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The Bioarchaeology of Early Bronze Age Ireland

Health, Disease, Trauma, and Care

Thesis presented by

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Doctor of Philosophy

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Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property



Stephanie Robinson

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Abstract

Human remains have been reported from Early Bronze Age contexts in Ireland since the 19th century. With a relative lack of settlement sites, the mortuary contexts of the Early Bronze Age in Ireland have been the focus for many studies, especially those interested in social structure and status. Despite this importance of funerary contexts, there has been very little detailed study of the human remains recovered from these graves and what analysis has been completed is found almost exclusively in site reports and demographic tables. This study addressed this underuse of a key recourse by undertaking the first integrated bioarchaeological analysis of the entire corpus of curated inhumations from the Early Bronze Age in Ireland. Additionally, two main methodological frameworks were used in this study: population health and the Bioarchaeology of Care. Reassessment of the demographics of the assemblage supported the identification of the Individualised Burial Tradition as a restricted formal burial tradition influenced by both gender and age ideology. However, the identification of changes in the impact of gender ideology across the life course in qualification for formal burial suggest that constructions of status were likely more complex than some previous models have proposed. The population health analysis was undertaken using the Biological Index of Frailty approach which identified comparatively low levels of frailty within the sample of the Early Bronze Age population. There were no statistical differences in average frailty scores based on sex or burial attributes, suggesting that variations in status were unlikely to have had a significant impact on health. During skeletal analysis, three individuals were identified with bony changes which would have impacted their ability to participate in Early Bronze Age lifeways. Bioarchaeology of Care analyses explored these examples of healthcare provisioning within the context of degenerative, congenital, traumatic, and terminal disease processes. The identification of evidence for healthcare provisioning suggests that the requirement for care did not disqualify individuals from formal burial during the period, and that this care included both physical and emotional elements. This is paralleled by the noticeably low trauma rate in the assemblage, with no convincing evidence of interpersonal violence. This suggests either a low frequency of such violence in Early Bronze Age society or that death in such circumstances may have resulted in an archaeologically invisible burial rite. The results of

this bioarchaeological analysis is compatible with a reconstruction of a relatively stable society, with individuals who merited burial living relatively healthy lives with a low risk of violence. Social structure seems to have included elements of age and gender ideology, however the impact of these were not consistent across the life course. This study has allowed for a deeper and more nuanced understanding of how social relations, organisation, practice, and identity in the Early Bronze Age, and how these factors impacted and shaped the lives of those who lived through this period of Irish prehistory.

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Chapter 1: Introduction

> *The discovery of well-preserved unburnt burials offers exceptional opportunities for the study of past populations but relatively little detailed study has been undertaken of Bronze Age skeletal anatomy, pathology and mortality in Ireland.* (Waddell, 1990, p.19)

Archaeological human remains are both inherently compelling and inherently emotive. As "the past personified" (Sofaer, 2006, p.1) they act as a connection to the past in a different way than other archaeological artefacts. This is particularly true for skeletal remains, with the physical remains of the body not only inescapably human, which can act as *memento mori,* but also acting as a reminder of the humanity of those who created and participated in the past. These remains are a direct window into the lives of individual actors in the past and can provide information about how these individuals lived. This is perhaps particularly important in the prehistoric past, lacking as it does any written record of people's lives. The Early Bronze Age is one of the few periods in Irish prehistory that inhumation burial was widely practiced. In contrast to the relative paucity of documented settlement sites, the mortuary record for the Early Bronze Age in Ireland is quite extensive, with human remains reported from these burial contexts since at least the 19th century. However, as these remains have been uncovered sporadically over a century and a half, the analysis of these remains has been inconsistent, fragmentary, and incomplete. This thesis aims to address this situation by undertaking the first modern integrated bioarchaeological study of all available unburnt human remains from the Early Bronze Age in Ireland.

Sitting on the western edge of Europe, Ireland has always occupied an interesting place in discussions of Bronze Age Europe (McLaughlin et al., 2016). While some have highlighted the integral role in resource production and trade connections of the island (O'Brien, 1995; 1999; 2004), others have continued to focus towards the continent and have viewed Ireland as sitting at the endpoint of many cultural, societal, and economic changes which spread during this period (inc. Harding, 2000; Kristiansen and Larsson, 2005). One of these societal changes which historically has been the focus of much research is the rise of social

stratification and the move to a prestige goods economy (Childe, 1930; Gilman, 1981; Treherne, 1995; Kristiansen and Larsson, 2005; O'Brien, 2012; Harding and Fokkens, 2013; Fitzpatrick, 2015). These models tend to be structured around a 'warrior chief' who controlled both ritual and economic power. The identification of these 'big men' and their associated societal structures are rooted in the discovery in continental Europe of large cemeteries, rich graves, specialised weapons, and what have been perceived to be gendered packages of grave goods.

Considering the interest in burials on the continent, it is unsurprising that one element of the Early Bronze Age in Ireland that has received considerable interest has been the mortuary record. At the beginning of the period, we see the spread of a fully developed formal burial tradition consisting of restricted formal burial with crouched inhumation or cremation burials placed in either cist or pit graves and often with bowl, vase, or urn vessel; often referred to as the Single Burial Tradition. Of particular interest to many is one particular element of this tradition – the introduction of single burial. Compared to the 'communal' burial seen across the Neolithic, this individualisation of burial has traditionally been linked with the rise of the 'ideology of the individual' and social stratification. However, more recently there have been some who have suggested that this focus on social stratification has resulted in a simplistic view of society which acts more to reflect 20th century culture rather than that of the Early Bronze Age.

These ongoing discussions have drawn on multiple elements of the mortuary record, including the demographics of formal burial, percentages of the population associated with burial attributes, and the relationship between individuals and grave goods. However, there has been very little direct and intentional interaction with the physical human remains themselves. Any analysis that has been completed is found almost exclusively within excavation reports, with the impact outside appendices almost exclusively found in demographic tables. One study has attempted to highlight the potential of bioarchaeological studies to further the understandings of the period, through exploring population health across Irish prehistory (Power, 1993). However, while issues with the methodology used in this study do undermine the interpretations of the conclusions, this study has also not had any noticeable impact on the wider discussions of the period.

The almost complete exclusion of bioarchaeological data from discussions of the Early Bronze Age of Ireland is unfortunate. Alongside the well-explored insight of demographics, bioarchaeological analysis provides one of the only direct windows into enhancing our understanding of essential aspects of the lives of earlier peoples. This is primarily due to the reciprocal relationship between the body and the environment, with each shaping interactions and outcomes of the other. This allows for us not only to increase understandings of the broad concepts but also individual experiences, through exploring the lived experience of the past. By incorporating aspects of the lived experience into understandings of the Early Bronze Age, discussions can move beyond sterile models and can approach an understanding which is both more humanised and nuanced.

To address this important avenue for understandings of the past which has been mostly ignored in discussions of the Early Bronze Age of Ireland, this study will undertake the first integrated modern bioarchaeological analysis of the unburnt human skeletal material. By investigating health, disease, and trauma, this project will focus on increasing the understandings of the lived experience for this period. Health is one of the biggest impacts on the lived experience, with implications not only for the physical abilities of the individual, but also their individual and social identity. Disease is a fact of life in modern societies and would also have been in the past. Alongside impacting health, disease also acts as a focal point of community interaction with the lived experience, as others chose how to interact with, and care for, the suffering individual. Trauma, particularly that associated with interpersonal violence, can speak directly to how individuals and communities related to each other, along with societal values and organisation. Considering these elements of the lived experience, alongside the previously explored archaeological evidence for this period, this study sets out to explore social relations, organisation, practice, and identity in the Early Bronze Age in Ireland.

1.1 Research Question, Aims, and Objectives

The research question identified for this study of the bioarchaeology of the Early Bronze Age in Ireland is 'What does the skeletal record of health, disease, and trauma indicate about the social relations, organisation, practice, and identity in the Early Bronze Age in Ireland?'

The first objective in this study is to undertake modern skeletal analysis on the inhumations dated to the Early Bronze Age of Ireland. A significant portion of the unburnt curated human remains from this period were only analysed shortly following their discovery, resulting in a significant variation in the quality of skeletal analysis available. As such, providing modern, updated, and standardised skeletal analysis is imperative. This will be combined with select published material that has received modern bioarchaeological analysis to form the assemblage for this study.

Three aims have been identified for the bioarchaeological analysis of the study assemblage: to investigate social organisation, to investigate the lived experience, and to investigate responses to the lived experience. Across these three aims, other elements of the archaeological record will be considered alongside the bioarchaeological data to explore societal relation, organisation, practice, and identity.

The investigation of societal organisation will focus towards probing social structure and organisation of the period, through a reappraisal of the demographics and burial attributes of the inhumation record. Of particular interest for this study is exploring possible restrictions within the formal burial tradition. The investigation of the lived experience is focused towards evidence for health and health inequality, pathology, and trauma. Population health will be investigated through the lens of frailty, using the Biological Index of Frailty (Zedda et al., 2021). This analysis will intend to explore biological and cultural responses to the environment. By integrating the bioarchaeological and archaeological records, this will seek to access elements of the lived experience during this period. The investigation of responses to the lived experience will be focused toward identifying evidence of health care provisioning in the Early Bronze Age. This will be completed utilising the Bioarchaeology of Care methodology to investigate a number of case studies (Tilley,

2012; 2015), with a Community of Care approach (Schrenk and Tremblay, 2022a), to synthesise identified examples of health care provisioning and to investigating how communities of the Early Bronze Age reacted to the elements of their lived experience.

This is the first project to comprehensively investigate the bioarchaeology of the Early Bronze Age Ireland through reanalysing skeletal material and synthesising multiple strands of bioarchaeological data. By utilising bioarchaeological methodology focused on the investigation of both population responses and the individual experience of the period and by integrating the bioarchaeology with the discussions of the archaeological record, this study will provide a deeper and more nuanced understanding of the lived experience of people in Early Bronze Age Ireland.

1.2 Thesis Outline

Following outlining the bioarchaeology of the Early Bronze Age in Ireland, an overview of archaeology record is provided in Chapter 2. The settlement and burial record are discussed, alongside the identification for a chronological framework which will be used in the analysis. This chapter also includes a discussion of how the questions of status and social structure have been approached for this period. Chapter 3 focuses on the theoretical underpinning for the bioarchaeological approaches utilised in this study. This covers an overview of how understandings of population health have evolved in bioarchaeology, including outlining the methodological approach adopted for this analysis. The utility of individual studies are discussed, highlighting the Bioarchaeology of Care and Community of Care approaches. The materials and methodology for the study are discussed in Chapter 4; with a catalogue of all skeletal analysis completed for this study and all material identified from the literature found in the appendix. This includes both the methodology for the modern skeletal analysis undertaken by the author and the methodological approached used for the bioarchaeological analysis.

The results of the demographic, frailty, pathology, and trauma analyses are presented in Chapter 5. Following this is Chapter 6, which presents the Bioarchaeological of Care case studies identified within the assemblage. The results of the analyses are explored in Chapter

7, including how this study relates to, and is integrated in with the wider archaeological record and thoughts of the Early Bronze Age. The implications for this integrated bioarchaeological approach to the inhumations of the Irish Early Bronze Age are presented in Chapter 8, alongside the possible future directions.

Chapter 2: Situating the Data – the Early Bronze Age of Ireland

The Early Bronze Age in Ireland is traditionally interpreted as a period of socio-political change. Networks of interaction shifted, with Britain becoming a more significant trading partner alongside continuing contacts with Atlantic Europe; settlement continued to expand across the island; the introduction and then production of tin-bronze; and the development and spread of a new burial and ceramic traditions. Preceded in Ireland by the Chalcolithic (O'Brien, 2012), from a technological stance the Early Bronze Age started around c. 2000 BC, at which point tin-bronze metallurgy was introduced to Ireland. However, many others consider an earlier date of c.2200/2100 BC as the beginning of the Early Bronze Age. This argument is based predominantly on the identification of a new burial tradition, consisting of crouched inhumation or cremation burials placed in either cist or pit graves, and a new ceramic tradition often referred to as 'Food Vessels' that consists of bowl, vase, or urn vessels (Brindley, 2007, pp.1, 326–331; Carlin, 2011, p.87; Roberts et al., 2013, p.22; Fitzpatrick, 2015, pp.806–807; Cleary, 2016, pp.139, 148; Carlin and Cooney, 2017, pp.49, 54). This focus on the burial record for defining the Early Bronze Age can also be seen in the identification of an absolute date for the period through the radiocarbon dating of burials. As this study is focusing on the inhumations of the Early Bronze Age, it was decided to adopt dating which was based on the development of the burial tradition, defining the Early Bronze Age as running from c.2200 BC until 1500 BC.

2.1 Bioarchaeology and the Early Bronze Age

While the burial record of the Early Bronze Age has formed the backbone of the understanding of the Early Bronze Age in Ireland, research specifically on the human remains found in these graves has not been a focus. The majority of the discussion and analysis of the human remains found in Early Bronze Age burials is located in discovery and excavations reports. Published across a broad period of time and in a range of journals, the quality of these reports varies significantly.

Analysis of human skeletal material from the Bronze Age has been found in excavation reports since the 19th century. During this period, the study of archaeological human remains was in the hands of physical anthropologists and anatomists, which estimated age-at-death, estimated sex, and sometimes reported pathological changes (Murphy, 2002, p.513). Alongside this interest in demographics, there was a strong influence of the early sociocultural evolutionary approaches (O'Donnabhain and Murphy, 2014, pp.155–157). Often directly associated with colonialist approaches to the past, this manifested in an interest in identifying and categorising past ethic groups and narratives of successive invasions. One of the primary expressions of this has been the typological analysis of crania, and the cephalic index; with craniometrics reported and utilised to investigate evidence of an large scale movement of different ethnic groups associated with the technological developments of the Bronze Age (Murphy, 2002, p.512; O'Donnabhain and Murphy, 2014, p.156). These ideas of cranial shape and its use to distinguish intrusive peoples continued along-side ideas of large-scale population movement into the 20th century (Raftery, 1938, p.33; Harbison, 1973, p.94; O'Donnabhain and Murphy, 2014, p.159).

The 20th century saw a significant number of important changes to how human remains were utilised in understandings of the Early Bronze Age on the island of Ireland. Following the formation of the Republic of Ireland in 1922, stories of the past were utilised by both Northern Ireland and the Republic in identity formation (O'Donnabhain and Murphy, 2014, pp.157–158). While the north highlighted links with Scotland, the south deliberately turned away from British personnel which resulted in a different trajectory for physical anthropology on either side of the boarder. One important development for the archaeology of the Republic around this time was the passing of the National Monuments Act in 1930. This resulted in the concerted effort to curate a broad spectrum of archaeological material in the National Museum of Ireland, including remains from Early Bronze Age graves, where they are still curated today (Waddell 1990, pp.41–166).

Beginning from the early 1990s, there has been a noticeable increase in trained bioarchaeologists working in Irish archaeology (O'Donnabhain and Murphy, 2014, pp.159–160). This resulted in a dramatic increase in the detail of the archaeological human remains record, particularly towards individuals of particular interest. While there was still a focus on

demographics, this increase in detailed analysis allowed for the development of a more complete picture of the Early Bronze Age (eg. Doody, 1988; Ó Ríordáin et al., 1997). This focus on detailed analysis has continued to grow from the latter half of the 1990s, with higher numbers of developer led projects resulting in an increase in the burials excavated. Sadly, due to the time pressure that these excavations are often under, increasing numbers of the osteological analyses associated with recent excavation reports are unpublished (Lynch, 2003; Fibiger, 2006; Hackett and Twomey, 2010; Troy, 2010).

One attempt to address the growing number of unpublished excavation reports was the *Breaking Ground, Finding Graves* (Cahill and Sikora, 2011) volumes published by the National Museum of Ireland. The result of a project to identify and prepare all of the unpublished archaeological reports from their archives dated between 1927 to 2006 for publication, this provided new and updated bioarchaeological analysis of many individuals curated by the National Museum of Ireland, including those from 102 Bronze Age sites (*ibid,* p.65). While this monograph is undoubtably one of the most important catalogues of modern bioarchaeological analysis of skeletal material from the Bronze Age in Ireland, it does not attempt to interpret or explore understandings of society or culture in Ireland at this time.

Moving past excavation reports and site publications, there are a number of publications that investigate and interpret the wider archaeological record of this period. While these publications do refer to the skeletal record for the Early Bronze Age, they themselves provide no analysis of human remains. Instead, these publications draw on that which is reported in excavation reports, utilising these elements in interpreting the burial record and constructing an understanding of the period.

The series of catalogues published by Waddell, *Irish Bronze Age Cists: A Survey* (1970) and *The Bronze Age Burials of Ireland* (1990), and *The funerary Bowls and Vases of the Irish Bronze Age* (1993) by Waddell and Ó Ríordáin, are foundational publications in Early Bronze Age burial studies. While often reasonably light on interpretive discussion, these publications provided a list of the burial record of this period; including cemetery composition, grave type, grave goods, and demographics. By collating information from

multiple publications, excavations, and National Museum of Ireland records, Waddell provided not only a comprehensive list of Early Bronze Age burials, but also allowed for the construction of a rigorous interpretive framework for broad interpretation and greater understanding of the period. Regarding bioarchaeological approached, Waddell reports demographic information alongside grave information from excavation reports in his catalogues.

Another seminal set of publications in the understanding of the Early Bronze Age is the work undertaken by Mount, *New Research on Irish Early Bronze Age Cemeteries* (1995) and *Early Bronze Age Burial in South-East Ireland in the Light of Recent Research* (1997). These publications where some of the first to integrate and interrogate the burial record across multiple sites in an attempt to provide a more detailed understanding of the Early Bronze Age of Ireland. Focused primarily on the geographical Southeast of Ireland, Mount investigated the distribution and siting of cemeteries, methods of discovery, grave structure and composition, demographics of cemeteries and graves, and the distribution of grave goods; all with a particular focus towards the identification of the social structure of the period. While the work undertaken by Mount changed the way that the burial record of the Early Bronze Age was interpreted, discussions of the human remains within his studies are based on the relevant previously published excavation reports.

The next major publication to address the skeletal record of the Early Bronze Age was Cormac McSparron's 2017 thesis, *Statistical Analysis of the Single Burial Tradition in Early Bronze Age Ireland and Some Implications for Social Structure.* Published as a monograph in 2021, *Burials and Society in Late Chalcolithic and Early Bronze Age Ireland*, McSparron aimed to update analysis on the Individualised Burial Tradition with a focus towards understanding social structure. Alongside undertaking a new radiocarbon dating analysis of multiple elements of the Individualised Burial Tradition, McSparron undertook a statistical approach to exploring how burial could reflect social structure of the period. Biased primarily on processualist theoretical approaches, McSparron heavily utilised energy expenditure models to link different elements of the burial tradition to social organisation and hierarchical structures. Regarding the bioarchaeological information, McSparron primarily focused on

demographic information, which was identified from published literature and available excavation reports.

While Joanna Brück has produced multiple publications providing post-processualist interpretations of the Early Bronze Age, she tends to only lightly interact with published demographics for the period, instead focusing on particular burials. However, there has been significant post-processional work that has more directly interacted with the skeletal record of the Early Bronze Age. Summitted in 2020 Haughton's thesis *Narrativizing Difference in Earlier Bronze Age Society: a comparative analysis of age and gender ideologies in the burials of Ireland and Scotland*, and subsequent publications *Seeing Children in Prehistory: A View from Bronze Age Ireland* (2021) and *Gender in Earlier Bronze Age Ireland and Scotland* (2023) investigates understandings of gender and age as seen in Early Bronze Age burials from Ireland and Scotland. This was undertaken though a combination of statistical analysis of sex and age elements as identified in modern skeletal reports and how these related to burial attributes, alongside descriptive analysis of local practice by investigating multiple sites in both regions. Similarly to the others outlined above, this work draws upon published demographic information. However, in contrast to Mount and McSparron, Haughton only includes modern bioarchaeological analyses. By excluding published skeletal analysis undertaken by anatomists, Haughton attempts to increase the confidence and quality within his sample.

There has been one publication outside of excavation reports that undertook a direct study of the bioarchaeology and paleopathology of the Early Bronze Age. This publication, *Reconstructing Patterns of Health and Dietary Change in Irish Prehistoric Populations* by Power (1993), attempted to investigate the diet and nutrition of the prehistoric period by undertaking a physiological stress analysis of 391 individuals from the Neolithic, Bronze Age, Iron Age and Early Medieval Ireland; including 73 individuals from the Bronze Age. To investigate physiological stress within the sample, Power compared the frequency of dental caries, linear enamel hypoplasia, cribra orbitalia, porotic hyperostosis, nonspecific infection, and attained stature across the four time periods. Power suggested that there was an increased reliance on cereals in the Early Bronze Age from the Neolithic, due to an increase in dental caries (*ibid,* p.15). However, as the levels were still low it is likely that animal

husbandry was economically important. Power also suggested that this importance of animal husbandry might be the cause of an increase in non-specific infection, due to increased disease load due to animal contact (*ibid*, p.16). While there is evidence for seasonal stress in the elevated linear enamel hypoplasia frequency, Power concluded that there was high population health during the Early Bronze Age.

Alongside the somewhat questionable decision to include the Early Medieval in a study of Irish Prehistory, 30 years on from its publication this study is notably methodologically and theoretically outdated. While there have been numerous developments in approaches to population health since the publication of this paper (see section 3.3), it must be noted that the rationale for the inclusion of the identified stress markers are noticeably low in supporting literature. One of the more questionable methodological decisions by Power was the use of the frontal bone for assessing periosteal lesions. While periostitis can develop on all bones in the skeleton, when only assessing one bone for these changes it is standard to use the tibia rather than the frontal bone. Power (1993, p.13) states that the frontal bone was chosen as it was already being assessed for cribra orbitalia, however in assessing stature Power would have also needed to examine the lower limb bones. This decision thus undermines the validity of the conclusions drawn regarding non-specific infection. Alongside the methodological concerns, the theoretical underpinnings of the study are lacking. While mentioning that "[t]he prehistoric (Neolithic to Early Medieval) periods in Ireland have received extensive archaeological investigation…" (Power, 1993, p.9), Power interacts with the Irish archaeological record in a limited manner. Instead, there is an over-reliance on publications on North American prehistoric populations as an interpretive framework for this study. This questions the validity of some of her conclusions, as she does not seem to interpret the findings of her study within the archaeological context of her sample.

In the 30 years since the publication of Power's article, there has been significant developments within bioarchaeology. While the developments regarding the methodological concerns can be found in section 3.3, this chapter attempts to address the concerns regarding the archaeological context for the sample. In order to provide a framework for discussing and understanding the context for the bioarchaeological analysis of the inhumations from the Early Bronze Age, this chapter will provide an overview of the

archaeological record of the Early Bronze Age, including settlement (section 2.2), burial (section 2.3), chronology (section 2.4), and discussions of social structure (section 2.5).

2.2 Settlement Record

The developer-led archaeology of the last two decades has dramatically increased the number of settlement sites that have been dated to the Bronze Age, from 70-80 sites to almost 600 structures (Doody, 2000; Ginn and Plunkett, 2020, p.41). An analysis of 755 radiocarbon dates from 202 domestic sites by Ginn and Plunkett (2020) has identified five settlement phases across the Bronze Age, two of which relate to the Early Bronze Age.

The first settlement phase has been identified from 2200 to 1700 BC and contains the "tentative beginnings of visible domestic architecture in the Bronze Age" (Ginn and Plunkett, 2020, p.47). This period does not see any substantial evidence of domestic buildings, with those that have been documented being rather simple structures (Ginn and Plunkett, 2020, p.48; Johnston, 2021, p.140). The length of time over which these structures were utilised is also debated, with some suggesting the evidence of cereals and boundaries as indicating long term occupation while others point to the ephemeral nature of the structures as indicative of (possibly seasonal) mobility (Johnston, 2021, p.138). The identification of the (re)emergence of the roundhouse form has been used to suggest that this period sees the beginnings of a shift in domestic architecture traditions, and that this might be indicative of larger changes in how the landscape was being used as some groups decided to settle down (Ginn and Plunkett, 2020, pp.47–48; Johnston, 2021, pp.138–140).

While Settlement Phase 1 was important for the development of the Bronze Age settlement tradition, it is Settlement Phase 2 (1700-1300 BC) that sees the widespread adoption of visible settlement architecture (Ginn and Plunkett, 2020, p.48). This phase sees a diversification in settlement types and locations, increases in house sizes, and the beginnings of the largest Bronze Age settlement site – Corrstown, Co. Londonderry (Ginn and Rathbone, 2012; Ginn and Plunkett, 2020, p.48). While Settlement Phase 2 continues into the Middle Bronze Age, Ginn and Plunkett (2020, p.48) have identified 26 houses which probably had their primary occupation window between 1700 and 1500 BC. This settlement

phase also coincides with a dip in arboreal pollen levels, which suggest that there was a reduction in tree cover (Plunkett, 2009a; 2009b; Ginn and Plunkett, 2020, p.48).

The Early Bronze Age also continued the expansion of settlement that is seen in the Chalcolithic, reclaiming Neolithic fields and movement into lower-lying ground in river valleys and the uplands in some areas (Cooney and Grogan 1999, pp.99–101). Analysis of Irish pollen records from Cooney Lough and Lough Dargan have suggested a rise in farming around c.2150 BC (Ghilardi and O'Connell, 2013, p.639; O'Connell et al., 2014; Ginn and Plunkett, 2020, p.48). Settlement expansion into more landscapes has been interpreted by some to be linked to a slight change in climate and soil deterioration. Analysis by Plunkett *et al.* (2013) suggests that the beginning of the Early Bronze Age saw a modest increase in use of bog and peatlands, with a significant increase identified after 1700 BC.

The distribution and grouping of settlement sites during Settlement Phases 1 and 2 suggest that the social structure of the Early Bronze Age was centred on single farmsteads, possibly with an extended family unit, sometimes with identifiable fields (McLaughlin et al., 2016, p.137; Ginn and Plunkett, 2020, p.52; Johnston, 2021, pp.140–153). These farmsteads were probably connected along waterways and trackways across the landscape from which they could link with communal resources, trade, and cultural ideas. This network of movement across the landscape also connected these kin-groups with the ritual terrain and monuments of their landscape. As such, mobility was likely a key element in the lifeways of the Early Bronze Age. It is interesting to note that there was significantly less enclosure of settlements in Ireland during this period compared to the situation in Britain (Ginn and Plunkett, 2020, p.48).

In their analysis of the settlement record across the entire Bronze Age, Ginn and Plunkett (2020, p.53) suggest that particularly during the Early Bronze Age there was a level of disconnect between the wider economy and the domestic sphere. Continuing from the Chalcolithic, Ireland is an important location of metal resources and craft; with material goods exchange strongly suggestive of a prestige-goods economy (O'Brien, 1999). While we see a rise in the visibility of the domestic sphere across the Early Bronze Age, the changes we see in the supply of metal and estimated demand appear to be somewhat separated

from the self-sufficient farmsteads that dominate the settlement record; “the nature of power and politics is unclear during this time, but it is separate from the roundhouse” (Ginn and Plunkett, 2020, p.53). However, considering the small numbers of identified settlement sites from this period, this disconnect could be more associated with the current archaeological record than the Early Bronze Age reality.

2.3 Burial Record

At the beginning of the Early Bronze Age, we see the emergence of a formal burial tradition across the island. Often referred to as the ‘Single Burial Tradition”, or the ‘Food Vessel Tradition’, this burial tradition consists of inhumation or cremation burials placed within either cist or pit graves and often with a ceramic grave good (Waddell, 2010, p.150). The burial tradition does not seem to have developed from any previously widespread Irish tradition, with the burial record of the Chalcolithic predominantly consisting of collective cremation burials (Carlin, 2011; Mount, 2012; Jones et al., 2015; Cleary, 2016). It seems to have arrived in Ireland already developed from Scotland, where it may have developmental links to British Beaker Burials (Fitzpatrick, 2015, p.816; McSparron, 2021, p.48). A key element of this burial tradition is the funerary ceramics. Referred to as ‘Food Vessels’ this ceramic group, consisting of a series of vessel categories, is identified through shared decorative elements and techniques (Brindley, 2007, pp.11–18). It is partly through similarities in these ceramics that the burial tradition has been liked with British Beaker Burials.

In wider discussions of the Early Bronze Age, mortuary archaeology has been a key focus in discussions of chronology and social structure as it forms a significant portion of the archaeological record for this period. While metallurgical phases have been a popular focus for the chronology of the Bronze Age, the ‘closed’ context offered by burials has been of interest for developing a chronology of the Early Bronze Age; particularly since the development of methods to radiocarbon-date cremated bone (Brindley, 1995; 2007; Sheridan and Bayliss, 2008). Seriation of mortuary ceramics, the primary grave good of the period, and extensive radiocarbon-dating has allowed for the identification of a burial

chronology for the Early Bronze Age that has resulted in the identification of the development of multiple elements within the burial tradition.

Alongside outlining a chronology for the Early Bronze Age, the burial record of this period has been of interest to many due to the introduction of single burial. This change in burial form, from one of collective burial to single burial, has been interpreted by some as reflecting a move away from a communal or ancestral focus to one with a greater importance on the individual (Brück, 2004, pp.308–309; O'Brien, 2004, p.570; Carlin, 2011, p.97; Quinn, 2015, p.6; McSparron, 2021, pp.25–32). This rise of the 'ideology of the individual' has been associated with increasing hierarchical or stratification of society, often associated with the trade and control of prestige items. However, increasing, this association has been questioned, with both a suggestion of an over-emphasis and a complete rejection of this interpretation (Brück, 2004; 2019; Johnston, 2021, pp.47–63).

2.3.1 Grave Occupancy and the 'Single Burial Tradition'

As mentioned, the formal burial tradition of the Early Bronze Age has traditionally been referred to as the 'Single Burial Tradition'. This has put it in direct comparison to the communal burial that was practiced in the Neolithic and Chalcolithic, were multiple individuals were placed, often successively, into the same burial location (often megalithic monuments) (Mount 1995, p.97; Mount 1997, p.134; Waddell 2010, p.150; McLaughlin et al. 2016, p.135). However, that is not to say that multiple burial was not practiced in the Early Bronze Age.

While the majority of multiple burials are cremations, with the largest number of individuals in one grave being 17 (McSparron, 2021, p.87), multiple burials have been identified in inhumation burials. At Ballybrew, Co. Wicklow, for an example, an adult male was placed into a cist where a non-adult had been previously interred after enough time to allow for the skeletonisation of the first individual, as evidenced by the disarticulated state of the remains of the primary inhumation (Martin et al., 1936, pp.257–250). The highest number of individuals included in a single grave is from Rathlin Island, where the inhumed remains of five individuals were found within one cist (Wiggins, 2000, p.66). Of the multiple burial forms, the one that has garnered the most interest is the numerous examples of an

inhumation and a cremation within the same grave. The appearance of the two burial rites within the same grave has raised questions around the choice of these rites, and how this interplays with chronology and social ideologies. Radiocarbon dating on an example from Ballybrennan, Co. Westmeath, suggested that, in this case, the individuals could have been placed into the grave at the same time but were afforded different burial processes (Hartnett and Prendergast, 2011; Cleary, 2016, p.166).

A number of explanations for multiple burials have been proposed. Mount (1995, p.107) suggested that multiple burials might represent individuals that could only achieve the required status to have access to formal burial through grouping. In particular, Mount (*ibid*, p.109) highlights that within his study non-adults were almost twice as likely to have been buried if accompanied by an adult, compared to males who were mostly interred individually. When interpreting his identification of a higher proportion of non-adults in multiple burials, Haughton (2020, pp.223–225) has highlighted cultural concerns regarding the decision to include multiple individuals within one grave. Haughton suggests that the prevalence of non-adult multiple burials may be more associated with the impact of the age ideology associated with the adult-controlled social sphere of burial rather than a status requirement. Brindley (2007, p.17) proposed that multiple burials, and particularly mixed inhumation/cremation burials, could represent associated individuals that died at different times, in situations where the required manpower for the construction of the cist was not available, or possibly evidence of the death of an individual away from their preferred burial ground. Stratigraphy of some multiple burials strongly suggests that they represent subsequent burials that were placed within the same grave (Cooney and Grogan, 1999, p.107; Brindley, 2007, pp.17–18; Cleary, pers comm). McSparron (2017, p.241) suggested an over-representation of multiple burial among cremation burials could be associated with a pattern of repeated burials within one grave, particularly as cremation was the dominate burial rite for a longer period of the Early Bronze Age.

Time for New Terminology?

While there is utility in the term ‘Single Burial Tradition’ in highlighting changes to formal burial at the beginning of the Early Bronze Age, the use of this term also acts to oversimplify the truth of grave occupancy during this period. It is true that the majority of graves in the

Early Bronze Age contain a single individuals (73.3% of graves in McSparron, 2017, p.238; 69% of graves in McSparron, 2021, p.87). However the simple narrative of 'single' burial is complicated when one considers the number of individuals buried in a grave with another. While the exact numbers differ between studies, roughly half of all individuals where placed into a grave with another (48.3% of McSparron, 2017, p.238; 41% in McSparron, 2021, p.108; 61% in Haughton, 2020, pp.99–101). This raises questions about the applicability of the term. Referring to a burial tradition by a term which seemingly discounts around half of the individuals within the tradition seems inadequate. Alongside directly feeding into the mindset around the importance of the 'ideology of the individual' during this period, it also can unintentionally complicate discussions of formal burial in this period – leading to confusing references to the 'single burials of the single burial tradition'. However, this does not mean that there is not utility to the term 'single' within this context. It must not be ignored that a majority of graves contain the remains of only one individual and that the term is useful for distinguishing the burial traditions of the Early Bronze Age from the collective burials that dominated the previous periods. These points highlight the need for an appropriate descriptive term for this formal burial tradition.

This research proposes that studies of the Early Bronze Age in Ireland instead adopt the term 'individualised' to describe the formal burial tradition of this period. The term 'individualised' was used by Cleary (2016) to refer to burials that had a constructed component that separated, or produced an appearance of separation, from larger burial contexts (often communal megalithic burials) (Cleary, 2016, pp.147–148, 164–165; Gibson, 2016, p.77). An example of this can be found in some Bell Beaker burials from Brittany and southern Portugal where the construction of distinct compartments at an earlier communal burial monument has been identified (*ibid,* pp. 147-148). This term also addresses the popularised image of Early Bronze Age burial, of a single individual in a cist, while not implicitly excluding multiple burials and pit burials. It is in this way, maintaining an emphasis on a defining element of burial in this period – single burial while still allowing for multiple internments, that it is proposed that we move to referring to the formal burial tradition of the Early Bronze Age in Ireland as the Individualised Burial Tradition.

2.3.2 Isolated Burials and Cemeteries

A significant number of the burials from the Early Bronze Age have been recorded as isolated within the landscape. While isolated appearance of some of these burials, particularly the 19th and early 20th century examples, might be associated with the method of discovery (discussed below) and targeted excavation, numerous examples have been confirmed as isolated burials. This group of isolated burials includes both cist and pit burials, with some found within burial mounds (Mount, 1997, pp.145–147; Waddell, 2010, p.164). The majority of these isolated burials are cist burials, and it is likely that the construction of a single cist was the beginning of the formal burial period for sites that developed into cemeteries (Mount, 1997, pp.147–149). The decision to place an individual within a new burial location would have been an intentional act that a community undertook. One interpretation of this act is that for the community the relationship between the deceased and the living landscape was a more important element of the individual compared to the individual's position within a community of dead, thus resulting in this act (Haughton, 2020, pp.136–138).

For discussions of the Early Bronze Age (and for this study), a cemetery has been defined as consisting of two or more graves within a defined location (Mount, 1997, p.145). Cemeteries consisting of cists-only, pits-only, and mixed are all known, although the ratio of these groups is likely biased by discovery methods. Within most cemeteries there is also evidence of patterning within the placement of graves (*ibid*, p.151). Not all cemeteries have evidence of a central or primary grave, and instead show a central grouping of a small number of graves. Additional or secondary graves, not necessarily temporally separated, were then placed around these central graves. These secondary graves show a pattern of occurring mainly on the eastern and south-eastern side of the burial area (*ibid*).

In the Early Bronze Age, there are three major forms of cemetery: flat cemeteries, mound cemeteries, and reused monuments. Flat cemeteries are defined by their lack of above ground monument, with the majority of these cemeteries discovered accidentally primarily though ploughing or quarrying (Mount, 1995, p.98; Flanagan, 1998, p.112; Waddell, 2010, pp.166–167). This accidental discovery has led to the majority of this site group being either inadequately or incompletely recorded, particularly true of those discovered in the early

20th century. The recent increase in archaeological work associated with infrastructure has provided more thoroughly excavated and recorded examples of Early Bronze Age flat cemeteries (*ibid*). Mound cemeteries have a round mound or cairn that contains the burials. In comparison to flat cemeteries, mound cemeteries have had more scientific excavations but have also been a victim of poor recording (Flanagan 1998, p.112; Waddell 2010, pp.167–172). Generally, mound cemeteries have been shown to hold similar numbers of graves to flat cemeteries, however the majority of exceptionally large Early Bronze Age cemeteries are of the mound type.

Reuse of Earlier Monuments

While the majority of Early Bronze Age cemeteries were new constructions, a number of earlier monuments were reused during this period (Mount counts 53 in Mount and Bayliss, 2013, pp.184–185). The reuse of earlier monuments is also known from the Chalcolithic, although the pattern of reuse differs in the Early Bronze Age. Chalcolithic beaker pottery is found in multiple megalithic tombs (Carlin, 2011, pp.92–93; Cleary, 2016, pp.148–151; Gibson, 2016). The majority of this material is found within the tomb structure, but from disturbed contexts and therefore cannot be directly associated with human remains, although small amounts of fragmentary human remains from these contexts have been radiocarbon dated to the Chalcolithic (Carlin, 2011, pp.92–93; Cleary, 2016, pp.148–151; Carlin and Cooney, 2017, p.51). As such, it is not clear if these represent defined burial activity or other ritual activity associated with these monuments (inc. Sweetman et al., 1985; 1987; Lynch, 2014). This is compared to the Early Bronze Age, where multiple sites across the island saw the insertion of new burials into their covering mound or cairn – including Baunogenasraid, Poulawack, Fourknocks, and the Mound of the Hostages (O'Neill Hencken and Movius, 1935; Hartnett, 1957; Hartnett and O'Sullivan, 1971; Raftery, 1974; Mount and Bayliss, 2013; O'Sullivan et al., 2013). This approach of placing 'new structures' within the context of existing monuments does somewhat mirror the reuse seen in Atlantic Europe in the Chalcolithic (Gibson, 2016, pp.88–91), where a clear distinction between the 'old' and 'new' was created, while also suggesting an element of respect or consideration as not to disturb previous internments.

The reuse of earlier monuments, creating what is referred to as multi-component cemeteries by Quinn (2015), is known across the globe and has often been seen through a lens of connecting to the past; associated with creating or controlling power, identity, social memory, or the ancestors (Quinn, 2015, p.2; see including Bradley, 2002; Kuijt, 2008; Schurr and Cook, 2014). As such, these multi-component cemeteries allow for, and create, an arena where contemporary societal concepts can be discussed or contested (Quinn, 2015, p.1). By definition, cemeteries are constructed when multiple consecutive burial deposits are made at a defined location and are often not a single act. Quinn (2015, p.2) categorised this into two processes, 'returning' and 'reusing'. It is the 'reusing' that creates a multi-component cemetery. However, this only happens at the beginning of a temporally distinct burial period, as after this point the community is once again 'returning'. Through this process an earlier monument is transformed into a functional cemetery within the contemporary burial landscape. Quinn (2015, pp.14–15) suggested that while this initial 'reusing' probably had strong links to what is traditionally associated with the reuse of earlier monuments, after some time of 'returning' this would have altered the role the site played within the community; the original reasons for 'reusing' obscured through the 'returning'. As such, its new role might have become more important for the community.

When looking into the history of infant burial in Ireland, Finlay (2000) proposed an example of this 'reusing' at Fourknocks. Both Neolithic sites of Fourknocks I and Fourknocks II see Early Bronze Age burials inserted into their covering mounds. At Fourknocks I all the individuals buried in cists were children, compared to at Fourknocks II where children were buried in the entrance passage and adults in the cists and the trench cut into the mound (Hartnett, 1957; Hartnett and O'Sullivan, 1971; Finlay, 2000, pp.413–416). Finlay (2000, p.419) suggested that the burial of infants and children in the passageway at Fourknocks II is a way of linking them with a liminal space. The differentiation between the child burials at Fourknocks I and the adult burials at Fourknocks II could highlight how, at these sites, the practice of 'reusing' and 'returning' could interact and produce different expressions concurrently.

Discovery Bias in the Early Bronze Age Burial Record

In his work, Mount (1995; 1997) proposed that the archaeological record of Early Bronze Age burial is a consequence of discovery bias. Mount highlighted that the majority of burials that have recorded discovery circumstances were either through ploughing (or associated processes) or quarrying. Looking into the discovery circumstance, Mount identified that ploughing identified cist burials preferentially over pits; in the south-east 83% of burials were cists (Mount, 1997, pp.125–126). Based on this, and on burial depth data, Mount has suggested that ploughing has resulted in the under-recording and/or destruction of pit burials as a plough will stop at or bring cist capstones to the surface, pit burials would be unnoticed or distributed and destroyed (*ibid*, pp.125–130). As such, Mount has suggested that a number of isolated cist burials and some cist only cemeteries were once mixed cemeteries, and the pit burials were either not found or destroyed (*ibid*, pp.145–147). With this in mind, Mount proposed that the majority of funerary contexts in the Early Bronze Age were mixed cemeteries consisting of a small number of cist burials surrounded by pit burials.

2.3.3 Cist and Pit Burials

Graves of the Individualised Burial Tradition can be grouped into one of two major categories: cist graves which include rectangular short cists and polygonal cists, and pit graves which could be semi-lined or unlined (Mount 1995, p.97; Mount 1997, p.134; Waddell 2010, p.150; McLaughlin et al. 2016, p.135). Rectangular cists consist of a cut containing usually four large side stones, arranged in a rectangular construction, with a base of compacted dirt or gravel and typically covered by one large capstone. A polygonal cist in comparison is constructed from multiple medium-sized stones in a semi-circular or oval shape, and covered by a large capstone. Pit burials consist of a cut in which the remains and any grave goods were directly placed. Semi-lined pit burials normally either have a stone base or a stone covering slab. Both cist and pit burial forms were in use from the beginning of the Individualised Burial Tradition, with inhumations and cremations both known from cist and pit burials. After c. 1900 BC there was a gradual decline in cist construction, alongside a decline in inhumation burial, as urns took over the ritual role of containing cremated remains (Fowler, 2017, p.103; McSparron, 2017, p.250).

