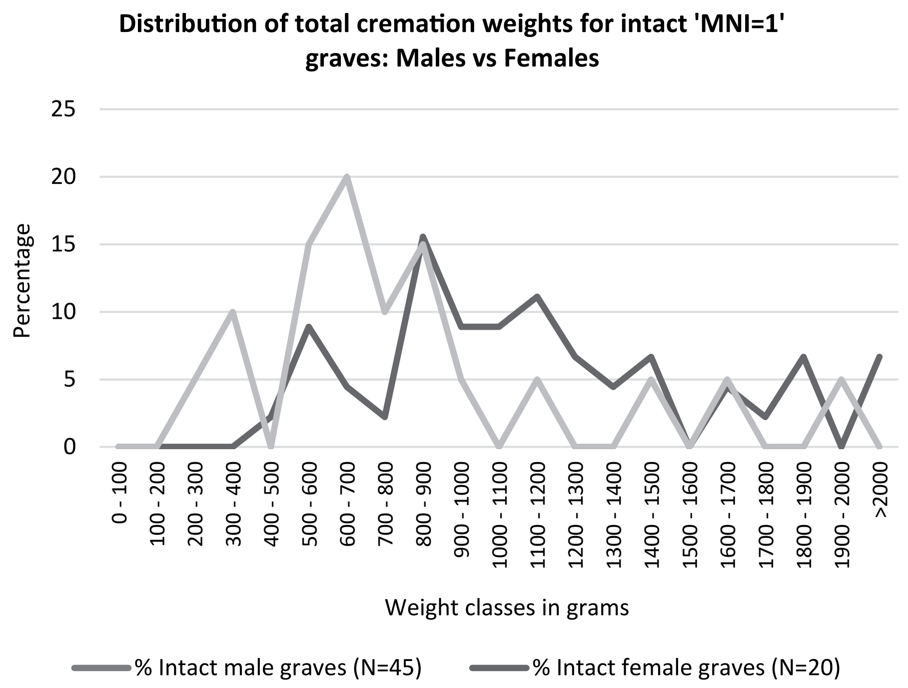

Fig. 4.5: Graph showing the distribution of cremation weights for all 'Intact' adult male and female 'MNI=1' graves in the present dataset.

Category	N	Q1	Median	Q3	Mean
All adults 'intact?'	625	110	309	603.5	404.09
All adults 'intact'	88	586.25	853.5	1180.75	945.5
All males 'intact?'	118	298.5	575.75	815	602.45
All males 'intact'	45	825.5	1067	1407.5	1181.78
All females 'intact?'	126	289.53	467.55	746.75	534.5
All females 'intact'	20	544	677.5	938.75	821.3
All non-adults (<15 years) 'intact?'	198	20.38	64.5	171.5	126.55
All non-adults (<15 years) 'intact'	30	63.75	205.5	415.75	286.52
Infans (0-3 years) 'intact?'	32	15.75	36.5	87	54.93
Infans (0-3 years) 'intact'	10	36	79.3	195.5	109.56
Child (4-15 years) 'intact?'	101	40.5	132	256	193.32
Child (4-15 years) 'intact'	17	205.5	380	565	427

Tab. 4.4: Medians, first- and third quartiles and means (in grams) for the total weights of the cremated remains in the different age and sex categories. For the details concerning the sexes and the different stages of childhood only the graves for which detailed sex and age determinations were available have been included.

Fig. 4.6: Box and whisker plots for the total weights of cremated remains in the different age and sex categories. The weights in grams are shown on the vertical axis. For the exact numbers of the quartiles, medians and means see Table 4.4.

When all factors that are of influence on cremation weights are ignored and the weights of all 1,504[51] graves are plotted over weight classes of 100 grams the graph in Figure 4.2 is created. The steep decline in cremation weights between 0.1 and 300 grams is most apparent in this graph and indeed matches the expectation model in favour of selection. However, if double graves are excluded from the sample and the remaining 1,453 graves are divided into 'intact' and 'intactness unsure' graves, the 'intact' curve starts to show a rather different distribution (Fig. 4.3). Still a small peak in the '0-100 grams' class is noticeable, but the overall distribution already has a far more regular course. When finally only the cremation weights of positively identified adult individuals are included, the 'intact' curve now slowly starts to resemble a bell curve (Fig. 4.4), the expectation model that was created for the non-selection scenario. The vast majority of the recorded 'intact' samples find themselves between 200 and 1600 grams with peaks between 600 and 900 grams. In the light of the above mentioned factors of influence on the total cremation weights for archaeological populations, these indeed seem the kind of weight classes to be expected. Box and whisker plots created for respectively all adults and all non-adults underpin the influence of taphonomy on the total cremation weights represented among archaeological populations (Fig. 4.6 and Tab. 4.4). The first quartile of 'intact' adult graves even coincides with the third quartile of the adult graves for which the intactness is questionable (Fig. 4.6 and Tab. 4.4).