As mentioned previously, it is thought that methods of discovery have biased the archaeological record in regards to the numbers of cist burials and pit burials. While more cists have been recorded over the long period of discovery for Early Bronze Age burials, it was likely that pit burials were the more common grave form for the period (Mount, 1995, p.99; 1997, pp.126–129). This has been supported by archaeological excavations of Early Bronze Age cemeteries, which often find a small number of cist burials surrounded by a group of pit burials. This 'preference' for pit burials in combination with the increased labour required to construct a cist burial has resulted in cist burial becoming associated with high status. Mount in 1997 (pp.130–131) estimated that it would take up to eight people to quarry and move each of the stones within a rectangular cist. While this does not take into account any animal assistance or the use of levers, both of which would have been available to Early Bronze Age people, this estimate does highlight the large amount of effort that each of these burials represent. However, this direct link between status and cist burial has been questioned recently, with the identification of a higher than expect number of non-adults buried in cists (Haughton, 2020, pp.97–98; 2021, p.367).

2.3.4 Grave Goods

The vast majority of grave goods of the Individualised Burial Tradition are ceramics. As a result, these artefacts have become an important focus in the understandings of the period. Since the first extensive catalogue and typology of the ceramics published by Abercromby in 1912, there have been multiple successive catalogues, typologies, and analyses of the group now known as Food Vessels (see ApSimon, 1969; Kavanagh, 1973; 1977; Brindley, 1980; 2007; Ó Ríordáin and Waddell, 1993); the most recent of which (Brindley, 2007) identified a chronology of the Early Bronze Age based on the seriation of the ceramics with radiocarbon dates. Brindley (2007) identified seven groupings of burial ceramics - Bowl Food Vessels, Vase Food Vessels, Vase Urns, Encrusted Urns, Miniature Vessels (sometimes called pygmy cups), Collared Urns, and Cordoned Urns; and it is these categories which will be used here.

<u>Ceramic Grave Goods</u>

Bowl Food Vessels are one of the two ceramic groups which are commonly found with inhumation burials. These are small vessels, generally 8-15cm, and are broader than they are high (Ó Ríordáin and Waddell, 1993, p.5). The majority of bowls have expanded rims

and are decorated with incised or impressed zoned decoration (Brindley, 2007, pp.11–12, 170–172). Four forms have been identified within the corpus of Bowl Food Vessels: simple/bipartite, neck bipartite, tripartite, and ribbed (Ó Ríordáin and Waddell, 1993, pp.5–17; Brindley, 2007, p.11). While useful for description, in her analysis Brindley (2007, p.169) suggests that these forms appear not be a relevant consideration in understanding the development of the tradition and are likely to be purely stylistic choices.

Vase Food Vessels are one of the three groups of mortuary ceramic that make up the Vase Tradition. These vessels are also found accompanying inhumation burials, although not as commonly as Bowl Food Vessels. These ceramics are typically between 11 and 16cm tall, taller than they are broad, with everted and expanded rims (Waddell, 2010, p.154). There are two principal ceramic categorisations within this group, bipartite and tripartite vessels (Ó Ríordáin and Waddell, 1993, p.25). Brindley (2007, pp.180–184) identified a chronological element in the development of the shape of the vessel and the decoration, particularly in the area of the rim and neck.

The two other grouping in the Vase Tradition are Vase Urns and Encrusted Urns. Vase Urns are similar in form to Vase Food Vessels, sharing both incised and impressed decoration. The major difference is the size of the vessel, with Vase Urns tending over 20cm in height (Waddell, 2010, p.157). The vast majority of these vessels are found accompanying cremations, with only one example associated with an inhumation on Rathlin Island. However, these vessels are commonly found in the same cemeteries as inhumation burials. There are clear stylistic links between the decoration of all elements of the Vase Tradition, Vase Food Vessels, Vase Urns, and Encrusted Urns; however, Vase Urns tend towards looser decoration (Brindley, 2007, pp.14–15). Encrusted Urns are named after the applied decoration which covers the body and rim of these vessels. Similarly to the situation with Vase Urns, these vessels are found accompanying cremation burials and are commonly found within the same burial complexes as inhumations. Alongside the applied ornament, Encrusted Urns are also decorated with incised lines and cord impressions (*ibid*, pp.13–15, 194). Encrusted Urns are found in both cist and pit burials and are always associated with a cremation, most commonly inverted over the deposit of cremated remains that could represent one or multiple individuals (*ibid*, pp.13–15, 103).

Collared Urns are named as such due to the 'collar' found on the uppermost part of their profile. Collared Urns are always found associated with cremations, and only occasionally found within the same cemetery complexes as inhumations. These urns are decorated primarily on their 'collar' and the concave 'neck' that sits directly below the collar through incised decoration and cord-impressions (Brindley, 2007, p.15). Collared Urns are found predominantly in pit burials inverted over a deposit of cremated remains, but a small number are known from cist burials (*ibid*, p.132). The Collared Urns found in Ireland are closely related in type to the series that are found throughout Britain and are thought to have been introduced into Ireland as a developed tradition (*ibid*, p.133, 212). As the name suggests, Cordoned Urns are defined by the applied cordons on the upper part of the vessels; and are the last in the series of Early Bronze Age funerary ceramics. Similarly to Collared Urns, these vessels are always found in association with cremations and only occasionally within the same cemeteries as inhumations. Of the urns, this group has the widest range in size, from 10cm to 49cm (*ibid*, p.15). Cordoned Urns are mostly found in pit burials inverted over cremated remains, either isolated or in small cemeteries. (*ibid*, p.142). This group is linked with Collared Urn, with Brindley proposing that these two groups form one tradition (*ibid*, pp.221–222, 229).

The distribution of Bowl and Vase Food Vessels, and by extension of inhumation burials, strongly preferred the north and east of the island; with the majority of Bowl Food Vessels found in the north and east, and Vase Food Vessels found predominantly in the east (Brindley, 2007, pp.52–54, 77–79). It has been suggested that there might be an element of discovery bias against these graves in certain parts of the west, either due to the lack of ease of certain construction materials or due to lower find situations. However, there have been finds of both groups in certain parts of the west (*ibid)*. This suggests that Bowl and Vase Food Vessels were somewhat restricted in their distribution. Interestingly, there are a number of small areas where vases seem to have been preferred over other ceramic traditions, including in Galway, Sligo, Mayo, and Roscommon (*ibid*, p.53, 77). As the main area of low distribution for both Bowl and Vase Food Vessels overlaps strongly with the primary distribution of Wedge Tombs, it has been suggested that these consist of two separated, possibly exclusive, burial groups. But the discovery of bowls in excavated Wedge

Tombs does suggest that it was not as simple as this explanation infers (*ibid)*. In contrast to bowls, vases are rarely found in Wedge Tombs (*ibid*, p.79).

Non-ceramic Grave Goods

While ceramics were undoubtedly the primary grave good in the Early Bronze Age, other groups of grave goods have been identified. These include animal bones and bone objects, shells, and flint or chert objects, bronze daggers and awls, beads, necklaces, v-bored buttons, bronze bangles, and clothes fittings (Flanagan, 1998, pp.155–157; Cooney and Grogan, 1999, pp.112–114; Brindley, 2007, pp.1–11, 249; Waddell, 2010, pp.162–164; McLaughlin et al., 2016, p.143; McSparron, 2021, p.69). While some of these groupings are comparatively common non-ceramic grave goods, including flint or chert flakes and animal bones, some are unique in this context (McSparron, 2017, p.154). This combination of common materials, difficult to date, low numbers, and unique finds have made these objects hard to study and understand; and subsequently often not the focus of intensive study (Becker, 2013, p.228). However, when metal has been found in graves, it has often been liked with a prestige goods economy controlled by adult males.

It is unsurprising that out of the non-ceramic grave goods, it has been the metal objects that have received the most interest, followed by the beads and other personal ornamentation. In Ireland, the majority of metal objects for the Early Bronze Age come predominately from single finds in the landscape (Mount, 2001; Waddell, 2010, p.139; Becker, 2013, p.230). Given how rare these items are in the Early Bronze Age archaeological record, the association with graves can assist in dating these items (Brindley, 2007, pp.260–262). This provides important information for understanding trade and metalworking in Ireland during this period (O'Brien, 2004, pp.570–571). The identification of Bowl Food Vessels with bronze items provides important evidence for the import-horizon of bronze in Ireland before the native production of tin-bronze and the Killaha phase (Waddell, 2010, pp.132–138).

The deposition of non-ceramic grave goods, and metal in particular, has commonly been interpreted as evidence of personal identity and high status. However, recent studies have suggested that this direct association was likely more complicated than traditionally interpreted. Both McSparron (2021, pp.105, 122) and Haughton (2020, pp.106–107)

identified a greater than expected proportion of adolescents buried with metal grave goods, contra to the traditional link between metal, status, and adult males. Haughton (*ibid*) also identified that within his assemblage female burials were more likely to have metal grave goods.

It must be noted, however, that the vast majority of metal for this period is not found within the burial context, rather within the landscape (Becker, 2013; Johnston, 2021, p.56). The analysis of the depositional patterning for metal objects within the wider Early Bronze Age archaeological record highlights the complicated nature of these practices. It is interesting that gold objects, often considered to be personal ornamentation, are almost absent from the burial record. This suggests that many of these prestige items may have not been considered to be 'individual' objects, rather communally orientated objects that may have been directly associated with "specialised identity" (Becker, 2013, p.244). Becker suggests that these important ceremonial identities might then have been taken up and dropped throughout the year or on another community cycle (*ibid*, p.251). This, and other object depositional patterns, raises questions around how we interpret what identities were relevant during burial (Becker, 2013, p.245).

2.4 Chronology of the Early Bronze Age

2.4.1 Brindley 2007 - Food Vessel Typochronology

A significant step forward in understanding the chronology of Early Bronze Age burial traditions was Brindley's 2007 *The Dating of Food Vessels and Urns in Ireland*. This volume is the result of a systematic analysis of the burial ceramics from this period, along with a series of radiocarbon dates. Brindley combined these two in her analysis to produce a model of the development of the ceramics of the period, and a framework for dating ceramics not included in her study.

The typology of the ceramics was created through seriation, informed by radiocarbon dates and any other artefacts, by identifying changes in form and decoration. In the typology, she divides the sequence for each ceramic group into three stages. For example, she identified three stages of development for Bowl Food Vessels based on the evolution of the

decoration (Brindley, 2007, pp.172–175). The initial stage, stage 1, is defined by densely packed, small decoration consisting of linear elements arranged in bands. The most common element for this stage is short, straight lines, with the most common technique being the impressed comb (*ibid*, pp.172–173). Brindley has dated this stage to a period of 60-80 years between 2160/2140 to 2100/2080 BC, with the whole tradition becoming fully developed and distributed by around 2140 BC (*ibid*, pp.241–243). The second stage is defined by an extension of included elements and a relaxation of spacing to create more strongly defined bands of ornamentation, with larger zigzags and filled triangles, hemispheres and saltires. Incised lines are still used extensively alongside the impressed comb technique (*ibid*, pp.173–174). Brindley has dated this stage to a period of roughly 100 years between 2100/2080 and 1980 BC (*ibid*, pp.245–247). There was likely a period of overlap at each end of this stage. The final stage is defined by a relaxation of the decoration, resulting in widely spaced ornamentation and broader bands of zigzags, lines, and other motifs. The preferred technique of this period was the incised line and impressions of cord (*ibid*, pp.174–175). Brindley dated the final stage of the Bowl Tradition to a period of roughly 60 years between 1980 and 1920 BC (*ibid*, pp.247–248). Alongside the rapid and widespread adoption of this ceramic, there seems to have been a broad replacement of this tradition with the Vase Food Vessels, with no evidence of any pockets of continued use of the Bowl Food Vessels (*ibid*, p.250).

In the Vase Food Vessel typology, both the shape of the vessel and the decoration develop, with particular emphasis on the rim and neck (*ibid*, pp.180–184). The initial stage is defined by small rims and a globular or biconical body. The decoration consists of bands comprising short lines forming zigzags and chevrons (*ibid*, pp.184–185). Brindley has dated this stage to between 2020/1980 and 1930/1920 BC, with the development of vases well underway by 1980 BC (*ibid*, pp.255–259). Stage 2 is defined by an increase in the size of the rim, with some vessels showing constriction of the neck. During this stage there is a preference for well-defined horizontal bands of decoration, consisting primarily of triangles (*ibid*, pp.186–187). The dating of this stage is affected by the 3500 BP plateau in the calibration curve, resulting in a less precise window of c. 1930/1920 to c. 1830 BC (*ibid*, pp.259–260). The final stage of vase development is defined by everted and vertical necks and short shoulders. The decoration is still in well-defined horizontal bands of triangles, chevrons and lozenges. As

with Stage 3 in bowls, this stage also saw a relaxation of the decoration, with a more open style especially in reference to cross-hatching (*ibid*, pp.186–188). Stage 3 has the smallest number of radiocarbon dates, which fall into two main groups. Together they suggest that this stage lasted 60-80 years between c. 1830 and c. 1740 BC. By the end of Vase Food Vessel tradition, inhumation had died out and funerary ceramics had moved entirely to Urns. This end of the Vase Food Vessel tradition roughly coincides with the end of Ginn and Plunket's (2020, p.47) Settlement Phase 1.

Regarding dating the development of the ceramics, Brindley starts with a survey of new and previously published radiocarbon dates, identifying a 'preliminarily calibrated date range' (PCDR) for each ceramic grouping. These ranges were then reviewed in respect of the typology, identifying a slightly restricted 'final calibrated date range' (FCDR). This reassesses some of the accepted dates, removing some that Brindley deems anomalous.

The typochronology (Figure 2.1) produced by Brindley (2007, p.334) identifies multiple trends in the development of burial ceramics of the Early Bronze Age. Brindley (*ibid*, pp.328–329) suggests that the appearance of the Individualised Burial Tradition required the creation of a new ceramic tradition, which spread quickly and cannot be easily linked to a locality from which it originated. After the widespread adoption, bowls continued to develop stylistically, however the shape of the vessels seems to be an aesthetic choice, with some regional preferences. Around 1980 BC, burial traditions began to change with the adoption of the vase tradition and cremation (*ibid*, pp.330–331). This change occurred roughly at the same time as the adoption of the Killaha metallurgical phase. From this point, inhumation declined in popularity as urns became the primary ceramic form. The transition from the Killaha phase to the Ballyvally phase appears to coincide with the almost complete adoption of cremation around c.1900 BC. Shortly after this we see Collared Urns, then Cordoned Urns, introduced from Britain (*ibid,* pp.332–333).

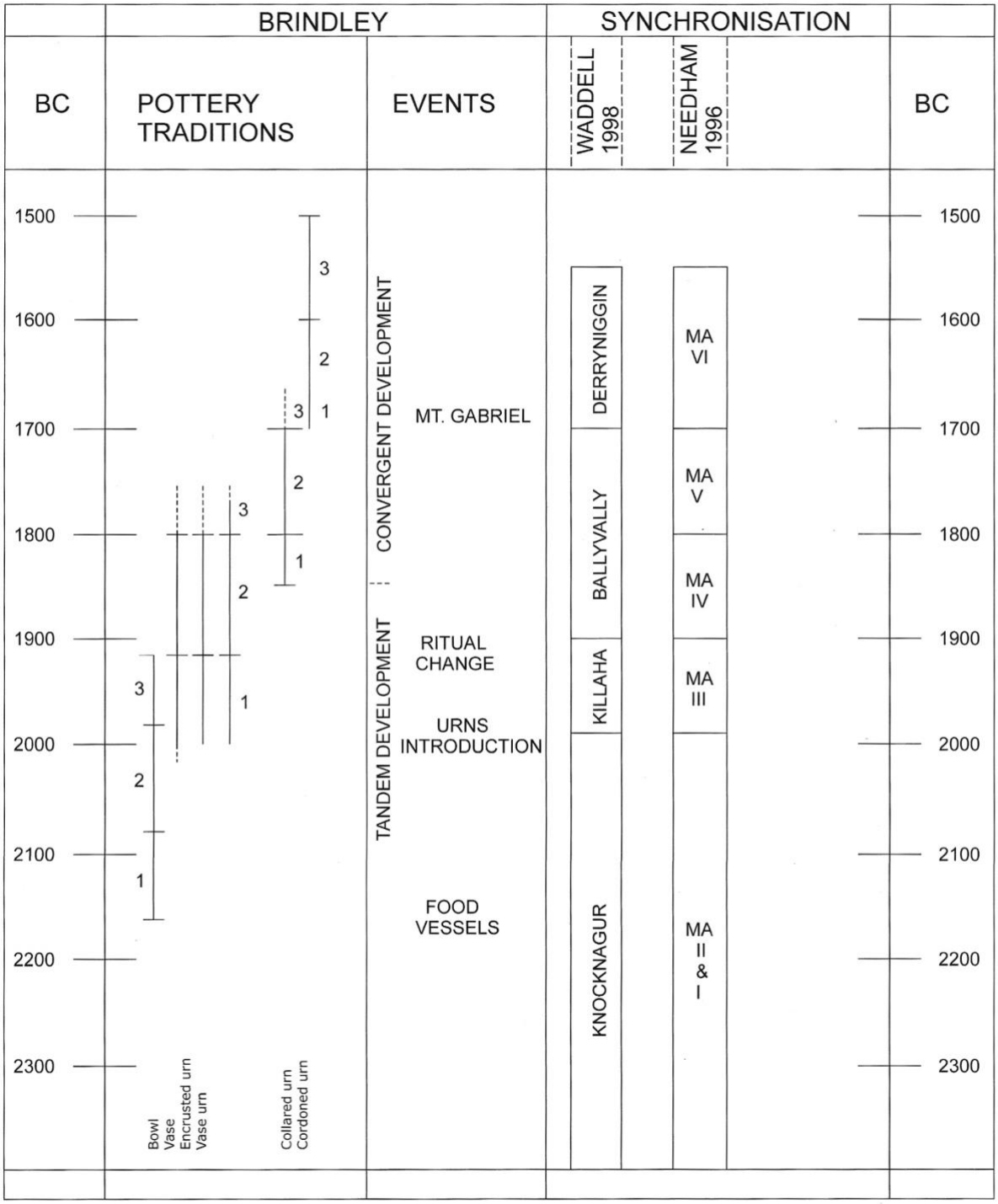


Figure 2.1: Brindley's table of tyochronology of the Early Bronze Age ceramics with synchronisation to metalworking phases and events; from Brindley 2007, p.333.

While this work has been praised for significantly constraining the timeline for these ceramics and providing an important framework for discussions of the Early Bronze Age and social developments across this period, several issues have been highlighted. Some questions have been raised around her three-stage system, with Sheridan and Bayliss

(2008, p.205) highlighting that Brindley admits that this was chosen "for convenience" (Brindley, 2007, p.159). However, the main questions have been raised around the radiocarbon database. Both Sheridan and Bayliss (2008) and McSparron (2017, pp.75–76) have highlighted how the identification of problematic dates does not seem to be consistent, with no explanation given for some dates. This gives the appearance of a very clean model, which raises questions around the introduction of a sample bias. The other main methodological concern for this study is the use of wiggle-matching rather than Bayesian modelling, which does not produce error estimates (Sheridan and Bayliss, 2008, pp.206–207). Direct comparison Bayesian analysis by Sheridan and Bayliss (*ibid*) found that Brindley's dates commonly fell outside of their models with the Bayesian models tending to be earlier, and some of shorter duration. However, Sheridan and Bayliss highlight that these differences fall on the scale of one to two generations, and the work of Brindley to anchor the development of this ceramic tradition within the scale of the people of the Early Bronze Age did, and continues to, play a significant role in the discussions of Early Bronze Age in Ireland.

2.4.2 McSparron 2017 – The Single Burial Tradition and Chronology

The first aim of McSparron's 2017 PhD thesis *Statistical Analysis of the Single Burial Tradition in Early Bronze Age Ireland and some Implications for Social Structure* was to create a chronology of the development of the Individualised Burial Tradition, including extending the analysis to aceramic burials. This analysis was based on published radiocarbon dates with a clear rationale for the exclusion of dates from the model (McSparron, 2017, pp.110–112), which resulted in a lower number of radiocarbon dates than used by Brindley (2007). The dating information was considered in conjunction with all other aspects of the Individualised Burial Tradition to develop a chronology of the burial tradition itself rather than a ceramic typochronology.

McSparron used Bayesian analysis to derive his chronological model, particularly the 'uniform phase model' (McSparron, 2017, pp.108–110), and OxCal 4.2. Alongside a model for the development of the Individualised Burial Tradition across the Early Bronze Age, the model also produces a new model for the beginning of the tradition. McSparron (*ibid*, pp.112–113) suggests that the Individualised Burial Tradition started between 2181 and

2102 BC at 95% probability. Provence-based analysis of the beginning of this burial tradition produced a different result to that suggested by Brindley (2007, pp.328–329); with McSparron identifying that the Individualised Burial Tradition appeared in Ulster and Connaught around the same time, shortly followed by Leinster (McSparron, 2017, p.113). The adoption of the tradition in Muster seems to have been delayed, possibly by up to a century. McSparron (*ibid*, pp.114–115) also provided new estimates for the emergence and disappearance of each of the ceramic groups. In general, similar to Sheridan and Bayliss (2008, pp.206–207), these ranges tend to slightly earlier than those given by Brindley (2007). Of main interest for this research, Bowls seem to date from the beginning of the Individualised Burial Tradition, with Vases following some time later. Analysis of the appearance of other parts of the traditions suggests that cists are the earliest type of grave form before polygonal cists and pit burials, with cists becoming less popular after c. 1900 BC (McSparron, 2017, pp.120–121). Inhumations appear with the beginnings of the tradition, with McSparron (*ibid*, p.123) suggesting that there was a period before the adoption of cremation. McSparron (*ibid,* p.124) also noted that there was a significant decline in inhumation burial after c.1900 BC. However, surprisingly, there appears to be a resurgence in inhumation burial after 1700 BC for a short period. This reappearance of inhumation had not been identified previously. McSparron also investigated a small number of dated pot-less burials, suggesting that there was a period at the start of the Individualised Burial Tradition in which all burials were buried with a pot (*ibid*, p.128). Once aceramic burials appeared, they continued across the Early Bronze Age.

Across his radiocarbon and statistical analysis, McSparron identified three phases of development for the Individualised Burial Tradition in Ireland, all of which see additive development (McSparron, 2017, pp.130–133, 248–251). Phase A emerged after c.2200 BC and covered roughly 150 years. Initially, burial during Phase A consisted of exclusively inhumation burials in cists, with McSparron proposing that all burials of this period contained at least one ceramic grave good, with the burial tradition expanding to include pit burials after roughly 50 years (*ibid*, pp.248–249). These pit burials were also exclusively inhumations and contained similar ceramics. While the majority of identified Phase A burials are single burials, multiple burials are also known from this period. Phase B saw the broadening of the Individualised Burial Tradition, beginning by 2052 BC, to include

cremation (*ibid*, pp.130, 249). This was a significant development within the burial tradition, as cremation would become the primary body disposal method. While cremation was adopted during this phase, it is interesting to note that often after cremation the remains were treated very similarly to unburnt remains regarding placement in the grave and occasionally grave size, showing considerable consistency in burial ritual across Phase A and Phase B (*ibid, p.*250). McSparron also identifies that Phase B saw the appearance of burials that did not contain any ceramic grave goods. The most significant developments in the Individualised Burial Tradition occur in Phase C, which begun around 1950 BC (*ibid*, pp.131, 250-251). In this period, we see the significant reduction in inhumation burial, probably disappearing from the record until the end of the period, and the rise to prominence of in-urn cremation burials. All grave forms are known from this period, although rectangular cists do see a marked decrease (*ibid,* pp.250–251). Phase C also sees a notable increase in the inclusion of non-ceramic grave goods (*ibid*, p.252). Interestingly, McSparron identified that there seems to be two major groups of burials in Phase C: Encrusted Urns and Vase Urns which show continuity with earlier phases through their use in both cist and pit burial and occasionally with other vase vessels, and Collared or Cordoned urns which show some elements of departure in that they are almost exclusively found in pit burials within a somewhat limited geographic area and only rarely found with vase vessels (*ibid*, pp.251–252). While there is evidence for 'bleed' between these groups, the two parallel burial rituals within the Individualised Burial Tradition does raise interesting questions around the social structure for Phase C. All three of these burial phases occur within Ginn and Plunket's (2020, p.47) Settlement Phase 1.

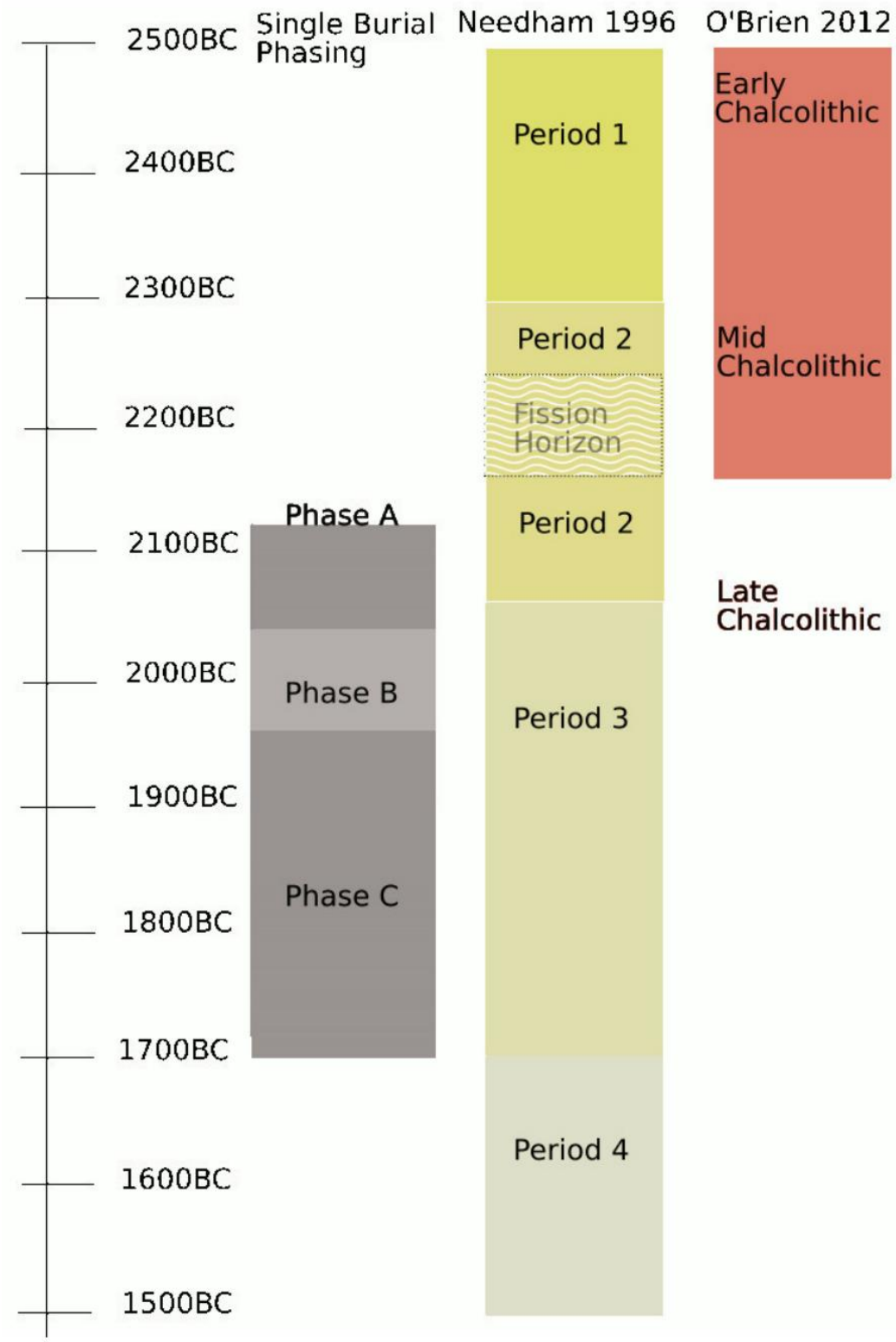


Figure 2.2: McSparron's phasing scheme for the Individualised Burial Tradition, with Needham's (1996) British Chalcolithic scheme and O'Brien's (2012) Chalcolithic scheme for comparison; from McSparron 2017, p.132.

It is interesting to note that while there are some slight differences in dates, there is meaningful overlap in important developments for the Individualised Burial Tradition in both Brindley's (2007) and McSparron's (2017) chronologies. Both see the beginning of the Individualised Burial Tradition after c.2200 BC, the addition of elements of the burial tradition (eg. pit burials, cremation, vase food vessels) before c.2000 BC, and a significant change in the tradition around c.1900 BC. However, there are some differences regarding absolute dating, and some details around the sequence of development for the formal burial tradition. Due to the move to Bayesian modelling and the analysis of the entire burial tradition rather than just the funerary ceramics to construct the chronology, McSparron's (2017) phasing scheme will be adopted for this research; with placement in the phases based on a combination of published radiocarbon dates and Brindley's (2007) ceramic typochronology.

2.5 Social Structure and Questions of Status

As it has been alluded to multiple times above, the Bronze Age in Europe is commonly associated with changes in social structure, with metallurgy having been linked to increasing social stratification and the spread of a prestige goods economy (Childe, 1930; Gilman, 1981; Fitzpatrick, 2015). This social stratification is associated with the control over resources, particularly metal and those who could perform metallurgy, with this control associated with both physical and ritual power (O'Brien, 2012, p.221; Haughton, 2020, p.23). These discussions often point towards rare material objects, such as gold, and their deposition in graves and hoards as reflective of this stratification, with better provisioned graves signifying those of status (Childe, 1930; Piggott, 1938; Gilman, 1981; Mount, 1997; O'Brien, 2012). As such, it is suggested that burial within this period across Europe developed as an arena for displaying status and identity (Sørensen, 2010; Haughton, 2020, p.25). Alongside status, other elements of identity have been drawn into these discussions, namely gender. Gendered understanding of grave goods has a long history in archaeology and in discussions of the European Bronze Age, with males identified through a particular set of grave goods, namely a sword, and females identified through burial with jewellery (Treherne, 1995; Kristiansen and Larsson, 2005; Haughton, 2020, p.25).

However, this narrative of social stratification has been questioned in more recent years. Several publications question the direct link between grave goods and the individual buried, suggesting that they may represent gifts from the mourners or other ritual activity (Barrett, 1990; Brück, 2004; 2006; 2019; Brück and Fontijn, 2013; Johnston, 2021). Evidence of the reopening of graves in this period has been highlighted as an indication that the grave was not a place of fixed status (Barrett, 1990; Bradley and Fraser, 2010; Brück, 2019). It has also been highlighted that many of these individualistic status models are very modernistic and capitalistic in structure, reflecting the outlook of the authors rather than the economic and social realities of the Bronze Age. Many have taken this to suggest that archaeological understandings of social structure may have been too simplistic, particularly in relation to burial. While discussions of the broader European Bronze Age form an important framework for understandings of social structure, this section will focus on those who have directly addressed the Early Bronze Age in Ireland.

It is unsurprising that graves have been central in discussions of social structure of the Early Bronze Age in Ireland, especially considering the relative abundance of the burial record. Traditionally the appearance of the Individualised Burial Tradition in the Early Bronze Age has been linked to increased social differentiation and the rise of the 'ideology of the individual' (Brück, 2004, pp.308–309; O'Brien, 2004, p.570; Carlin, 2011, p.97; Quinn, 2015, p.6). This has primarily been associated with the practice of single burial, compared to the communal burial of the previous periods, suggesting a shift from the importance of the ancestors to that of the individual. However, this focus of social structure and a simplistic link between the Individualised Burial Tradition has drawn criticism.

2.5.1 The Early Bronze Age and Status

One of the most influential authors on Early Bronze Age burial record is Charles Mount. In applying wider European models of Bronze Age social structure to the Irish evidence, Mount (1995; 1997; 2001; 2012) proposed this period saw a socially stratified society focused on adult males, which practiced formal burial restricted to a sub-set of the population. Multiple elements of the Individualised Burial Tradition were identified to support this position, including single burial, inhumation, grave form, body disposal, and grave goods. Mount (1995, pp.97, 109–111) proposed that the introduction of single burial in this period

signified a societal focus on the individual, with particular focus on adult males due to the predominance of male burial in this period, with Mount identifying two male burials for every female burial within his sample of published burials from the Southeast of Ireland (1997, pp.160–165). Another element of this was the proportion of non-adults to adults, with roughly 20% of his sample to be non-adults (Mount, 1995, pp.108–109; 1997, pp.159–160). Comparing this to published estimations of pre-industrial life expectancies suggesting an estimated level of roughly 50% non-adult burial, Mount proposed that this apparent under-representation of non-adults to reflect the reduction in time these individuals had to qualify for formal burial.

Compared to the high-status single burial, Mount (1995, p.109) suggested that individuals who received multiple burial were those who could only qualify for formal burial though the 'pooling' of their combined status. The identification of the majority of multiple burials consisting of females and non-adults supported Mount's importance of the adult male within Early Bronze Age society. Inhumation was also identified as a marker of status, as it both allowed for the retainment of the individual identity (Mount, 1997, p.157) and required the construction of a larger grave size (*ibid,* pp.130–131). Following energy expenditure models, Mount (*ibid,* pp.126, 130–131) identified cists as an indicator of status, estimating that it would take up to 8 people to quarry and move each stone without any animal assistance or the use of levers. Mount also suggested that the mortuary ceramics of this period were a part of a larger prestige goods system, which in itself was linked to adult males (*ibid,* p.144). It is also interesting to note that in situations where females had received the high status treatment, such as Grave 6 at Keenoge, Co. Meath, Mount suggested that these may represent situations where the woman acquired status "through the death of her husband or her own accomplishments"(Mount, 1995, p.106; Mount and Buckley, 1997, p.27).

More recently, McSparron (2017; 2021) also identified an increase in social stratification across the Early Bronze Age in Ireland through a combination of an updated Bayesian understanding of the chronology of the period and statistical analysis of burial indicators. Firmly rooted in the processual approach to mortuary contexts and leaning heavily on Saxe (1970), Binford (1971), Tainter (1975), and Wason (1994), McSparron posited that "social

structure can be investigated by looking at increasing degrees of ranking" (2017, p.45). Through changes in burial complexity, McSparron identified a stepwise increase in social complexity across his chronological phases (outlined in section 2.4.2). Phase A sees limited redundancy in burial attributes which he interpreted as reflecting an un-ranked society, where all with the required qualities can accomplish status (*ibid,* pp.297–298). The incorporation of more burial rites in Phase B suggested to McSparron that there was a greater ranking in society, most likely an achieved rank society where there is a limited number of 'office-holders' but that these roles are not inherited (*ibid*, pp.298–300). It is in Phase C that McSparron identified the most significant shift in social structure, with a move to a Prestige Goods Chiefdom in which rank was ascribed (*ibid*, pp.300–307).

While investigating the status associations between the elements of the Individualised Burial Tradition as outlined by Mount, McSparron identified a chronological influence in the understanding of multiple elements. In his analysis, McSparron (2017, p.259) suggested that the association between cists and status is not straightforward, identifying that several cists contained multiple burials. Cist burial also seemed to become less popular across the Early Bronze Age, with the introduction of a 'rite' dichotomy in Phase C, with cists preferred for the Vase Urns and Encrusted Urns, and pits preferred for Collared and Cordoned Urns (*ibid,* pp.274–277). While questioning the simplistic effort-expenditure interpretation for cists, McSparron did agree that there is a link between this grave form and higher status, particularly non-Collared and Cordoned Urn burials. Regarding grave goods, McSparron (*ibid*, pp.99–101) identified effort-related status differences in the objects included in graves. However the interpretation of the inclusion of these items in graves has been complicated due to their relatively rare occurrence. It is not until Phase C that McSparron (*ibid*, p.268) identified a marked increase in their use and a link to status and display.

Regarding inhumation and cremation, McSparron (2017) identified a strong chronological component, with inhumation practiced exclusively in Phase A, both practiced in Phase B, and almost exclusively cremation practiced in Phase C. McSparron interprets this shift to have a significant ritual component, with McSparron even suggesting that during the intermediate Phase B it may have been cremation that was the higher status rite as effort-expenditure arguments linking inhumation to high status tend not to address the energy

requirements of the cremation process (*ibid*, pp.267–268). O'Donnell (2016, p.168) estimates that it requires 0.3 to 0.5 tonnes of seasoned wood to cremate one body, as fresh wood would not burn consistently to produce the level of cremation seen in the burial record. O'Donnell's (2016, pp.165–170) analysis of charcoal from cremations suggests that seasoned or stored wood from selected trees – oak, pomaceous fruitwood, and ash – were used in Early Bronze Age cremations, suggesting that cremation was not seen simply as body disposal and that it had important ritual significance. McSparron (2017, pp.267–268) suggests that during Phase B cremation could have represented a higher status rite which facilitated the swift and safe passage of the deceased soul to the next world.

2.5.2 The Early Bronze Age and Relational Identities

As mentioned, not all authors accept a model of social stratification and individualism for the society of the Early Bronze Age in Ireland. The critiques of this model often focus on three elements – interpretations of grave goods, identification of modern worldviews underpinning these models, and recognising variability (Haughton, 2020, p.33). Of these three, the interpretation of grave goods has been the focus of the highest number of publications (inc. Brück, 2004; 2006; 2019; Fahlander and Oestigaard, 2008; Brück and Fontijn, 2013; Fowler, 2013; Johnston, 2021). Joanna Brück (2004, pp.313–318) has led the charge in the reinterpretation of grave goods, proposing that these items reflected not the status of the individual but instead reflecting a web of relationships. Brück (*ibid*) suggests that the grave goods were gifts from those who attended a burial rather than personal possessions of the dead. The deposition of these items might be associated with mourning, rites of passage, kinship relationships, and coming to terms with loss; with the particular placement of these objects a way of locating people in relative to these ideas (Brück, 2019, p.81). As such, these items were involved in the processes of expressing and renegotiating the relationships between the dead and the living, and between the living after death, with the grave being a place of mediating identity (Johnston, 2021, pp.47, 59–63).

It has also been highlighted that a number of the underpinning elements of the hierarchical models seem to be based in modern, western, capitalist ideals. Of particular focus has been the apparent application of economic principles not established until the last 200 years onto Bronze Age people (Brück and Fontijn, 2013, pp.201–202; Haughton, 2020, p.33).

A noticeable amount of the literature has a distinct rational-economic tone with a clear subject-object divide: discussions of objects in terms of their economic value, trade routes in terms of control, and natural resources in terms of exploitation. This framework has been extended to multiple ritual elements, including arguing that the deposition of metal in hoards was a way of removing metal from circulation to maintain its economic value; "behaviour that seems economically irrational at first sight thus becomes economic in the end" (Brück and Fontijn, 2013, p.202). Such concepts also find themselves within discussions of Bronze Age gender, where this rational economic actor is implicitly male. As such, it is not surprising that elements of 20th century gender politics can be identified within these discussions (subject-object, logic-nature, active-passive, male-female) and can be found within these status-based conceptions of personhood (*ibid*, pp. 203–204). The variability of the burial record has also been highlighted in opposition to a model of social stratification. While the significant variety in graves has been noted, it is also true that there is very little in terms of the 'exceptional' burials identified on the continent that have formed the basis of some of these models (Waddell, 1990; Bradley, 2007; Haughton, 2020, pp.34–35).

Rather than a model of social stratification for the Bronze Age, many of these authors instead propose a model based on the concept of relational personhood. Relational personhood is based on the idea that identity is relational and is formed through the interactions and relationships between people (Brück and Fontijn, 2013, p.204). This model also proposes that people were not the only actors in the creation of identity, with objects, animals, and landscapes also involved in identity formation (Brück, 2019, pp.71–89, 222; Johnston, 2021, pp.7, 229). It is within this nexus of identity formation that a gift-based economy was situated, where the giving and receiving of objects is directly involved in the formation and maintenance of social relationships and interpersonal connections. Brück (2006) also suggested that fragmentary human remains could be involved in these patterns of exchange, with the revisiting of the grave associated with the continued renegotiation of kinship between the dead and the living.

However, this approach to Early Bronze Age society is not without its own critiques. One criticism that has been identified is the tendency for authors to 'cherry pick' burials to

investigate, focusing in on a select group of examples to the detriment of the entire burial tradition (Haughton, 2020, p.39). Focusing on the graveside experiences of renegotiating identities has led to the loss of regional context and understandings of scale. Similarly, rejecting the understanding of status associations with grave goods in favour of ones based on the kinship of objects does not address how to interpret when only a portion of burials contained grave goods. It is also interesting to note that some elements of gender assumptions have themselves escaped interrogation. Marriage has played a key role in discussions of exchange and inheritance within the Bronze Age; however, it is rarely defined and instead assumed to have operated as a stable, long-term, monogamous, heteronormative social institution (Brück, 2006; 2009; 2019; Fowler, 2013; see for critique Crellin, 2020, p.361; Haughton, 2020, p.38). Alongside the associated gendered assumptions, economic elements of marriage have escaped interrogation, with Brück (2006, p.86) mentioning the payment of dowries.

Haughton's 2020 thesis *Narrativizing Difference in Earlier Bronze Age Society: a comparative analysis of age and gender ideologies in the burials of Ireland and Scotland* set out to directly address some of these critiques. In light of Mount's identification (Mount, 1995, pp.108–109; 1997, pp.159–160) of a noticeable under-representation of non-adults in his sample, it is not surprising that Haughton did suggest that there was an element of age ideology within the Individualised Burial Tradition. However, the nature of this differed from what has been suggested by Mount. Within Haughton's sample of all Irish individuals which had received modern skeletal analysis, 39.5% were non-adults, almost double the roughly 20% in Mount (Mount, 1995, pp.108–109; 1997, pp.159–160; Haughton, 2020, p.93). This level of non-adults is comparable with Lewis' (2007) estimate of 30% and Goodman and Armelagos' (1989b) estimate of 40% child mortality in preindustrial societies. Even when adolescents and those identified simply as 'non-adults' were excluded, there was still a level consistent with these estimations (28.4% non-adults) (Haughton, 2020, p.93). This suggested to Haughton that non-adults and adults were equally likely to be buried. However, the treatment of non-adults was seen to differ in other ways. Haughton identified that non-adults were more likely to be buried in cists than adults (*ibid,* pp.96–97), and more likely to be buried with another individual (*ibid,* pp.99–101). In site-based analysis Haughton identified multiple cemeteries with distinct approaches to non-adult burial, such as the non-

adult burial practice of burial with either an adult or a quartz pebble in Edmonstown, Co. Dublin, or the identification of a pregnancy/motherhood-associated cemetery at Ballynacarriga, Co. Cork (*ibid,* pp. 208–211). This suggests to Haughton that the Early Bronze Age saw an age division based on 'non-adult' and 'adult', and that burial was a sphere controlled by adults (*ibid)*. Non-adults qualified for formal burial, however the expression of this was regionally mediated with some communities requiring differentiated burial.

The burials of Bronze Age Europe are often associated with a strong gendered element, either through gendered grave goods or body positioning (Treherne, 1995; Kristiansen and Larsson, 2005; Haughton, 2020, p.25). However, when investigating the Irish burial record, Haughton found very little evidence of an established gender ideology (Haughton, 2020, pp.217–220). While there was a clear predominance of males within the burial record, roughly two males for every female, when considering the proportion of males or females who received particular burial treatment few differences were identified. No significant difference was identified in the grave type (*ibid*, pp.97–98) or grave occupancy (*ibid,* p.100), there was however a slightly higher proportion of males buried in a north-south axis (*ibid*, p.99). It is interesting that within his sample, Haughton identified a higher incidence of females buried with metal than males (*ibid,* pp.106–107), contra to the traditional association with this grave good class and males. The site-based analysis identified regional differences in gender ideology within cemetery composition, with some cemeteries showing no gendered differentiation (eg. Kilcroagh or Ballybrennan, Co. Westmeath) and others showing elements of this practice; such as an initial period of exclusively male burial at Edmondstown, Co. Dublin, or an area of exclusively female and non-adult burial at Ballynacarriga, Co. Cork (*ibid*, pp. 217-220). This regionality in practice suggests to Haughton that the Early Bronze Age in Ireland was a period of 'loose gender' or that there was "awareness of and concern for recognising and responding to differences between bodies at particular times, or in particular places" (*ibid,* p.218).

Throughout Haughton's work (2020; 2021; 2023), one element that is consistently identified is a strong sense of regionality. While the widespread adoption of the Individualised Burial Tradition shows that there was travel and communication between the communities across the island, how this formal burial tradition was interpreted and implemented highlights that

each community still maintained elements of local identity. Haughton proposed that this was not yet a time of hierarchical societies, however, certain elements of this structure may have been 'leaking' into society. Society seems to be somewhat in flux, "some families, some communities, or some individuals may at times have been able to briefly control a larger than usual share of resources, but this indicates only that situational hierarchy could arise within a dispersed, heterarchical social formation" (Haughton, 2020, p.228).

Chapter 3: Situating the Research – Bioarchaeology, Theory, Praxis

Archaeological human remains have long been of interest to archaeologists (O'Donnabhain and Lozada, 2014b, p.1). Before they were the purview of bioarchaeologist, archaeological human remains were often under the oversight of anatomists, medical practitioners, physical anthropologists, and evolutionary biologists. In 1977 at a regional anthropology conference, Buikstra called for a new approach towards archaeological human remains. This interdisciplinary approach was to be one that brought together archaeologists and physical anthropologists, as well as calling for discussions of archaeological human remains to come out of appendices and into research design. Defining bioarchaeology as the contextualised study of archaeological human remains, this call formed the foundation of modern bioarchaeology (Buikstra, 1977). Unsurprising for a field that aimed to draw together two different theoretical approaches, this call for integration has been echoed multiple times across the continued development of the field.

This study aims to undertake the first modern integrated bioarchaeological analysis of the Early Bronze Age inhumation record. Two primary methodological approaches were identified to form the core of this research, one investigating at the population level and the other focusing on the life experiences of individuals. While a history of the development of modern bioarchaeology is out of the scope of this current study (see O'Donnabhain and Lozada, 2014a for a global perspective), outlining some ways bioarchaeology has continued to grapple with its interdisciplinary nature will be briefly outlined below, before exploring the methodological frameworks which have been adopted for this research.

3.1 Approaches to Archaeological Human Remains

3.1.1 Towards an Integrated Approach

As mentioned above, bioarchaeology is an interdisciplinary field that was developed by drawing together, *inter alia*, archaeology and physical anthropology. As such, it is not surprising that the theoretical background of these two 'halves' of bioarchaeology have had

a lasting impact on theoretical approached within the field. Most who have looked back on the history of the field (inc. Buikstra, 1991; Armelagos and Gerven, 2003; Zuckerman and Armelagos, 2011; Rakita, 2014) have identified two foundational theoretical influences – the 'new' anthropology of Washburn (1951) which advocated for problem-orientated rather than descriptive studies, and the 'new' archaeology of Binford (1962) which focused on cultural evolutionism and the deployment of scientific methods. While there has been a significant amount of theoretical and methodological growth in bioarchaeology since the development of the field, these two foundations have continued to have lasting influences (Rakita, 2014, p.214).

This impact has been felt particularly strongly within North American bioarchaeology, which is not surprising considering that much of the early development of the discipline occurred in the USA. In an essay outlining the development of bioarchaeology in the USA, Rakita (2014) proposed the existence of two 'tribes' of bioarchaeological approaches within the field as it has developed in that country. The first of these two 'tribes' Rakita refers to as the 'biological adaption' tribe. This group tends to focus on "assessments of the biological (or evolutionary) adaptation of human populations especially as it relates to health status and diet" (*ibid,* p.222). Methodologically they are more strongly linked with physical anthropology – with a focus on paleopathology, population health, and examinations of trauma and activity patterns. While they do interact with cultural and mortuary elements, they tend to focus more on adaptationist questions. The second of the tribes, Rakita refers to as the 'anthropological question' tribe. This group tends to focus on "context of skeletal remains, mortuary practices, body modification, and interpersonal violence" (Rakita, 2014, p.223). This tribe is more interested in questions of culture and identity rather than health. Methodologically they are more strongly linked with archaeology – focusing on the representative nature of skeletal samples, population structure, population movement, and individual case studies. It is interesting to note how these two tribes, and their development, mirror the development of archaeology through the later quarter of the 20th century into the 21st century, regarding processual and post-processual approaches.

While it would be simplistic to say that all bioarchaeologists from the USA fall neatly into one of these two 'tribes', as they more accurately represent two ends of a spectrum, Rakita

does comment that most tend to feel more comfortable leaning one way or the other (Rakita, 2014, p.219). However, like the ongoing reconciling of approaches in archaeology, most recognise that elements from both approaches are needed, with Rakita identifying that there is an ongoing intentional reconciling of the two 'tribes'. As has been noted by Agarwal and Glencross, ''Contemporary bioarchaeologists are much more engaged with social theory as they strive to better connect the biology and social construction of the skeleton" (Agarwal and Glencross, 2011, p.8).

Another example where the influence of the bisected nature of the foundations of bioarchaeology has been explored can be found in Sofaer's 2006 influential monograph *The Body as Material Culture*. It is not surprising that the disciplinary divide within UK bioarchaeology that Sofaer identified in the publication is somewhat reflective of the tribes referred to in Rakita (2014). To one side of this divide sits the osteological approach – heavily rooted in the scientific method, this approach views the remains as material, with the wish to make comparisons between samples resulting in "osteological conceptualisations [that] are necessarily fixed, universal and transhistorical in order that the body may be subject to scientific analysis" (Sofaer, 2006, p.xiii). Across from this sit approaches where the body is seen as "a social construction that is contextually and historically produced" (Sofaer, 2006, p.xiii). While these approaches require the body to place agency onto past peoples, the remains themselves often act only as a vessel for identity to be placed upon rather than being intrinsically linked; "the skeletal body as the hook on which to hang interpretations" (Sofaer, 2006, p.20). With regard to this divide, Sofaer proposed that we move towards considering archaeological human remains as a form of material culture, as "the body is the nexus between biology and culture" (Sofaer, 2006, p.30).

One element that is key to bioarchaeological research is the fact that bone is a dynamic tissue that is shaped and reshaped throughout an individual's life, allowing human skeletal remains to act as a record of lifeways. Often referred to as skeletal plasticity, this means that the skeleton is directly affected by the interaction of the individual with the world – both in intentional and unintentional ways. These ways can be thought of as purely biological – growth, disease, degeneration, and trauma; but they can also be social – habits,

labour, and learnt behaviour (Sofaer, 2006, pp.72–77). By recognising that plasticity has a social, or cultural, aspect to it, the body can be seen to develop within a culturally-dependant context. As such, the body can be thought of as being created by social actions, with the body embodying the effect of lifeways (*ibid,* pp.xv, 76-77). Alongside behaviour shaping the body, the body also shapes behaviour. One clear example of this is seen in ageing bodies, in which the physical process of ageing results in a reduction in the full range of behaviours a body can perform 'naturally' (for an example of this in ageing ballet dancers see Wainwright and Turner, 2004). It is in this way, through the recursive relationship between the body and behaviour, that Sofaer proposed that the body can be understood as a form of material culture. This, in turn, then allows bioarchaeologists to "access the particularities of the body in a specifically archaeological manner by understanding the development of individual bodies in contextually specific social settings" (Sofaer, 2006, p.87).

3.1.2 Early Bronze Age and Integrated Bioarchaeology

The influence of this divided set of approaches within the field can be felt in the history of the bioarchaeology of the Irish Early Bronze Age. As outlined in section 2.1, the significant majority of the work completed on this material has a distinctly osteological feel. When we do see elements of the bioarchaeology making their way into archaeological discussions, it is the demographics which are of interest, acting as that 'hook' on which to hang archaeological interpretations of the period. Even the work by Power (1993) can be seen to fall to one side of this divide, interpreting stress markers inside the context of North American prehistory rather than completely interfacing with their Irish archaeological context.

As the Early Bronze Age is one of a small number of periods in Irish prehistory in which inhumation was practiced on a widespread scale, it is particularly suitable for bioarchaeological analysis. This study is designed to be a part of the continued calls to bridge the divides within bioarchaeological approach by integrating both population and individual level analyses. This approach was identified as it allows for the exploration of a more rounded image and provides a more nuanced understanding of the lived experiences of the Early Bronze Age in Ireland.

3.2 Skeletal Biology

As outlined above, recognising and interpreting skeletal plasticity is critical for undertaking bioarchaeological research. As such, before describing the methodological approaches chosen for this study, it was identified that a brief summary of the mechanisms for understanding skeletal plasticity would be beneficial. While a comprehensive overview is outside the scope of this study, this section aims to outline key aspects.

To allow for clear and consistent communication between bioarchaeologists, anatomical terms that reflect the basic anatomy of the human skeleton have been identified. Of these, the main terms that are relevant to this thesis are the terms that describe locations on individual bones (White and Folkens, 2005). In the axial skeleton, which consists of the skull, vertebra, rib cage and the pelvic girdle, the term superior is used to describe towards the top of the head and inferior is used to describe towards the base of the feet. Posterior is used to describe towards the back of the individual, and anterior is towards the front of the individual. In the appendicular skeleton, terms are in reference to relative position to the centerline of the skeleton (White and Folkens, 2005). Proximal is used to refer to the length-end of the bone towards the trunk, and distal is used to refer to the length-end of the bone that is towards the fingers or toes. The term medial is used to describe the width-side of the bone that is towards the centerline of the skeleton, and conversely lateral is used to describe the width-side of the bone that is away from the centerline of the skeleton.

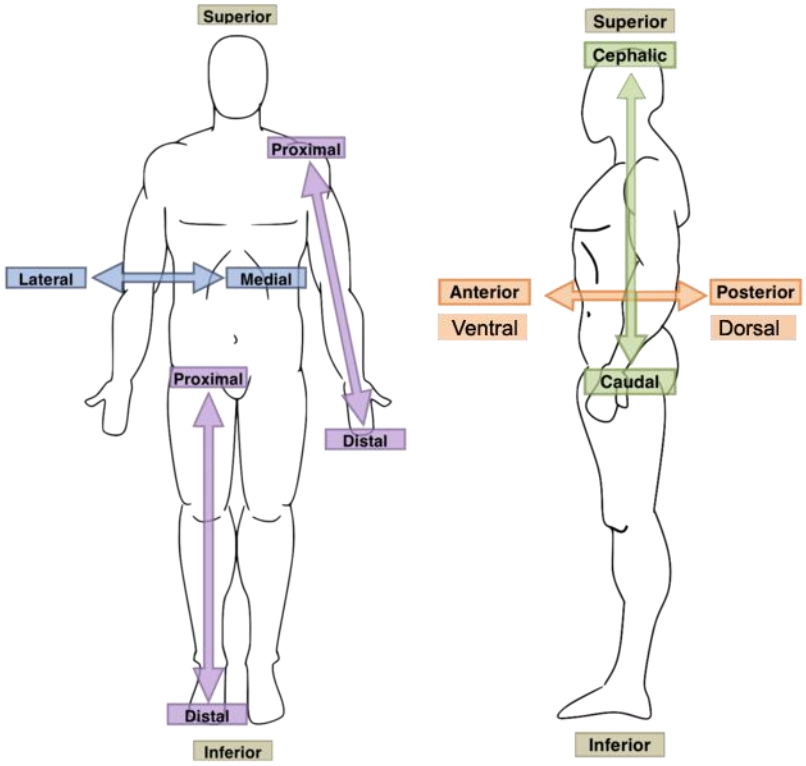


Figure 3.1: Diagram of Anatomical Orientation and Directional Terms. Image from https://www.coursehero.com/study-guides/ap1x94x1/anatomical-orientation-and-directions/

The processes that allows for the shaping and reshaping of bone tissue during life are referred to as modelling and remodelling (White and Folkens, 2005; Larsen, 2015; Lynnerup and Klaus, 2019). The first of these responses is modelling, the primary expression of bone growth. The period of growth and development of an individual is often referred to as ontogeny, and is the main period of change in a human skeleton. Across ontogeny, bone develops and mineralises, and grows in both length and width. There are two major groups of bone development, endochondral ossification and intramembranous ossification (White and Folkens, 2005, pp.46–48; Lynnerup and Klaus, 2019, pp.44–48). The majority of bones develop through endochondral ossification, where bone ossifies by replacing a hyaline cartilage model, with primary ossification occurring before birth and secondary ossification occurring after birth. Intramembranous ossification, which forms the majority of the skull and sections of the clavicle, occurs when connective tissue ossifies without the formation of the cartilage model. While the mechanism of ossification differs between these two modes, the resulting bone is structurally the same (*ibid*). Once ossified, bone continues to grow

through ontogeny. Increases in thickness occur through the deposit of new bone on the outer surfaces, with bone destruction occurring on the inner surface to increase the overall size of the bone. Growth in the length of the long bones occurs in two areas, the metaphysis (primary centre of ossification) and the epiphysis (secondary centre of ossification) between these two regions of bone sits the epiphyseal plate (or growth plate) a layer of cartilaginous tissue which allows for bone formation (*ibid*). As such, in individuals undergoing ontogeny, the number of bones in the skeleton is higher, around 300 compared to 206 in adults, as the epiphysis is yet to fuse to the diaphysis, or shaft, of the long bone, which occurs at the end of ontogeny. Once ontogeny ends, the primary process of bony change moves from modelling to remodelling.

The main skeletal response to external factors is remodelling, process of continuous removal and replacement of bone tissue during life. Remodelling is associated with skeletal responses to biomechanical loading, stress, pathology, and trauma (White and Folkens, 2005, p.48; Lynnerup and Klaus, 2019, pp.48–52). Remodelling occurs through the interrelated actions of osteoblasts (which deposit new bone) and osteoclasts (which remove bones), with two primary modes – conservation and disuse (Lynnerup and Klaus, 2019, pp.48–49). Conservation remodelling includes functional adaptations to biomechanical loading and repair of bone tissue. In conservation remodelling, osteoblasts and osteoclasts work in predominately in equal proportions to address areas of damage and fatigue, while also directly contributing to metabolically available calcium for allostasis (*ibid*). In comparison, disuse remodelling sees a reduction in overall bone mass as osteoblasts and osteoclasts work unproportionally. Disuse remodelling occurs in response to habitual decreases to biomechanical loading, some disease processes such as osteoporosis, and senescence (*ibid*). The interplay between modelling and remodelling that occurs across the life history of an individual provide a skeletal record which is forms the basis for bioarchaeological understandings past lifeways.

3.3 Population Health

Interest in the health and well-being of past peoples has existed since the days when the analysis of archaeological human skeletal remains was conducted by anatomists. Initially the

focus was towards the diagnosis of disease in past individuals, with little interest expressed in explorations of the implications of disease (Bush and Zvelebil, 1991). However, as the discipline of Bioarchaeology continued to develop and the awareness of the interplay between culture and health grew, there was an increased interest in health at the population level. The potential of the population health approach was demonstrated in the landmark publication of *Paleopathology at the Origins of Agriculture* (Armelagos and Cohen, 1984) which explored the processes and outcomes of the transition to agriculture, mostly in the Americas. This publication identified a general pattern of deteriorating health outcomes associated with the transition to agriculture, which conflicted with the generally held beliefs around the progressive development of the past. This publication, and the ones directly following, highlighted both the potential of these population health studies and models for how the interplay between culture and biology effect health outcomes (Cohen and Armelagos, 1984; Goodman et al., 1984; Goodman and Armelagos, 1989a; Armelagos and Cohen, 2013, p.xvii). One of these models highlighted how this interplay manifested in a feedback loop, where the impact of stress affects the environment and cultural systems and the environment and cultural systems affect stress (Figure 3.2).

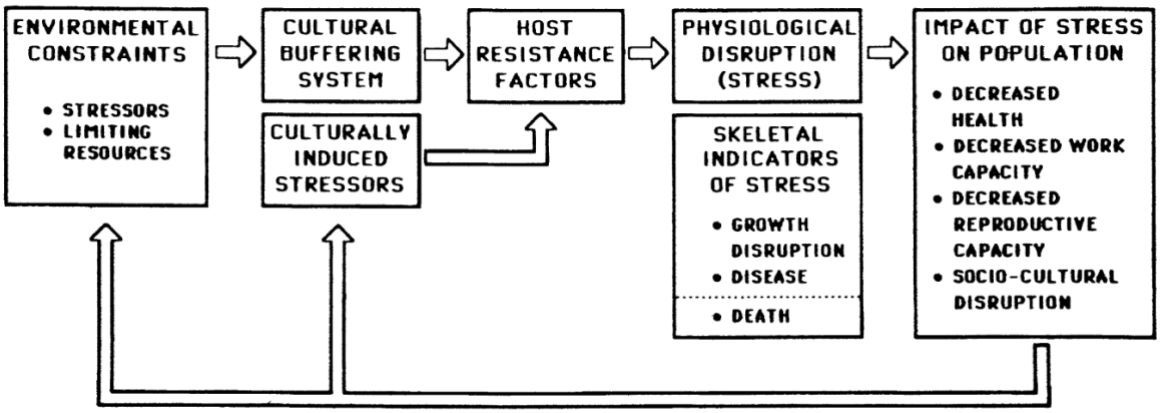


Figure 3.2: A general model for the study of stress in skeletal populations (from Goodman and Armelaogs, 1989; revised from Goodman et al., 1984)

The identification of the interplay between culture and population health was also directly associated with the development of the biocultural approach, which was a key element in the establishment and continued development of the discipline of bioarchaeology (Armelagos and Cohen, 1984; Goodman and Armelagos, 1989a; Bush and Zvelebil, 1991;

Zuckerman and Armelagos, 2011). The biocultural approach is focused on "understand[ing] the role of health in the dynamic interaction between the environment, human populations and culture" (Bush and Zvelebil, 1991, p.6), which allowed for a more complete and informed interpretation of ancient cultures. By identifying and exploring the interactions between biology and culture, this approach allowed the field to move away from descriptive work and towards a greater understanding of how archaeological human remains can inform trends and patterns in past populations (Temple and Goodman, 2014).

Within the biocultural approach, it was quickly identified that the concepts of health were complex and that there was no simple indicator of health in the skeletal record. This led to the identification skeletal markers that could act as proxies to probe the effects of social, cultural, economic, and environmental factors on health and population stress in the past (Bush and Zvelebil, 1991; Roberts and Manchester, 2012; Larsen, 2015, pp.7–8; Kyle et al., 2020, p.118). While information regarding specific disease-processes can provide health information, the relatively low prevalence of specific disease markers in the bioarchaeological record resulted in the focus turning to non-specific skeletal lesions. This is a category of skeletal markers that do not result from a single identified disease-process, reflecting instead a range of disease-processes. It was posited that non-specific skeletal lesions could act as a measure of 'stress'; which in turn could act as a proxy for health in the past (Bush and Zvelebil, 1991; Keita and Boyce, 2001, p.735; Larsen, 2015, pp.7–8). Often referred to as physiological stress markers, these skeletal lesions became an accepted measure of general levels of nutrition, disease, and environmental quality in the past.

3.3.1 The Osteological Paradox

Published in 1992, the seminal paper *The Osteological Paradox: Problems of Inferring Prehistoric Health from Skeletal Samples* (Wood et al., 1992) addressed the growing field of population health; with implications that spread throughout bioarchaeology and that people continue to grapple with today. While an in-depth discussion of the Osteological Paradox is out of the scope of this research, it is important to address the publication due to the impact it has had on population health research. The Osteological Paradox primarily concerns the interpretation of lesions as markers of poor health. Highlighting that only chronic disease-processes result in the bony changes seen in skeletal collections, Wood et

al., (1992) suggested that those who present with lesions could in fact represent a 'healthier' group than those without. This is due to the fact that the group presenting lesions survived the disease process long enough for the formation of lesions. In comparison, an individual without any lesions may represent an individual who didn't survive the disease process long enough to allow for lesion formation. As such, those without lesions who were previously interpreted as 'healthier' may in fact represent a 'unhealthier' group (Wood et al., 1992, pp.344–349). There are also concerns when interpreting levels of disease in a population, or morbidity, as the section of the population represented in the skeletal record tend to have higher morbidity; as they are the non-survivors (*ibid,* pp.349–351).

Far from suggesting that such studies should be abandoned, Wood et al., (*ibid,* pp.357–358) suggested that analyses need to be undertaken with a greater acknowledgement of the difficulties outlined. The field of bioarchaeology continues to interface with the Osteological Paradox. Alongside methodological shifts including the widespread adoption of integrating multiple skeletal measures of health rather than focusing on one (inc. Steckel et al., 2002), discussions around the utility of the term 'health' (Reitsema and McIlvaine, 2014; Temple and Goodman, 2014; Marklein et al., 2016), and the specific inclusion of the hidden heterogeneity and differential morbidity within the interpretation of results (DeWitte, 2014), there have been publications that have tried to directly address the issues raised by the Osteological Paradox.

One of these publications was that of the Health Index methodology (Steckel et al., 2002a, p.148). Exploring the Osteological Paradox, they outlined a sample with a noticeably lower level of skeletal lesions than what was expected based on the documentary evidence – a poor house in New York. The authors suggested that this lower than expected level of skeletal lesions was most likely reflecting a moderately healthy childhood before changing situations resulted in these people finding themselves in the poor house. Based on the documentary evidence of a mortality rate of around 20% per year, it is suggested that the conditions of the poor house would result in those who were extremely stressed dying before lesions accumulate. The authors suggest that these 'paradoxical' samples could be identified and understood by interpretation within cultural context (Steckel et al., 2002a,

p.149). In a similar vein, a study that set out to deliberately probe the Osteological Paradox compared four physiological stress markers across two skeletal series – mass graves related to two battles, and the civilian cemetery in the Greek colony of Himera, Sicily; a 'catastrophic' and 'attritional' assemblage respectively (Kyle et al., 2018). Although there was a decrease in the number of skeletal lesions seen in the catastrophic sample suggesting that those with the higher prevalence of lesions were the most frail, this was not the strongest correlating factor for skeletal stress markers (*ibid,* pp.168–159). The authors identified that within these skeletal series it was culture, and in particular status (as seen through burial contexts), that was the greatest predictor of skeletal lesions (*ibid,* pp.165–167). The results support the general hypothesis associating skeletal stress with frailty, while also highlighting the need to consider cultural and environmental factors when interpreting results (Kyle et al., 2018, pp.168–170).

3.3.2 Questions around Terminology

As mentioned above, the issues around identifying health in the skeletal record have been well documented in the literature. A significant portion of discussion has focused on our understanding and use of the term 'health'. Concerns around this term in bioarchaeology were foregrounded after the release of the World Health Organisation's definition of health in 1999: as "a state of complete physical, mental, and social well-being and not merely the absence of disease, or infirmity" (WHO, 1999). This definition highlighted an already acknowledged fact that based purely on the skeletal record it is impossible to fully measure and quantify health. This is particularly so with issues of mental and social well-being, as these concepts are culturally mediated (Reitsema and McIlvaine, 2014, p.182; Temple and Goodman, 2014, p.190).

Issues around the use of the term 'health' in bioarchaeology were underscored by the publication of a special issue in 2014 of the American Journal of Physical Anthropology following a 2013 symposium examining the then current state of population health, physiological stress, and related topics within bioarchaeological research as a whole (Reitsema and McIlvaine, 2014, p.182). Highlighting the difficult and complicated relationship between 'health' and 'stress', the symposium strongly suggested the abandonment of 'health' as a term in bioarchaeological study as this is not what is being

measured. While recognising that it is an imperfect solution to the terminology problem, Temple and Goodman (2014, p. 189) suggest that as a discipline bioarchaeology moves to using the term stress, as this is what is being evaluated through physiological stress markers.

Stress as a term has seen widespread use in discussions and analyses of 'population health' since the publication of *Palaeopathology at the Origins of Agriculture* (Armelagos and Cohen, 1984; Goodman and Armelagos, 1989a; Temple and Goodman, 2014, pp.187–188; Larsen, 2015, pp.7–8). Similarly to health, stress has a well-understood colloquial definition. However, while some issues persist around a clear definition for the term stress (Temple and Goodman, 2014, p.186). Unlike the situation with health, an operative definition for stress has been identified, borrowed from pathophysiology and human biology. Based on Hans Selye's (1957, 1974, 1976b, 1976a) theory of stress response, 'stress' in bioarchaeology has been linked to disruptions to homeostasis – the internal processes involved in maintaining a steady internal state required for survival (Klaus, 2014, p.294; Larsen, 2015, p.7); or as argued by Klaus (2014, 295) allostasis which refers to the maintenance of homeostasis through biological and behavioural processes. While stress itself is not visible, the resulting consequences are been seen through bony changes associated with the disease processes that result from disrupted allostasis (Klaus, 2014, p.295).

An important factor in bioarchaeological contexts is recognising the role of both environmental factors and cultural systems can have on levels of stress in a population (Goodman and Armelagos, 1989a, pp.225–226; Temple and Goodman, 2014, pp.188–189; Larsen, 2015, p.7). It is important to be cognisant of the role that cultural systems can have in buffering against environmental stressors; and also the fact that such systems can result in the artificial limiting of available resources to all or parts of the population. Apart from the importance of this in allowing for a more complete understanding of stress levels in past populations, such situations allow for the interplay between biology and culture to be elucidated, which is a key goal of bioarchaeology (Klaus, 2014, p.295). While some issues around the vagueness of the term stress persist, its identification as a useful label with an operative definition have resulted in its consistent use.

As a result of bioarchaeology's ongoing struggle with the Osteological Paradox (Wood et al., 1992) and the challenges of addressing morbidity and differential mortality, there has been a move towards the adoption of the term 'frailty'. Interest in the use of frailty is associated with the concept that the plasticity associated with resistance to stressors is often related to levels of mobility (Marklein et al., 2016, pp.209–210; Kyle et al., 2018, p.167; Zedda et al., 2021, p.460). As such, frailty is seen as a measure of the cumulative response to stressors as related to susceptibility to disease or death. While the colloquial understanding of frailty does not have the strength of 'health' or 'stress', it does have a widely understood and accepted definition within the clinical setting that can be related to the skeletal record (Marklein et al., 2016, pp.210–211): a "biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, and causing vulnerability to adverse outcomes" (Fried et al., 2001, p.M146). Marklein et al., suggested that by studying frailty we can assess skeletal lesions in terms of both the morbidity and mortality, establishing frailty as a "variable state of cumulated stress" (2016, p.211).

All three of the major terms discussed here are currently used in bioarchaeological publications. The issues with 'health' are widely known and recognised, however its utility in the general and colloquial understanding of the term means that it is still frequently used in titles and introductions. While some argue that 'stress' also maintains some vagueness in its bioarchaeological uses, the identified operational definition associated with disruptions to homeostatic, or allostasis, alongside its clear linguistical links to the term 'physiological stress markers' result in its place in the common terminology for the discipline. Calls to move towards frailty have resulted in increases in use of the term, however it is most commonly used in conjunction with the other terminology, rather than replacing stress. Due to the utility of the term 'population health' in describing and understanding this area of bioarchaeological interest, this thesis will continue to use the term 'health'. However, reflecting the above concerns, 'health' shall not be used within the analytical sections of this research. 'Stress' will be used when discussing physiological stress markers and stressors, while frailty will be utilised when discussing the interpretation of patterns in skeletal lesions.

3.3.3 Methodological Development

As mentioned above, a series of non-specific skeletal lesions have been identified that act as proxies for health in the past. The proxies that have been identified as useful fall into a series of categories: physiological stress markers (including porotic hyperostosis, cribra orbitalia, and enamel hypoplasia); degenerative joint disease; measures of stature; and dental pathology. The methodological approach to assessing these proxies is often based on presence/absence counts, with individual stature often assessed in relation to the population or as averages over time. It was quickly recognised that as different stress markers reflect the impact of different stressors, a more complete picture could be produced if multiple stress markers were included in analysis (Steckel et al., 2002a, p.148; Reitsema and McIlvaine, 2014, p.183; Hubbe et al., 2018, p.360; Zedda et al., 2021, p.460).

One of the major methodological developments in relation to the identification and assessment of relevant skeletal lesions was the Health Index, published in 2002 (Steckel et al., 2002b; 2002a). This standardised methodology for identifying, measuring, and comparing levels of physiological stress was proposed to allow for ease of comparison of population health across multiple sites and regions. Extending the general calls for the inclusion of more than one measure, the Health Index identified seven measures in the skeleton to be recorded: "stature inferred from long-bone lengths; signs of disrupted dental development (linear enamel hypoplasia); signs of anaemia (porotic hyperostosis and cribra orbitalia); dental pathology (caries, antemortem tooth loss, abscesses); lesions associated with skeletal infections; degenerative joint disease; and trauma (fractures and weapon wounds)" (Steckel et al., 2002a, p.144). Addressing the issues around the term 'health', the Health Index links levels of health with both the length and quality of life. As such, one of the important steps in the methodology is adjusting the scores for each measure into age-specific rates, resulting in one numerical indicator of health for each individual (*ibid,* pp.143–147). The scores for each individual are then converted into a single 'index number' for the sample, which allows for easy comparison between each sample on which the Health Index is applied (*ibid*, p.147). This has allowed for a series of long-distance comparisons to be made using this methodology.

As always, limitations of this methodology have been identified. The ubiquitous limitations associated with measures that focus on chronic conditions and around needing to interpret results in their cultural context were recognised by the authors who proposed the approach (Steckel et al., 2002a, p.153). Further limitations have been identified, including concerns around comparing sites with different levels of preservation and the validity of equally weighting all of the measures (Hubbe et al., 2018; Zedda et al., 2021, p.460). This has resulted in a general consensus that the Health Index represented an "imperfect but useful measure" (Steckel et al., 2002a, p.153).

Another, more recent, proposal for a standardised model for identifying, recording, and comparing skeletal lesions between populations is the Skeletal Frailty Index (Marklein et al., 2016). Following a similar approach to the Health Index, the Skeletal Frailty Index uses four categories of skeletal markers: growth; nutrition; activity; and trauma. Within these broad categories, the method involves assessing a total of 14 "cumulative and active skeletal biomarkers of stress" (Marklein et al., 2016, pp.211–212). These 14 markers are femoral length, femoral head diameter, enamel hypoplasia, periostitis, periodontal disease, porotic hyperostosis, cribra orbitalia, rickets, neoplasms, osteoporosis, osteoarthritis, intervertebral disc disease, rotator cuff disorder, and fracture. Individual scores in the frailty index are then compared by age and sex cohorts. By approaching skeletal lesions as a cumulative measure of frailty, the authors suggest that this method acknowledges the issues around morbidity and differential mortality that was outlined by the Osteological Paradox (Wood et al., 1992; Marklein et al., 2016, p.211). The ever present need to interpret results within the biocultural context is acknowledged. The move towards the Skeletal Frailty Index rooted in assessments made on living populations, and frailty in general, may provide a way through the ambiguous terminological issues discussed above.

As with any methodology, multiple limitations have been identified. While the identification of 14 markers in the Skeletal Frailty Index roots this method within a clinical understanding alongside increasing the range of stressors which can be investigated, this results in some issues regarding preservation. As all 14 markers must be identified in each individual for inclusion within analysis, this extensive list of markers can significantly reduce sample sizes (Marklein et al., 2016, p.215; Zedda et al., 2021, p.146). The authors suggest a way to

address this would be to construct a population-specific list of markers. However, this would complicate inter-population comparisons while still not addressing situations of significant mixing of preservation. Pervious concerns regarding the equality of all measures are also still valid for this methodology (Hubbe et al., 2018; Zedda et al., 2021, p.460).

Following the approach taken by the Skeletal Frailty Index, the Biological Index of Frailty aims to directly address some of the consistent limitations identified in the methodological approaches outlined above (Zedda et al., 2021). With more similarities than simply the name, the Biological Index of Frailty utilised twelve skeletal biomarkers – including the majority of the makers identified in the Skeletal Frailty Index. Similarly to the two methods outlined above, each individual is 'scored' either 1 or 0 for each maker (*ibid,* p.467*)*. The main departure in this method however, is the inclusion of a system for weighting each marker. This system of weighting allows for the Biological Index of Frailty to include elements of severity into scoring and allows for certain markers to contribute more towards a frailty 'score' (*ibid*, pp.467–469). The other major advantage of this method is the ability to include individuals of mixed preservation. Through the use of a simple equation to produce a frailty 'score' for each individual, as long as there is a minimum number of markers present (three in the publication), an individual can be included (*ibid,* p.467). As such, this method hopes to address some consistent limitations of methodological approaches within population health studies.

Alongside approaches for the identification and recording of skeletal lesions, there have been other methodological improvements to the analysis of levels of skeletal lesions, particularly regarding statistical models. Proposed in response to the Osteological Paradox, elements of population demography such as Hazard Models have been adopted to strengthen analysis (e.g., DeWitte and Wood, 2008; DeWitte, Boulware, & Redfern, 2013; Wilson, 2014). The use of odds ratios has joined chi-square and logistic regression to improve the statistical analysis and address some issues associated with the inbuilt limitations of skeletal assemblages; noticeably uneven age distributions (Klaus, 2014, p.303; Kyle et al., 2018, p.165; Pilloud and Schwitalla, 2020, p.5). Strongly associated with the adoption of more robust statistical methods is the requirements to include age-distributions in analyses. The importance of this was highlighted by DeWitte's (2014) analysis of

periosteal reactions in a post-Black Death sample from London. Through identifying the age-associated increase in periosteal reaction within the sample, DeWitte (2014, 263-264) suggested that this increase in reactions may be reflecting increases in survivability. As such, the greater number of periosteal reactions in the post-Black Death sample suggest that this population was in general healthier, at least in terms of longevity (DeWitte, 2014, pp.264–265).

As mentioned multiple times throughout this chapter, the importance of interpreting any analysis of skeletal lesions within their relevant cultural context continues to be of the upmost importance. Associated with this contextual interpretation is the importance of the continued and renewed move away from typological analyses to ones focused on hypothesis testing and the presence of anthropological and bioarchaeological theory (Temple and Goodman, 2014). This allows for the foregrounding the complexity of stress, individual variation, cultural shielding and vulnerability, and social structure; which is of importance due to the fact that categorical analyses can act to mask this complexity.

Recently there have been renewed calls to reassess many of the skeletal lesions most commonly used in population health studies. Citing the fact that many of these lesions have multiple associated causal agents, there have been calls for a focus on more accurate understandings of the aetiology of these skeletal lesions to allow for more accurate interpretation (Edinborough and Rando, 2020). Periostitis, cribra orbitalia, and porotic hyperostosis have all received particular attention (Weston, 2012; Cole and Waldron, 2019; O'Donnell et al., 2020; Rothschild et al., 2020; 2021; Anderson et al., 2021). The need to move away from simplified interpretations and towards recognising and interfacing with the multifactorial aetiologies of these markers has been stressed (Weston, 2012, p.507). While there is a need to reassess selection, aetiologies, and interpretation of physiological stress markers, Edinborough and Rando's (2020) call for a general abandonment of the field of population health until these issues are sorted seems short-sighted. The example of the Osteological Paradox shows an example of how the discipline has continually grappled with methodological concerns while also producing analyses that have allowed for a greater understanding of the past. Population health studies still provide a means for investigating the relationships between experiences of stress, culture, and the environment in the past.

3.3.4 The Biological Index of Frailty

When identifying a methodological framework for this study all three of the 'index' approaches outlined above were considered. The combination of the theoretical underpinning of utilising frailty and the ability to include skeletal material of mixed preservation (important consideration with an assemblage roughly 4000 years old), the Biological Index of Frailty was selected (Zedda et al., 2021). This section will summarise the methodology and how it will be applied to this assemblage.

3.3.4.1 Skeletal Biomarkers

As mentioned previously, this method identifies twelve skeletal biomarkers of stress to assess frailty. These markers are short stature, low body mass, enamel hypoplasia, rickets/osteomalacia, periodontal disease, cribra orbitalia, porotic hyperostosis, non-specific periostitis, joint disease, vertebral degenerative disease, trauma, and osteoporosis. Each marker will be briefly discussed in terms of aetiology and associations with frailty.

Short Stature

Stature is a well-established skeletal biomarker for stress, due to the well-known impact of environmental factors on reaching genetic restraints on height. Due to the impact of genetic factors on attained stature, the utilisation of stature as a stress biomarker must be population and sex specific. As such, this marker is often explored through comparisons in averages either through time or between intra-population sub-samples (Zakrzewski, 2003; DeWitte and Hughes-Morey, 2012; Marklein et al., 2016). Outside of genetics, multiple elements including environmental stress, metabolic stress, disease impacts, and restricted nutrition have all been shown to impact attained stature (Walker et al., 2007; Pérez-Ríos et al., 2018; Zedda et al., 2021, p.460; Rani et al., 2023). Of these factors, malnutrition has been highlighted multiple times as a major influence on ontogeny. Alongside acting as a visible marker for impacted health during development, impaired growth has also been linked with reduced health outcomes later in life (McEniry, 2013; McGovern, 2014). Links between impacted growth and poor health outcomes has been attested in both clinical and bioarchaeological contexts, with stature acting as one of the more common biomarkers within population health research (Steckel et al., 2002b; Zakrzewski, 2003; DeWitte and Hughes-Morey, 2012). Due to these factors, attained stature is incorporated into models of

frailty, with short stature identified as those who fall within the lowest quartile of stature for each sex (Marklein et al., 2016, Zedda et al., 2021).

Low Body Mass

Low Body Mass does not have a history of use as a skeletal biomarker within population health studies, instead being adopted from clinical frailty models. Within clinical frailty, rather than low body mass, it is robusticity which is often measured. This is as robusticity is associated with mobility, physical activity, and strength (Steckel et al., 2002a; Marklein et al., 2016). As such, this measure is used to investigate vulnerability to disability, care requirements, falls, and morbidity (Fried et al., 1998; 2001; Xue et al., 2011). When translating the frailty framework to bioarchaeology, robusticity or low body mass are most commonly evaluated through measurements of the maximum diameter of the femoral head (Marklein et al., 2016, p.213; Zedda et al., 2021, p.461). As with attained stature, body mass measurements are thought to reflect growth impacts. They have also been linked with population differences and need to be assessed at both the intra-population level and also with considerations of sex differences. As such, similar to short stature, identification of low body mass is based on the lowest quartile of values for each sex (Zedda et al., 2021).

Enamel Hypoplasia

Enamel hypoplasia is a well-established skeletal biomarker for stress that has been used extensively. Enamel hypoplasia presents as an area of reduced enamel thickness or pitting on the tooth crown caused by genetic defects, localised trauma, or systemic metabolic stress (Goodman and Rose, 1990). Most frequently seen in the archaeological record as a series of lines of decreased enamel thickness, enamel defects result from systemic metabolic stress producing a temporary upset of enamel formation within the jaw during childhood (Goodman and Rose, 1990). Lasting weeks to months, these periods have been linked to nutritional deficiencies (Coumoulos and Mellanby, 1947; Nikiforuk and Fraser, 1981; Rugg-Gunn et al., 1998; Gualdi-Russo et al., 2017; Masterson et al., 2017) or disease load (Sarnat and Schour, 1941; Duray, 1996; Hillson, 1996). As enamel does not remodel later in life, enamel hypoplasia remains detectable after death (Larsen, 2015). Alongside the utility of no remodelling, there have been several studies linking enamel hypoplasia to reduced life expectancy, supporting the hypothesis of the link between of physiological

stress markers and frailty (Barker and Osmond, 1986; Steckel et al., 2002b; Boldsen, 2007; Miszkiewicz, 2015; Zedda et al., 2021).