Separate plots for the respective sexes (Figs. 4.5-6; Tab. 4.4) show that male graves produced relatively higher cremation weights than female graves. This difference is probably best explained by differences occurring in bone metabolism in the life cycles of males and females[52] and not so much because of different treatment of the respective sexes after cremation. Also, the same differences in weight between males and females have been observed in experiments conducted on modern populations in modern crematoria (*e.g.* McKinley 1993).

Do the here presented figures for the intact adult graves exclude the possibility of selection all together? The answer would be certainly not. The analysis only underpins the statement made by Harvig and Lynnerup that 'whole' bodies are represented more frequent than is often assumed (*cf.* Harvig/Lynnerup 2013) and that a lot of factors other than selection are of influence on the cremation weights ultimately retrieved from cremation graves in archaeological excavations. What the here presented figures have however also shown, is that even for intact graves of adult individuals occasionally extremely low cremation weights come about that cannot be simply written off as taphonomy or (post-)excavation handling (see 0-100 grams class in Fig. 4.5). In the cemetery of Nijmegen-Kops Plateau, for instance, an intact urn was found containing only one piece of burnt bone (Fontijn/Cuijpers 1999, 52). These are the graves that clearly stand out for the very limited amount of intentionally interred cremated remains. Wahl specifically mentions the intact graves in the 0-100 grams class to represent intentionally incomplete, or symbolic interments (Wahl 1982, 24).

51 For three graves some uncertainties about the published weights arose during analysis and have been left out of the final count.

52 Deficiencies in the hormone *estrogen* are an important cause for bone loss, or *osteoporosis*. Women exhibit signs of osteoporosis more often when compared to men due to *estrogen* deficiencies occurring from the menopause onwards (Väänänen/Härkönen 1996).

Tab. 4.5: Expected shares of skeletal regions for unburnt adult skeleton (McKinley 1989, 68) and the shares of the skeletal regions as observed for the present dataset.

Skeletal region	McKinley 1989, 68	Present dataset
Skull	18.2%	10.83%
Axial	23.1%	5.08%
Limbs combined	58.7%	35.02%
Residue	0%	49.07%
Total	100%	100%

In addition, a slight bias exists for the present dataset as only the graves for which no doubt existed as to their intactness have been included in the 'intact' group. Of the 128 graves that qualified as 'intact' graves, 111 are urn graves doing no justice to the 56% of graves in the present dataset that did not concern urn graves (Tab. 5.1). The problem however is that the intactness of urnless cremation graves is much harder to assess. When an urn is found in a ploughed-over burial pit but still standing upright with a lid still placed on top, it is fairly safe to state such a grave is for the most important part still intact. In a comparable situation, but this time for the type of grave that only consists of a shaft-like pit where cremated remains have been deposited mixed with pyre debris (Section 6.3) this assessment is much harder to make. Also, because the cremated remains in urnless cremation graves have lacked the protection of a solid container. Still, cases like 'Mound 3' at the site of Oss-Zevenbergen where only one piece of burnt bone was retrieved from underneath a monumental barrow (Section 1.4.2) form clear examples of sealed-off urnless graves where clearly intentionally only a small portion of the original body was deposited.

Without a clear indication for the intactness of the grave concerned, total weights remain a problematic proxy for the representativeness of the cremated remains. When the ratios of the different skeletal regions are however also included in the assessment of representation, even damaged graves can begin to add to the discussion.

4.4.2.4 Ratios of the different skeletal regions as a proxy to representativeness

For an average adult (unburnt) skeleton the different skeletal regions make up specific ratios of the skeleton. It is said that the skull makes up some 18.2%, the axial skeleton some 23.1%, the upper limbs 20.6% and the lower limbs 38.1% (McKinley 1989, 68). By looking at these ratios for the cremated remains the possibility arises to check whether specific body parts were preferred for interment or that all skeletal regions are represented in the expected ratios.