Rickets/Osteomalacia

Rickets and Osteomalacia, the skeletal manifestations of chronic vitamin D deficiency, are pathological changes which are of interest within many bioarchaeological contexts. While these conditions are not commonly used as skeletal biomarker of stress, they often act as the primary pathology of interest within research. Vitamin D deficiency effects the skeletal system as Vitamin D is associated with calcium and phosphorus metabolism, and thus bone mineralisation (Ives, 2018; Mays and Brickley, 2018; Brickley and Mays, 2019, pp.540–550; Zedda et al., 2021, pp.461–462). When this impacts bone modelling during ontogeny it results in a selection of bony changes including the characteristic bowing of the femora and tibiae, flaring of the metaphasis, and cortical porosity (Mays and Brickley, 2018; Brickley and Mays, 2019, pp.540–545). Osteomalacia is the adult form when bone remodelling is impacted. Bone deformation and pseudofractures are common in osteomalacia, as the bone matrix fails to fully mineralise (Brickley and Mays, 2019, pp.546–550). Rickets and Osteomalacia are associated impacts on growth and mobility, incomplete fractures, and increased risk of disease (Ives, 2018; Mays and Brickley, 2018; Ngari et al., 2018). As these conditions are linked to low exposure to sunlight and malnutrition, their inclusion in frailty models is linked with poor ontogeny conditions and increased morbidity.

Periodontal Disease

Measures of oral health have a history of use as skeletal biomarkers of stress, as oral health has been shown to impact overall health (Zedda et al., 2021, p.461). One of these measures is periodontal disease, the inflammation of the periodontal connective tissue associated with a build-up of plaque (Hillson, 1996; Kinaston et al., 2019, p.771). Periodontal disease can lead to tooth insecurity and antemortem tooth loss, along with ulcer formation. Within skeletal material, periodontal disease is identified through porosity and alveolar bone resorption around the roots of the teeth. The chronic inflammation associated with periodontal disease has been linked to cardiovascular and respiratory disease (Spahr et al., 2006; Pan et al., 2009; DeWitte and Bekvalac, 2010). As analysis of past populations has demonstrated a correlation between periodontal disease and increased risk of mortality

(DeWitte, 2010; DeWitte and Bekvalac, 2010), this measure has been included within frailty models based on presence/absence (Marklein et al., 2016, p.213; Zedda et al., 2021, p.461).

Porotic Hyperostosis and Cribra Orbitalia

Porotic hyperostosis and cribra orbitalia, among the most commonly reported pathological conditions, are used extensively as skeletal biomarkers of stress. Both porotic hyperostosis and cribra orbitalia present as porous lesions that result in a sponge- or coral-like appearance on the flat bones of the skull in porotic hyperostosis or on the orbital roofs in cribra orbitalia (Angel, 1966; Stuart-Macadam, 1987). Both porotic hyperostosis and cribra orbitalia have been traditionally linked to acquired anaemia, as the result of marrow hyperplasia and the expansion of trabecular bone. While there is some debate over which of these is the preferred explanation in paleopathology (Sullivan, 2005; Oxenham and Cavill, 2010 for iron deficiency; Rothschild, 2012 for chronic disease and parasites; Walker et al., 2009 for megaloblastic), these stressors are most commonly linked to nutritional deficiencies. While there have been moves towards reconsidering the proximal causes of cribra orbitalia for some time (inc. Keita, 2003; Wapler, Crubézy and Schultz, 2004; Walker et al., 2009), the link to acquired anaemia for both stress indicators has recently been called into question (O'Donnell et al., 2020; Anderson et al., 2021; Rothschild et al., 2021). As the bioarchaeological literature has yet come to a consensus on the aetiologies for these conditions, links between the bony changes and increased frailty and mortality risk continue to persist (Rothschild, 2012; Hens et al., 2019; Rinaldo et al., 2019; O'Donnell et al., 2020). As such they are still utilised as skeletal biomarkers for frailty (Marklein et al., 2016, pp.213–214; Zedda et al., 2021, p.462).

Non-specific Periostitis

Periostitis, or sometimes referred to as periosteal reactions, is one of the more commonly utilised skeletal biomarkers of frailly within bioarchaeological literature as is most commonly identified on the long bones (Weston, 2012, p.492). Presenting as a plaque-like area of woven bone atop of the bone surface, periostitis is associated with the insults to the periosteum – the membranous covering of bone which houses osteoblasts and is associated with bone repair (Steckel and Rose, 2002; Weston, 2012; Roberts, 2019, pp.228–296). The development of periostitis is associated with multiple aetiologies, including trauma,

infection, and inflammation. Within frailty studies, periostitis is most commonly associated with systematic responses to infection, and non-specific infection in particular. It is in this form which it is most commonly utilised and interpreted as a skeletal biomarker. While studies have identified correlations between non-specific periostitis (particularly active periostitis) and increased risk of mortality in skeletal populations (DeWitte, 2014), there has also been those who have cautioned against the simplistic interpretation of this marker (Weston, 2012). Highlighting the tendency of studies to focus purely on the association between periostitis and nonspecific infection, ignoring the numerous other aetiologies, Weston (2012, p.502) reiterated the need to consider periostitis within the context of all skeletal bony changes present. For its use as a frailty marker, periostitis is associated with the burden of responding to a physiological insult and likely suggestive of compromised health status (Marklein et al., 2016, p.213; Zedda et al., 2021, p.461).

Joint Disease

Degenerative joint diseases, including osteoarthritis, are the most common pathological changes identified within human skeletal remains. Due to their link between repetitive movements, ageing, and 'wear and tear', it is not surprising that they commonly are included in frailty discussions – both within clinical and bioarchaeological settings (Waldron, 2019). This is due to the links between joint disease and joint stiffness, pain, and mobility reduction (Fried et al., 2001; Montero et al., 2016; King et al., 2018; Vitaloni et al., 2019; Tenti et al., 2020). While clear links between skeletal manifestations of joint disease and symptomatic burden have yet to be clearly identified (Link, 2009; Perrot, 2015; Riddle and Jiranek, 2015; Waldron, 2019, p.729), the extensive clinical associations between joint disease and poor health outcomes often results in the utilisation of this method in frailty indexes (Marklein et al., 2016, p.214; Zedda et al., 2021, p.462).

Vertebral Degenerative Disease

Alongside degenerative joint disease, degenerative changes in the synovial joints of the vertebral articular facets and the cartilaginous joint of the intervertebral disc joint are commonly reported in skeletal collections. Identified through osteophytic growth or pitting along the joint surfaces, these changes are associated with inflammation, injury, increase strain through the system, repetitive movements, and ageing (Waldron, 2019). As such, they

also commonly result in pain, stiffness, reductions in mobility, and the ability to participate in activities (Kauppila, 2009; Gellhorn et al., 2013; Kos et al., 2019). Thus, it is not surprising that alongside degenerative joint disease, that vertebral degenerative disease is considered as a marker of increased frailty (Marklein et al., 2016, p.214; Zedda et al., 2021, p.462).

Trauma

While often recorded and reported, antemortem trauma is not commonly utilised as a skeletal biomarker with population health studies, although it is seen by some to be one of the more reliable indicators of quality of life and living conditions (Domett and Tayles, 2006; Zedda et al., 2021, p.462). This link with quality of life is associated with the documented outcomes of antemortem trauma, including decreased mobility, significant impacts on independence, and possible health complications (Costa et al., 2008; Phillips et al., 2013; Marklein et al., 2016, pp.214–215; Zedda et al., 2021, p.462). As such, it is not surprising to find that trauma is commonly utilised as a frailty marker within clinical contexts. Within the Biological Index of Frailty, only antemortem trauma was included as a frailty marker, as perimortem trauma would not have had time to impact frailty.

Osteoporosis

Osteoporosis is not commonly utilised as a skeletal biomarker within bioarchaeological research due to the difficulties in quantifying the condition. Metabolically linked bone mass and bone quality reduction, the world health organisation defines osteoporosis as 2.5 standard deviations or more below the average bone mass of a young adult (Zedda et al., 2021, p.462). Osteoporosis is strongly linked with age, however there are a number of conditions that can result in significant reductions to bone mass – including cystic fibrosis, paralysis, immobility, rheumatoid arthritis, and nutritional deficiencies (Agarwal and Stout, 2003; Miazgowski et al., 2012; Brickley and Mays, 2019, pp.552–553; Zedda et al., 2021, pp.462–463). Reductions in bone mass often led to fractures, with hip, wrist, and the spine being the most common sites (Rachner et al., 2011; Brickley and Mays, 2019, pp.552–553). These often result in impacted mobility, poor health outcomes, and increased susceptibility to other conditions. As such, osteoporosis is commonly used as a frailty indicator within clinical contexts, and is applicable in bioarchaeological contexts when it can be accurately

measured most commonly through clinical techniques including x-rays and CT scans (Zedda et al., 2021, p.466).

3.3.4.2 Formation of a Frailty Score

As mentioned previously, the Biological Index of Frailty attempts to address some shortcomings of previous methodological approaches to population health, in particularly differential severity within markers, the equal weighing of all markers, and mixed preservation. Zedda et al. (2021) address these concerns by adopting both a scoring system and a weight system. Similar to most methodological approaches, each skeletal biomarker is scored either 1 or 0, based on the presence or absence of the marker. For the skeletal markers which are population based – stature and low body mass, the Biological Index of Frailty identifies those whose values fall into the lowest quartile of measurements for both males and females as being 'present' for that marker. The Biological Index of Frailty also outlines how much of the skeleton must be present for an absent score to be identified for each marker. It must also be noted that for a selection of skeletal biomarkers, cribra orbitalia, porotic hyperostosis, and periostitis, the severity and the state of the lesion (active or healing/healed) must be recorded with this information necessary for the weighting step. A full summary of the scoring criteria can be found in Zedda et al (2021, p.456), and in figure 3.3. If a marker cannot be assessed due to taphonomic factors, then that marker does not receive a score. A minimum of three markers must be present to allow for the calculation of a frailty score for the individual.

Biomarker	Presence of the stress biomarker score "1"	Absence of the stress biomarker score "0"
Short stature	The stature falls into the first quartile of the distribution of male or female adult's statures of the considered population.	The stature is not in the first quartile of the males and female adult's distribution. At least one long bone should be present and measurable to estimate stature.
Low body mass	The maximum femoral head diameter falls into the first quartile of male or female adult's distribution of the considered population.	The femoral head diameter falls above the first quartile of male or female adult's distribution. At least one femoral head should be observable and measurable.
Linear enamel hypoplasia	Presence of at least one tooth with a visible groove of hypoplasia.	No tooth presents hypoplasia. At least one canine or one maxillary incisive should be observable (Goodman & Rose, 1990).
Periodontal disease	The morphology of the alveolar bone corresponds to periodontitis from Grade 2 to Grade 4 (Ogden, 2008).	The alveolar bone is normal (Grade 1 of the Ogden (2008) scoring system). At least one posterior tooth and half jawbone should be observable.
Periostitis	At least one bone shows evidence of new bone formation. Operators should differentiate between active, remodeled and mixed lesions (DeWitte, 2014b).	No bone presents signs of periostitis. At least one tibial shaft should be observable (DeWitte, 2014b).
Rickets/osteomalacia	Presence of lower limb deformity and other signs of Vitamin D deficiency (Waldron, 2008).	No signs of vitamin D deficiency. At least one lower limb's long bone should be observable.
Cribra orbitalia	Presence of porous lesions on the orbital roofs. Degrees of severity and healing should be recorded (Rinaldo et al., 2019).	No porous lesion is visible on the orbital roofs. At least one orbital roof should be observable.
Porotic hyperostosis	Presence of porous lesions on the cranial vault. Degrees of severity and healing should be scored (Rinaldo et al., 2019).	No porous lesion is visible on the cranial vault. At least half of the skull should be observable.
Osteoarthritis and other joint disease	Presence of OA or other DJD on at least one joint (Waldron, 2008).	No evidence of OA or other DJD. At least 10 joints (2/3 of the main joints) should be observable.
Vertebral diseases	Presence of IVD, OA or other pathologies of the non-synovial joints of the spine on at least one vertebra.	No disease on vertebras. At least 16 vertebras (2/3 of the spinal column) should be present and observable.
Trauma	At least one ante-mortem trauma is present (Scianò et al., 2020).	No trauma is visible. At least 2/3 of the skeleton should be observable.
Osteoporosis	BMD is under the diagnostic threshold for osteoporosis, evaluated with clinical techniques.	Normal BMD.

Abbreviations: BIF, biological index of frailty; BMD, bone mineral density; IVD, intervertebral disc disease.

Figure 3.3: Scoring criteria for Skeletal Biomarkers for the Biological Index of Frailty, as seen in Zedda et al., 2021, p.465.

Alongside specified scoring criteria, the Biological Index of Frailty also employs a system to weigh each of the skeletal biomarkers. In order to assign a weight to each of the skeletal biomarkers, Zedda et al utilised a logistic regression model to estimate the odds ratio of mortality for each biomarker (2021, p.467). The sample which was used in this analysis was the Wellcome Osteological Database of the Museum of London, with material coming from the cemeteries of St Merton Priory, Bermondsey Abbey, Guildhall Yard, Spital Square, St. Benet Sherehog, and St. Mary Graces (sample total of 863) (Zedda et al., 2021, p.463). To calculate premature mortality, the age at death of each individual was compared to the mean life expectancy for the period based on a life table (Mallegni and Lippi, 2009; Rachner

et al., 2011; Zedda et al., 2021, p.467). The weights were assigned based on the results of the logistic regression model, with an odds ratio of <1 resulting in a weight of 1, odds ratios between 1 and 1.9 resulting in a weight of 2, and those with a odds ratio higher than 2 resulting in a weight of 3 (Zedda et al., 2021, p.467). The presence of a healing or healed marker was assigned a weight half that of the active lesion.

Skeletal biomarker		Weight		Score (1 or 0)	W * S
Short Stature		1			
Low Body Mass		3			
Linear Enamel Hypoplasia		3			
Rickets/Osteomalacia		1			
Periodontal Disease		1			
Cribra Orbitalia+	severity 1	1 active	0.5 healing/healed		
	severity 2,3,4	3 active	1.5 healing/healed		
Porotic Hyperostosis+	severity 1	1 active	0.5 healing/healed		
	severity 2,3,4	3 active	1.5 healing/healed		
Periostitis+		2 active	1 healing/healed		
Joint diseases		1			
Vertebral disease		1			
Trauma		2			
Osteoporosis		1			
Total		Max 22			

$$Biological\ Index\ of\ Frailty = \frac{\Sigma\ (W * S)}{\Sigma\ W} * 100 =$$

(based on at least 3 biomarkers) 0-21 low frailty; 21-53 medium frailty; 53-100 high frailty

+If the biomarker is not present (score "0") the weight considered is 3 for CO and PH and 2 for periostitis

Figure 3.4: Evaluation form for the Biological Index of Frailty, as seen in Zedda et al., 2021, p.464.

Thus, with a weight and score for each skeletal biomarker, a Biological Index of Frailty score can be calculated for each individual. The weight is multiplied by the score for each marker present, before totalled for each individual. This is then divided by the sum of the weight for all present markers, then multiplied by 100. The utilisation of this formula allows for the

inclusion of mixed preservation within analysis, as the score is adjusted to reflect only those markers present for assessment.

$$Biological\ Index\ of\ Frailty\ (BIF) = \frac{\Sigma(Weight \times Score)}{\Sigma Weight} \times 100$$

The result of this equation is a score between 0 and 100 for each individual. The form for the calculation of this score is shown in figure 3.1. Based on the sample utilised to build this model, three categories of BIF score were identified: 0-21 (first quartile) indicates low frailty, 22-53 (second and third quartile) indicates medium frailty, and 54-100 (fourth quartile) indicates high frailty (Zedda et al., 2021, p.467). The score for each individual is then averaged to identify a level of frailty within a population or sub-sample of a population for both intra- and inter-population analysis.

3.4 Studies of Individuals

Studies which focus on a single individual from a core tenet of bioarchaeology, no doubt associated with the fact that skeletal analysis is performed at this level. Within bioarchaeology, the 'popularity' of the two magnitudes of study – individual and population – have fluctuated over time, although no period saw only one due to their interconnected nature. While population studies did see prominence for a significant period, more recently there has been a resurgence within individual studies. This is somewhat connected with post-processual archaeology looking towards moving away from seeing the past through a series of percentages towards personalising or 'peopling' the past. This played directly into the strengths of individual studies, as they can be used to investigate the stories of an individual. As mentioned at the outset of this chapter, one of the approaches through which this is achieved is osteobiography. The osteobiographic approach interprets the skeletal analysis of an individual into a biological profile, with a focus towards building a life-history (Mayes and Barber, 2008, p.574). This approach allows bioarchaeologist to explore lifeways at all levels of society, including those who have left little to no written record. While osteobiographies of multiple individuals have been integrated to explore questions at the population level, it is this focus on one individual that has led to the popularity of this approach within public outreach (Boutin and Callahan, 2019, p.79).

Numerous other methodological approaches have utilised the osteobiographical framework to investigate specific elements of past lifeways. One of these is the Bioarchaeology of Care, a methodological approach to investigate evidence for health-related caregiving in the archaeological record (Tilley, 2015). In a display of the cyclic nature of the scale of interest in bioarchaeology, recently there has been a move to investigate health care provisioning at a population level, with the development of the Community of Care. As this study is interested in exploring health care provisioning in the Early Bronze Age, this section will outline the osteobiography, bioarchaeology of care, and the community of care approaches.

3.4.1 Osteobiography

The development of osteobiographies is as old as that of Bioarchaeology and was associated with the shift of skeletal analysis out of appendixes (Hosek and Robb, 2019, p.3). This approach was then developed further as a methodology to utilise individual life-histories to investigate topics at a broader level, including health, behaviour, and culture (Saul, 1972; 1976; Saul and Saul, 1989). Osteobiography has become the primary approach to explore lifeways and life-history of a specific individual in the past. An Osteobiography is constructed through the collating of all information available from the archaeological record for a specific individual (Hosek and Robb, 2019, p.2). Due to the limitations of the archaeological record, there is no standard set of analyses that is required to construct an Osteobiography (*ibid*, pp.7–8). While skeletal analysis forms the foundation of this approach, it can also include pathological, isotopic, and aDNA analyses (Hosek and Robb, 2019, p.6). As with all bioarchaeological analysis, the inclusion of cultural context is of great importance. It is this layering of data that allows the construction of the life-history on an individual (Hosek and Robb, 2019, p.7; Robb et al., 2019, p.18).

Alongside the role that Osteobiography plays in providing a detailed unit of analysis within larger data sets, this approach has also found a role within public-facing bioarchaeology. The ability of these life-histories to provide a ‘face’ in studies of the past increases accessibility, relevancy, and interest to those in other disciplines as well as the general public (Boutin and Callahan, 2019, p.79). This is particularly true for prehistory and the individuals who fell below the threshold of written history. Robb *et al.,* (2019) explored this ability to construct

'history' and found that even for those whom we have some limited written records that Osteobiography provided for a more complex and nuanced understanding of past lives. One of the other strengths of the Osteobiography is the ability of well-contextualised life-histories to be interpreted from a narrative approach (Boutin and Callahan, 2019). Used extensively in public outreach, the use of narrative, while somewhat fictive, can provide an important 'humanising' influence on archaeology, and to broader and more general views of past peoples.

3.4.2 Bioarchaeology of Care

Anthropologist Margret Mead has often been quoted (perhaps apocryphally) as saying that the first sign of civilization in an ancient culture was a femur that had been broken and then healed. Mead is said to have explained that in the animal kingdom, if you break your leg, you die. You cannot run from danger, get to the river for a drink or hunt for food. You are meat for prowling beasts. No animal survives a broken leg long enough for the bone to heal. A broken femur that has healed is evidence that someone has taken time to stay with the one who fell, has bound up the wound, has carried the person to safety and has tended the injured individual through recovery. Helping someone else through difficulty is where 'civilization' starts.

This link between 'civilization', or humanity as another interpretation of the quote suggests, and care provision has resulted in a great interest in situations where this can be identified in the past. After the discovery of the Shanidar Neanderthals, and particularly Shanidar 1, this interest has extended beyond the limits of the archaeological record (inc, Trinkaus and Zimmerman, 1982; Trinkaus and Shipman, 1993; Spikins et al., 2018). The identification of the injuries to Shanidar 1, including blindness or partial sight in the left eye, deformities in the leg and foot which would have resulted in a limp, and the atrophy of the right arm following trauma and the removal of the arm above the elbow; and the survival of this individual to between 35 and 50 suggest that not only *Homo sapiens* offered care in the past.

In bioarchaeology, care-provision has been inferred from skeletal remains that show evidence of recovery from, along with examples of survival with, instances of severe

pathology that probably would have resulted in death without some level of support (Tilley, 2015, p.1). Apart from evidence that care was provided to these individuals, these cases are of particular interest to bioarchaeologists. This is due to the fact that disease, and what would be the appropriate care, are socially mediated, and thus are shaped by cultural norms, traditions, cultural knowledge and skills, socio-economic factors, and environmental factors (Tilley and Oxenham, 2011; Tilley, 2015, pp.1–2). As such, it follows that when examples of care-provision in the archaeological record are investigated, they can provide insight into multiple aspects of past cultures.

3.4.2.1 History of Care within Archaeology

The identification of individuals that received care within the archaeological record has occurred across the history of the production of skeletal reports and covers a wide range of conditions and cultural contexts (Tilley and Oxenham, 2011; Tilley, 2015, pp.13–14). However, there was often little emphasis placed on discussions of care, the requirements, and the implications of such practices in the literature, instead focusing on describing and diagnosing any pathological conditions identified (eg Lubell and Jackes, 1985; Formicola, Milanesi and Scarsini, 1987; Suzuki, 1989; Webb, 1995; Hawkey, 1998). While the analysis of care in such publications is limited, they have enriched understanding and provided insight in past behaviour.

In 1991, Dettwyler published a paper arguing for the inability to identify care and compassion in the skeletal record; even in instances where survival with severe pathology had been identified. Referring to three prehistoric individuals to whom caregiving had been suggested, she used modern day examples of individuals with similar conditions who functioned unaided, saying that claims for the past receipt of care were therefore untenable (Dettwyler, 1991). With a focus on the socially-mediated nature of disability, Dettwyler proposed that we cannot speak meaningfully about the lived experience of these individuals. Dettwyler also suggested that those scholars who proposed the evidence of care in prehistoric individuals have "overstepped the boundaries of reasonable inference" (Dettwyler, 1991, p.375). Unsurprisingly, this publication had a significant impact on discussions around care-provision in bioarchaeology, significantly curtailing discussions. While a complete review of this paper is outside the scope of this research, (see Tilley, 2015

pp. 43-48) issues around conflation between 'care' and 'compassion' alongside direct association of 'handicap' with a purely social aspect have been identified.

While cautioning against interpretations of motive and intent behind care-giving remains important, in recent years the scholarly debate on care has shifted again, with some scholars returning to inferring care-giving in the prehistoric past (Bahn, 2003; Craig et al, 2010). A significant development within this space occurred in 2011 with the publication of the Bioarchaeology of Care (Tilley and Oxenham, 2011). This publication proposed a methodological approach to investigating evidence of care, outlining a systematic and repeatable case-study approach to the topic. Demonstrating the approach, the publication presented the analysis of the young male, Man Bac Burial 9, who had evidence of severe pathology: paraplegia and reduced upper body mobility from childhood (Oxenham et al., 2009). Estimated to have survived into his 30s, this individual would have required long-term intensive nursing. Care for this individual would have included food provisioning and preparation, assistance with sanitation, prevention and sufficient treatment of infection, maintenance of levels of physical comfort, supervision, and housing alongside social inclusion within the community (Tilley and Oxenham, 2011, pp.39–40). Interpreting the evidence for this level of care to the cultural level, this suggests that the community in which Man Bac Burial 9 lived had a level of stability and cohesion to provide the care required. The length of survival of this individual also suggests that the decision to care for Man Bac Burial 9 likely was reviewed and continued at multiple points. This case study demonstrated the potential of the Bioarchaeology of Care approach, not only in providing a framework for interpretation of care-provision but also how such situations can enrich knowledge in past lifeways and culture.

3.4.2.2 Bioarchaeology of Care Methodology

The Bioarchaeology of Care approach, also known as the index of care, was further developed in subsequent publications (Tilley, 2012; 2015; Tilley and Cameron, 2014; Tilley and Schrenk, 2017). Constructed as a case-study, the methodology for the Bioarchaeology of Care consisting of four steps (figure 2.1) which describe the individual, determine health care requirements, construct a model of care, and interpret the outcomes of care; with each

step outlined below. This process builds upon itself and aims to establish an understanding of both the individuals' and the communities' experience of care.

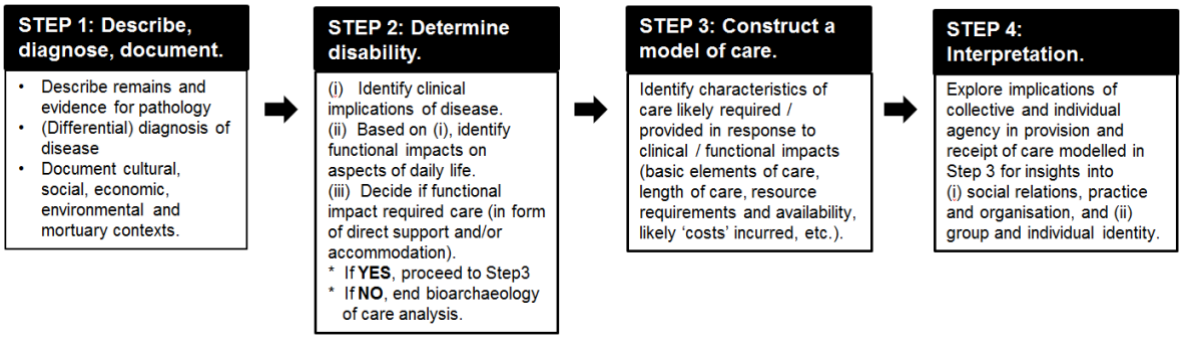


Figure 3.5: Methodology of the Index of Care, as seen on www.indexofcare.org

Step 1

The first step of Bioarchaeology of Care methodology is initiated after a set of human remains with evidence of survival with a serious injury or pathology is identified (Tilley, 2012, p.3; 2015, p.157). Complete skeletal analysis is completed for the individual, including the estimation of age-at-death and sex, along with the full description of any pathological changes. After the description, a differential diagnosis is completed for all pathological lesions (Tilley, 2012, p.3; 2015, pp.159–160). In the situation that a specific diagnosis cannot be identified, information regarding the impact of any disease processes is recorded. The specifics of the mortuary context are recorded for the individual; alongside those of wider cultural mortuary practices, as the identification of any deviant practices are important in step 4 (*ibid*). Finally all other contextual information is recorded, including all known cultural, socioeconomic, and environmental information. Any identification of precious evidence of care provision is of particular interest.

Step 2

Step 2 is focused on identifying if there would have been any need for care-provision, either direct care or accommodation (Tilley, 2012, p.3; 2015, pp.160–161). The first section of this step is devoted to identifying the clinical impact of the disease process(es) identified in Step 1 (Tilley, 2012, p.3; 2015, pp.160–163). This is undertaken by searching through the clinical literature to identify symptoms and assess for the severity and duration of these. While it is difficult to interpret how any identified symptoms would have impacted an individual in the

past, as human biology has not changed, basic impacts of pathological conditions will have remained consistent (Tilley, 2015, pp.160–161). The second section is focused on assessing the functional impacts of the identified pathology and symptoms (Tilley, 2012, p.3; 2015, pp.164–169). The ease of this process is directly linked to the severity of symptoms as identified in the first section; if symptoms are severe, then no lifeway context would allow for survival unless under care (Tilley, 2015, pp.164–165). Thus there is a need to consider identified symptoms in connection with the lifeways identified within the cultural context element of Step 1. As it is not uncommon for symptoms to change over the duration of a disease-process, Bioarchaeology of Care methodology asks for the individual to be assessed for the period of most severe impact (*ibid*, pp. 165). At the completion of the second section, an assessment regarding the likelihood of care provision must be completed. If it is concluded that care provision was required for the survival of the individual to the identified age-at-death within the identified lifeways context, then Bioarchaeology of Care analysis continues (*ibid*, pp. 169).

Step 3

Step 3 consists of constructing a 'model of care', which outlines what the care identified in Step 2 entailed; based on the symptoms identified in Step 2 and the lifeways context outlined in Step 1 (Tilley, 2012, pp.3–4; 2015, pp.169–174). This model of care is interested in identifying possible processes adopted to address the functional impacts identified, the duration of care required, changes in care provision over time, and an assessment of care efficacy. In addressing a model of care provision, two major categories of care are identified – direct support and accommodation. It is recognised that there will be multiple elements of care that will be invisible to this approach, and elements which cannot be accessed by the archaeological record; such as exact nature of remedies, psychological or spiritual care (Tilley, 2012, p.4; 2015, p.170). However, as mentioned above, with consistent human biology comes consistent care needs – bleeding needs to be stopped, immobile individuals need to be repositioned to prevent pressure sores developing, individuals need to be fed and hydrated *(Ibid*). It is these practical elements of care which are the focus for this step. However, it is important to recognise that these elements which cannot be attested in the archaeological records would not have consisted of all care provided, and that all care provided would have been shaped by cultural factors (Tilley, 2015, pp.173–174). It is this

recognition of agency in decisions of past care-provision that opens the door for Step 4, interpretation. In situations where the contextual information required for the interpretation central to Step 4 is not present, the Bioarcheology of Care approach can conclude at Step 3 (Tilley, 2015, p.178).

Step 4

Step 4 is the interpretation of the developed model of care, probing what this model can tell us in regards to the cultural context for providing care, those who provided care, and the individual who received care; seeking insight into social relations, practice, identity, and culture (Tilley, 2012, p.4; 2015, pp.177–188). Across the process of interpretation, inferences must be tested in relation to the identified cultural context and lifeways and against the likely clinical and functional impacts of disease processes identified in the previous steps (Tilley, 2012, p.4; 2015, pp.178–179). However, the more interpretive focus of Step 4 may allow for new insights into past practices, or help to re-contextualised parts of past practices. The first section of Step 4 focuses on group agency and identity. It is the decisions around the nature of care provision that are explored here, including deciding to offer care, care strategies, ceasing care, and treatment after death (Tilley, 2012, p.4; 2015, pp.182–184). Investigating these decisions can then be utilised to explore group aims and motivations around care provision. The individual that received care is the focus of the second section of Step 4. This section is aimed towards constructing an impression of the individual, and then towards addressing agency that they would have had in their care (Tilley, 2012, p.4; 2015, pp.184–188). Whilst it is recognised these impressions will never be more than broad generalisations, they can also provide information around their relationship with the care provider and community at large. While these last steps of the Bioarchaeology of Care approach are highly interpretative and subjective, these elements can allow for bioarchaeologists to engage with the complexity of care and disability in the past, and the humanity of those individuals whom we study (Tilley, 2012, p.6). The Bioarchaeology of Care provides a structured, systematic, and transparent methodology, aware of the inbuilt subjectivity within such an emotive topic.

3.4.3 Community of Care

As mentioned, the Bioarchaeology of Care as a theoretical and methodological framework for investigating evidence of care provisioning in the past is, by design, one of case studies (Tilley and Oxenham, 2011; Tilley, 2012; 2015). This focus on individuals has not only allowed the Bioarchaeology of Care to be applicable in many different temporal periods and cultural contexts but has also provided a systematic framework to examine the lived experience of poor health and the subsequent health care in the past. The contributions the Bioarchaeology of Care has provided to the bioarcheological understandings of healthcare provisioning, disability, and agency of past people has led some to explore ways that this model may be implemented on a broader level (Schrenk and Tremblay, 2022a). Expanding Bioarchaeology of Care towards a population-level analysis would allow for a better understanding of the complexities of care provisioning, especially those associated with the burdens and decision-influencing factors associated with the choice to provide care when multiple individuals within a community could be suffering from differing severities and timescales of pathology at any one time (Schrenk and Tremblay, 2022b, pp.1–3). This scale of analysis, sometimes referred to as the Community of Care approach, is not without its challenges.

One of the challenges of Community of Care is directly tied to the nature of the material of focus. Due to the natural limitations of the skeletal record, the incomplete nature of how disease expresses itself in bone, the lottery that is taphonomy, and the incomplete record of lifeways and social norms, Bioarchaeology of Care cannot ever represent the totality of care practices in the past (Tilley, 2015, pp.86–87). Another issue for Community of Care is associated with what questions can be asked of Bioarchaeology of Care at the population level. The complexity of care provision means that the generalisation of care provision from one individual to a community response for all individuals can lead to incorrect, and possibly harmful, misunderstandings of past peoples (*ibid*). There are also issues assessing the proportionality of care provisioning. While it may be a simple comparison to fall into, we will never be able to accurately compare care between periods or cultures, as there are too many confounding factors to control (Penny-Mason, 2022, p.42).

Considering this, one may ask whether there is anything to gain from trying to implement the Community of Care approach. However, considering the improvements in understanding that the Bioarchaeology of Care approach has provided to bioarchaeology, many feel that the by acknowledging and directly addressing these limitations, we can extend our understanding of past care practices. Currently there is no one recognised methodology within the Community of Care, with it instead made up of a collection of approaches which critically consider the questions behind their research (Penny-Mason, 2022), include flexibility and intersectionality in our theoretical toolkits (Casserly and Moore, 2022; Penny-Mason, 2022), and encourage the creation or adaptation of approaches based on each population of interest (Schrenk and Tremblay, 2022b; Tremblay and Schrenk, 2022). This has allowed the Community of Care to explore how individuals and communities responded to the requirement of health care provisioning.

Chapter 4: Material and Methods

In order to undertake a bioarchaeological analysis of the Early Bronze Age in Ireland with a focus on health, disease, trauma, and care provision, on the dataset for this study comprised the curated unburnt remains from the period. This is because the inhumation record preserves a more complete record of the biology of the individual in comparison to the substantial body of cremated human remains. Information about aspects of life such as pathology cannot be identified in the cremation record due to the fragmentation through burning and processing associated with this burial rite. While the focus on unburnt remains reduced the sample available for study, this allows for a more in-depth exploration of the interplay between biology and culture for this period. This is the first study to assess the entire available sample of unburned skeletal material from the Early Bronze Age in Ireland as a corpus. This chapter will first cover how the material for this study was identified, before outlining the bioarchaeological methods that were deployed.

4.1 Material

The initial step of identifying the dataset for this research was undertaken via a comprehensive search through all available sources, including Waddell's *The Bronze Age Burials of Ireland* (1990), the *People of Prehistoric Ireland* INSTAR Project (2010) catalogue, the National Museum of Ireland (NMI) finds database, the National Museum of Northern Ireland (NMNI) database, and personal communications with the Northern Ireland Environment Agency: Built Heritage (NIEA). This search identified a total of 777 individuals reported as Early Bronze Age inhumations discovered in the Republic of Ireland and Northern Ireland, with the identification of an Early Bronze Age date predominantly associated with either the grave form or identification of the ceramic. Of these individuals only 228 have a current known location, with the majority, 197 individuals, curated at NMI. The majority of the 500+ remains that were not curated were excavated in the late 19th and early 20th century, when the retention process was not yet standardised. The identification of such a high proportion of 'lost' inhumations highlights the need for studies such as this one to reassess the material that has been retained and to consider how the remains that have been curated can inform ongoing discussions of the period.

The majority of all reported excavations of Early Bronze Age inhumations include a level of skeletal analysis, however the quality of this analysis varies significantly. Before the 1980s this analysis was undertaken by anatomists, with the reports often consist of listings of elements recovered, estimations of age and sex, and metric analysis that was completed with varying degrees of detail. As outlined in section 2.1, these analyses often used methods and approaches that are not appropriate in modern bioarchaeological analyses. It is not surprising then that the vast majority the analysis undertaken before 1990 does not comply with modern bioarchaeological standards, and thus the reliability of any interpretations must be in question. On this basis, it was decided to reanalyse the remains that had received analysis prior to 1990. A catalogue of the 198 individuals which formed the assemblage for this project can be found in Appendix 1, including the full skeletal analysis reports for all individuals analysed by the author.

4.1.1 Curated Material

One of the primary objectives of this project was to update and standardise the available bioarchaeological analysis for Early Bronze Age inhumations. Remains that had not been the subject of modern bioarchaeological analysis was prioritised for reanalysis. This resulted in the remains of 102 individuals being reanalysed for this study. Of the 102 individuals reanalysed for this study, 86 were housed in the NMI collections centre; 15 curated by the NIEA; and one individual was housed at Rubicon Heritage. A map of the distribution of sites analysed can be found in Figure 1, along with the sites identified from the literature.

All skeletal analysis was completed following with modern bioarchaeological methodology, with more information on this process found in section 4.2. Skeletal analysis of each individual was recorded in a digital FileMaker database created by the author in order to streamline data processing. As might be expected in an assemblage of this nature, there was significant variation in the preservation of the individuals. Of the 102 skeletons examined, 93 individuals from 56 sites had sufficient levels of preservation to be included in the analysis.

4.1.2 Material from the Literature

To supplement the material analysed by the author, remains that had undergone modern bioarchaeological analysis with modern bioarchaeological methodology, undertaken by a recognised practicing bioarchaeologist, were included in analysis, with data drawn from skeletal reports. From this literature, 104 individuals were identified as being appropriate for inclusion within the analysis. Three principal sources were used: the National Museum of Ireland's *Breaking Ground Finding Graves* monograph (2011); unpublished excavation reports from Headland Archaeology Ltd, Cultural Resource Development Services Ltd, Archaeological Development Services Ltd, Irish Archaeological Consultancy, Ægis Archaeology Ltd, Argaret Gowen & Co Ltd, and Tempus Archaeology, sourced from the National Monuments Survey archive of excavation reports; and excavation reports published in Irish archaeology journals (including the Journal of Irish Archaeology, the Journal of the Royal Society of Antiquaries of Ireland, and the Ulster Journal of Archaeology).

If the skeletal analysis was completed by a recognised bioarchaeologist with modern bioarchaeological methodology, then information from the skeletal report was recorded in a FileMaker database. This included burial attributes (see below), demographic information (age at death estimation, sex estimation), frailly markers (stature, femur head metrics, enamel hypoplasia, cribra orbitalia, porotic hyperostosis, periostitis, joint disease, and vertebral disease), any non-frailty pathological changes, and any evidence of trauma. Where these had not been reported within the available skeletal reports, those sections of the database were left blank. This was recorded in both an absent/present metric along with complete recorded details to allow for ease and completeness when combining both sets of data for analysis. A map of the distribution of sites identified in the literature can be found in Figure 1, along with the curated material.

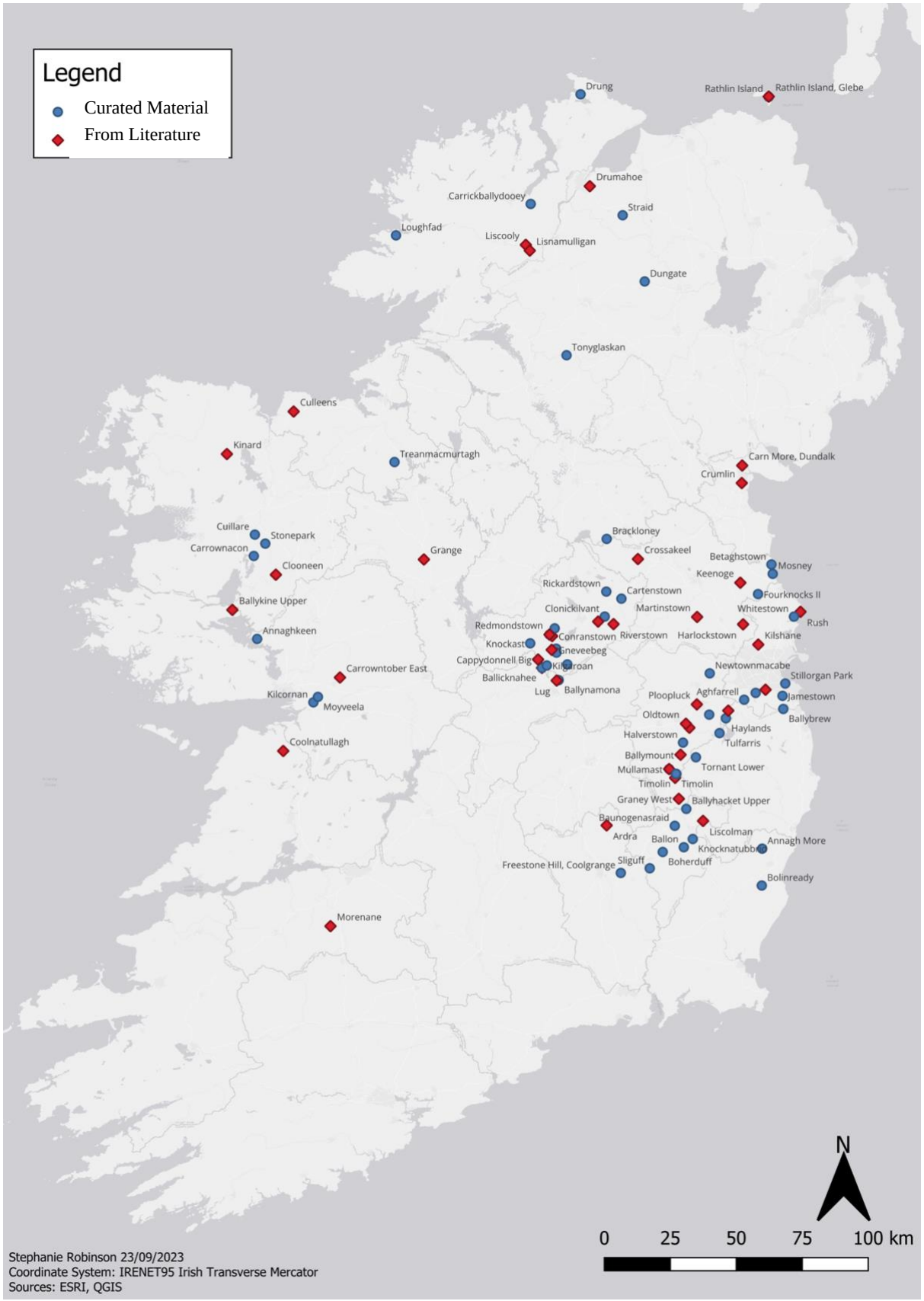


Figure 4.1: Distribution Map of all sites used in this project. Material analysed by the author signified by blue circles, material identified in the literature signified by red diamonds

4.1.3 Burial Attributes

The burial attributes for all individuals were recorded from either published or unpublished excavation reports. Of particular interest were grave occupancy, grave type, body position, grave goods, geographic distribution, and phase distribution. During analysis, a small number of individuals for which burial attributes could not be associated confidently. As such, these individuals, mostly excavated in the 1950s, were not recorded with burial attributes and could not be included in analyses that focused on burial attributes.

The number of individuals in each grave was recorded for all sites in the sample, with this being collapsed into single or multiple for analysis. Both inhumations and cremations were counted in grave occupancy. For those where there was some doubt around the number of individuals within the grave, the individual was recorded as being in a single grave. Grave structure was recorded as described in excavation reports, however this was collapsed into cist and pit groups for analysis with stone-lined pits being included in the pit category. Body position was recorded as described in excavation reports, recorded as one of six groups: right, left, crouched with side not recorded, disturbed, other, and not recorded. Ceramic grave goods were also recorded as described in excavation reports, with all individuals within a grave recorded with all ceramics found in that grave unless a clear association could be made. For analysis, the ceramics were collapsed into Bowl, Vase, other, and aceramic groups to increase sample size. Non-Ceramic grave goods were recorded as described in the excavation reports. However, due to the variety in non-ceramic grave goods across the assemblage, each was categorised into one of four groups following McSparron (2017, p.101; 2021, pp.40–41). Group 1 consisted of individuals with no non-ceramic grave goods. Group 2 (class 1 in McSparron) consisted of simple non-ceramic grave goods which were ‘unimproved’, such as simple flint flakes or quartz pebbles. Group 3 (class 2 in McSparron) consisted of a well-made artifact from common material, such as plano-convex knife, re-touched scraper, or a stone bead. Group 4 (class 3 in McSparron) consisted of artifacts made from raw material or that required specialist skills, such as copper objects, bronze objects, or complex jewellery. These groups are based on energy expenditure models. The county was recorded from excavation reports and collapsed into provinces for analysis.

The assemblage was sorted into three phases based on those outlined in McSparron (2017; 2021). Phase A begins at 2200 BC, with Phase B beginning between 2134-2052 BC, and Phase C starting around 1950 BC. Individuals were placed within these phases either based on radiocarbon dates or based on analysis of ceramics. Those without published calibrated dates were calibrated using OxCal version 4.4.4 (Bronk Ramsey, 1995; 2023) and the Intcal20 curve (Reimer et al., 2020).The analysis on the ceramics was based on the Brindley (2007) typology – either where there was a published interpretation or where clear illustrations were available allowing phasing by the author. Where there was a noticeable discrepancy in the radiocarbon dates and the phase identified based on the ceramics, each situation was considered on a case-by-case basis for the best fit associated with the relevant confidence in the ceramic analysis or the radiocarbon date. Only 94 individuals, could be placed into a temporal category. A summary of the basic demographics and the burial attributes of all individuals in the assemblage can be found in Appendix 2.

4.2 Methods

In the Republic of Ireland, the legal status of ancient human remains is covered by the National Monuments legislation, where they are defined as having the same status as any other archaeological artefact. Ethical approval by the University was therefore not required for this study. Irish and international standards and guidelines relating to ethical treatment and analysis of human skeletal remains from archaeological contexts were followed, as outlined in Buikstra and Ubelaker (1994), Buckley et al. (1999), and McKinley and Brickley (2004). International ethics standards will also be observed. These standards include:

- British Association for Biological Anthropology and Osteoarchaeology Code of Ethics (2008)
- British Association for Biological Anthropology and Osteoarchaeology Code of Practice (2010)
- Code of Ethics of the American Association of Physical Anthropologists (2003)

The methodology for this project is in line with the National Museum of Ireland Policy on Human Remains, which was adopted by the National Museum of Ireland management

committee in 2006. The following section outlines the methodology utilised for the skeletal analysis, before covering the methodological approached undertaken for this research.

4.2.1 Skeletal Analysis

Skeletal analysis was undertaken following the international standards for modern bioarchaeological, based on Buikstra and Ubelaker (1994). Each assemblage was analysed at the location of curation. Complete skeletal analysis of each individual was undertaken under a bright light through macroscopic visual inspection. Each individual was assigned an ID based either on existing curatorial IDs, or based on the site and grave number where there was no clearly identified pre-existing ID. Complete skeletal analysis was undertaken on each individual. The preservation (good, moderate, poor) and completeness was recorded during analysis. An inventory was taken for the elements present, including identifying preservation levels. Degenerative joint disease was assessed for each joint surface. The vertebrae were assessed for preservation, degenerative joint disease on the articular surfaces, osteophyte growth around the centrum, and evidence of Schmorl's nodes. Each tooth was assessed for caries, calculus, abbesses, and attrition. Each individual was inspected for pathological changes and trauma, with any instance identified described – including element, position, bone activity, healing, extent, and presentation. Relevant archaeological information such as site name, county, licence number, year of excavation, grave type, body orientation, grave orientation, and any associated material was recorded for each individual where such information was available.

4.2.1.1 Estimations of Age

There are multiple methods for estimating the age-at-death for an individual using a wide range of skeletal elements. When estimating age, individuals are placed in one of seven age categories: foetus (before birth), infant (0-2 years), child (3-12 years), adolescent (13-17 years), young adult (18-34 years), middle adult (35-44 years) and old adult (45+ years). These seven groups fall into two categories, non-adult and adult. Each of these categories focus on different ageing techniques, with the non-adult techniques focusing on patterns in development and growth, and the adult techniques focusing on degenerative changes. Where preservation was poor, then the individual was identified as either a non-adult or as an adult.

Estimating non-adult age-at-death

As mentioned above, estimation of non-adult age-at-death focuses on measures of growth and development. The growth period sees a significant number of skeletal changes, which have been widely studied. This has resulted in the ability to estimate relatively small ranges for age-at-death during the first roughly 20 years of life (White and Folkens, 2005). However, this is not without complications as the growth period is also highly susceptible to interruption for issues such as malnutrition. For non-adults three methods for estimating age-at-death were chosen for this study: dental formation (Anderson et al., 1976; Baker et al., 2005), dental eruption (Ubelaker, 1989; Baker et al., 2005), and epiphyseal fusion (McKern and Stewart, 1957; Buikstra and Ubelaker, 1994).

Formation, eruption, and wear of teeth has been well studied within human populations, leading to their extensive use in estimating age-at-death. The development and eruption of the dentition is linked more closely with chronological age than the development of other skeletal elements, with regular formation and eruption times (Smith, 1991, p.143; White and Folkens, 2005, p.364; Larsen, 2015, p.25). Tooth formation begins in-utero and continues until around 20 years of age, when the third molar has erupted and root formation is complete, which makes this method very useful for estimating age-at-death in non-adults. The regular and well understood nature of dental formation and eruption, combined with the high preservation rates of teeth in archaeological and forensic contexts, has resulted in dentition being one of the most commonly used methods for estimating age-at-death in non-adults (Anderson et al., 1976; Ubelaker, 1989; Baker et al., 2005). While studies have shown that dental formation and eruption are regular, this does not mean that it is constant. Small variations between individuals have been recorded, with both population differences and sex differences known (Ubelaker, 1989, p.46; White and Folkens, 2005, p.364). The permanent canine has been identified as the tooth that is most effected by sex-linked differences in growth.

As outlined previously, a significant number of bones in the human skeleton develop in multiple sections to allow for growth during ontogeny. Once an individual has reached adulthood and completed growth, the epiphysis fuses to the diaphysis resulting in the adult length of the bone (McKern and Stewart, 1957; Buikstra and Ubelaker, 1994, p. 43; White and Folkens, 2005, p. 374). The process of fusion is progressive and in analysis gets scored as one of three categories: open, partial union, complete union (Buikstra and Ubelaker, 1994). The category of open describes an epiphysis that has no evidence of fusion, the epiphysis and the diaphysis are completely separate. Partial union is when the epiphysis and the diaphysis are united, but there is a visible fusion line demarcating the epiphysis from the diaphysis. Complete fusion is recorded when the epiphysis and the diaphysis are united, and the fusion line has become obliterated and replaced by continuous smooth bone. Mapping this process of epiphysial fusion is widely used in estimations of non-adult age-at-death. Epiphysial fusion was recorded utilizing the fusion graph showing fusion ranges from Buikstra and Ubelaker (1994) and the fusion table found in Schaefer et al (2009), combining the international standards and more up to date understandings of progression of fusion.

When estimated age-at-death in non-adults, an age category is first identified before a less secure but tighter age range is estimated (eg. Child, 9 ± 3 years). When a difference between an age estimation based on epiphyseal fusion and dental formation was identified, the confidence was placed in the dental formation age estimation.

Estimating adult age-at-death

Measures of development and growth can still be used for adult age-at-death estimation up until roughly 30 years. From this point adult age estimation relies on degenerative changes. As degenerative changes are not as tightly controlled as development and growth, adult individuals can only be placed into broad age groups. The degenerative changes that are of particular interest when estimating adult age-at-death rely on the macroscopic inspection of the pubic symphysis (Brooks and Suchey, 1990) and the auricular surface (Lovejoy et al., 1985). Dental changes related to age have also been recorded and are utilized when estimating age. Dental attrition (Miles, 1963; 2001; Lovejoy, 1985) is the most common of these changes recorded, with patterns of wear well studied. Cranial suture closure (Meindl and Lovejoy, 1985) and sternal rib changes (Iscan and Loth, 1986) are also used to estimate

the age-at-death in adults. Due to some concerns regarding the use of cranial suture closer and sternal rib changes in estimating adult age-at-death, this project focuses on the macroscopic inspection of the pubic and the auricular surface, and on dental attrition.

The pubic symphysis is one of the most widely used bones to estimate age-at-death in adults. Based on macroscopic changes to the symphyseal surface of the pubis of the pelvis, this method tracts how this surface degrades with age (Buikstra and Ubelaker, 1994, p.23; White and Folkens, 2005, p.374). Age related changes to the pubic symphysis have been noted for many years, with the first method developed by Todd in 1920 and was based on 306 males of known age (Todd, 1920). The method identified ten phases of change to the pubic symphysis, focusing on evidence of billowing, ridging, ossific nodules, and texture across the surface (White and Folkens, 2005, p.375). In this study, the Suchey-Brooks (1990) method was utilised to estimate adult age-at-death. The major drawback of using this method is the required preservation of the pubic symphysis. Due to the structure of the pubic, and the overall thin-ness of the bone, this bone is often affected by taphonomic changes. Even in cases where the bones are preserved, it is not uncommon for a part of the symphyseal surface to be damaged or fragmentary. As such, this method was only applied when the bone was preserved and had limited taphonomic damage. Due to the large confidence intervals for the Suchey-Brooks (1990) method, this method was used in conjunction with other methods.

Similarly to the pubic symphysis, the age-at-death estimation method for the auricular surface is based on macroscopic changes to the auricular surface which are age related (Buikstra and Ubelaker, 1994, pp.24–25; White and Folkens, 2005, p.380). One of the major benefits of using this surface for estimating age-at-death is that this section of the pelvis has higher rates of preservation in the archaeological record, and the primary method developed extends beyond the age of 50. Based on the Hamann-Todd collection, Lovejoy et al (1985) described the first method that utilised the auricular surface in age estimation, outlining eight phases. These phases assessed age-related changes in granulation, microporosity, macroporosity, transverse organisation, billowing, and striation in the surface of the auricular surface (Lovejoy et al., 1985; Buikstra and Ubelaker, 1994, pp.24–

25; White and Folkens, 2005, p.380). The changes described in this method are similar to those seen in the pubic symphysis but can be harder to determine.

After a tooth erupts, it begins a gradual process of wear on the occlusal (chewing) surface. Driven primarily by the process of mastication, there are many factors that can affect the rate of crown wear including tooth size, tooth angulation, internal crown structure, pathological changes, non-diet use, sex-differentiated non-diet use, and diet (White and Folkens, 2005, pp.365–368). In most populations, it is a reasonable conclusion that the rate of wear within that population is relatively consistent, and this allows patterns of tooth wear to be used to estimate age-at-death (Miles, 1963; Lovejoy, 1985; Mays, 2002). As the sample for this study is not all housed at the one location and temporal pressure, it was not practical to create an internal dental attrition scale for Irish Early Bronze Age inhumations. As such, this study utilises a combination of the Brothwell (1985) and the Lovejoy (1985) methods to estimate broad age categories. Alongside the use of developed dental attrition methodologies, each tooth was scored for dental attrition consistent with the scale in Buikstra and Ubelaker (1994). This system scores the incisors, canines, and premolars on an eight-point scale, assessing level of enamel wear, dentine exposure, and secondary dentin or pulp cavity exposure (Buikstra and Ubelaker, 1994, p.52). While the standards suggest the use of a ten-point scale for the molars, this study utilises the eight-point scale for all teeth. This decision was made due to the extra time the molar scale requires, as each cusp must be scored individually. The use of this scoring system allows for some refinement of the age groups provided by the identified dental attrition methods. This method is of particular use in cases with poor skeletal preservation, but where the teeth have survived.

Similarly to estimating age-at-death in non-adults, in adults the estimation of age-at-death begins with the identification of an age category followed by the identification of a refined age-at-death where preservation allowed. The completion of fusion and levels of dental attrition were most commonly the basis of the identification of an age category. Where fusion was not complete, this allowed for the estimation of a refined age-at-death. Both the pubic symphysis and the auricular surface were used to support the estimation of an age category and deriving a refined age-at-death estimation

4.2.1.2 Estimations of Sex

Sex estimation is most accurate when performed on individuals who have reached skeletal maturity, as it is at this point that secondary sex characteristics result in the development of sexual dimorphism that is used to estimate the sex of the individual (White and Folkens, 2005, pp.385–386). Multiple methods exist for estimating sex with a focus on the skull and the pelvis. On the cranium and mandible 25 points of interest on the skull have been identified which show sexual dimorphism (Buikstra and Ubelaker, 1994, p.16; Loth and Henneberg, 1995). These points have been identified based on the assumption that the male skeleton is more robust and has larger muscle attachments (Buikstra and Ubelaker, 1994, p.16; White and Folkens, 2005, p.385). Multiple points must be assessed, as it is common for individuals to have one or two characteristics that are more robust or gracile than would be expected for their sex. While the skull is used extensively in sex estimation, sex estimation based on the pelvis is often seen to carry more weight. This is due to the fact that the differences seen in the pelvis are associated with the ability for pregnancy and childbirth, rather than secondary sex characteristics. Sex estimation using the pelvis often utilises the Phenice method (1969). Outside the major focus around the birth pathway, another 22 points of interest on the pelvis have been identified (Buikstra and Ubelaker, 1994). Alongside morphological differences, metrical analysis has also been shown to assist in sex estimation of adults (White and Folkens, 2005, p.386). These metrics focus on the femoral and humeral head diameters, and the femoral bicondylar width (Bass, 1995). These methods were utilised in cases where the skull or the pelvis had not survived sufficiently as to indicate a probable sex, or in cases where the morphological sex estimation was not clear.

Within the skeletal analysis for this research only individuals that were identified as adult were assessed for sex estimation. Sex estimation was based on the assessment of seven markers in the skull, the Phenice Method, pelvic morphology. Metric analysis was also performed to increase the confidence of the sex estimation. The seven markers chosen for this study were: supraorbital ridge, supraorbital margin, mastoid process, nuchal crest, mental protuberance, ascending ramus, and gonial angle or flare. These seven markers, four in the cranium and three in the mandible, combine the Buikstra and Ubelaker (1994) standards and work by Williams and Rogers (Williams and Rogers, 2006) identifying the

most reliable of the 21 skull morphology markers. The supraorbital ridge and supraorbital margin are both found on the frontal bone, the mastoid process is on the temporal bone behind the opening for the ear, and the nuchal crest is found on the occipital bone. It is important to identify multiple markers across the skull as it is not uncommon to have only a partial skull preserved. The mental protuberance, ascending ramus, and gonial angle or flare are all found on the mandible.

Alongside the Phenice method (1969), a selection of morphological traits in the pelvis were included in the analysis to increase confidence. The greater sciatic notch has also been shown as sexually dimorphic within the pelvis and was included in this study along with the pre-auricular surface (Buikstra and Ubelaker, 1994, p.18; White and Folkens, 2005, p.393). Out of all the morphological traits identified in this study the pre-auricular surface is the least reliable and the hardest to ascertain, so it was used when the other methods were unavailable. It was important to include these morphological traits as the iliac blade has a higher preservation level in the archaeological record than the pubis.

All markers were scored on a 5-point scale, where 1 was female, 2 was probable female, 3 was undetermined, 4 was probable male, and 5 was male (Buikstra and Ubelaker, 1994; White and Folkens, 2005). Each marker which was observable was scored independently before all were considered to derive an overall estimation. If a clear majority of markers received the same score, that score used as the overall estimation. When there was a mix of scores, the number of scores on each side of undetermined was first considered, then the confidence of an overall estimation was identified based on proportions of markers with each score.

4.2.1.3 Estimations of Attained Stature

Multiple factors influence the height of an individual, with genetics playing the largest role in determining the upper limit of the stature of an individual outside of endocrine disorders (White and Folkens, 2005, p.398). However, poor nutrition or disease can cause delayed or stunted growth that result in a lower stature than genetically attested. It is for this reason that we refer to stature in the archaeological record as attained stature.

Estimates from complete femurs have been preferred in this study, as the femur has the strongest relationship with attained stature. The measurement of the femur was undertaken with an osteometric board. Where the femur was not complete, measurements of the complete tibia or partial femur or tibia have been used for attainted stature estimates (Trotter and Gleser, 1958; Trotter, 1970; Jacobs, 1992; Jantz, 1992; Buikstra and Ubelaker, 1994). All measurements were recorded during the skeletal analysis. These methods provide a range of probable heights (165cm +/- 3.5cm). When looking at averages for demographic groups or comparing results temporally or spatially, it was the middle number provided by the estimate that was used. This is to attempt not to increase or decrease the average for the population.

4.2.1.4 Assessment of Pathological Changes

Along with estimating age, sex, and stature, all individuals were visually assessed for any pathological changes. Each bone was individually assessed and recorded following the Buikstra and Ubelaker (1994) standards and the BABAO Standards (McKinley and Brickley, 2004). A pathological lesion was identified if there was abnormal bone formation, abnormal bone destruction, abnormal bond density, abnormal bone size, or abnormal bone shape. Where lesions were identified, the exact location and extent of the abnormal bone was recorded along with the category of bony change. Once this process was completed for the entire skeleton, the distribution of the pathological changes was noted – single focus, multifocal, bilateral lesions, random distribution. Once the lesions were completely described a differential diagnosis was undertaken, which involves identifying all possible causes for the identified lesions in order of most likely to least likely.

4.2.1.5 Assessment of Trauma

During the visual inspection for pathology, all individuals were also visually assessed for trauma. Once any trauma was identified, the exact location and extent of each insult was recorded, with cranial and postcranial trauma recorded separately. Alongside the location and extent, the type of trauma was recorded. Once trauma was identified, it was assigned to one of two main trauma categories: those associated with fractures and those associated with weapons (Buikstra and Ubelaker, 1994; Lovell, 1997; 2008; Davidson et al., 2010).

In this sample, it was expected that fracture trauma would consist of the majority of traumatic insults. A fracture trauma was identified as a partial or complete break in a bone (Lovell, 1997). Any identified fracture was put into one of eight different categories: partial or greenstick, transverse, oblique, spiral, comminuted, crush, compression - including impaction and avulsion, and fractures secondary to pathology (Buikstra and Ubelaker, 1994; Lovell, 1997; 2008). Greenstick fractures occur when a bending stress is applied to the bones. This results in a partial fracture only involving the convex side of the bones and often seen as a localized bulging on the bone. Greenstick fractures are common in children whose bones are more pliable and less likely to break, along with ribs in adults (Lovell, 1997, p.143). A transverse fracture occurs when stress is applied perpendicular to the longitudinal axis of the bone. This results in a fracture that presents directly through the longitudinal axis of the bone and is most commonly caused by the application of a force over a small area (*ibid,* p.141). Oblique fractures occur when the stress is applied at an angular direction against the longitudinal axis of the bone. This results in an angled fracture line through the bone (*ibid,* p.143). Once healed, oblique and spiral fractures can be difficult to separate. A spiral fracture occurs when a rotational force is applied along the longitudinal angle of the bone. This fracture presents as a fracture line that winds around the longitudinal axis of the bone (*ibid,* p.143). Comminuted fractures occur when a force passes through a bone, radiating in multiple directions. This results in a splintered fraction pattern, with many smaller bone pieces (*ibid,* pp. 143-144). Crush fractures occur when a force is applied directly to the bone, causing it to collapse (*ibid,* p. 142). Compression fractures occur when the stress is placed along the longitudinal axis of the bone. This often results in a shortening of the bone as the pieces are forced into one another (*ibid,* p. 143). Some pathological changes can result in secondary fractures. This is most commonly seen with pathology that weakens bone, like osteoporosis. Secondary factures to pathology will be recorded when there is clear evidence of the pathology.

Weapon trauma was categorised into one of three groups: blunt force trauma, sharp force trauma, or puncture to stab trauma (Davidson et al., 2010). Blunt force trauma was identified by the presence of circular facture lines, radiating fractures and depressed areas of bone (*ibid,* p. 188-190). Sharp force trauma was identified by linear lesions with well-defined, sharp edges and smooth cut surfaces (*ibid,* pp. 191-193). Any identified sharp force

trauma was placed within one of three wound types: puncture wounds, incision wounds and cleft wounds (*ibid,* p. 192). Puncture or stab wounds occur when a force is applied perpendicular to the trauma site and are identified by wounds deeper than they are wide. Incisions or cut wounds occur when a sharp-edged object is drawn over the trauma site and are identified by wounds longer than they are deep. Cleft or notch wounds occur when vertical forces are applied by a heavy bladed weapon and are identified by a V-shaped notch that may penetrate the interior of the bone structure. Projectile trauma was identified by areas of missing bone and radiating fractures (*ibid,* p. 194).

Once the trauma insult was described, it was assessed for a level of healing. If there was no evidence of new bone formation, and the insult had sharp well-defined edges to the trauma site then the trauma was recorded as not healed (Sauer, 1998; Wheatley, 2008). Trauma with no evidence for healing is indicative of perimortem injuries. If there was evidence of the formation of a callus or the formation of new woven bone, then the insult was recorded as healing. If there was evidence of a trauma insult but there was no evidence of woven bone, as it had been replaced by mature trabecular bone, and the edges of the insult had become rounded, then the insult was recorded as healed. Both healing and healed fractures are antemortem injuries, but they indicate different survival times since the injury. This difference in survival after the injury could indicate a number of possible complications that are associated with traumatic injuries.

4.2.2 Biological Index of Frailty

As outlined in section 3.3.4, the Biological Index of Frailty was identified as the methodological framework for investigation into population health in the Early Bronze Age of Ireland (Zedda et al., 2021). This methodology utilises numerous skeletal biomarkers as proxies, along with assigning weights to each marker. This weighting of the allows for the inclusion of skeletons with mixed preservation and address concerns around the impact of severity, healing, and equal contributions of skeletal markers towards understandings of frailty. The methodology, as published, requires at least three skeletal biomarkers for an individual to be included with analysis, as this was the level of information identified to be required for the calculation of a Biological Index of Frailty score. This methodology also requires all individuals included within the analysis to have an age at death estimation of at

least twelve, due to concerns regarding the differential impact of taphonomy on children's remains and concerns around survival to result in the development of the skeletal biomarkers of interest.

4.2.2.1 Skeletal Biomarkers

The Biological Index of Frailty identifies twelve skeletal biomarkers: short stature, low body mass, enamel hypoplasia, rickets/osteomalacia, periodontal disease, cribra orbitalia, porotic hyperostosis, periostitis, joint disease, vertebral disease, trauma, and osteoporosis. Only nine of these skeletal biomarkers were included within the frailty model for this study; with rickets/osteomalacia, periodontal disease, and osteoporosis being excluded, each for a separate reason. Neither rickets nor osteomalacia were identified on any individual within the assemblage, so this marker was removed from the model. Due to some concerns around periodontal disease, including issues with inter-observer error in measurement (Clarke and Hirsch, 1991; Roberts and Manchester, 2012, pp.73–74; Kinaston et al., 2019, p.771), it was not included in the design of the skeletal analysis and thus could not be included in the frailty analysis. Osteoporosis was not included as it could not be accurately measured without the use of specialised equipment, which was unavailable. As such, the skeletal biomarkers utilised in this study were short stature, low body mass, enamel hypoplasia, cribra orbitalia, porotic hyperostosis, periostitis, joint diseases, vertebral disease, and trauma.

4.2.2.2 Constructing a Frailty Score

In constructing a Biological Index of Frailty score for each individual, the information relating to the presence, severity, and healing of each identified skeletal biomarker was exported from FileMaker into excel for preparation for statistical analysis. This information was then converted into a numerical score (no score for unobservable, 0 for absent but observable, and 1 for present). As both short stature and low body mass are scored based on population averages, the first quartile of measurements for each skeletal biomarker was identified for males and females. As such, individuals without a sex estimation (including non-adults) were excluded from the stature and body mass calculations. Based on the weights identified in Zedda et al. (2021, p.464), weight information was added to the excel spreadsheet as a separate column. For cribra orbitalia, porotic hyperostosis, and periostitis, the recorded

severity and healing status was assessed for each individual and reflected in the weight value. Once the score and weight values were inputted for each individual, the sample was screened to remove all individuals who did not have the required minimum of three skeletal biomarkers available or who had an estimated age at death of less than twelve. A Biological Index of Frailty score was then calculated for each individual using excel.

$$Biological\ Index\ of\ Frailty\ (BIF) = \frac{\Sigma(Weight \times Score)}{\Sigma Weight} \times 100$$

After a BIF score was calculated for each individual, these scores were exported into the statistical software SPSS (Statistical Package for the Social Sciences) for statistical analysis along with demographic and burial information.

4.2.2.3 Data Analysis

Both descriptive and statistical analysis was utilised to identify if there were any differences in BIF score based on demographic factors or burial attributes. The variables investigated include age, sex, grave occupancy, grave type, body position, grave goods, geographic distribution, and phase distribution. Descriptive analysis was undertaken through comparisons of the mean and standard distribution of BIF scores across sub-samples within the variables of interest. To support and investigate any trends identified through descriptive analysis, two statistical analyses were identified. Kendall's Tau-b test was utilised to identify if there was correlation between estimated age and BIF score, due to the known association between age and frailty. An ANCOVA test was identified to compare the means of the BIF scores across the other variables, as this test can control for any confounding effect that age at death may have on any identified trends.

4.2.3 Bioarcheology of Care

As outlined in section 3.4.2.2, Bioarchaeology of Care is a methodological approach for investigating cases of care provision in the past, focusing on individuals with identified pathological changes which would have had a serious impact on lifeways (Tilley and Oxenham, 2011; Tilley, 2012; 2015; Tilley and Schrenk, 2017). As such, this methodology was identified to investigate care provisioning in the Early Bronze Age through a series of

case studies. The combination of investigating the bioarchaeology of the Early Bronze Age at both a population and case study level was deemed important in the aim to provide a more detailed understanding of this period of Irish Prehistory.

4.2.3.1 Criteria for Inclusion

All individuals identified within this assemblage were assessed for inclusion within the Bioarchaeology of Care analysis. This was undertaken by first identifying all individuals with pathological changes or traumatic injuries. Evidence for a period of survival was assessed through the identification of healing processes. Severity of impact was also assessed, in order to identify those who would have required health care provisioning during life – as this is the focus of Bioarchaeology of Care analysis. While multiple individuals were identified who possibly received care during their life, three individuals were identified to show the clearest examples. These individuals also had a diverse range of conditions, which was ideal as it could highlight the diversity of health care practices during the Early Bronze Age. As such, these three individuals were chosen to receive full Bioarchaeology of Care analysis, two individuals examined by the author and one individual from the literature.

4.2.3.2 Application of Methodology

Once the three individuals had been identified, a complete Bioarchaeology of Care analysis was undertaken on each in turn. This was performed by the author for one of the three individuals. The skeletal analysis for one individual was taken from an unpublished excavation report. The skeletal analysis for the last individual was based on a published excavation report and supplemented through skeletal assessment by the author. The skeletal analysis identified in the excavation reports was completed to modern standards. Contextual information regarding burial attributes were identified in the respective excavation reports for each individual. Following the identification of the complete skeletal reports and the required contextual material, the Bioarchaeology of Care analysis could be undertaken. This followed the four-step methodology outlined in section 3.4.2.2.

4.2.3.3 Constructing a Community of Care Approach

Due to the context-dependant nature of the Bioarchaeology of Care analysis, it is necessary to construct a framework for investigating how care provision was undertaken at a community level (section 3.4.3). To build a Community of Care approach for the Early

Bronze Age for this research, it was identified that synthesising a series of Bioarchaeology of Care analyses would best meet the challenges of the assemblage. This is due to the fragmented nature of the assemblage, along with the temporal constraints of the current research. After the completion of each of the Bioarchaeology of Care analyses they were considered as a series, from which trends were identified. These trends were then explored with regards to insights into social relations, practice, organisation, and identity. Both consistencies and elements of difference in responses or approaches to care provision were explored within the context of current understandings of Early Bronze Age social structure and economy. Correlations between care provisioning and burial attributes were of interest, as differences in body treatment are often central in the ongoing discussions around social structure in this period.

Chapter 5: Results

This chapter outlines the results of the analysis on the assemblage, including demographic information, frailty, pathology, and trauma. As outlined in section 4.1, 197 individuals were included in the analysis for this study: 93 individuals reanalysed for this project and 104 individuals identified from the literature. The principle criteria for the inclusion of previously published material in the analysis were: modern bioarchaeological skeletal analysis, preservation of more than one element, and a credible age estimate.

5.1 Demography

The demographic analysis of the assemblage is presented below, focusing on estimated age-at-death and sex estimation. This is followed by an investigation of distributions of individuals across different burial attributes, including analyses regarding differences in distributions based on estimated sex and age-at-death. Chi-square tests were utilised in this section to identify any statistically significant associations between either estimated sex or age-at-death and burial attributes. When considering the demographics of this assemblage, it must be remembered that this study is only considering the curated inhumations from this period. A re-assessment of the cremated material from the Early Bronze Age of Ireland would support this work.

5.1.1 Estimated Age-at-Death

The study assemblage consisted of 140 adults and 57 non-adults, with the latter group comprising 29% of the total sample. The full age-at-death distribution is presented in Table 5.1. All demographic categories were represented in the assemblage. The largest demographic category was the young adult category, consisting of 72 individuals, or 36.5% of the sample. There was an equal number of infants and old adults, with 13 individuals (or 6.6% of the sample) each.

	Count	Percent
Infant (Birth-2)	13	6.6%
Child (3-12)	25	12.7%
Adolescent (13-17)	19	9.6%
Young Adult (18-34)	72	36.5%
Middle Adult (35-44)	31	15.7%
Old Adult (45+)	13	6.6%
Adult (18+)	24	12.2%
TOTAL	**197**	**100**%

Table 5.1: Estimated Age-at-Death distribution for the sample population

5.1.2 Sex Estimation

Sex estimation was undertaken on all adults within the sample population, 140 individuals. Fifty-seven individuals were estimated as male, 23 as possible male, 22 as undetermined, 13 as possible female, and 25 as female (Table 5.2). For all following analyses, these categories were collapsed into three – male, undetermined, and female. This was undertaken to increase sample sizes for statistical analysis. With this consolidation, it was identified that there were roughly 2 male burials for every one female burial within this assemblage (ratio of 2.11:1).

a)	Count	Percent
Male	57	40.7%
Possible Male	23	16.4%
Undetermined	22	15.7%
Possible Female	13	9.3%
Female	25	17.9%
TOTAL	**140**	**100**%

b)	Count	Percent
Male	80	57.1%
Undetermined	22	15.7%
Female	38	27.1%
TOTAL	**140**	**100**%

Table 5.2: a) Sex Estimation for all Adults within the Sample Population. b) Simplified Sex Estimation Used for Statistical Analyses

A major contributor to the reasonably high proportion of undetermined individuals (15.7% of the sexed sub-sample) is associated with mixed levels of preservation – not surprising considering the age of the sample. It must also be noted that due to the nature of sex estimation, it is easier to identify male individuals, so it is quite possible that larger than 50%

of the undetermined individuals may have been female. However, even if more than 50% of the undetermined were female, the bias towards males would still remain a characteristic of the sample.

5.1.3 Distribution of Estimated Sex across Age-at-death

Analysis was undertaken to identify if there were any differences in the estimated sex distribution across the identified age categories (see Table 5.3a). As sex estimation is focused on adults, the only non-adults who received sex estimation were two late adolescents with distinct morphological traits. When considering just the adults estimated to be either male or female (see Table 5.3b) there a higher proportion of male burials within the young adults compared to the old adults, with a ratio of 2.25:1 (45 males to 20 females) identified in the young adults compared to a ratio of 1.2:1 (6 males to 5 females) within the old adults. As seen in Table 5.3a, the undetermined and the individuals which could only be identified as Adults are acting as a confounding factor in identifying if this trend is meaningful, as their 'true' placement could noticeably affect these ratios.

a)		Male	Undetermined	Female
Infant (B-2)	Count	0	13	0
	% Infant	0.0%	100.0%	0.0%
Child (3-12)	Count	0	25	0
	% Child	0.0%	100.0%	0.0%
Adolescent (13-18)	Count	1	17	1
	% Adolescent	5.3%	89.4%	5.3%
Young Adult (18-34)	Count	45	7	20
	% Y. Adult	62.5%	9.7%	27.8%
Middle Adult (35-49)	Count	18	4	9
	% M. Adult	58.1%	12.9%	29.0%
Old Adult (45+)	Count	6	2	5
	% O. Adult	46.2%	15.4%	38.5%
Adult (18+)	Count	11	9	4
	% Adult	45.8%	37.5%	16.7%
TOTAL	**Count**	**81**	**77**	**39**
	Percent	**41.1%**	**39.1%**	**19.8%**

b)		Male	Female	Ratio
Young Adult (18-34)	Count	45	20	2.25:1
	% Y. Adult	69.2%	30.8%	
Middle Adult (35-49)	Count	17	9	1.89:1
	% M. Adult	65.4%	34.6%	
Old Adult (45+)	Count	6	5	1.2:1
	% O. Adult	54.5%	45.5%	
Total	**Count**	**70**	**34**	**2.06:1**
	Percent	**67.3%**	**32.7%**	

Table 5.3: a) Simplified Sex estimation by Age-at-death Categories. b) Distribution of Males and Females across Adult Age-at-death Categories.

5.1.4 Burial Attributes

This section outlines the distribution of burial attributes within the assemblage, including grave occupancy, grave type, body position, grave goods, geographic distribution, and phase distribution. Burial attributes were also explored to see if there were any differences in distribution based on the estimated sex or age of the individuals. Those individuals which could not be associated with burial attributes due to issues with curation were excluded for these analyses, resulting in a sample of 190 individuals. For analyses assessing sex differences, individuals with an undetermined sex estimation were excluded, resulting in a sample of 119 individuals. When assessing whether or not there was a relationship between age and the burial attributes, the categories were collapsed into adult and non-adult to increase sample sizes for the analysis. Alongside descriptive analysis, chi-square tests were utilised to identify any statistically significant differences in distribution.

5.1.4.1 Grave Occupancy

The majority of the individuals in the assemblage, 121 individuals or 64%, were the only individual found within the grave. Sixty-eight individuals, or 36%, were found in graves with at least one other individual, either cremated or inhumed. The majority of the multiple burials consisted of two individuals, with five being the largest number of inhumations found within a single grave – Grave 2 on Rathlin Island (Wiggins 2000, 66).

	Count	Percent
Single	121	64.0%
Multiple	68	36.0%
TOTAL	**189**	**100**%

Table 5.4: Distribution of grave occupancy in the assemblage.

Descriptive analysis of the distribution of grave occupancy in relation to sex estimation identified a noticeably higher proportion of female multiple burial within the sample, with 41.7% of females buried with another individual compared to 31.2% of males. However, statistical analysis of this trend did not return a statistically significant result: $X^2(1, N=116) = 1.192$, p = .275. When assessed for any age-related impact on grave occupancy, descriptive analysis identified a higher proportion of non-adults in multiple burials, with 41.8% of non-adults buried with another individual compared to 33.6% of adults. Six non-adults were buried with a cremation, four buried with an adult male, three buried with an adult female, two buried with a non-sexed adult, two buried with another non-adult, and six were buried with more than one other individual. The difference between the age groups was not statistically significant: $X^2(1, N=189) = 1.148$, p = .284.

a)		Single	Multiple
Male	Count	55	25
	% Male	68.8%	31.2%
Female	Count	21	15
	% Female	58.3%	41.7%
TOTAL	**Count**	**76**	**40**
	Percent	**65.5%**	**34.5%**
p-value	0.275		

b)		Single	Multiple
Non-Adult	Count	32	23
	% Non-Adult	58.2%	41.8%
Adult	Count	89	45
	% Adult	66.4%	33.6%
TOTAL	**Count**	**121**	**68**
	Percent	**64.0%**	**36.0%**
p-value	0.284		

*Table 5.5: Distribution of grave occupancy based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

5.1.4.2 Grave Type

The majority of individuals in this assemblage were buried in cist graves, 117 skeletons or 62.2% of the total sample. Pit graves contained 71 individuals or 37.8% of the total.

	Count	Percent
Pit	71	37.8%
Cist	117	62.2%
TOTAL	**188**	**100**%

Table 5.6: Distribution of Grave Types.

When assessing for sex or age differences in grave type, the analysis was completed at the individual level rather than the grave level. Descriptive analysis identified a slightly higher portion of males in cist burials (62%) compared to female burials (58.3%), however considering the size of this difference the chi-square test was not statistically significant, X^2(1, N=115) = .142, p = .707. When assessed for any association between grave type and age-at-death, descriptive analysis suggested a slightly higher proportion of non-adults buried in cists (64.3%) compared to adults (61.4%). As this difference was not large, it was unsurprising that it was not statistically significant in the chi-square test, X^2(1, N=188) = .143, p = .702. A chi-square test found no statistically significant correlation between grave type and grave occupancy, X^2(1, N=184) = 1.810, p = .178.

a)		Pit	Cist
Male	Count	30	49
	% Male	38.0%	62.0%
Female	Count	15	21
	% Female	41.7%	58.3%
TOTAL	**Count**	**45**	**69**
	Percent	**39.1%**	**60.9%**
p-value	0.707		

b)		Pit	Cist
Non-Adult	Count	20	36
	% Non-Adult	35.7%	64.3%
Adult	Count	51	81
	% Adult	38.6%	61.4%
TOTAL	**Count**	**71**	**117**
	Percent	**37.8%**	**61.9%**
p-value	0.702		

*Table 5.7: Distribution of grave type based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

5.1.4.3 Body Position

There was a similar number of individuals that were recorded as being discovered on their right side (43 individuals or 21.8% of the total), their left side (41 individuals or 21.7% of the total), or as disturbed before or at the moment of discovery (45 individuals, or 23.8% of the total). Twenty individuals (10.2% of the total) were reported as being crouched, but it was

not reported on which side they were laying. Five individuals were found in a non-standard position, such as crouched on their back. The remaining 35 individuals (18.5% of the total) had no recorded body position.

	Count	Percent
Right	43	22.8%
Left	41	21.7%
Crouched, side not recorded	20	10.6%
Disturbed	45	23.8%
Other	5	2.6%
Not Recorded	35	18.5%
TOTAL	**189**	**100**%

Table 5.8: Distribution of Body Position with the Grave.

As almost all individuals whose remains had not been disturbed were found in a crouched position, the investigation of correlations between body position and estimated sex or age-at-death focused on whether the individual was buried on their left or their right side. Descriptive analysis found a preference for males to be buried on their left (57.1% compared to 42.9%) and females to be buried on their right (56.5% compared to 43.5%). However, chi-square analysis of this preference showed no statistical significance, X^2(1, N=58) = 1.038, p = .308. The low sample size in this test must be noted. Interestingly, the age analysis found an almost equal number of adults buried on the right and left side, with only a slight difference in body position in the non-adults (58.3% on the right and 41.7% on the left). It was unsurprising that there was no statistically significant difference in the distribution of body position bases on estimated age-at-death, X^2(1, N=84) = .686, p = .407.

a)		Right	Left
Male	Count	15	20
	% Male	42.9%	57.1%
Female	Count	13	10
	% Female	56.5%	43.5%
TOTAL	**Count**	**28**	**30**
	Percent	**48.3%**	**51.7%**
p-value	0.308		

b)		Right	Left
Non-Adult	Count	14	10
	% Non-Adult	58.3%	41.7%
Adult	Count	29	31
	% Adult	48.3%	51.7%
TOTAL	**Count**	**43**	**41**
	Percent	**51.2%**	**48.8%**
p-value	0.407		

*Table 5.9: Distribution of body position based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

5.1.4.4 Ceramic Grave Goods

The largest group within this analysis was the aceramic burial, with 92 individuals or 48.7% of the assemblage. Of those buried with ceramics, the majority, 72 individuals or 38.1% of the total (74.2% of those with ceramics) were buried with a bowl food vessel. Twenty individuals, 10.6% of the total (20.6% of those with ceramics) were buried with a vase food vessel. The remaining five individuals with ceramics were buried with either a pygmy cup or an unclassified vessel.

	Count	Percent
Bowl	72	38.1%
Vase	20	10.6%
Other	5	2.6%
Aceramic	92	48.7%
TOTAL	**189**	**100**%

Table 5.10: Distribution of Ceramic Grave Goods.