In the analysis of cremated remains from archaeological contexts specialists generally distinguish between the *'(neuro-)cranial,' 'viscerocranial,' 'axial,' 'diaphyseal'* and *'epiphyseal'* parts of the skeleton. However, they also have to reserve a rather large category for 'residue' as for archaeological cremations by far not all bone fragments can still be recognised as belonging to specific parts of the skeleton. For 436 graves in the present dataset that contained the cremated remains of just one individual details were available as to the distribution of the different skeletal regions. In 65 cases these details were delimited to 100% residue. For the remaining 371 cases, respectively 64 'intact' graves and 307 'intact?' graves, the means per skeletal region have been listed in Table 4.5.

Site_code	Grave_ID	Weight	%Skull	%Axial	%Limbs	%Residue	Age
NL-ZH-001	290	11	9.09	0.00	90.91	0.00	Adult_(15+)
NL-LI-365	632	64	26.56	0.00	25.00	48.44	Infans_(0-3)
NL-LI-365	647	18	16.67	0.00	0.00	83.33	Infans_(0-3)
NL-BR-004	904	40	25.00	0.00	12.50	62.50	Infans_(0-3)
NL-BR-004	911	100	48.00	4.00	3.00	45.00	Child_(4-15)
NL-BR-004	922	50	0.00	0.00	80.00	20.00	Adult_(15+)

Tab. 4.6: All 'Intact' graves containing no more than 100 grams of cremated remains and for which the cremated remains had been analysed for the representation of the different skeletal regions.

When the observed ratios for the present dataset are compared to the expected ratios for unburnt skeletons it shows that the present dataset produced lower shares for all respective skeletal regions. Even though these mutual ratios might deviate, for cremation graves they do however appear in logical proportions (Tab. 4.5). First, the lower shares can be explained by the large share of unidentifiable bone fragments in cremation graves (on average 49.07%, see Tab. 4.5). Moreover, as mentioned in the above, bones containing a lot of cortical bone are likelier to survive cremation, interment and excavation than bones containing a lot of cancellous bone. Hence, the relatively large shares of diaphyseal bone fragments in the present dataset. Additionally, ratios comparable to the present dataset have also been attested elsewhere emphasising that the here presented ratios are not out of the ordinary (compare Tab. 4.5 to Wahl 1982, 26). Overall, it does not seem that specific body parts were selected for interment. On the contrary, in most occasions the 'whole' body is represented in expectable proportions.

Also, on basis of the here presented ratios it does not seem that specific body parts were favoured over other body parts for interment. Only in twelve out of 371 cases just one skeletal region was represented, respectively two graves with only skull fragments and ten graves with only fragments of the limbs. All twelve graves however concern heavily damaged graves for which the highest total weight observed was 52 grams and second highest weight 25 grams. Only the six graves in the 'intact' group that produced less than 100 grams of cremated remains and for which the ratios of the different skeletal regions had been analysed show some deviating ratios. Four graves, all non-adults, contain remarkably larger shares of skull fragments and two graves, both adults, show very large shares of limb fragments (Tab. 4.6). Still all these graves contained other parts of the skeleton as well.

A final assessment that can be done on basis of the different skeletal regions, is to check whether an anatomical order was maintained when urning the cremated remains. To test this hypothesis, micro-excavations of cremated remains inside urns are required. For the present dataset only seven examples of such micro-excavations were available. An eighth example outside the present dataset concerns the urn from 'Mound 7' of Oss-Zevenbergen.[53] In sum, seven out of eight urns showed no anatomical order or whatsoever in the way the cremated

53 Urns excavated in layers: Geldrop-Genoenhuis [NL-BR-004]: four urns (Hissel 2007, 98); Zundert-Mencia [NL-BR-010]: one urn (Smits 2005b, 7); Oss-Zevenbergen [NL-BR-180]: one urn (Smits 2013, 260); Elst-Westeraam [NL-GL-047]: one urn (Smits 2005a, 29); Rossum-Oranjestraat [NL-OV-059]: one urn (Bergsma 2008, 75).

remains were put in the urn (Smits 2005a, 29; 2005b, 7; 2013, 260; Hissel 2007, 98). Only one urn found in the cemetery of Rossum-Oranjestraat showed some grouping of long bones and skull fragments (Bergsma 2008, 75). The overall impression from these few examples is that cremated remains entered the grave in a shuffled state. The exception from Rossum however shows that some anatomical ordering might occasionally be expected as well and that further research into the matter is required. Therefore, systematic research to the placement of cremated remains in urns is highly recommended in future excavations. Even by collecting the cremated remains from an urn in just three separate layers can already provide valuable insights in the collection and handling of cremated remains after cremation.