Descriptive analysis identified a higher proportion of males with bowls (45.0% of males) as compared to females (33.3% of females). While there was a higher proportion of females with vases (11.1% of females compared to 6.3% of males), the small sample numbers question the strength of this association. There was a slightly higher proportion of aceramic females compared to males (52.8% of females compared to 47.5% of males). A chi-square test identified that these trends identified were not statistically significant, $X^2(3, N=116) = 2.050$, $p = .562$. Regarding age differences in distribution, there was a slightly higher

proportion of adults with bowls (40.3% compared to 32.7%) and non-adults with vases (14.5% compared to 9%). The difference between the proportion of aceramic burials in adults and non-adults (49.2% in adults compared to 47.3% in non-adults) was minimal. Considering the sizes of the identified differences, it was not surprising that a chi-square test was not significant, $X^2(3, N=189) = 4.084$, p = .253.

a)		Bowl	Vase	Other	Aceramic
Male	Count	36	5	1	38
	% Male	45.0%	6.3%	1.3%	47.5%
Female	Count	12	4	1	19
	% Female	33.3%	11.1%	2.8%	52.8%
TOTAL	**Count**	**48**	**9**	**2**	**57**
	Percent	**41.4%**	**7.8%**	**1.7%**	**49.1%**
p-value	0.562				

b)		Bowl	Vase	Other	Aceramic
Non-Adult	Count	18	8	3	26
	% Non-Adult	32.7%	14.5%	5.5%	47.3%
Adult	Count	54	12	2	66
	% Adult	40.3%	9.0%	1.5%	49.2%
TOTAL	**Count**	**72**	**20**	**5**	**92**
	Percent	**38.1%**	**10.6%**	**2.6%**	**48.7%**
p-value	0.253				

*Table 5.11: Distribution of ceramic grave goods based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

One element to consider when examining the identified descriptive differences in distribution of ceramic grave goods is the temporal element. As outlined in section 2.4, bowl food vessels appear in the burial record prior to vase food vessels, with vase food vessels in use for longer than bowl food vessels. While the distribution was not statistically significant, the identification of this descriptive difference does lead to suggest that there may be a chronological change in the Individualised Burial Tradition. This will be explored in section 5.1.4.7.

5.1.4.5 Non-Ceramic Grave Goods

The majority of individuals, 141 skeletons or 74.6% of the total, were not buried with any non-ceramic grave goods. Among those with non-ceramic grave goods, the majority, 37 individuals or 19.6% of the total (77.1% of individuals with non-ceramic grave goods) had simple grave goods. Four individuals had grave goods suggestive of specialised craftwork such as plano-convex knifes or bone pins, with six individuals having grave goods made from rare material such as complex jewellery and copper or bronze objects.

	Count	Percent
None	141	74.6%
Simple	37	19.6%
Craftwork	5	2.6%
Rare Material	6	3.2%
TOTAL	**189**	**100**%

Table 5.12: Distribution of non-ceramic Grave Goods.

Descriptive analysis identified a higher proportion of female burials with non-ceramic grave goods, with 33.3% of females buried with non-ceramic grave goods compared to 20.0% of males. This trend towards a higher proportion of females buried with non-ceramic grave goods is strongest when looking at the rare material groups, with 13.9% of females buried with a grave good in this category compared to 1.3% of males. A chi-square test of the sex-based distribution of non-ceramic grave goods is statistically significant, $X^2(3, N=116) = 8.259$, $p = .041$. Descriptive analysis of the age-based distribution identified a higher proportion of non-adults with non-ceramic grave goods (32.7% compared to 22.4%), particularly simple non-ceramic grave goods (29.1% compared to 15.7%). It is interesting to note that all examples of non-ceramic grave goods in the rare materials category were found with adults. A chi-square test of this distribution was not statistically significant, $X^2(3, N=189) = 6.896$, $p = .075$.

a)		None	Simple	Craftwork	Rare Material
Male	Count	64	13	2	1
	% Male	80.0%	16.3%	2.5%	1.3%
Female	Count	24	6	1	5
	% Female	66.7%	16.7%	2.6%	13.9%
TOTAL	**Count**	**88**	**19**	**3**	**6**
	Percent	**75.9%**	**16.4%**	**2.6%**	**5.1%**
p-value	0.041*				

b)		None	Simple	Craftwork	Rare Material
Non-Adult	Count	37	16	2	0
	% Non-Adult	69.6%	26.8%	3.6%	0%
Adult	Count	104	21	3	6
	% Adult	77.6%	15.7%	2.2%	4.5%
TOTAL	**Count**	**141**	**37**	**5**	**6**
	Percent	**74.6%**	**19.6%**	**2.6%**	**3.2%**
p-value	0.075				

*Table 5.13: Distribution of non-ceramic grave goods based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

5.1.4.6 Geographical Distribution

The majority of individuals within this assemblage were uncovered in Leinster, 144 individuals or 73.1%. Ulster followed next with 38 individuals or 19.3% of the total, with 13 individuals or 6.6% of the total in Connacht and two individuals in Munster.

	Count	Percent
Ulster	38	19.3%
Connacht	13	6.6%
Leinster	144	73.1%
Munster	2	1%
TOTAL	**197**	**100**%

Table 5.14: Distribution of Inhumation Burials by Province.

Descriptive analysis of the sex-based distribution identified a higher proportion of males in Ulster (21% compared to 10.3%) and a higher proportion of females in Connacht (12.8%

compared to 1.2%). An almost similar proportion of males to females was identified in Leinster (76.5% compared to 76.9%). A chi-square test of the geographical distribution estimated sex categories identified that these differences were statistically significant, X^2(3, N=120) = 9.282, p = .026, however the small sample size in Connacht, and to a lesser extent Ulster, is cause for caution when interpreting these results. A higher proportion of non-adults in Ulster (21.1% compared to 18.6%) and Connacht (12.3% compared to 4.3%) was identified, with a higher proportion of adults in Leinster (76.4% compared to 64.9%). Chi-square test analysis of the geographical distribution of adult and non-adults was not statistically significant, X^2(3, N=197) = 5.220, p = .156.

a)		Ulster	Connacht	Leinster	Munster
Male	Count	17	1	62	1
	% Male	21.0%	1.2%	76.5%	1.2%
Female	Count	4	5	30	0
	% Female	10.3%	12.8%	76.9%	0%
TOTAL	**Count**	**21**	**6**	**92**	**1**
	Percent	**17.5%**	**5.0%**	**76.7%**	**0.8%**
p-value	0.026*				

b)		Ulster	Connacht	Leinster	Munster
Non-Adult	Count	12	7	37	1
	% Non-Adult	21.1%	12.3%	64.9%	1.8%
Adult	Count	26	6	107	1
	% Adult	18.6%	4.3%	76.4%	0.7%
TOTAL	**Count**	**38**	**13**	**144**	**2**
	Percent	**19.3%**	**6.6%**	**73.1%**	**1.0%**
p-value	0.156				

*Table 5.15: Distribution of inhumation burials by province based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

5.1.4.7 Phase Distribution

Of those that could be assigned to a phase, the greatest number were in Phase B, with 68 individuals or 34.7% of the total, followed by Phase A with 22 individuals, or 11.6% of the total. Four individuals, 2.1% of the total were assigned to Phase C.

	Count	Percent
Phase A	22	11.6%
Phase B	68	36.0%
Phase C	4	2.1%
Not Phased	95	50.3%
TOTAL	**189**	**100**%

Table 5.16: Distribution of Inhumation Burials by Time Period.

Descriptive analysis identified a slightly higher proportion in males across all phases, however a chi-square test identified that this was not statistically significant, $X^2(3, N=116) = 0.835$, $p = .841$. There was also a slightly higher proportion of non-adults across all three phases, which also returned a not statistically significant chi-square test, $X^2(3, N=189) = 2.859$, $p = .414$.

a)		A	B	C	Not Recorded
Male	Count	10	30	1	39
	% Male	12.5%	37.5%	1.3%	48.8%
Female	Count	4	12	0	20
	% Female	11.1%	33.3%	0%	55.6%
TOTAL	**Count**	**14**	**42**	**1**	**59**
	Percent	**12.1%**	**36.1%**	**0.9%**	**50.9%**
p-value	0.841				

b)		A	B	C	Not Recorded
Non-Adult	Count	8	22	2	23
	% Non-Adult	14.5%	40.0%	3.6%	41.8%
Adult	Count	14	46	2	72
	% Adult	10.4%	34.3%	1.5%	53.7%
TOTAL	**Count**	**22**	**68**	**4**	**95**
	Percent	**11.6%**	**36.0%**	**2.1%**	**50.3%**
p-value	0.414				

*Table 5.17: Distribution of inhumation burials by time period grave goods based on a) estimated sex and b) estimated age-at-death. Statistically significant results denoted by **

5.2 Frailty in the Early Bronze Age

As outlined in section 3.3.4, the Biological Index of Frailty was chosen for the population health analysis of the Early Bronze Age assemblage. Nine skeletal biomarkers were identified for inclusion in the model – short stature, low body mass, enamel hypoplasia, cribra orbitalia, porotic hyperostosis, periostitis, degenerative joint disease, degenerative vertebral disease, and trauma. A table of these markets for this assemblage can found in Appendix 3. The rates of seven of the nine markers are presented and discussed individually in section 5.2.1. This is followed by the frailty analysis in section 5.2.2.

5.2.1 Markers of Frailty

The rates of six of the markers and the mean of one (stature) are presented here. These base rates are presented as the variation observed across the markers is of interest. There is a reasonably high rate of enamel hypoplasia, with 49.6% of individuals scorable having the marker. The rates for both porotic hyperostosis and cribra orbitalia were low to moderate, with more individuals having cribra orbitalia (31.2% compared to 22.9%). It is interesting to note that both porotic hyperostosis and cribra orbitalia had similar numbers of individuals scorable for those markers. The rate for periostitis is noticeably low, with this marker identified on only 11 individuals within this assemblage. The rates for degenerative joint disease (DJD) are quite high within the assemblage, particularly for vertebral DJD. This condition was the most commonly identified pathological change within the assemblage, followed by enamel hypoplasia. This prevalence of DJD is quite common in pre-modern skeletal collections, as it is directly related to 'wear and tear' of strenuous physical activities that would have been more common in pre-industrial societies. The population mean for attained statute is 169.28cm. There is a 10.81cm difference in average attained stature between males and females, with average male attained stature at 172.88cm and average female attained stature at 162.07cm.

Pathology	Present	Total	%
Enamel Hypoplasia	56	119	49.6%
Porotic Hyperostosis	22	96	22.9%
Cribra Orbitalia	29	93	31.2%
Periostitis	11	122	9.0%
Degenerative Joint Disease	44	98	44.9%
Vertebral Degenerative Joint Disease	63	94	67%

Table 5.17: Rates of Markers of Frailty within the Assemblage.

5.2.2 Biological Index of Frailty

As mentioned previously, only individuals with at least three markers available could be included in the Biological Index of Frailty analysis. Of the total assemblage of 198 individuals identified for this study, 147 individuals had at least three markers available. As only individuals with an estimated age-at-death of 12 or older can be included in the Biological Index of Frailty analysis, this further decreased the sample size for this analysis. As such, a Biological Index of Frailty score (BIF score) was calculated for 121 individuals. Each individual was also assigned to a frailty category: low (0-21), medium (22-53), and high (54-100); as developed in the initial publication of this method (Zedda et al., 2021, p.467). Average BIF scores were then compared across the variables explored above, including age, sex, grave occupancy, grave type, body position, grave goods, geographic distribution, and phase distribution. Alongside descriptive analysis, Kendall's Tau-b tests and analysis of covariate (ANCOVA) tests were utilised to identify any statistically significant differences in distribution.

5.2.2.1 Population

The average BIF score for this sample was 26.7807, with a standard deviation of 19.58167. Utilising the BIF score categories outlined, this sample of the Early Bronze Age population had a medium level of frailty. There were roughly an even number of individuals in the low and medium frailty categories, with noticeably fewer in the high frailty category.

	Count	Percent
Low Frailty (0-20)	53	43.8%
Medium Frailty (21-52)	52	43.0%
High Frailty (53-100)	16	13.2%

Table 5.18: Distribution of Frailty Categories.

5.2.2.2 Age Categories

Descriptive analysis of frailty across age-at-death identified a trend of increasing BIF scores as an individual got older. A trend of an increasing average frailty score with age is expected in a model such as this, as those who live longer have time to accumulate more frailty markers. A Kendall's Tau-b correlation between age and BIF score was statistically significance (τ_b = .142, p = .042).

Age-at-Death	Mean	Standard Deviation	Sample Size
Adolescent (13-18)	24.8551	27.49813	13
Young Adult (18-34)	25.0254	17.75807	61
Middle Adult (35-44)	30.6164	17.49142	24
Old Adult (45+)	36.1708	21.83591	10
Adult (18+)	22.6378	20.40440	13
p-value	0.042*		

*Table 5.19: Comparison of Mean BIF Scores by Age-at-Death Categories. Statistically significant results denoted by **

The identification of a statistically significant correlation between estimated age-at-death and BIF score does indicate a need to control for age through the use of analysis of covariate (ANCOVA) tests. One concerning element identified in this test is the question of sample sizes. While 121 is an acceptable sample size for statistical tests, when this sample is broken up into multiple, often uneven, sub-groups, it has been quite common for at least one group to have less than 30 individuals, which is the preferred number for statistical tests. This will be a re-occurring issue throughout the statistical analysis and is expected to have an impact on the statistical significance of any differences identified in descriptive analysis. While this

will complicate the interpretation of the results, it is important that we utilise a conservate approach and rely on the statistical analysis.

5.2.2.3 Sex Categories

Descriptive analysis identified that on average, females had the lowest BIF scores (24.7895, SD 17.14505), followed by males (26.8183, SD 18.68678) and then undetermined group (30.6082, SD 27.19617). While this distribution could be reflecting an element of taphonomy, with the undetermined group assumed to have the lowest preservation, this is unlikely due to the requirements of preservation for the inclusion of each marker outlined in Biological Index of Frailty model. An ANCOVA was performed to investigate if there were any differences between BIF scores based on the estimated sex of the individual, controlling for age-at-death. Neither the test considering all three categories, $F(2, 117) = 2.252$, $p = .110$, nor just comparing the male and female categories, $F(1, 101) = .386$, $p = .536$, was statistically significant. This suggests that gender did not play a significant role in health outcomes in this sample.

Sex	**Mean**	**Standard Deviation**	**Sample Size**
Male	26.8183	18.68678	70
Undetermined	30.6082	27.19617	17
Female	24.7895	17.14505	34
p-value	0.110		

*Table 5.20: Comparison of Mean BIF Scores by Sex Categories. Statistically significant results denoted by **

5.2.2.4 Grave Occupancy

Descriptive analysis identified a small difference in the mean BIF scores based on grave occupancy. Those buried with another individual had a slightly lower mean BIF score (25.8751, SD 20.28926) compared to those buried alone (27.3182, SD 19.44047). This is opposite to a traditional view for the period, which would consider single burial higher status, and thus more likely to have better health outcomes. However, it should be noted that the difference is small. An ANCOVA was performed to investigate if there were any differences between BIF scores based grave occupancy, controlling for age-at-death.

Unsurprisingly, considering the small difference identified between these two groups, the test was not statistically significant, F(1, 117) = 0.046, p = .830.

	Mean	Standard Deviation	Sample Size
Single	27.3182	19.44047	80
Multiple	25.8751	20.28926	40
p-value	0.830		

*Table 5.21: Comparison of Mean BIF Scores by Number of Individuals in the Grave. Statistically significant results denoted by **

5.2.2.5 Grave Type

Descriptive analysis of mean BIF scores between those with a recorded grave type identified that those buried in a pit grave had on average lower BIF scores (22.9267, SD 18.59775), with those buried in cist graves having higher BIF score (28.6129, SD 19.19342). This result is once again opposite to what would be traditionally assumed, with cist burial associated with higher status. An ANCOVA was performed to investigate if there were any differences between BIF scores based on grave type, while controlling for age-at-death. This test was not statistically significant, F(1, 114) = 2.254, p = .136.

Grave Type	Mean	Standard Deviation	Sample Size
Pit	22.9267	18.59775	40
Cist	28.6129	19.19342	77
p-value	0.136		

*Table 5.22: Comparison of Mean BIF Scores by Grave Type. Statistically significant results denoted by **

5.2.2.6 Body Position

Descriptive analysis of mean BIF score identified very little difference between those buried on their right side (25.5857, SD 17.47935) and those buried on their left (25.4177, SD 21.30836). There was an increase in mean BIF score in those who were crouched, but did not have a recorded side (34.0694, SD 18.01203), those who were disturbed (32.6884, SD 18.51678) and those who were buried neither on their left or their right (32.8192, SD 16.79166). Those without a recorded body position had a noticeably lower average BIF

score (15.9547, SD 20.58804) An ANCOVA was performed to investigate if there were any differences in BIF score associated with body position, while controlling for age-at-death. This test found no statistically significant association between these two variables, F(5, 113) = 1.645, p = .154.

Side	Mean	Sample Size	Standard Deviation
Right	25.5857	30	17.47935
Left	25.4177	33	21.30836
Crouched	34.0694	13	18.01203
Disturbed	32.6884	23	18.51678
Other	32.8192	5	16.79166
Not Recorded	15.9547	16	20.58804
p-value	0.154		

*Table 5.23: Comparison of Mean Frailty Scores by Body Position within the Grave. Statistically significant results denoted by **

5.2.2.7 Ceramic Grave Goods

Descriptive analysis identified that those buried with vase vessels had the lowest average BIF score (13.5234, SD 17.68046), with those buried with bowl vessels had a noticeably higher average BIF score (28.8272, SD 19.95676). Those buried with other groupings of ceramics had the highest average BIF score (34.3750, SD 13.25825), however this group had the smallest sample size, suggesting that this higher average is likely reflecting this element. Aceramic burials had an average BIF score similar to those buried with bowl vessels (26.9645, SD 19.65386). An ANCOVA was performed to investigate if there was an association between ceramic grave good class and average BIF score, while accounting for age-at-death. This test was not statistically significant, F(3, 115) = 1.570, p = .200.

Ceramic Grave Goods	Mean	Sample Size	Standard Deviation
Bowl	28.8272	56	19.95676
Vase	13.5234	10	17.68046
Other	34.3750	2	13.25825
Aceramic	26.9645	52	19.65386
p-value	0.200		

*Table 5.24: Comparison of Mean Frailty Scores by Ceramic Grave Goods. Statistically significant results denoted by **

As mentioned in section 5.1.4.4, there is a temporal element to the ceramics in the Early Bronze Age in Ireland. As such, the noticeably lower average BIF score for individuals with vases does indicate that there might be a temporal element to frailty in this sample, which will be explored in section 5.2.2.10.

5.2.2.8 Non-Ceramic Grave Goods

Descriptive analysis identified a trend of decreasing average BIF score in those buried with simple non-ceramic grave goods (33.2802, SD 22.67736), to those buried with craftwork non-ceramic grave goods (20.4960, SD 15.58992), and finally to those buried with rare material non-ceramic grave goods (16.9865, SD 14.28177). Interestingly, those who were buried with no non-ceramic grave goods were not the highest average BIF score group (26.1224, 19.06913), as those with simple non-ceramic grave goods had higher average scores. An ANCOVA was performed to investigate this identified trend of decreasing BIF score with non-ceramic grave good class, accounting for age-at-death. This was found to not be statistically significant, $F(3, 115) = 1.928$, $p = .129$.

Non-ceramic Grave Goods	Mean	Sample Size	Standard Deviation
None	26.1224	89	19.06913
Simple	33.2802	22	22.67736
Craftwork	20.4960	3	15.58992
Rare Material	16.9865	6	14.28177
p-value	0.129		

*Table 5.25: Comparison of Mean Frailty Scores by Non-ceramic Grave Goods. Statistically significant results denoted by **

5.2.2.9 Distribution by Province

Descriptive analysis identified an interesting pattern in the average BIF scores by province. Both Ulster (27.0160, SD 18.67961) and Leinster (27.5590, SD 19.34420) had very similar average frailty scores, with Connacht (19.9435, SD 25.44091) and Munster (6.2500) noticeably lower scores. An ANCOVA was performed to see if there was any difference in average BIF score based on the province, as adjusted for age-at-death. This test found no statistically significant difference between the provinces, $F(3, 116) = .599$, $p = .617$.

Province	Mean	Sample Size	Standard Deviation
Ulster	27.0160	22	18.67961
Connacht	19.9435	8	25.44091
Leinster	27.5590	90	19.34420
Munster	6.2500	1	
p-value	0.617		

*Table 5.26: Comparison of Mean Frailty Scores by Provence. Statistically significant results denoted by **

5.2.2.10 Phase Distribution

Descriptive analysis identified a trend of increasing average BIF scores across the temporal periods. There was a minor increase in average BIF score between Phase A (26.7028, SD 21.43851) and Phase B (27.0165, SD 20.06687), before a noticeable increase in Phase C (66.6667). However, as only one individual could be assessed for BIF in Phase C, this result should not be considered reflective of true trends. Those who could not be assigned to a phase had the lowest average BIF score (26.0194, SD 18.52109). An ANCOVA was performed

to investigate the relationship between temporal period and average BIF score, adjusted for age-at-death. This test found no statistically significant difference, F(3, 115) = 1.534, p = .210.

Phase	Mean	Sample Size	Standard Deviation
A	26.7028	17	21.43851
B	27.0165	46	20.06687
C	66.6667	1	
Undetermined	26.0194	56	18.52109
p-value	0.210		

*Table 5.27: Comparison of Mean Frailty Scores by Phase. Statistically significant results denoted by **

5.3 Non-Frailty Pathology

When completing skeletal analysis, all pathological changes are recorded, including those outside of those chosen as stress markers for the Biological Index of Frailty analysis. Non-frailty pathological changes can act as an indicator of the general risk for disease and congenital abnormalities within a population, along with identifying cases which would have impacted individuals lived experience. Examining non-frailty pathology also allows for the identification of possible cases of health care provisioning, which will be explored in chapter six. Twenty-five individuals were identified with non-frailty pathological changes, including multiple unusual cases. This section outlines all 25 skeletons, grouped by the nature of the pathological changes noted in their remains.

5.3.1 Exostoses and Enthesopathies

Exostosis is the formation of new bone on the bone surface. One of the most common locations for exostoses is at an enthesis – the attachment site for muscles, ligaments, and tendons; however, they can occur at other locations. When occurring at an enthesis, these bony spurs are referred to as enthesopathies. Enthesopathies can present as either prolific lesions (exostosis) or erosive lesions and have multifactorial aetiologies associated with mechanical strain, metabolism, inflammatory, and/or genetic components (Mariotti et al., 2004; White and Folkens, 2005; Buikstra, 2019; Sick, 2021). Enthesopathies are commonly

used in studies investigating subsistence strategies, mobility, and divisions of labour as they are associated with repetitive tasks. Depending on the size and location of the new bone, the existence of exostoses or enthesopathies may be unknown by the individual during their life, or they can result in mild to severe chronic pain. Eleven individuals were identified with exostoses, many of which could be classed as prolific enthesopathies.

A series of exostoses were identified on individual TYR028:021_1, a middle adult male from Dungate, Co. Tyrone. This included an exostosis on the distal third of the shaft of the right third metatarsal, enthesopathy on the lateral side of the proximal end of the left fibula measuring 34.82mm long, 6.3mm wide and 5.76mm proud of the bone surface. An enthesopathy was identified on the distal lateral surface of the articular facet of the right patella, with enthesopathies identified on both ischial tuberosities. The exostosis identified on the metatarsal is probably associated with the second *plantar interossei,* which is associated with adduction of the toes and help strengthen the arch of the foot. The bony changes identified on the fibula are likely associated with the *soleus* muscle, which flexes the foot. The enthesopathy identified on the patella is suggestive of injury to the patella ligament, which could have resulted in ongoing knee pain. The enthesopathies identified on the ischial tuberosities are likely associated with the *semimembranosus*, *biceps femoris*, *semitendinosus*, and the *abductor magnus* muscles. These groups are associated with the hip joint and control of the knee. Considering that the enthesopathies are located on the ischium, it is likely that they are associated with mechanical stress through both hip joints. This patterning of exostoses suggests chronic stress through many muscle groups of the leg.

A young adult possible female, individual 1961:244 from Drung, Co. Donegal, was identified to have an enthesopathy on their left humerus. The enthesopathy was situated 53.15mm below the greater tubercle, along the crest extending distally from the greater tubercle, measuring 13.21mm proximo-distally, 6mm medio-laterally, and 3.60mm proud of the bone surface. This likely results from stress associated with the *pectoralis major* muscle group, which is associated with flexion, adduction, and internal rotation of the humerus. Interestingly, although an enthesopathy was identified, the humerus of this individual was not overtly robust, suggesting this the enthesopathy more likely resulted from an injury rather than chronic stress through this muscle group.



Figure 5.1: Left humerus of individual 1961:244, showing an enthesopathy located along the crest extending distally from the greater tubercle. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

Enthesopathies were identified along the length of the *linea aspera* of both femora and on the right calcaneus of individual 1938:9730 from Loughfad, Co. Donegal, a middle adult male. Several muscles attach to the *linea aspera*, including the *gluteus maximus*, *pectineus*, *adductor magnus*, and *iliacus* muscles. Due to the massive muscle bodies which attach to this area, it is more difficult to identify one particular activity to which this could relate. The enthesopathy on the right calcaneus was associated with the achilles tendon, a common site for enthesopathies.

An exostosis was identified on the distal medial aspect of the right femur in individual E2980:4 from Moone, Co. Kildare. It is likely that the development of this exostosis was associated with a soft tissue injury to the *adductor magnus* muscle, which is associated in stabilisation of the hip joint and the adduction of the femur. Due to the location of the exostosis, it is possible that this individual suffered from knee pain, feasibly associated with running.

An enthesopathy and an exostosis were identified on the right calcaneus of individual 1971:903 from Newtownmacabe, Co. Kildare. The enthesopathy was associated with the achilles tendon, a common site for enthesopathies. The exostosis was located on the lateral side of the right calcaneus, placed inferiorly to the peroneal tubercle. This exostosis formed

a u-shape and had internal maximum dimensions of 78.8mm by 15.77mm, external maximum dimensions 12.3mm by 18.52mm and 7.70 mm proud of the bone surface. This exostosis is associated with the tendons of the *fibularis longus* and *brevis* muscles, which plantarflex and evert the foot. They are also associated with stability of the leg on the foot and are commonly damaged when one sprains their ankle. As such, it is likely that this individual had one or multiple ankle injuries, which could have resulted in a weak ankle.



Figure 5.2: The right calcaneus of individual 1971:903, with an enthesopathy associated with the achilles tendon and an exostosis located near the peroneal tubercle. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

Individual 1956:209 from Redmondstown, Co. Westmeath, was identified to have had an exostosis on the lateral surface of the left calcaneus. Associated with the peroneal tubercle, the exostosis measured 13mm by 8.74mm, and 5.68mm proud of the bone surface. The peroneal tubercle is associated with the tendons of the *fibularis longus* and *brevis* muscles, as mentioned above. This individual also likely had an ankle injury at some point, resulting in the development of the exostosis.

An exostosis extending medially on the medio-dorsal corner of the proximal end of the second metatarsal was identified on individual 1971:906 from Milltown, Co. Westmeath.

The exostosis extended a maximum of 6.01mm from the surface in a diagonal direction, with the tip 18.48mm from the medio-dorsal proximal corner of the bone. The identification of this suggests an injury to the right foot of this individual. This would have impacted the articulation with the medial cuneiform and the *dorsal interossei I*. This could have resulted in foot pain and impacted walking, running, and jumping in this individual.



Figure 5.3: The second metatarsal of individual 1971:906, with an exostosis extending medially from the proximal end. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

A small oval exostosis was identified on the lateral surface of the right fibula on individual P1953:3a from Graney West, Co. Kildare. This is likely associated with trauma to the bone or surrounding muscle. As the exact location of the exostosis was not recorded, the precise muscle group could not be identified. It was also noted that this individual had a defined soleus line, suggesting extensive use of this muscle.

Individual 1953:3b from Graney West, Co. Kildare, an adult male, was recorded as having enthesopathies on the posterior margin of the iliac crest and in the retroarticular area of both ilia. Enthesopathies of this area are associated with the sacroiliac joint and abdominal muscles, suggesting impact to core strength and the lower back.

An erosive enthesopathy was identified on the left calcaneal tuber of individual C124 from Rathlin Island, Co. Antrum. The area of lytic activity measured 19mm by 30mm and was visible on the medial aspect. It is likely that this enthesopathy was associated with an injury to the achilles tendon, which could have impacted walking, running, and jumping.

An exostosis was identified on the *linea aspera* in the distal half of the left femur in an old adult male from Riverstown, Co. Westmeath, individual 1969:672. Several muscles attach to the *linea aspera*, including the *gluteus maximus*, *pectineus*, *adductor magnus*, and *iliacus* muscles. Due to the massive muscle bodies which attach to this area, it is more difficult to identify one particular activity to which this could relate. However, as the exostosis was identified on only the left femur, this suggests an injury on the left side.

The identification of numerous exostoses and enthesopathies within this sample is consistent with the identification of high levels of DJD within the assemblage, suggesting high levels of manual labour and mobility within the Early Bronze Age population.

5.3.2 Developmental Pathology

This section covers pathological conditions that are associated with the develop or impact the development of an individual. Often linked to congenital factors, some of these conditions are noticeable at birth, while others are only expressed later in the development of the individual. While this group of pathological changes includes serious outcomes, many of them are compatible with life and maturity. With the assemblage, no individual was identified with a developmental pathology which had resulted in premature death. However, 11 individuals were identified who suffered from pathological changes associated with development. These changes are grouped according to their skeletal region and type and are discussed below.

5.3.2.1 Pathology of the Spine and Sacrum

There are multiple congenital abnormalities that can form in the spinal column, along with several factors that affect their manifestation. Not surprisingly, the effect of these conditions varies significantly, with some resulting in minimal impact on the individual in

life, while others can be life-threatening. Four groupings of developmental pathology were identified within the assemblage, effecting ten individuals.

Sacralisation and Lumbarisation

Sacralisation and lumbarisation are spinal defects where either the fifth lumbar vertebra becomes fused to the sacrum (sacralisation), or where the first sacral vertebra does not fuse to the sacrum and can act like a sixth lumbar vertebra (lumbarisation). Both of these conditions are associated with 'border shifting' during development (Lewis, 2019, pp.598–599). In both cases, the change in morphology can be unilateral (partial) or bilateral (complete). Sacralisation is more commonly found in skeletal collections, with lumbarisation harder to identify in cases where the sacrum is not preserved. Both sacralisation and lumbarisation themselves are asymptomatic, however they can predispose individuals to the development of related back problems and pain as they result in changes to biomechanics. Five individuals were identified with either sacralisation or lumbarisation within this assemblage.

Some degree of sacralisation was identified in five individuals. Partial sacralisation of L5 was identified in individual 1981:360.2 from Timolin, Co. Kildare. Complete sacralisation was identified in individual 1935:799 from Ballybrew, Co. Wicklow, individual 1978:343 from Glassamucky, Co. Dublin, and individual 1961:231 from Drung, Co. Donegal. One instance of lumbarisation was identified, in individual 1949:84 from Hempstown Commons, Co. Kildare. Individual 1949:84 also had another spinal condition, discussed in the next section.

Scoliosis

Scoliosis is a developmental condition of the spine where there are lateral deviations in the shape of the spinal column. The aetiology for this condition is not well understood, but it is agreed that there is a genetic component (Lewis, 2019, pp.596–598). Scoliosis develops in childhood and often worsens throughout maturation. The most common shape for a scoliotic spine to develop is one of a 'S' shape, with two curves, resulting in the head being placed near the mid-sagittal line. Unsurprisingly, the impact of scoliosis on the individual is dependent on the degree of the changed shape. Minimal changes to the shape of the spine can be mostly asymptomatic, although would likely predispose an individual to back pain

and other injuries. Moderate to severe scoliosis can result in an impact on respiratory, organ, and mobility functions. Two individuals were identified with mild scoliosis, with one further found to have similar torsion-related changes to two vertebrae.

Mild scoliosis of the lumbar and sacrum was identified in individual 1980:43 from Clonicklivant, Co. Westmeath. The deviation is most clearly seen in the sacrum, with a noticeable twist to the left. A reconstruction of L3/L4, L4/L5, and L5/S1 show that the disc space was not symmetrical, with an increase in height on the left side. This suggests that this asymmetry in the disc space may have been secondary to the asymmetrical development and fusion of the sacrum to provide stability to the lower back in this individual. This mild scoliosis likely resulted in lower back pain.



Figure 5.4: Posterior view of the sacrum of individual 1980:43. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

Another case of mild scoliosis was identified in individual AE.06.19_2 from Drumnahoe, Co. Derry. This case was also centred in the sacrum, with the body of S1 tilted and the neural arch mal-alighted. There was no reported alternate bend in the lower lumbar vertebrae. This mild scoliosis would have likely been asymptomatic.

Individual C124 from Rathlin Island, Co. Antrum, was identified to have had torsion-related changes to two vertebrae. An oblique malalignment was identified in the spinus processes of L3 and L4, with the superior aspect twisted by almost 45° (Sloan et al., 2008). It is possible that this may have been the result of long-standing strain to the lower vertebral ligaments and resulting in pain.

Spondylolysis

Spondylolysis is a defect of the vertebra, where the neural arch becomes detached between the lamina and the pedicle, separating the inferior facets. While there is thought to be a genetic component to developing spondylolysis, it has a complex aetiology and is commonly associated with repetitive biomechanical stress on the affected area (Lewis, 2019, p.599). Once the defect develops, the vertebral body can slip forward and develop into spondylolisthesis. Spondylolysis is most commonly found in the lower lumbar vertebrae, however it is also known to develop in the cervical vertebrae. While it can be asymptomatic, spondylolysis is often associated with back pain, reduction in movement of the lower back, and radiating pain into the buttock. Two individuals within the assemblage were identified as having this condition.

Individual 1982:355 from Punchestown Great, Co. Kildare, was identified to have had spondylolysis of L5. The neural arch had fractured bilaterally at the *pars interarticularis,* with the section including the inferior facets no longer present with the remains. There was no evidence on L5, or the surrounding vertebrae, for any indication of the vertebral body slipping forward, suggesting that the spondylolysis had not developed into spondylolisthesis.

Individual E704:5 from Lug, Co. Offaly, was identified to have had spondylolysis of L5. As only the left side of L5 was present, it could not be confirmed whether the spondylolysis has been unilateral or bilateral.

5.3.2.2 Developmental Malformation of the Hand

One instance of a developmental malformation not associated with the lumbar/sacral region was identified. 2011:6 from Rickardstown, Co. Westmeath, presented with abnormal

third metacarpals and capitates. Macroscopic analysis of these bones suggested that the styloid process had not developed attached to the third metacarpal, but instead fused to the MC3 articulation on the capitate. As the styloid process does not develop until ages 11-12 (Scheuer and Black, 2000, p.325), it is possible that this could be associated with trauma to the wrist around this point. However, due to the bilateral nature of this bony change, it is more likely to be developmentally associated.

Two circumstances can be identified which could have resulted in the bony changes identified in 2011:6. Occasionally the styloid process becomes detached during development and can form an additional bone (Gray, 1924, p.231; Prohealthsys, 2023). If this separate bone quickly became fused to the capitate, it would result in the bony changes identified in this individual. The other circumstance which could have resulted in this outcome is the development of an *os styloideum*. An *os styloideum* is an extra bone in the wrist that most commonly sits between MC2 and MC3 or MC3 and MC4, and can become fused to the other carpal bones (Nicolodi et al., 2017). Depending on the size and location of this bone, it can develop into what is known as a carpal boss, which can result in pain and a reduction of movement in the wrist (Vanhoenacker et al., 2021). Based on the morphology of individual 2011:6, it is possible that an *os styloideum* formed in the area that the styloid process normally formed, preventing its development, before fusing to the capitate.

Although the exact aetiology for the bony changes cannot be identified, the impact of the lack of a functional styloid process can be identified. The primary function of the styloid process is in the stabilisation of the wrist, especially when force is placed through the first three digits (Marzke and Marzke, 1987; Vanhoenacker et al., 2021). As such, the lack of a functional styloid process would have resulted in a reduction of grip strength, decreased wrist stabilisation and predisposition to injury and pain. It would have likely increased the predisposition of this individual to develop arthritis, however this did not happen during this individual's life.



Figure 5.5: Both MC3 and Capitate bones of Individual 2011:6 showing the malformation of the styloid process. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

5.3.3 Specific Pathology

In comparison to non-specific pathology, specific pathology is those bony changes that have been related to a particular condition. These changes are often referred to as pathognomic and are required for the diagnosis of specific pathology. Although these changes are closely linked with a particular condition, it is still important that the differential diagnosis process is followed. Five instances of specific pathology were identified in this assemblage and are presented below.

5.3.3.1 Scurvy

Scurvy, the inadequate intake of Vitamin C, is a serious condition in humans as they are unable to synthesis this vitamin and must receive it from their diet. Vitamin C is involved in the formation of collagen, and thus levels of this vitamin effect the development and quality of connective tissue (Geber and Murphy, 2012; Brickley and Mays, 2019, pp.532–539). Due to this link between Vitamin C and diet, the development of scurvy is directly associated with a poor diet. Skeletal expressions of scurvy are associated with haemorrhages, with areas of porosity identified in areas of significant muscle attachment or strain. The expression of scurvy is known to differ between juveniles and adults (Geber and Murphy, 2012, p.514).

Individual 2013:124.3 was excavated from a small flat cemetery in Kilcornan, Co. Galway between 1948 and 1950. The cemetery was uncovered due to sand quarrying, and consisted

of three graves, however locals mentioned that this location was known to produce human remains and thus was likely a larger burial site originally (Waddell, 2010, p.94). Individual 2013:124.3 was placed crouched on their right side in a cist grave, with a bipartite vase placed behind their head. The individual was identified as a child, with a refined age-at-death of 3 years, plus or minus a year. In the process of skeletal re-analysis a series of bony changes were identified (see appendix for full skeletal report).

A circular to D shaped patch of highly spiculated bone was identified on the left parietal along the lambdoid suture. This area measured 45.25mm x 40.66mm and was located 32.32mm from the lambda. A corresponding area of porosity was identified on the occipital. An area of highly spiculated bone was also identified on the right parietal, although this area had received more taphonomic damage. This area measured 64.65mm x 42.52mm, however the taphonomic damage could have masked the identifiable bony changes. Areas of porosity were also identified in both orbits, on the hard palate, on the greater wings of the sphenoid, the maxilla, the mandible, and in the supraspinous fossae of both scapulae. There was some taphonomic damage to the greater wings of the sphenoid and the posterior portion of the maxilla which reduced the visibility of the porosity. No porosity was identified on the epiphyseal portions of the long bones, however taphonomic damage did obscure some of these regions.



Figure 5.6: Evidence of probable scurvy in 2013:124.3. a) Two areas of spiculated bone on both parietals, b) Porosity on the hard palette, c) Porosity in both orbits, d) Porosity on the greater wing of the sphenoid. All image copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

Based on the diagnostic criterion outlined in Geber and Murphy (2012, pp.515–516), the pattern of bony changes in this individual match the diagnosis of probable scurvy, as some of the lesions required for a definite diagnosis were missing (such as porosity on the mandibular rami). Based on the age of this individual, it is most likely that they developed scurvy associated with complications of the weaning process. As this is the only individual identified with evidence of scurvy, it is most likely that this does not reflect culturally-based deficiencies in weaning foods, but instead the interplay between this individual and the provided diet. A similar case is also known from the Early Bronze Age of England, a child with an estimated age-at-death of 2 years excavated from Barrow Clump (Mays, 2008).

5.3.3.2 DISH

Diffuse Idiopathic Skeletal Hyperostosis (DISH) is a condition characterised by the ossification of the anterior longitudinal ligament (Waldron, 2019, pp.730–732). Often described as resembling 'dripping candle wax', the ossification only occurs on the right side of the thoracic region, thought to be due to the influence of the descending aorta on the left. DISH most often develops in the thoracic vertebrae but can continue down towards the sacrum. In DISH there is no involvement of the disk space, which typically remains intact. Clinically, DISH is diagnosed when four or more vertebrae are fused, however in the skeletal record the identification of the 'candle wax' ossification of the anterior longitudinal ligament along with the maintenance of the disk space are primarily used to identify DISH, especially in cases of taphonomic damage. The aetiology of DISH is uncertain, however it is commonly associated with age, obesity and type 2 diabetes, leading to links between DISH and high status individuals. DISH is often asymptomatic, however it is also associated with complaints of back pain and can increase the risk of spinal fractures.

A flat cemetery was discovered in Graney West, Co. Kildare in 1953 as the result of sand quarrying. Three graves were identified, two cists and one pit burial (Mount et al., 1998, pp.35–42). Grave 3, the pit burial, contained the remains of individual P1953:31, a middle adult male, crouched on their left side. Skeletal analysis of this individual identified the ossification of ligaments on the right side of T7-T9, with the 'dripping candle wax' appearance (Mount et al., 1998, pp.79–81). T10 and T11 were also fused, but through the development of osteophytes. Ossified insertions were identified on the iliac crest, ischium, and in several costal joints. Osteoarthritic changes were identified in the left wrist, right acetabulum, on both patellae, and on the proximal femora. A significant build-up of new bone on the right *linea aspera* was noted. A break in the mid-shaft of the right femur exposed the cross-section, in which an enlargement of the cortical bone was identified. This could represent the early stages of Paget's disease (a condition of unknown aetiology), however microscopic analysis is required to confirm.

Individual P1953:31 lacks the four fused vertebrae for the clinical diagnosis of DISH, however the identification of the 'candle wax' ossification of the longitudinal ligament and the other proliferative bony changes results in the inability to discount a diagnosis of DISH in

this individual. As such, this is a case of possible DISH. It is likely that the fused vertebra resulted in back pain and a reduction in movement through the mid back. The other bony changes suggest that this individual suffered from pain associated with the development of osteoarthritis. This pain would have impacted the lived experience of this individual, although likely would not have restricted their ability to participate in the community lifeways.

5.3.3.3 Spina Bifida Occulta

Spina Bifida is a congenital condition where the neural canal does not develop completely. When seen in the skeleton, Spina Bifida is identified through the incomplete development of the neural arch of the vertebrae (Lewis, 2019, pp.594–596). With a strong genetic component, Spina Bifida can range in severity. The incomplete development of the neural arch can result in the exposure of the spinal cord, which may become protruded and can lead to serious complications. In general, the more skeletal elements involved with this developmental condition, the worse the outcome is for the individual. One less severe form of Spina Bifida is Spina Bifida Occulta, where the incomplete development of the neural arch is limited to the sacrum and lower lumbar vertebrae. Spina Bifida Occulta is often asymptomatic, as the dural lining is maintained, although some studies have suggested that back pain severity may be higher in those with Spina Bifida Occulta. One individual within the assemblage was identified with Spina Bifida Occulta. It is interesting to note that a higher prevalence of Spina Bifida has been identified within the Irish population in comparison to wider Europe, both contemporarily and historically (Saluja, 1986).

Individual 1949:84 from Hempstown Commons, Co, Kildare, was identified to have two developmental bony changes to their sacrum, the lumbarisation of S1 (discussed above) and Spina Bifida Occulta. The neural arches of S5, S4, and S3 have not developed, with the neural arch of S2 developing, however with an area of non-fusion through the spinous process. The neural arch of S1 has developed, however with an area of non-fusion in the right lamina. While the non-development of the sacral neural arches up to S2 is considered borderline Spina Bifida Occulta, the border-shifting that resulted in the lumbarisation of S1 does suggest that this case could be considered to be open up to S1. The Spina Bifida Occulta in this individual was likely asymptomatic, with it highly possibly that 1949:84 was

unaware that they had this condition. Similarly, the lumbarisation of S1 itself is asymptomatic. However, as outlined above, it does predispose this individual to the development of back pain due to the in changes in biomechanics. As such, it is quite possible that this individual suffered from back pain during life.



Figure 5.7: Lumbarisation of S1 and Spina Bifida Occulta in Individual 1949:84. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

5.3.3.4 Torticollis

Torticollis, also known as wry neck, presents as a permanent head tilt. This is due to the asymmetrical tension of the sternocleidomastoid muscle, and can result in bony changes to the mastoid process, torsion of the frontal or occipital bones due to the rotation of the head, changes to the facial bones, changes to the positioning of the ears, abnormal placement of the orbital, and asymmetry of the occipital (Hollier et al., 2000; Yu et al., 2004; Kutterer and Alt, 2009; Lee et al., 2015). While torticollis can develop at any point during life, most clinical cases are congenital, with congenital torticollis being one of the

most common congenital abnormalities. Torticollis can result in delayed developmental milestones, issues with communication, reduced mobility due to poorer balance, lower visual dependence for postural control, changes to gait, and slower walking speeds.

Three cists were uncovered in a small flat cemetery in Ballybrew, Co. Wicklow in 1935. Cist 2 contained two individuals, the disarticulated remains of an adolescent and the crouched remains of a young middle adult male. Skeletal analysis of the adult male, individual 1935:799, identified multiple sided robusticity changes in the skull. These included asymmetrical mastoid processes, the right portion of the occipital being noticeably more robust, asymmetrical magnum foramen, a noticeable twist in the spheno-occipital joint, and the right temporal-mandibular joint being more anteriorly placed. These bony changes are consistent with those seen in torticollis. With the possible identification of congenital torticollis, this individual was also selected for Bioarchaeology of Care analysis. This can be found, along with more detailed information, in section 6.2.

5.3.3.5 Multiple Myeloma

Multiple Myeloma is a terminal cancer of plasma cells, which results in tumour growth in bone marrow leading to the characteristic lesions of this condition – lytic bone lesions (Mitsiades et al., 2004; Grauer, 2019, pp.520–521). In modern contexts, survivability of patients is highly variable, ranging from six months to ten years. The most common symptoms are pain/bone pain, fatigue, anaemia, pathological fractures, osteoporosis, renal dysfunction, and increased risk of infection. The final stage of Multiple Myeloma includes organ damage and eventual failure. Multiple Myeloma has been reported in many archaeological skeletal collections, in both the Old World and the New World.

Uncovered in the central cist of a cairn cemetery in Lug, Co. Offaly, individual E704:5, a middle adult female, was identified with the characteristic lesions of Multiple Myeloma. More than 130 lytic lesions were identified in this individual, along with at least six pathological fractures, suggesting that they suffered from late-stage Multiple Myeloma. The survival to this stage, along with evidence of healed pathological fractures, suggests that this individual received care across the progression of their disease. As such, this individual along with two others, were identified for Bioarchaeology of Care analysis. More detailed

information on this individual, along with the Bioarchaeology of Care analysis can be found in section 6.3.

5.4 Trauma

In bioarchaeology, trauma describes any instance of mechanical injury, both complete and incomplete, to bone suffered during life and can represent one or repeated incidents (Redfern and Roberts, 2019, pp.211–213; Mant et al., 2021, p.586). Fractures most commonly are the result of atypical mechanical stress across the bone structure resulting in a point, or multiple points, of failure. The two main categories of fracture types describe the mechanism of stress application – direct and indirect trauma. If the trauma is not associated with the death of the individual, then repair begins.

The presence or absence of skeletal trauma was recorded for each individual within the assemblage. While this measure was included within the Biological Index of Frailty, it is also worth investigating separately. Within the total sample of 192 skeletons, nine individuals were identified with skeletal trauma. Of these nine, seven have healed trauma and three have trauma which could be associated with violence. Each instance of trauma is outlined below.

5.4.1 Healed Trauma

The identification of healing in skeletal trauma is vital as it places the incident as antemortem, occurring before the time of death (Redfern and Roberts, 2019, p.221). The first step of classic bone healing is the formation of a hematoma and blood clot around the fracture site. This is then replaced by fibrous material to create a callus. Within two days woven bones begins to be deposited, which is then replaced by mature, laminar bone after roughly six weeks (White and Folkens, 2005, p.48; Redfern and Roberts, 2019, pp.221–223). The period required for completed healing is dependent on various factors, including the fracture type, bones involved, health status of the individual, and the development of complications. Seven individuals were identified with healed trauma in this assemblage.

5.4.1.1 Fractured Finger

A healed transverse fracture was identified in the proximal fifth phalanx of the right hand from individual 1939:114 from Halverstown, Co. Kildare. The fracture line is transverse across the shaft, travelling diagonally from near the lateral corner of the distal epiphysis, towards the medial side roughly one third along the shaft from the distal epiphysis. A small callus was mineralised on the lateral side, facing the fourth digit. The fracture is completely healed, and only shows minimal misalignment, which would not have afforded this individual any significant lasting impacts. This injury is most likely associated with the individual hitting their hand against a hard object.



Figure 5.8: Palmar (A) and Dorsal (B) views of both proximal fifth phalanges from the hands of individual 1939:114. The right phalanx has a healed fracture. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

5.4.1.2 Fractured Toe

A healed crush fracture was identified on the distal first phalanx of the left foot in individual 1980:43 from Clonickilvant. The fracture line was visible on the plantar surface of the phalanx, running medio-latterly from the proximal portion to the distal portion. The fracture had healed well, with a complete remodelling of the callus. This most likely resulted from the individual 'stubbing' their toe and would have had no lasting impact on the individual.

5.4.1.3 Fractured Rib

A healed fracture was identified on a rib fragment in individual 1982:121 from Timolin, Co. Kildare. The fracture line was identified on the superior surface of the rib and had a maximum length of 28.2mm. A portion of the mineralised callus projected from the surface of the bone, reaching a maximum distance of 4.16mm from the surface. This projection was 8.1mm wide at the point it met the rib surface. There was slight misalignment of the bone, but it would have had a mild impact on this individual once the injury had healed. Ribs are one of the more common fracture sites and are associated with a range on aetiological situations, including interpersonal violence, a fall, and coughing. There likely would have been some pain associated with the injury, along with slightly impacted respiration during healing.



Figure 5.9: Healed fracture in a Rib Fragment of Individual 1982:121. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

5.4.1.4 Fractured Ulna

A healed fracture was identified bisecting the coronoid process of the right ulna in individual 1946:13.1 from Ballybrennan, Co. Westmeath. Alongside the healed fracture, secondary degenerative changes were identified on the proximal ulna, proximal radius, and the distal humerus; including significant lipping across all articular surfaces of the elbow and the development of eburnation on the capitulum, the head of the radius, and a small area on the proximal ulna where it articulated with the capitulum.

There are two utilised categorical systems for describing coronoid fractures of the ulna, the Regan and Morrey (RM) types (Regan and Morrey, 1989) which are based on the height of the coronoid fracture, and the O'Driscoll system (O'Driscoll et al., 2003) which is based on the location of the fracture. The fracture identified in this individual is either a RM type I (avulsion of the tip) or a RM type II (involving 50% or less of the process), and an O'Driscoll type 1 (fracture of the tip). However, due to the excessive osteophytic lipping identified in this individual, it is difficult to conclusively identify the relevant descriptive types.

Coronoid fractures rarely occur in isolation, with RM type II and O'Driscoll type 1 fractures both commonly associated with 'terrible triad' injuries, where there is elbow dislocation, fracture to the coronoid process, and the fracture of the radial head (Manidakis et al., 2012; Peach and Ali, 2012; Adams and Steinmann, 2013; Mellema et al., 2014; Lowery and Massey, 2022; Wang et al., 2022; Stevens and Tiwari, 2023). Such injuries also involve significant damage to the lateral collateral ligament and the medial collateral ligament, including avulsion, along with possible rupture of extensor musculature. This injury group is most commonly associated with a fall onto an outstretched hand, which results in valgus, axial, and posterolateral rotational forces through the elbow (Manidakis et al., 2012; Stevens and Tiwari, 2023). It is interesting to note that 'terrible triad' injuries are associated with the development of arthritis in the elbow (Manidakis et al., 2012; Wang et al., 2022; Stevens and Tiwari, 2023).

It is most likely that this individual fell onto their outstretched hand, resulting in the injury to their elbow. The severe secondary osteolytic growth suggests that there would have been soft-tissue damage along with the coronoid fracture, and it is possible that there was some element of dislocation. While there is no clear evidence of a radial head fracture to diagnose a 'terrible triad' injury, it is possible that the secondary osteophytic growth could be obscuring the true extent of the initial bony changes. This injury probably resulted in pain, swelling, weakness, and decreases in elbow stability, which would have continued to impact the individual after the fracture healed as evidenced by the development of the arthritic changes.



Figure 5.10: Secondary degenerative changes to the right humerus, ulna, and radius of individual 1946:13.1 following a fracture to the coronoid process. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

5.4.1.5 Forearm Fracture

Skeletal analysis of individual E2980:5, a Middle Adult Female from Moone, Co. Kildare, identified multiple bony changes (see section 6.1), including skeletal trauma. A healed fracture was identified on the distal mid-shaft of both the right ulna and right radius (Figure 5.11). Both fractures showed completed healing, with complete remodelling of the callus,

along with noticeable anterior-posterior displacement of the distal elements. The excavation report for this site refers to this injury as a ‘parry fracture’.



Figure 5.11: Healed fracture to the right ulna and radius of individual R2980:5. From Troy 2010

The term ‘parry fracture’ is used to describe fractures to the distal ulna and are associated with a direct blow to the forearm when an individual raises their arm to protect the head (Judd, 2008). As such, in the bioarchaeological literature, parry fractures are often mentioned in discussions of interpersonal violence, and particularly in domestic violence when identified in females (as in this individual). While the positioning of this ulna fracture, in the distal third of the shaft, aligns with the identified patterning for parry fractures, this trauma is associated with the isolated fracture of the ulna. Breaks in the radius associated with such blows are known, but are clinically rare (*ibid*, p. 1661). As such, the radial

involvement in this individual would preclude the identification of a parry fracture according to some.

Fractures to the distal radii are referred to as either a Colles' fracture or a Smith's fracture, dependant on if the distal portion is angled dorsally or volarly. Both fractures are associated with mechanical stress through an outstretched hand, either flexed dorsally or ventrally (Judd, 2008, pp.1660–1661). Involvement of the ulna is known in Colles' fractures, however this is most commonly limited to the styloid process. Involvement of the ulna in a Smith's fracture is very rare. Both of these fractures are commonly associated with falls, however they can also result from interpersonal violence.

While it is possible that these fractures could have occurred from different injuries, and thus could represent both a parry fracture and a Colles' fracture, the location of the fractures at roughly the same level in the shafts suggests that they both resulted from the same instance. As such, with the radial involvement, the identification as a parry fracture may be inappropriate. This caution when classifying parry fractures is primarily the result of their strong connection with interpersonal violence in the bioarchaeological literature. With this case not being a clearly definable parry fracture, it should not be cited as a definite example of violence in the Early Bronze Age.

The lack of a clear classification of this fracture pattern complicates the interpretation of this instance of trauma. While it cannot be clearly identified as an example of interpersonal violence, it would be irresponsible to simply disregard this possibility. The identification of healing in these fractures indicate that this individual received some level of care following the incident – either accidental such as a fall, or intentional such as violence. The displacement identified suggests that there would have been a lasting impact to this individual following the initial event. This displacement would have impacted the ability of this individual to utilise the full range of wrist movements and possibly reduced their strength through their hand. However, there is no suggestion that they lost function in either their wrist or hand.

5.4.1.6 Non-union Fracture

Non-union is a serious, chronic complication of fracture healing and is associated with the failure of the development of a mineralised callus. Causal factors for the development of non-union include bone(s) involved, pattern of fracture, soft tissue damage, infection, and mechanical stability of the fracture site (Wildemann et al., 2021). The development of non-union can lead to severe pain, loss of function, deformity. Multiple instances of non-union fractures are known from the skeletal record, most commonly found in the upper extremities (Redfern and Roberts, 2019, pp.249–250). One individual in the assemblage was identified to have suffered from a non-union fracture.

Alongside the torticollis discussed above, individual 1935:799 from Ballybrew, Co. Wicklow, was also identified to have suffered from a non-union fracture of the right tibia and fibula. An oblique fracture was located on the right tibia and fibula, below the mid-shaft point. Healing was present on all fracture surfaces, however the proximal and distal portions of the fracture site had not united during healing. The identification of extensive healing and no woven bone suggests that the incident occurred months to years before death. Due to the relatively steep angle of the fracture, it is likely that the false joint would not have been weight-bearing. This injury is also covered in greater detail within the Bioarchaeology of Care analysis of this individual (section 6.2).

5.4.1.7 Pathological Fracture

There are multiple pathological conditions that can reduce the ability of bone to resist mechanical stress. When a fracture develops in a pathologically effected bone that would 'normally' remain unaffected by the mechanical stress, this is called a pathological fracture (Redfern and Roberts, 2019, p.219). There are many conditions that are associated with the development of pathological fractures, including osteomalacia, neoplasms, syphilis, Paget's disease, and osteomyelitis; however, the most common is osteoporosis. One individual was identified to have suffered from multiple pathological fractures.

As mentioned above, individual E704:5 from Lug, Co. Offaly, most likely suffered from Multiple Myeloma, a cancer of the plasma cells which results in lytic bone lesions. Pathological fractures are commonly associated with Multiple Myeloma, as the

pathognomonic lesions for this condition weaken the structure of many bones. One of the more common first presentations of Multiple Myeloma in clinical settings is following the pathological fracturing of one or more vertebrae. At least six pathological fractures, five vertebral compression fractures and one sacral fracture, were identified in E704:5 associated with their Multiple Myeloma diagnosis. All fracture sites showed signs of healing, although limited by pathological processes. These fractures are discussed in more detail within the Bioarchaeology of Care analysis of this individual (see section 6.3).

5.4.2 Unhealed Trauma

The identification of unhealed lesions is an important step in the analysis of skeletal trauma, as it allows for the identification of perimortem injuries, those occurring at or around the time of death (White and Folkens, 2005, p.48; Redfern and Roberts, 2019, pp.221–223). As mentioned, when assessing healing evidence of remodelling and new bone deposition are evaluated. If no evidence of remodelling can be identified, then this suggests that the fracture occurred perimortem. The other element assessed is the fracture line itself. As bone is living tissue, there are differences between how bones break when they are 'wet' and when they are 'dry'. When bones are 'wet', as in the living or those who have only just begun decomposition, they create clean, sharp, and often straight fracture lines. This is compared to the uneven and rough fractures associated with 'dry' bones (*ibid*). Two instances of unhealed trauma were identified in this assemblage.

5.4.2.1 Unhealed Trepanation

A semi-circular lesion with accompanying cut marks was identified on the left temporal bone of individual 1951:29a from Edmondstown, Co. Dublin. No evidence of healing was identified associated with either the semi-circular lesion or the cut marks, suggesting that this represents a perimortem injury. The patterning of the trauma, circular lesion with associated cut marks, is indicative of a trepanation. Trepanation is one of the oldest known surgical interventions, as is associated both with responses to skull trauma and with responses to headache or similar conditions. There were no other signs of skull trauma in this individual, suggesting to the author of the skeletal report that this trepanation was in response to pathology. Buckley, who performed the initial skeletal analysis of this individual (Mount et al., 1993, p.65), interpreted the location of the trepanation to suggest that the

trepanation could have been performed in response to mastoiditis, although this could not be assessed as the mastoid area was heavily decayed.

In a 2003 overview of all Irish evidence of trepanation, O'Donnabhain (2003) reassessed individual 1951:29a. O'Donnabhain (2003, p.80) identified that while the lesion was located near the squamosal suture, there were no bony changes on the parietal, it was also noted that the cut marks associated with the lesion resembled rodent gnawing. This suggested that this lesion was more likely a pseudotrepanation associated with taphonomic processes. This individual could not be reassessed in the course of this research, and as such, it would be inappropriate to take this individual as a definite example of unhealed trauma within this assemblage.

5.4.2.2 Sharp Force Trauma

Sharp force trauma refers to an injury caused by an object with a sharp edge or point (Davidson et al., 2010, pp.191–192). There are three main groupings of injuries associated with sharp force trauma – punctures or stabs, incisions or cuts, and clefts. A puncture or stab is deeper than it is long, with an incision or cut wider than it is deep. A cleft or notch is identified through a v-shaped notch. One individual in this assemblage was identified as having evidence of sharp force trauma, individual 1977:233 from Betaghstown, Co. Meath.

A series of seven parallel cut marks were identified on the proximal-anterior portion of the right humerus of 1977:233. The cut marks were deepest closest to the epiphysis and showed no evidence of remodelling. The clear, straight nature of the cut marks suggest that they occurred when the bone was still wet, suggesting that these cut marks represent a perimortem injury. Another factor supporting the perimortem identification is that the most proximal cut extends into the epiphysis, which was unfused in this individual. This suggests that this injury occurred while the bone was still articulated and held together by soft tissue.



Figure 5.12: Series of parallel cut marks to the humerus of individual 1977:233. Image copyright National Museum of Ireland. Image reproduced with the kind permission of the National Museum of Ireland.

The interpretation of this series of sharp force trauma presents a challenge. The nature of the bone insults along with their placement does not match any known taphonomic patterns, especially considering the identification of a cut mark running from the epiphysis onto the diaphysis. However, it also does not match any understandable patterns for violence. The location of the cuts is not overtly accessible during life. It is possible that these marks were caused in association with a burial rite. 1977:233 was placed in a crouched position and was not disarticulated in antiquity. While comprehensive defleshing of the individual can be ruled out, it is possible that some invisible portion of the burial rite for this individual resulted in these marks.

5.4.3 Evidence of Interpersonal Violence

Three individuals were identified possibly representing evidence of interpersonal violence in this assemblage – E2980:5 from Moone (forearm fracture), 1952:29a from Edmondstown (possible trepanation), and 1977:233 from Betaghstown (sharp force trauma); and as

outlined in the section above, none of these three individuals present a clear case for trauma resulting from interpersonal violence.

The location of the fracture sites in E2980:5 at the same level suggest that they represent one incident, and as such must be considered together. This results in the patterning, the involvement of both the ulna and the radius, not matching the known patterns associated with interpersonal violence within the bioarchaeological literature. Neither assessment of the skull lesion in 1952:29a support the identification of interpersonal violence in this individual. The original identification of this lesion as a pathologically-mediated trepanation suggest that this lesion is closer to a model of care rather than violence, with action taken to reduce rather than inflict suffering. However, the reassessment of this lesion as a pseudotrepanation instead increases the ineligibility of this individual in discussions of interpersonal violence. As mentioned, the patterning of cut marks on 1977:233 presents an interpretive challenge, with no paralleled pattern of injury. It is more likely that they are associated with burial rites rather than interpersonal violence.

Chapter 6: Evidence of Care in the Early Bronze Age

As outlined in section 5.3, numerous examples of specific pathology were identified within the assemblage. Within this subset of the assemblage, a pattern of bony changes suggestive of evidence of healthcare provisioning was identified on multiple individuals, primarily through bony repair. Three case studies were identified for more in-depth Bioarchaeology of Care analysis as they offered the clearest examples of care, each expressed evidence of care in a different way, and covered a range of disease processes: degenerative, traumatic, congenital, and terminal. These three case studies are presented below. For a review of the Bioarchaeology of Care methodology utilised, please see section 3.4.2.2.

6.1 Skeleton 5, Moone, Co. Kildare

6.1.1 Step 1 - Description

Context

Moone (E2980), Co. Kildare was excavated in 2008 and is one of many sites discovered along the N9/N10 Kilcullen to Waterford Scheme. The excavation uncovered a Neolithic ring-ditch, an Early Bronze Age flat cemetery, and a penannular Iron Age ditch containing artefacts and cereal-drying kilns (Hackett, 2010, p.6). The site sits on the top of a small hillock, with views of the Wicklow mountains to the north, south, and east (*ibid*, 8). Deposited by glacial activity, the geology of the hillock (alternating bands of sand and gravel) differs from that of the surrounding area (sandy silt). This is not the only Early Bronze Age site known from the immediate surroundings, including a site in Mullamast (08E0100) (which sits to the west, north, and east) from the same scheme that discovered domestic pits, pottery and lithics, a cremation pyre dump, and a crouched inhumation (*ibid*).

The Early Bronze Age cemetery at Moone consisted of a total of 16 graves, in which a minimum number of 19 individuals were buried in nine single inhumations, four multiple burials, and one cremation (Hackett, 2010, p.10). The radiocarbon dates for this cemetery suggest that there were three periods of burial in the cemetery (*ibid*, 30). This cemetery

differs from the traditional template of Early Bronze Age cemeteries in a number of ways. While it is not unusual for pit burials to outnumber cist burials (Mount, 1995), the only cist burial in this cemetery was one of the latest burials deposited at the site and also only contained the crouched inhumation of a young child (refined AAD 2-4) (Hackett, 2010, pp.10–16; Troy, 2010). The remaining burials were pit graves, with three variations identified – shallow pit, stepped pit, and deep pit. Partial stone lining was identified in six of the pit burials (Hackett, 2010, pp.10–16). Another deviation from the template can be seen in the demographics of the site. Rather than the expected adult male focus commonly associated with formal burial in the Early Bronze Age, the Moone cemetery contained five females, three males, and ten non-adults (Hackett, 2010, pp.36–37; Troy, 2010). It is also interesting to note that while the largest burial that sits closet to the centre of the site is a semi-stone lined pit burial of an adult male, the radiocarbon analysis suggests that this individual was a part of the second phase of burial at the site and thus cannot have been the initial focus of burial at Moone (Hackett, 2010, pp.13–14, 30–31).

Mortuary Treatment

Skeleton 5 (SK5), a middle adult female, was placed crouched, on their left side, facing southeast in a deep pit grave (Hackett, 2010, pp.11–12; Troy, 2010). This individual was found with a selection of grave goods including: a ribbed tripartite food bowl vessel (placed at the back of the skull), a fragment of a flint core, an overshot flint flake, a chert core, a red flint flake blank, a flint core, a quartz hammerstone, a piece of haematite or limonite, a sandstone polisher with staining, a shale honestone, and a bronze awl which had been broken (one half placed at the head and the other at wrist of right hand) (*ibid*). This selection of objects marks this as the richest burial within the cemetery and with the inclusion of the bronze awl, places this burial into a small subset of Early Bronze Age burials that contain metal artefacts. Unlike the traditional positioning where both legs are up towards the chest and mostly together, only the left leg of this individual was in this position. The right leg of this individual was instead slightly flexed, with the polishing stone placed under the knee and the honestone under the ankle (see Figure 7.1) (Hackett, 2010, p.34). While the right pelvis was highly fragmented, the left pelvis showed moderate degenerative joint disease (Troy, 2010). This placing of the leg in a position that deviates from the norm has been suggested by the author of the excavation report to reflect “a

deliberate attempt to show respect to this female, who may not have been physically able to bend her leg while alive" (Hackett, 2010, p.34). The right index finger of SK5 was also found placed into the mouth, in an area of antemortem tooth loss (Hackett, 2010, p.10; Troy, 2010).

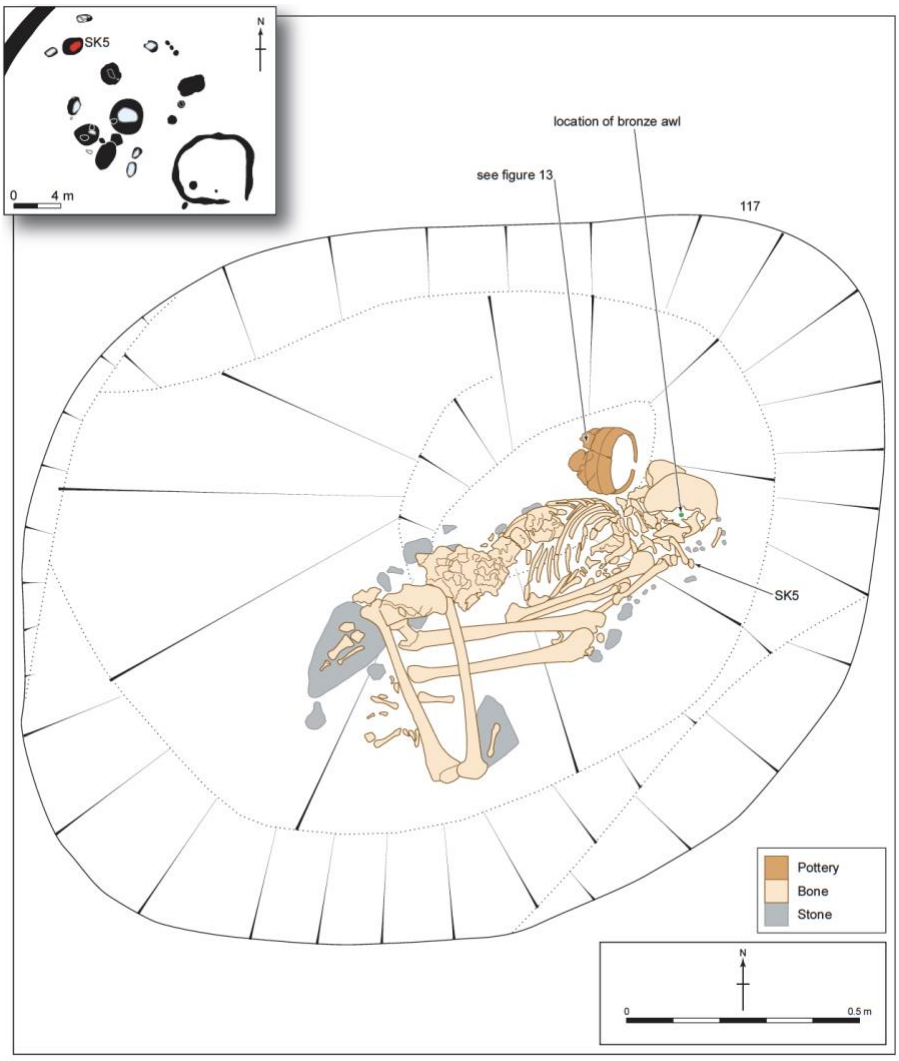


Figure 6.1: Schematic drawing of SK5 from Moone E2980. From Hackett, 2010, p. 71

Skeletal analysis of Skeleton 5

Skeletal analysis for SK5 was completed by Carmelita Troy at Headland Archaeological Ltd, and is reported in Appendix 9 of the excavation report for E2980 (Troy, 2010); all information below is reported from this source. The preservation of SK5 is moderate, with roughly 75% completeness. Both the skull and the mandible were represented, although fragmentary. Both scapulae and both clavicles were represented, along with both humeri,

radii, and ulnae. The hands consisted of six left and seven right carpals, all metacarpals, five left phalanges, and eleven right phalanges. The spine consisted of all cervical vertebrae, T1-T2, T11-T12, L1-L5, and S1-S2. Six right and nine left ribs were identified. The left pelvis was represented, although not complete, along with both femora, patellae, tibiae, and the left fibula. The feet were represented by four left and five right tarsals, all but the left fifth metatarsal, two left phalanges and three right phalanges (Troy, 2010). SK5 has been identified as a middle adult, with a refined age-at-death estimate of 35-45 based on auricular surface morphology and dental attrition. A sex estimation of female was made based on the morphology of the skull, the sciatic notch, and supported by metric analysis (*ibid*).

This individual had multiple pathological changes. This included the antemortem loss of 22 teeth (see table 6.1), a medium cavity on the distal side of the upper right first molar, and severe porotic hyperostosis on the frontal and both temporals (Troy, 2010). A healed, although moderately misaligned, fracture was identified on the mid-shaft of the right radius and ulna (*ibid*). While Troy identifies this fracture as a 'parry fracture', reinterpretation by this author suggests that it is unlikely that this was the case (see section 5.4.1.5). Significant and diffuse Degenerative Joint Disease (DJD) was identified in this individual. Mild to severe DJD was identified on all remaining vertebrae except for T2 and S2 (*ibid*). Severe Schmorl's nodes were identified on T12 and L1-L4. Moderate DJD was identified on three left ribs and the left acetabulum (see figure 7.2). The right acetabulum could not be assessed for DJD. Mild DJD was identified in both glenoid fossae, with mild to severe porosity identified on both the lateral and medial ends of the right clavicle (*ibid*).

AM	AM	P	AM	AM	AM	AM	P	P	AM	AM	AM	P	P	AM	AM
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
AM	AM	AM	P	P	P	AM	AM	AM	AM	P	P	AM	AM	AM	AM

Table 6.1: Dental inventory of SK5 from Moone E2980. From Troy, 2010, p.278



Figure 6.2: Degenerative changes to the left acetabulum in SK5. From Troy 2010

Diagnosis

The pathological changes identified in SK5 paint a picture of an eventful life. The severe porotic hyperostosis identified in SK5 suggests that they likely suffered from nutritional difficulties during the early portion of their life (Grauer, 2019, pp.514–515). If these occurred during childhood, they could have resulted in reduction of the quality of enamel, predisposing SK5 to the observed dental problems. Assessment of any reduction in enamel quality in the form of enamel hypoplasia in SK5 was hindered by a combination of moderate to severe dental attrition and severe antemortem tooth loss, with 22 teeth lost during life. It is interesting to note that although this individual had lost 22 teeth during life and had a medium caries on one of their remaining teeth at death (26) there was no identified evidence of abscesses.

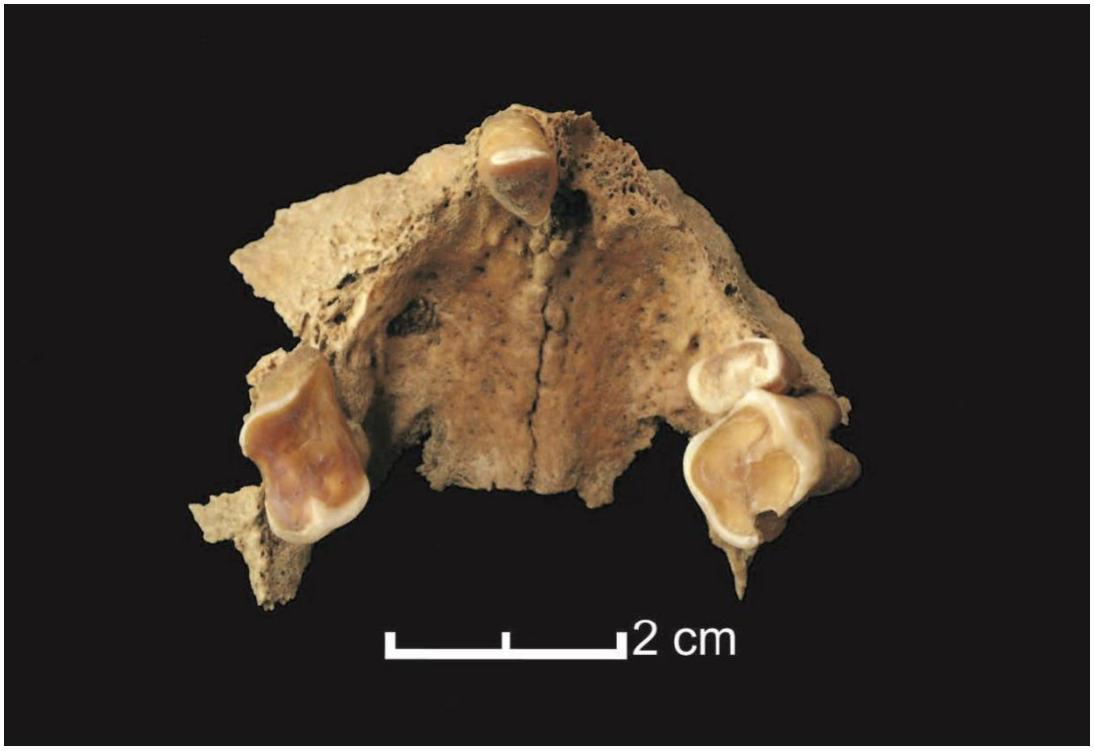


Figure 6.3: Maxilla of SK5, showing antemortem tooth loss and attrition. From Troy 2010

As discussed in section 5.4.1.5, the trauma pattern identified on the right ulna and radius does not precisely match the patterning of a 'parry fracture'. As the positioning of the two fractures are similar, it is most likely that they were caused by the same injury. This suggests that it is a more likely that this pattern of trauma was associated with the individual attempting to break a fall, rather than this injury being associated with violence. If the right hip had reduced mobility, as suspected based on the mortuary treatment, then it is possible that these two injuries could be related. While extensive bony changes were identified in this individual, it is the severe degenerative joint changes that are of particular interest for this Bioarchaeology of Care analysis due to the proposed identification of movement restriction in the right hip.

DJD is the most common pathological change identified within paleopathology. There are two main categories of degenerative joint diseases: those which primarily produce bone and those which are erosive (Waldron, 2019, p.719). Although bony destruction can be identified within the joint changes in SK5, they lack the pathognomonic changes that define the erosive class, and as such are reflective of the productive class. The only diagnostic member of the productive class is osteoarthritis (OA), which is the most common form of

arthritis today (Corti, 2003; Waldron, 2019, p.719). While there are a number of differential diagnoses for the proliferative changes seen in SK5, including diffuse idiopathic skeletal hyperostosis (DISH), spondylosis, and rotator cuff disease, the diffuse patterning of bony changes across a significant number of joints, the identification of both lipping and pitting in effected joints, and the relatively advanced age of this individual all support a diagnosis of OA for SK5 (Troy, 2010; Waldron, 2019, pp.725, 729). While, as mentioned in section 5.2.1, OA is the most common pathological change seen in this sample, the combination of the extensive arthritic changes in this individual and the interpretation of movement-restriction in this individual based on their mortuary treatment highlighted this individual for a Bioarchaeology of Care analysis, as it is proposed that it would have the outcome of these bony changes which could have significantly affected the ability of this individual to participate in lifeways.

6.1.2 Step 2 – Determining Disability

Clinical impacts

OA is a disease of the synovial joints which results in the degradation of all elements of the joint capsule – particularly the cartilage (McDonough and Jette, 2010; Hunter, 2011; Waldron, 2019, pp.720–721). While it is traditionally associated with age and joint stress related 'wear and tear', clinical literature identifies OA as a heterogeneous disease associated with bone metabolism, inflammation, and numerous risk factors (Corti, 2003; Moskowitz, 2009; Hunter, 2011). The most commonly effected joints include those of the spine, hip, knee, and hand (McDonough and Jette, 2010; Waldron, 2019, p.725). The primary effects of OA on the individual during life are those associated with pain and reduction in movement. In modern populations the pain associated with OA, particularly in weight-bearing joints, is linked with difficulties walking, maintaining personal hygiene, dressing, undertaking household chores, climbing stairs, grocery shopping, and work activities. (Corti, 2003; Fautrel et al., 2005; Moskowitz, 2009; Farr II et al., 2013; Cuperus et al., 2015; Araújo et al., 2016; King et al., 2018; Vitaloni et al., 2019). Alongside these physical impacts, research has also identified mental impacts associated with the chronic pain of OA: reduction in sleep and sleep quality, poor mood, social isolation, reduced participation in leisure activities, with depression and anxiety resulting as comorbidities (Fautrel et al., 2005;

Farr II et al., 2013; Hunter et al., 2014; Montero et al., 2016; Sharma et al., 2016; Vitaloni et al., 2019).

While there is a substantiated link between OA, chronic pain, and a lower quality of life in the clinical literature (Fautrel et al., 2005; Moskowitz, 2009; Farr II et al., 2013; Ackerman et al., 2015; Cuperus et al., 2015; Kawano et al., 2015; Perrot, 2015; Araújo et al., 2016; Montero et al., 2016; King et al., 2018; Vitaloni et al., 2019; Tenti et al., 2020), assessing this within the skeletal record poses multiple challenges. A direct link between the severity of joint changes and the severity of associated pain is not well established, with some suggesting that the level of discomfort is more closely associated with the speed at which the changes are occurring (Link, 2009; Perrot, 2015; Riddle and Jiranek, 2015; Waldron, 2019, p.729). As the clinical literature does show a strong link between OA and pain, particularly in the large joints, somewhat irrespective of the new joint morphology, we can link these changes in the skeletal record with experienced pain even if we cannot comment on the magnitude of the experienced pain (Waldron, 2019, p.729).

Alongside the diffuse OA, this individual also experienced extensive tooth loss during life, with only 10 of 32 teeth remaining at the time of death. Due to the involvement of teeth in mastication and communication, the loss of teeth has been found to have multiple impacts on quality of life, especially in those with severe tooth loss (Jung et al., 2011; Aida et al., 2012; Saintrain and De Souza, 2012; Zelig et al., 2019; Yin et al., 2020). The loss of teeth results in difficulties chewing and eating, which often leads to dietary changes away from foods that are tough, dry, crunchy, or stringy (Savoca et al., 2010). These foods often include fruit, vegetables, seeds, grains, and certain meats, which can result in poor diet, obesity, or malnutrition (Savoca et al., 2010; Yin et al., 2020). The disruption to the chewing process can also affect swallowing and digestion (Zelig et al., 2019). Regarding the number of teeth needed for normal function, Gotfreden and Walls (2007) proposed that at least 20 teeth were needed, with less than 20 teeth significantly increasing the likelihood of functional disability in older adults in Japan (Aida et al., 2012). Eleven teeth or less was associated with a noticeable decrease in diet quality by Savova *et al* (2010). Alongside the masticatory issues tooth loss is also associated with difficulties communicating due to the role that teeth play

in speech, and lower confidence due to facial abnormalities which can lead to social isolation (Saintrain and De Souza, 2012; Zelig et al., 2019; Yin et al., 2020).

Estimating the need for care

While there is an inability to directly link the severity of joint changes in OA to severity of pain or functional limitations, the extensive nature of the OA in SK5 does strongly suggest that they suffered from noticeable symptoms and likely had chronic pain and mobility restrictions. Chronic pain is a difficult condition to assess within a Bioarchaeology of Care context as pain thresholds are dependent on the individual and can fluctuate in manageability from day to day. As mentioned, we are not able to quantify the level of pain in SK5, however, we also cannot ignore possible impacts of pain on this individual. As the clinical literature highlights fatigue and activity avoidance in particular (Fautrel et al., 2005; McDonough and Jette, 2010; Hunter et al., 2014; Montero et al., 2016), it is reasonable to suggest that the disease impact on SK5 included these outcomes.

The degree of mobility restrictions in SK5 is also hard to assess. The mortuary treatment of this individual does suggest that they had some difficulties with leg movement, which would have impacted their ability to walk. This, in turn, would have reduced the ability of SK5 to participate in the subsistence activities of their community, with mobility over long distances associated with trade difficult, if not impossible. While long distance trade networks are attested in Ireland during this period, it is unknown whether it was common for the primary community units to travel, or if this was the primary domain of a sub-set of the population during this period. Difficulties walking likely hindered the ability of SK5 to participate in farming or animal husbandry practices, although they could have assisted in food preparation. Alongside lower leg mobility restrictions, the OA identified in the shoulders of SK5 could have resulted in reduced strength and range of movement in the arms. With the mortuary treatment of this individual suggesting that they were involved with craftwork, any reduction in strength or range of movement through the shoulder could have impacted the ability of this individual to participate in these activities. The identification of OA in the spine would have likely resulted in back pain, which likely exacerbated the identified mobility and activity restrictions.

The tooth loss seen in SK5 would have impacted the mastication and communication abilities of this individual. With only ten of 32 teeth remaining, SK5 suffered from severe tooth loss, and would have fallen into the categories identified in clinical literature for functional disability. Extra time and effort would have been required to prepare food that SK5 could eat, including increased eating time, avoidance or preference for certain food items, chopping food into smaller pieces, or cooking food until it became softer (Zelig et al., 2019). The effects of tooth loss could also have caused SK5 difficulty when communicating with the other members of their community if the clarity of their speech was impacted.

The combination of pathological changes identified in SK5 strongly suggest that at least in the later years of their life, they would have required some level of care from the community for survival. While the expected role of an individual changes throughout their life, the physical limitations identified in SK5 would have required the community to reassess their expectations for this individual as the pathological changes advanced. While the mortuary treatment of SK5 deviated from the template of body positioning in the Early Bronze Age, the apparent care in which this individual was buried, along with the number of grave goods, strongly suggests that this individual was a valued and cared-for member of their social group.

6.1.3 Step 3 – Model for Care

The impact of the pathological changes identified in SK5 suggest that this individual's survival was supported by the care and accommodations provided by their group after symptoms manifested. While it is impossible to securely identify how long this symptomatic period lasted for SK5, the extent of bony changes suggests that this individual was affected in the medium to long term. As OA is a chronic degenerative disease, the scope of symptoms in SK5 would have developed progressively, increasing in severity over time. During the middle phases of OA, pain management would have been the primary care required for this individual. Considering the high levels of degenerative joint diseases within the larger Early Bronze Age population (see section 5.2.1), it is highly likely that a cultural approach for managing joint pain had been developed.

As symptoms worsened across the progression of the OA, it is likely that more accommodations would have been required, alongside continued pain management. Increased pain could have led to irritability, fatigue, and associated mood changes, which could have likely impacted social relationships and group dynamics. The grave goods identified within SK5's burial suggest that they had a strong connection to craftwork. If this interpretation is correct, then it is possible that OA progressively impacted their ability to produce the quality or quantity of material that they were once capable of producing. While the primary pathological changes are interpreted to have affected the right leg, the degenerative changes to the shoulders and spine could have reduced the strength and range of movement in the shoulder of this individual, thereby impacting their craftwork.