4.4.2.5 Body parts or bodies whole?

To sum up, a fairly normal distribution of cremation weights is displayed by the adult graves in the present dataset that were still intact. Overall these cremation weights are indeed lower than observed for adult individuals in modern crematoria. However, given the many factors that are of influence on both cremation weight as volume archaeological populations can be expected to show generally lower weights than modern populations (*cf.* Harvig/Lynnerup 2013). These factors concern weather conditions during open-air cremation; visibility of the cremated remains after cremation; taphonomy in the ground (*cf.* McKinley 1989, 66-67; Wahl 1982, 24-25); and (post-)excavation handling of cremated remains (*cf.* Harvig/Lynnerup 2013).

Additionally, in the present dataset the different skeletal regions were displayed in the expected ratios by the vast majority of the graves. This observation suggests that overall no selections of specific body parts were carried out for the final interment. As mentioned, none of the above observations exclude the possibility of selection all together. They only underpin that ‘whole’ bodies are represented more frequent in Late Bronze Age and Early Iron Age graves than is often assumed.

The present dataset did produce a small class of graves for which symbolic interment of only a small representation of the decedent should definitely be considered. These concern the intact graves of adult individuals displaying cremation weights less than 100 grams (*cf.* Wahl 1982, 24). Cases like Nijmegen-Kops Plateau (Fontijn/Cuijpers 1999, 52) and Oss-Zevenbergen (Section 1.4.2) where only a single piece of bone ended up in the grave are clear examples of intentional selective deposition of cremated remains confirming the rite did indeed occur. As mentioned, there might be more examples of selection hiding among the graves for which the intactness could not be assessed.

4.4.3 Mixing bodies

Selection was not the only way of interfering with the burnt remains of a decedent’s body in the time between cremation and interment. Not only provided the rite of cremation the mourners with the possibility to break down the decedent’s body into pieces, but also to combine (parts of) bodies into new entities. This latter category concerns the 51 double graves that have been recorded for the present dataset (Tab. 4.7). Double graves have been recorded throughout the whole of the Netherlands and occurred throughout the entire period of study. But why were people in the Late Bronze Age and Early Iron Age occasionally combining the remains of multiple individuals into one grave?

One explanation for the presence of multiple individuals in one grave is that these people died around the same time and, whether or not for convenience’ sake, were cremated

Combination	N	%
1. Adult [Female]; 2. Adult [Male]	3	5.88
1. Adult [Male]; 2. Adult [sex unknown]	2	3.92
1. Adult [Sex unknown]; 2. Adult [sex unknown]	2	3.92
1. Adult [Male]; 2. Non-adult	3	5.88
1. Adult [Female]; 2. Non-adult	10	19.61
1. Adult [sex unknown]; 2. Non-adult	21	41.18
1. Non-adult; 2. Non-adult	3	5.88
1. Adult [Male]; 2. Age/sex unknown	1	1.96
1. Age/sex unknown; 2. Age/sex unknown	1	1.96
1. Adult [Female]; 2. Adult [Male]; 3. Non-adult	2	3.92
1. Adult [Female]; 2. Age/sex unknown; 3. Age/sex unknown	1	1.96
1. Adult [Female]; 2. Adult [sex unknown]; 3. Non-adult; 4. Non-adult	1	1.96
1. Adult [Male]; 2. Adult [Female]; 3. Adult [Female]; 4. Adult [Female]; 5. Non-adult; 6. Non-adult; 7. Non-adult	1	1.96
TOTAL:	51	100.00

Tab. 4.7: Combinations of sex and age as observed for the 51 cremation graves in the present dataset that contained the remains of more than one individual.

and interred together. On basis of the tacit bones alone this indeed is an explanation that cannot be entirely excluded. However, today we would probably feel rather confused if we were to hear that one of our late beloved ones was to be cremated with a complete stranger for economic reasons or that he or she was to be interred with someone else to save space in the cemetery. The thought alone would by many be considered as appalling. But this all changes as soon as decedents are somehow socially related. Family graves, for that matter, can be found at almost every modern cemetery.

In this light, it seems plausible people in the Late Bronze Age and Early Iron Age too would have wanted to emphasise certain social relations in death. The most direct way of doing this, is by burying the cremated remains of the individuals concerned together. The transformation the decedent underwent in the cremation process, from a decaying corpse to a small and tangible heap of calcined bones, would in fact have facilitated a desire to bury certain individuals together. Moreover, the cremation process also enabled people to perform the final interment of the cremated remains at any desired moment. In other words, if a social relation was to be emphasised in the grave by burying the ashes of individuals together, people could simply have waited until the last individual had died. It is in this regard that the occurrence of double graves could also indicate a substantial amount of time between cremation and interment.

The different combinations of sex and age observed for the double graves in the present dataset are presented in Table 4.7. In one occasion the grave concerned consisted out of two separate urns that were buried 30 centimetres apart, in the other 50 graves the cremated remains had been mixed, whether or not in an urn. 46 of these 51 graves contained the cremated remains of two individuals, three contained the remains of three individuals, in one grave four individuals were represented and in one grave no less than seven individuals. These latter two graves were both found in the Early Iron Age cemetery of Beegden (Roymans/ Hoogland 1999) underneath the very same long mound. Clearly these concern exceptional cases as these numbers have not been observed for any of the other cemeteries included in the present dataset. Two of the three graves containing three individuals concern a combination of male, female and non-adult. For the third example only one of the three individuals could positively be identified as an adult female. Though only few in number, it does not escape the impression that these graves might represent a family.

The 46 graves that contained the remains of two individuals show a clear dominance of 'adult/non-adult' combinations. In no less than 34 of these graves, some 67% of the total population of double graves, have remains of both adult as non-adult individuals been identified. Also, among the graves containing more than two individuals combinations of adults and non-adults are abundant. Overall, graves containing the remains of both adults and non-adults make up at least 80.4% (41/51) of all double cremation graves in the present dataset. At first sight, 'female/non-adult' combinations seem dominant over 'male/non-adult' combinations, respectively ten versus three examples (Tab. 4.7). However, six non-adults in the 'female/non-adult' combination concern neonates while this age category is not represented among the 'male/non-adult' combinations. It is very well possible that these combinations of adult females and neonates represent pregnancies or childbirths gone wrong (Section 6.2). Bearing in mind this scenario, it does not seem that males and females were treated very differently in this respect. Combinations of two adults or two non-adults clearly also came about, though by far not as often as combinations of adults and non-adults (Tab. 4.7).

Compared to the total number of cremation graves, these 51 graves only make a small portion of the total population: Some 3.4% (51/1507). However, these only concern the 51 examples where the remains of multiple individuals have been *positively* identified. Still, the vast majority of Late Bronze Age and Early Iron Age cremation graves would have concerned individual burials. At least these few examples show that it is not unlikely that cremated remains were not immediately interred after cremation, but were saved for the right occasion, leaving open the possibility of emphasising specific social relations. A case in point are the two urns found underneath the long mound in the cemetery of Beegden that together represent no less than eleven individuals (Roymans/Hoogland 1999, 77). It is highly unlikely that these eleven individuals all died at once and were cremated and interred at the same time. Looking at the ages and sexes represented by these two urns, one male, four females and at least five non-adults it is more likely that these urns represent entire households if not symbolise a certain bloodline that needed to be anchored in this specific cemetery.

The large share of combinations of adults and non-adults in the present dataset also suggests that especially for the cremated remains of non-adults the option of saving the ashes until they could be interred with the ashes of what presumably was an adult relative was surely considered an option. Reasoning the other way around, thus from the perspective of the adults in these combinations, makes no sense as it presupposes the ability to foretell which children would not make it to adulthood.

4.5 Conclusion

Having witnessed the different treatments a corpse underwent from the moment someone passed away until after cremation, we now slowly arrive at the point in the mortuary process where the body entered the grave. As demonstrated, so far the corpse already made quite a metaphorical journey. With the exception of a small population of inhumed individuals in the Dutch riverine area, some 98- 99% of the decedents were to be transformed from a human body of flesh and blood to a bundle of calcined bones hardly resembling a former living being. Judging from the high combustion grades, people would have made sure this transformation by fire happened thoroughly. Even though the amount of cremated remains that was to enter the grave varied considerably, as argued in the above for the majority of the decedents it is not unlikely these remains were in fact all that was to be retrieved after the cremation process and that 'whole' bodies are represented more frequent than is often assumed.

However, intact cremation graves of adult individuals containing less than 100 grams of cremated remains, some 3% of the intact dataset (Fig. 4.4), confirm that intentional selection procedures also occurred. In addition, the various examples of graves containing the remains of multiple individuals indicate that bodies could not only be broken apart but also joined together. Clearly, to these people the cracked, shrunken and calcined bones left after cremation were not simply the last physical remains of a corpse that needed to be disposed of. On the contrary, it rather seems these remains were considered as objectified bodies that still had social qualities. This notion not only stems from acts of selection and mixing, but perhaps even more so from the fact that these objectified bodies were assigned a fixed spot within the physical world. Not on themselves, but in relation to others in the context of the cemetery.