Considering the lifeways proposed for the Early Bronze Age, including small scale agriculture and seasonal mobility, reduction in mobility would likely have had a noticeable effect on the community. This is particularly true if their right hip had significantly reduced movement as has been suggested. The ability of this individual to participate in mid- to long-distance mobility, possibly associated with trade, animal husbandry, would have been significantly impacted. This would have posed considerable difficulties if this level of mobility was expected of the whole community. Even around the settlement, difficulties walking would have impacted which activities SK5 would have been able to participate. It is possible that SK5 would have also required some assistance with other daily activities, including standing up and some level of personal hygiene. Considering these possible impacts to SK5's independence, it is quite possible that a mobility device supported this individual in daily activities, evidence of which is osteologically attested to in past societies (Casserly and Moore, 2022, p.85). However, even considering a mobility support, it is probable that this individual requited assistance from one or two members of the community intermittently throughout the day, likely associated with particular activities.

Another element of the accommodation that this individual required would have been associated with the severe tooth loss in this individual. The reduction of their masticatory ability would have required increased time in food preparation to allow this individual to eat successfully, or different food requirements all together. It is highly likely that the SK5 was deeply involved with the extra labour associated with their requirements, however

considering the identification of care and accommodation in other elements, it is probable that other members of the community, likely their kin group, would have been involved in these needs.

6.1.4 Step 4 – Interpreting Care

Alongside the physical aspects, there would also have been social aspects to the care provided for SK5. One facet of this would have related to identity. Changes in health, and in particular physical abilities, are often associated with changes in self-identity as physical abilities begin to differ from the image of oneself. When this occurs over time, as with degenerative changes, the continual deterioration of health often results in an ongoing need to renegotiate elements of identity, particularly as this deterioration is linked to increased reliance on the community (Gowland, 2017, p.237). Even within a society where identity was predominantly relationally constituted, entering into a care-receiver/caregiver relationship would likely result in changes to community dynamics. The need for care often results in changes to power dynamics, as elements of dependency enter into relationships (*ibid*, p.245). This dependency precipitates changes in the relational identity of both the caregiver and the care-receiver, and can be both positive or negative.

Associated with changes in self-identity, it is possible that there would have been changes to the social identity of this individual. One element of this would have been the cultural understanding of the disease process of OA, as diseases can be thought of having social identities themselves (*ibid*, p.243). If the physical changes associated with OA were linked with the process of age, which would not be surprising as it is a degenerative condition, then the development of symptoms may have resulted in the community considering this individual to be 'aged'. As such, it is possible that this individual could have transitioned to a different social role – one similar to the prototypical elder. This role could have had a focus on food preparation, childcare, and maintaining or transferring communal, ritual, and/or specialist knowledge. While it is noted in clinical literature that in modern, Western societies, changes in social roles are correlated with a reduction in mental quality of life outcomes (Osborne et al., 2012), the social structure of Early Bronze Age societies and the more interconnected nature of communities might have provided more support. This might

have been particularly true if social role transitions were more communally integrated than they are within Western societies today, as seen elsewhere in the modern world. Elements of this new role could have suited SK5. Assisting in food preparation could have been important for SK5, as their dietary requirements were likely associated with increased food processing. However, depending on how this was achieved, SK5 would have likely only assisted due to the OA in their shoulders and back resulting in decreased strength and stamina. If elements of the self-identity of SK5 were related to their role in craftwork, teaching and knowledge-transfer may have provided a new outlet for identity and emotional needs as their ability to produce declined. If their role in craftwork was as important as is suggested by the included grave goods (Hackett, 2010, pp.40–41), then the transmission of this knowledge could have been significant to their community. This could have promoted the on-going care of SK5, encouraging the community to continue increasing the accommodations afforded to SK5 throughout the progression of their OA.

One element that needs to be addressed in a Bioarchaeology of Care analysis is the identification of any deviance in the expected funerary treatment. The placement of this individual in a similar but non-standard body position, with objects directly associated with such body position, marks this individual out from the majority of the assemblage. The identification of "odd deposits" (Gilchrist, 2019, p.389), items or features that seem to defy other non-ritual explanations, has been suggested to represent apotropaic or protective intentions by the community (*ibid,* pp. 389-394). The interpretation of the body position of SK5 by the excavator (Hackett, 2010, p.34) is in line with the identification of this as an 'odd deposit'; with the items chosen for placement in the grave possibly acting as an expression of the continued care of this individual. While Gilchrist's (2008; 2019) research is focused on Medieval Britain, these ideas around the interpretation of 'odd' deposits dovetail with Brück's (2004; 2019) concepts of object agency. The 'odd' positioning of the sandstone polishing stone under the knee and the shale honestone under the ankle suggests that these items may have acted like an 'amulet', having been imbued with a curative or supportive role for this important individual in death. Stones have a long history of ritual use and have been known to be associated with apotropaic use, in both life and death (Gilchrist, 2008; 2019). As such, these stones may have been involved in a repertoire of ritual actions that represent the communities continuing care for this individual from life into death.

6.2 Individual 1935:799, Ballybrew, Co. Wicklow

6.2.1 Step 1 – Description

Context

A small cemetery in Ballybrew, Co. Wicklow was uncovered by quarrying in September 1935 (Martin et al., 1936, p.255; Waddell, 1990, p.159). One end of the first cist was exposed in the face of the pit during the process of gravel digging, after which work was halted and the cist excavated (Martin et al., 1936, p.255). This cist, orientated NNW-ESE, contained the crouched remains of an adult female, together with a bowl food vessel, a broken lignite bead, a small flint scrapper, and two flint flakes. Impressions suggesting a rush matting were preserved on some of the paving stones (Martin et al., 1936, pp.255–257; Waddell, 1990, p.159). A second cist was discovered eleven days later roughly a meter WNW from the first cist (Martin et al., 1936, pp.257–258; Waddell, 1990, p.159). This cist, orientated NW-SE, contained the remains of two individuals, an adolescent and an adult male, as well as a tripartite bowl, three fragments of flint, and two quartz chips (Martin et al., 1936, pp.257–261; Waddell, 1990, p.159). It is reported that another cist was also found in the same quarry to the south of the second cist, although it was listed as empty in the excavation report (Martin et al., 1936, p.259; Waddell, 1990, p.159). Surrounding the area of the cists, an accumulation of material above the gravel was interpreted as evidence of a low mound which would have covered the burials, however, no evidence of the mound was visible at ground level (Martin et al., 1936, p.259).

Mortuary Treatment

As mentioned, cist two contained two individuals, an adolescent and an adult male. The adolescent (NMI 1935:799.1), with an estimated age at death of 14 ± 2 years, was found disarticulated towards the NE of the cist. Some of the remains of the adolescent were found within the upturned tripartite bowl, which sat in the east corner of the cist. Analysis of the adolescent identified cribra orbitalia and enamel hypoplasia on multiple teeth (see appendix 1). The adult male was found flexed, lying on their back, towards the SW part of the cist, with their head to the SE (Martin et al., 1936, pp.257–258). The disarticulated nature of the adolescent compared to the articulated adult male suggests that the adolescent was the initial burial in this cist, which was then moved to allow for the deposition of the adult male.

This proposed sequence of events together with the identification of some of the adolescents' remains within the tripartite bowl, suggest that this bowl was associated with the adolescent. The body position of the adult male is of interest. While this individual is in a generally crouched position, as is standard in the Early Bronze Age, instead of being placed on either their left or right side this individual was placed on their back (see figure 7.3). This burial position differs noticeably from the majority of the assemblage, however it has been reported at one other site – Whitestown, Co. Dublin. The identification of a non-normative body position suggests that this individual received different treatment during burial.

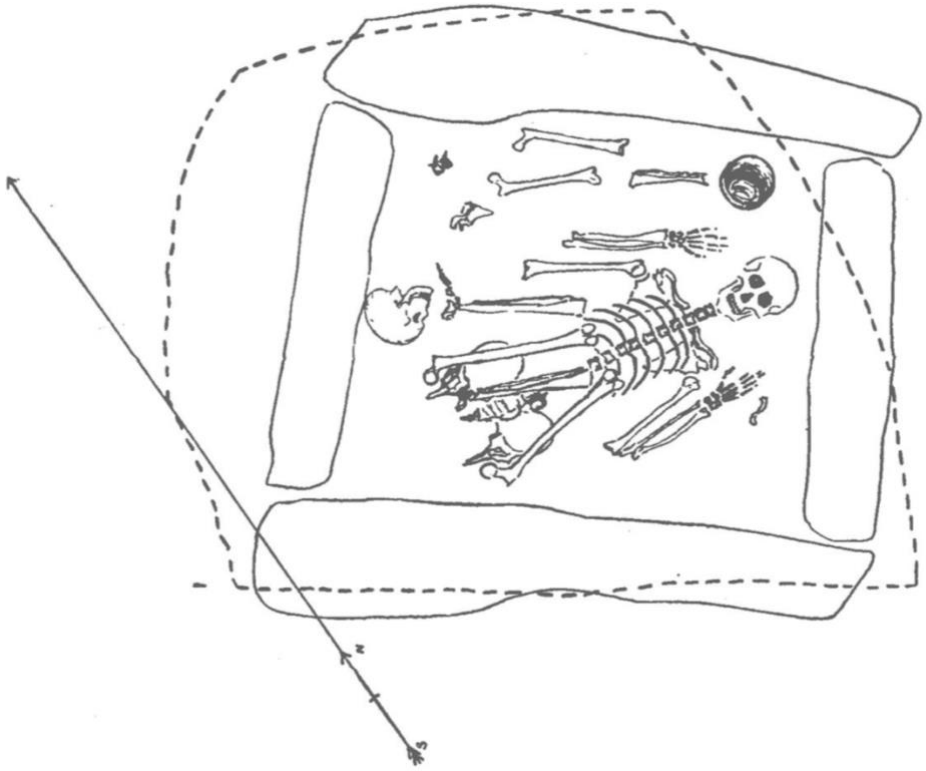


Figure 6.4: Plan of Cist two from Ballybrew showing the positioning of the skeletons. From Martin, Price and Mitchell, 1936, p. 260.

Skeletal analysis of Individual 1935:799

Skeletal analysis for 1935:799 was completed for the excavation report in the 1930s, and as such is not in line with modern standards (Martin et al., 1936, pp.261–270). The remains were reanalysed for this project, and it is that analysis which will be presented below, with a complete skeletal report available in appendix 1. 1935:799 is well preserved, with good skeletal region representation. The skull is complete except for some damage to the left

maxilla, lacrimal, internal nasal conchae, ethmoid, and vomer. The shoulder girdle was complete, with both upper limbs complete except for the left ulna, of which only the proximal and shaft portions were preserved. The left hand was represented by four carpals, five metacarpals, and eleven phalanges; the right hand was represented by a complete set of carpals and metacarpals, and nine phalanges. The sternal body, ten left ribs, and twelve right ribs were preserved. The spine was complete except T12 and L3 which were partial. The pelvic girdle was complete, with the sacrum showing sacralisation of L5. The lower limbs were complete, with damage to the right femur and left fibula. The feet consisted of five left tarsals, five left metatarsals, three right tarsals, four right metatarsals, and four foot phalanges. The age of death was estimated based on the auricular surface and pubic symphysis to be a young adult, with a refined age at death of 30-40. Male sex was estimated based on the morphology of the skull, ventral arc, subpubic concavity, isotopic ramus ridge, and the sciatic notch.

Mild degenerative changes were identified in the left proximal humerus, both acetabula, both proximal femora, and the right proximal tibia. Moderate degenerative changes were identified in the right distal femur, and severe changes in the right patella. Mild degenerative changes were identified in the right inferior facet of C7, right inferior facet of T9, left inferior facet of L1, and the left inferior facet of L3. Schmorl's nodes were identified on T6-T12, L1-L4.

Multiple sided robusticity changes were identified in the skull of 1935:799 (see figure 7.4). The right portion of the occipital is noticeably more robust, with a corresponding flattening of the left portion. The magnum foramen is asymmetrical, there is a noticeable twist in the spheno-occipital joint, and the right temporal-mandibular joint (TMJ) is more anteriorly placed and shows remodelling. The most striking element of these bony changes is the mastoid processes, with the right mastoid process measuring 16.55mm by 30.45mm by 16.46mm, compared to the left mastoid process at 14.51mm by 26.60mm by 12.26mm. The right mastoid also shows remodelling of the mastoid grove. The left parietal has flattened compared to the right, with the parietal boss thus sitting higher on the bone. As such, there is a more oblique angle between the sagittal crest and the temporal line on the right frontal, giving this portion of the skull a flatter appearance. The left zygomatic is somewhat

regressed, which resulted in a differential orbital shape compared to the right. The supraorbital ridges are also asymmetrical, with the right extending further towards the crown but not as far laterally as the left supraorbital ridge.



Figure 6.5: Sided robusticity changes to the skull of 1935:799. Inferior view and frontal view of the skull. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

An oblique fracture was identified on the right tibia and fibula, below the mid-shaft point (see figure 7.5). The fracture line travels anterio-posteriorly from front to back on a diagonal. The proximal tibia fracture surface measures 68.21mm in length, with the proximal fibula fracture surface measuring 16.43mm in length. While all surfaces show healing, the distal portions of the tibia and fibula did not unite with the proximal portions of the tibia and fibula. Significant remodelling occurred to the proximal portion, with the medullary cavities of both the tibia and fibula closing and these two segments fusing through the formation of new bone. In comparison, there is limited remodelling on the distal portions of the tibia and fibula, evidence of bone reabsorption and limited new bone

formation across the fracture site. There is some indication of a habitual position for the proximal sections on the distal sections.



Figure 6.6: Non-union fracture of the right tibia and fibula of 1935:799. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

Diagnosis

Cranial deformations can result from multiple different processes. Craniosynostosis is a condition in which the sutures of the skull close prematurely during growth, resulting in cranial deformation as the pressure of the growing brain results in bony changes (Kutterer and Alt, 2009, p.393). This can result in symmetrical or asymmetrical cranial deformation, depending on which suture is affected; the degree of deformation is associated with the age at suture fusion. Human-lead processes can also change the shape of the cranium when pressure on the bone from a young age results in differing growth, either through intentional skull binding or due to repeated placement in the same position. Cranial deformation can also occur with conditions that primarily affect the postcranial skeleton, including cerebral palsy. The change in overall body positioning that occurs in these

conditions results in different stressors impacting the cranium during growth, which in turn leads to deformities (Tesorieri, 2016). However, none of these diagnoses fit the patterning of bony changes observed in 1935:799. There is no evidence of premature suture fusion, and human-lead processes do not explain the full pattern of changes. The lack of significant postcranial pathology discounts cerebral palsy. Another condition that can result in cranial deformation is Torticollis, otherwise known as wry neck, which presents as a permanent head tilt. Torticollis results in bony changes to the mastoid process as a result of the asymmetrical tension of the sternocleidomastoid muscle (SCM), torsion of the frontal or occipital bones due to the rotation of the head, changes to the facial bones including deviation of the chin point, changes to the positioning of the ears, abnormal placement of the orbital, and asymmetry of the occipital (Yu et al., 2004; Kutterer and Alt, 2009; Kansara et al., 2014; Seo et al., 2016). Almost all of these changes can be identified in 1935:799. As such, it is highly likely that 1953:799 suffered from torticollis.

The identification of remodelling on all fracture surfaces alongside the lack of fusion between the proximal and distal portions of both the right tibia and fibula identify this as a non-union fracture, as this is the pathognomonic presentation of this condition. The significant level of remodelling of the proximal tibia and fibula, alongside the fact that all of the new bone that formed following this trauma was replaced by compact bone suggests that the traumatic incident occurred months to years before the death of 1935:799. Due to the relatively steep angle of the fracture, particularly to the tibia, it is highly likely that while there was a formation of a false joint in the mid-shin it would not have been weight-bearing.

6.2.2 Step 2 – Determining Disability

Clinical impacts

Torticollis develops when there has been damage, underdevelopment, or aplasia of the sternocleidomastoid (SCM) muscle (Kutterer and Alt, 2009; Kansara et al., 2014; Lee et al., 2015; 2017; Zafar et al., 2018). Most commonly unilateral, the shortening or lack of tension caused by the damage to the SCM results in a significant reduction of the motion of the head (Kutterer and Alt, 2009; Kuo et al., 2014; Lee et al., 2015). This presents as a head tilt, with some level of rotation towards the unaffected side (Yu et al., 2004; Kutterer and Alt, 2009; Lee et al., 2015). While torticollis can develop at any point in life through trauma or

disease, the vast majority of torticollis cases within clinical literature are congenital. Congenital torticollis is one of the most common congenital abnormalities, and while there is thought to be a link with difficulties in childbirth, it has multiple aetiologies that are not fully understood (Hollier et al., 2000; Yu et al., 2004; Kutterer and Alt, 2009; Lee et al., 2015).

Clinically, treatment for torticollis is mostly focused on early treatment to prevent the development of facial asymmetry. While there are physical issues associated with torticollis, this focus on preventing or treating facial asymmetry is due to the strong social stigma associated with facial asymmetry. Differences in appearance often lead to differential, potentially negative, treatment by the social group, which can have significant impacts on self-esteem (Kansara et al., 2014; Kuo et al., 2014). This can be particularly true concerning the facial region, which is closely tied to identity. Along with social impacts, torticollis has been linked to some physical difficulties. Babies with torticollis have been found to have difficulties breastfeeding equally well from both breasts and can refuse to suckle from one breast (Kuo et al., 2014; Genna, 2015; Hobaek Siegenthaler, 2017). Alongside the issues associated with head positioning, issues creating sufficient suction can occur, as the SCM is activated in mandibular excursions (Genna, 2015). While there are positioning changes that can be undertaken to encourage feeding, these issues can result in compromised growth and health outcomes. Other developmental issues have been observed in association with torticollis, including slower development of gross motor skills, delays with fine motor skills, issues with communication and interpersonal skills, asymmetrical use of hands, and higher susceptibility to infection (Kansara et al., 2014; Kuo et al., 2014; Cabrera-Martos et al., 2015; Watemberg et al., 2016; Hobaek Siegenthaler, 2017). It is also reported in the clinical literature that torticollis can result in reduced mobility due to poorer balance, lower visual dependence for postural control, changes to gait, and slower walking speeds (Barr et al., 2017). Research by Zafar *et al* (2018) has found that alterations to head and neck posture, like those seen in torticollis, can have a noticeable effect on respiratory function. The SCM and other muscles of the neck are accessory to respiration as they assist the diagram by lifting the rib cage, particularly during laboured breathing (*ibid*). Not only does this affect the ability of those with torticollis to completely fill and empty their lungs, but it can also

have knock-on effects, as changes to diagram and core function can lead to other systematic disorders.

Non-union is a serious, chronic complication of fracture healing and can result in serious dysfunction and pain. Clinically linked with the absence of completed healing after six to nine months, the causal factors for the development of a non-union fracture are many and not all well understood. These factors include nutritional state, age and sex, comorbidities, bone(s) involved, pattern of fracture, soft tissue damage, interposed soft tissue, infections, mechanical stability, and extent of trauma (Copuroglu et al., 2013; Pountos et al., 2013; Ferreira et al., 2016; Nandra et al., 2016; Wildemann et al., 2021). The development of this complication is associated with severe pain, loss of function, deformity, stiffness of associated joints, muscle atrophy, and significant reductions in quality of life (Copuroglu et al., 2013; Pountos et al., 2013; Tay et al., 2014; Ferraz et al., 2016; Kugelman et al., 2019; Stewart, 2019; Wildemann et al., 2021). Non-union fractures of the weight bearing bones are particularly severe, as they directly impact mobility and have been associated with long term health outcomes on par with end-stage hip arthrosis and congestive heart failure (Wildemann et al., 2021). Analyses using time-trade-off – a quality of life measure in which patients are asked how many years out of 10 living with their current health situation they would give up to live the remainder in perfect health – found that patients with non-union fracture would trade more time than those with asthma, diabetes, end-stage osteoarthritis, or stroke (Brinker et al., 2017; Stewart, 2019).

Estimating the need for care

While we cannot confirm whether 1935:799 suffered from congenital or acquired torticollis, the identification of tension from the frontal through the base of the skull to the occipital, along with asymmetries in the facial bones strongly suggests that it developed during childhood at the latest, while the bones could still deform. As such, this would have been a lifelong condition for 1935:799. The asymmetry identified in the facial bones of this individual is not as extensive as that which can develop in more extreme manifestations of torticollis. This suggests that while there would have been a noticeable head tilt, deviation in the level of the eyes, and changes to the positioning of the jaw, the deformation of the face probably would not have been extreme. It is highly likely that this would have had

some social impact on 1935:799, however we cannot comment on the outcome of this impact.

Based on the clinical literature, torticollis would also have had physical impacts on this individual. The changes to the TMJ and the mandibular condyle would suggest that there was some pain associated with the use of the jaw. This would have impacted both mastication and speech. It is probable that the primary physical impact of torticollis on 1935:799 was mobility based. The head tilt and resulting change in the level of the eyes and ears would have most likely affected the balance of this individual. While they likely would have learnt to overcome the main challenges, clinical literature suggests that this would have also resulted in changes to their gait and walking speed. It is interesting that the most severe accidental trauma identified in the Early Bronze Age assemblage was found in this individual. This supports the concept that this individual had some gait or balance issues that were associated with torticollis, which could have contributed to the incident that resulted in the trauma to their right lower leg.

As mentioned, the degree of healing identified on the non-union fracture suggests that the trauma that resulted in this fracture occurred months to years before the death of 1935:799, meaning that this individual lived with this chronic complication for some time. Similarly to SK5 from Moone, Co. Kildare, chronic pain and mobility issues would have been the primary impact. While we cannot comment on the degree of pain, as with SK5, it is probable that the pain would have resulted in fatigue, activity avoidance, joint stiffness, and mood changes. Joint stiffness can be attested from the degree of osteophytic growth on the right patella in 1935:799. It is highly probable that following the development of the non-union fracture, the right leg would not have been weight bearing, as suggested by the angle of the fracture. The trauma to the tibia and fibula would have also resulted in the destabilisation of the ankle joint, which would have also severely impacted weight bearing. The resulting difficulties in walking would have impacted all activities of 1935:799, including the ability to participate in agriculture or animal husbandry practices, or with transporting materials around the settlement.

The pathological changes identified in 1935:799 strongly suggest that they were a recipient of care from their community. Due to the differing nature of the conditions identified in 1935:799, this care would have taken different forms across the lifespan of this individual. While the torticollis would have impacted 1935:799 throughout their entire life, it is highly likely that the non-union fracture would have required a higher level of care. As this occurred at a later point in life, the community could have needed to reassess their expectations for this individual after the development of the non-union fracture. While this individual did receive a 'deviant' burial, the formal burial of 1935:799 in a cist does suggest that this individual, or their direct kin group, was valued.

6.2.3 Step 3 – Model for Care

The clinical and functional impacts associated with the identified pathological changes in 1935:799 suggest that this individual's survival to the attained age-at-death was supported by their community through both accommodation and direct support. Care for 1935:799 would have begun after they developed torticollis. If this happened during infancy, then they may have required assistance with breastfeeding. As issues with breastfeeding can develop for multiple reasons and are quite common, it is likely that there would have been communal knowledge and behaviour to support mothers and infants during this period.

As development continued, any developmental delays that arose would have required increased time and input from the kin group and the community for 1935:799 to reach developmental milestones. Specific challenges could have arisen around mobility, especially if 1935:799 had balance issues as has been suggested. As these care requirements developed during childhood, a period in which care and dependency is expected (Gowland, 2017, pp.242–243), it is likely that the community assisted the kin group of this individual in addressing and accommodating any challenges. These accommodations could have included more input during teaching, increased community supervision, increased time allotted for mobility or mobility aids, such as a walking stick.

It is probable that the subsistence activities that 1935:799 would have been able to undertake would have been restricted by their torticollis. Mobility issues combined with possible respiratory restrictions would have reduced the labour that 1935:799 was capable

of undertaking. As such, the community would have needed to identify activities that 1935:799 could complete safely. These could have included animal husbandry, food preparation, and possibly working in part of a team to complete subsistence tasks. While the challenges faced by 1935:799 would have required accommodation from their community, it is unlikely that direct support to allow for survival was required. Balance issues could have also made 1935:799 more accident prone, which may be substantiated by the identification of a non-union fracture in this individual.

The care required by 1935:799 would have increased significantly following the incident that resulted in the oblique transverse fracture of the right tibia and fibula. Due to the forces required to fracture both the tibia and fibula, 1935:799 would have needed direct support immediately following the trauma. After the incident they would need to be stabilised quickly (including stopping bleeding and attending to symptoms of shock), and if the incident occurred outside the immediate confines of the settlement they would have had to be moved to a safe location before the majority of any treatment could occur. The pain of such trauma would have been significant, requiring the use of pain management. Following the initial care associated with the incident, 1935:799 would have needed help maintaining personal hygiene, food provisioning, and hydration as they began to heal.

After the development of a non-union fracture, the community would have had to reconcile the fact that the support required by 1935:799 had developed into a medium to long term need, rather than a short term one. While it is likely that 1935:799 regained some level of independence, pain management would have continued to play a significant role in the comfort of this individual. If mobility aids were not used before, it is most probable that they would have been required after the fracture. The evidence of bone positioning identified in 1935:799 suggests that the community might have attempted to stabilise the area through wrapping the area around the false joint, or through the use of a splint. While this probably wouldn't have provided enough stability for weight-bearing, it could have improved 1935:799's ability to move around the settlement and possibly reduced pain through unintentional movement of the fracture site. Even with this increased stability, the mobility challenges associated with the loss of use of the right leg would have likely required ongoing support and assistance from the community.

6.2.4 Step 4 – Interpreting Care

As explored in relation to SK5, it is important to consider elements of social relationships, and identity when interpreting care. If the torticollis identified in this individual was congenital, as suspected, then they would have required care from birth. The social impact of the care required by 1935:799 may not have been significant early on, as care requirements and dependency is expected for the young (Gowland, 2017, pp.242–243), as mentioned earlier. However, as the care requirements of 1935:799 started to diverge from others as they required more input to reach the expected developmental milestones, it is possible that the community began to re-assess the social expectations of this individual. As this occurred early on in the life of 1935:799, it is possible that the community approached the social identity of this individual from a state of permanently altered social expectations that resulted in the formation of a non-normative social role and identity. This does not mean that this non-normative role was not related to the normative adult male role, or that it was seen negatively by others. This was likely somewhat compounded by facial asymmetry that this individual would have had. Alongside a role associated with elements of lifeways, it is possible that 1935:799 had a role associated with the ritual aspects of the community, if the differences of this individual had connections within that sphere.

Alongside the changes to physical care that 1935:799 required following the fracture and the development of the non-union, this traumatic event would likely result in changes to identity. The injury itself would have likely been traumatic, and 1935:799 would have needed emotional care in the immediate aftermath of the injury. As it became clear that this injury would have a lasting impact, particularly with the development of the non-union, 1935:799 would have needed to come to terms with the shift in their expectation of self. Even considering the impact of torticollis on this individual, the sudden change in the abilities of this individual would have resulted in changes to their self-identity as 1935:799 came to terms with their now doubly reduced physicality. It is possible that this shift in expectation of self was accompanied by changes in their social identity. While a new social identity of this individual would have likely been rooted in the pre-injury persona (Gowland, 2017, p.243), the new challenges 1935:799 faced may have resulted in elements of social identity being removed. Depending on how the community considered the new, and long

term, care requirements of this individual, these changes may have resulted in negative outcomes for the individual.

Comparing the mortuary treatment of all three individuals identified for Bioarchaeology of Care analysis, it could be argued that 1935:799 received the lowest status burial, with a non-normative position – crouched on their back, and as a secondary interment. This could suggest that this secondary change in social role resulted in a change in the way 1935:799 was viewed within their community. However, the survival of this individual with a condition that has as such poor long term health outcomes as a non-union fracture, does suggest that they were receiving emotional care and support alongside their physical care. As such, another interpretation of this non-normative burial is that this new social role was reflected in a non-normative burial with an important individual, possibly a respected ancestor or member of an important kin group.

6.3 Grave 3, Lug, Co. Offaly

6.3.1 Step 1 – Description

Context

In the early 1900s in the townland of Lug, near Tullamore, Co. Offaly and 2kms south of the border with Westmeath, the process of levelling a cairn in preparation for cultivation uncovered a series of cist burials (Duignan and Buckley, 2011, pp.393–394). The cairn appears to have been quite large, with the landowner reporting removing over 100 cartloads of stones, with the excavator estimating it to have been roughly 8.2m wide and 1.2m high before the landowner began to level the area (*ibid*). The cairn is reported to have sat on top of a flat-topped mound, some 18-20m in diameter. During the initial removal of the stones the capstones of four cists were uncovered, two of which were removed to allow for ploughing. In 1934 two more cists were uncovered, and subsequently brought to the attention of Dr Adolf Mahr and the members of the Harvard expedition, who undertook a rescue excavated the cairn in 1935 (*ibid*). In total, nine graves were discovered in the cairn: seven cist burials and two pit cremations (*ibid,* p.401). Analysis of the remains has identified 15 individuals: twelve adults and three infants, with five adults being estimated to be female and two adults estimated to be male. Four of the graves contained pottery. The site had

been disturbed prior to excavation, and associated with the multi-phase discovery of the site information on half of the graves was very limited (*ibid,* pp. 400-401). Another cist was found in the townland of Lug in 1975, some 400m away from the location of the cairn (*ibid*). The cist contained the cremated remains of an adult female and a juvenile, and is reported to have contained a pottery vessel, although this could not be confirmed.

Mortuary Treatment

Grave 3 seems to have been placed centrally within the cairn, consisting of an "extremely well made" (Duignan and Buckley, 2011, p.398) short rectangular cist, aligned approximately east-west with evidence of paving in the form of small fragments of limestone embedded in the gravel. The cist contained the crouched remains of a middle adult female (*ibid,* pp. 406-407) lying on their right side, with the skull in the southwest corner of the cist. A small ribbed bowl had been placed upright near the skull. There was evidence of flooding within the cist, including ingress of silt and a water mark eight centimetres high on the northern stone. This resulted in differing preservation of the remains dependent on whether they had become embedded in the silt. A radiocarbon date for this burial has been obtained, yielding a date of 3575 ± 40 BP (GrA-24309), which has been calibrated to 2032-1775 BC (Duignan and Buckley, 2011, p.401).

Skeletal analysis of Grave 3

Skeletal analysis for Grave 3 was completed by Laureen Buckley for the Breaking Ground Finding Graves volume, and is reported in such (Duignan and Buckley, 2011). While this individual was assessed and photographed by the author, the published skeletal analysis forms the basis for this case study. Due to the extensive nature of the pathological changes to this individual, the following will present only a summary. A full skeletal analysis report can be found in *Breaking Ground, Finding Graves* volume 1 (Duignan and Buckley, 2011, pp.406–412).

The preservation of this individual is good, although many of the bones were fragile due to the pathological changes. There was also some water damage noted on a selection of the remains. The skull and mandible were mostly complete. Both clavicles and scapulae were well represented, although there was some fragmentation. The left humerus was complete,

the right humerus represented by the shaft and distal end, and both radii and ulnae were complete. The hands were well represented. All of the vertebral column was represented, although with fragmentation. Twelve left ribs and ten right ribs were identified, along with the body of the sternum. The pelvic girdle was mostly complete, including the sacrum. Both acetabula were complete. Both femurs were fragmented at the distal ends, with the tibiae fragmented at the proximal ends. The fibulae were represented by their shafts. The feet were poorly represented, with the remaining bones significantly decayed (Duignan and Buckley, 2011, pp.406–407). Grave 3 has been estimated to be female based on the morphology of the skull and pelvis. Due to the significant pathological changes to this individual, age estimation was difficult, with tooth wear suggesting a refined age-at-death estimate of 25-40 (*ibid*).

More than 130 lytic lesions, areas where bone has been destroyed, were identified across several bones in Grave 3, involving almost all skeletal regions. The lesions were of various shapes, although often roughly circular, and had no indication of bony repair. Lytic lesions were identified on the scapulae, clavicles, humeri, all observable vertebrae, most observable ribs, sternum, sacrum, ilia, ischia, both pubic bones, femora, and throughout the skull. Of particular note were the almost complete destruction of the medial ends of both clavicles, significant destruction of the sternal body, a significant number of lesions in the ilia, almost complete destruction of both pubic bodies, and a lesion 35mm wide located approximately 40mm above the left orbit (see figure 7.6 and 7.8). Following the identification of these lesions, the skull was CT scanned at the Advanced Radiology Centre, which revealed a significant number of additional lytic lesions which were not identifiable through macroscopic analysis. This is due to the fact that they were primarily located in the internal structure of the bone, although some had penetrated the endocranial surface. It is noticeable that in both the humeri and femora the lesions were restricted to the medial portions of the bone, particularly the heads and anatomical necks. None of the distal limb bones (ulnae, radii, tibiae, fibulae) were impacted. A detailed list of the identified lesions can be found in the published skeletal report by Buckley (Duignan and Buckley, 2011, pp.407–412).



Figure 6.7: Lytic lesions identified in Grave 3. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

Alongside the lytic lesions, a number of pathological fractures were also identified (see figure 6.8). Compression fractures were identified in T4, T9, T10, L2, and probably L4. A healed fracture was identified in one right rib. A fracture was identified in the sacrum at the S3/S4 juncture resulting in an almost 90 degree angle, which may have been associated with a small fall or repeated pressure on the weakened sacrum.



Figure 6.8: Pathological fracture of T10 and the Sacrum. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

The left wrist had been dislocated, possibly in childhood, which resulted in the left radius curving laterally and the creation of a false joint just above the ulnar notch.

Diagnosis

The bony changes identified in Grave 3 are characteristic of myeloma, a cancer of plasma cells that predominantly impacts bone marrow. As myeloma develops, it spreads through the bone marrow of the individual, resulting in 5mm to 2cm lytic lesions with sharply defined or scalloped edges and no osteoblastic activity (Grauer, 2019, pp.520–522). The most common and characteristic presentation of myeloma is multiple myeloma, in which multiple lesions can be identified. Clinical studies have identified a male predominance in cases of multiple myeloma. The most common differential diagnosis of multiple myeloma is that of osteolytic metastatic cancer (Grauer, 2019, p.522). While osteolytic metastatic cancer, particularly breast cancer, is more common in females and as such must be assessed in this situation, it often does not have as extensive skeletal involvement as in cases of multiple myeloma and there is often evidence of osteoblast activity associated with some of the legions. The identification of lesions in almost all of the areas which are most commonly affected in multiple myeloma (cranium, clavicles, vertebrae, sternum, ribs, scapulae, pelvis, and long bones) does support a diagnosis of multiple myeloma. However, due to the

taphonomic damage, not all of the lytic lesions identified in Grave 3 can be positively identified as pathological in nature. As such, this author supports Buckley's (2011) diagnosis of probable multiple myeloma. Accepting this diagnosis, the identification of more than 20 focal lesions in Grave 3 suggests that this individual was suffering from Stage 3 multiple myeloma at time of death (Delorme and Baur-Melnyk, 2009).



Figure 6.9: Frontal view of skull of Grave 3 showing the largest of the lytic lesions in the skull. All images copyright National Museum of Ireland. Images reproduced with the kind permission of the National Museum of Ireland.

6.3.2 Step 2 – Determining Disability

Clinical impacts

Multiple myeloma is a neoplasia of plasma cells, which results in tumour growth in the bone marrow, and has a uniformly fatal outcome for those affected (Mitsiades et al., 2004; Grauer, 2019, pp.520–521). Multiple myeloma has a multistage evolution consisting of monoclonal gammopathy of undetermined significance (MGUS), a 'smouldering' or

asymptomatic phase that can last for years, a symptomatic intermedullary phase, and a extramedullary or plasma cell leukaemia phase (Mitsiades et al., 2004). As mentioned, the characteristic lesions of multiple myeloma are lytic bone lesions, which develop when the uncontrolled growth of plasma cells in the bone marrow develops into a tumour. These tumours cause an uncoupling of the natural balance of osteoclast and osteoblast activity, promoting osteoclast activity and suppressing osteoblasts (Mitsiades et al., 2004; Heider et al., 2006; Brigle and Rogers, 2017). As multiple myeloma progresses, the impact spreads outside the bone marrow, resulting in organ damage and eventual failure. Even within modern contexts survivability of patients can be highly variable, ranging from six months to ten years (Terpos et al., 2010; Brigle and Rogers, 2017), however the median overall survivability historically is around two to three years (Acaster et al., 2013; Terpos et al., 2021). There are a range of risk factors which contribute to the severity and survivability of multiple myeloma, including genetic factors, haemoglobin levels, comorbidities, abnormal organ function, and the degree of skeletal involvement (Delorme and Baur-Melnyk, 2009; Terpos et al., 2010; Kleber et al., 2011).

In clinical presentations of new cases of multiple myeloma, the most common symptoms are pain/bone pain, fatigue, and anaemia (Mitsiades et al., 2004). As the multiple myeloma progresses, symptoms increase to include pathological fractures, osteoporosis, renal dysfunction, hypercalcaemia and less common hyperviscosity, bone marrow failure, and increased risk of infection (Mitsiades et al., 2004; Heider et al., 2006; Terpos et al., 2010; 2021; Acaster et al., 2013; Sonneveld et al., 2013; Osborne et al., 2014; Baz et al., 2015; Brigle and Rogers, 2017). Bone pain is the most common symptom, reported in 75-80% of patients and can often increase with activity, resulting in decreased physical function (Heider et al., 2006; Terpos et al., 2010; Baz et al., 2015; Brigle and Rogers, 2017). As the lytic lesions spread, they often result in osteoporosis and pathological fractures, affecting 40-50% of patients, which often result in severe pain, surgical requirements, and are associated with decreased survivability (Terpos et al., 2010; Raje and Roodman, 2011). The most common pathological fractures are vertebral compression fractures, which develop as the bone loses structural integrity in the presence of lytic lesions. Renal dysfunction occurs in 20-40% of patients and is linked to decreased survivability (Kleber et al., 2011; Gonsalves et al., 2015).

It is unsurprising that multiple myeloma has been linked with a decrease in quality of life (Osborne et al., 2014; Baz et al., 2015; Ramsenthaler et al., 2016). Bone pain impacts mobility and activity levels, affecting the ability of patients to undertake daily activities (Baz et al., 2015; Ramsenthaler et al., 2016; Brigle and Rogers, 2017). Pain also has an effect on sleep, exacerbating the fatigue associated with multiple myeloma, which in turn can also impact the ability to perform daily activities and social roles. The negative effect of a multiple myeloma diagnosis on the emotional state of patients is documented, with depression reported in many patients associated with the physical, role, and social changes that follow the terminal diagnosis and the development of the full range of symptoms (Osborne et al., 2012; 2014; Baz et al., 2015).

Estimating the need for care

While the extent of bony changes identified in Grave 3 suggest that the cancer had progressed significantly, it is impossible to securely identify the time period between the development of symptoms and death. However, considering the progression of the disease and the historical survivability of multiple myeloma, it is likely that the symptomatic period was six months to two years. Due to the multi-stage evolution of multiple myeloma, it is highly likely that Grave 3 would not have been noticeably symptomatic for a period after they developed multiple myeloma. MGUS and the 'smouldering' phase both have limited presentation, and it is not uncommon for these phases to go undetected in modern populations. During this period it is likely that Grave 3 suffered from fatigue, which while impactful would not have required care. However, once the full range of symptoms developed, the needs of this individual would have changed.

With bone pain being the primary symptom associated with multiple myeloma, it is most probable that Grave 3 would have had to deal with chronic pain. As mentioned previously, chronic pain can have a serious impact on an individual, affecting sleep, mood, mobility, and the ability of an individual to participate in expected social norms. Fatigue and anaemia would have reduced the activity levels available to Grave 3, which would have impacted the amount they would have been able to contribute to food production, food preparation, and other necessary activities for the community. There would have also been an impact on the mobility of this individual, not only through fatigue which would have made mobility over

long distances extremely difficult, but the bone pain and bone weakening associated with the lytic lesions identified would have severely affected this individual. The number of lytic lesions identified on the femoral necks in particular raise concerns around the weight bearing abilities of these bones. Evidence of these concerns is demonstrated by the identified pathological fractures: compression fractures of the vertebrae and a fractured sacrum. While compression fractures of the vertebrae can result in the compression of nerve tissue, a serious complication, the complications associated with the sacral fracture can be quite serious, including chronic pain and bladder dysfunction. The combination of bladder dysfunction and renal impairment could have resulted in further complications, if Grave 3 was also suffering from this common comorbidity of multiple myeloma. The angle in which the sacral fracture healed also suggests that this might have resulted in some bowel complications.

Towards the end of their life, it is highly likely that Grave 3 would have required direct support. It is quite possible that they became bed-ridden, suffering from severe pain, fatigue, nausea, renal and bowel complications, and possibly infection. This would have resulted in the need for assistance from the community in all areas of life, including personal hygiene, food preparation, hydration, mobility, and pain management. The progression of the lesions in Grave 3, combined with the mortuary treatment of a centrally placed cist suggest that this individual was a valued and cared for member of the community in the face of a serious disease process.

6.3.3 Step 3 – Model for Care

The impact of the pathological changes identified in Grave 3 suggest that this individual's survival to the achieved age at death was supported by the care, both accommodation and direct support, provided by their community. As with each case study explored here, care would have begun once symptoms developed and would have increased in intensity as the disease progressed. Throughout the entire disease process, pain management would have been a core element of care for this individual. Alongside the provision of pain management, the community would have had to absorb the outcomes of such pain, including activity avoidance, decreased productivity of Grave 3 in their tasks, increased fatigue, irritability, and mood changes. Fatigue in particular would have had a similar and

synergetic effect on outcomes. The reduction in the ability of this individual to participate fully in their social role would have been one of the primary costs of care accommodation for Grave 3. Any loss of assistance in food provisioning would have required the other members of the community to increase their contribution, or there would have been a decrease in the food surplus that acted as a cushion for poorer times.

As is the case with many disease processes, the care required by Grave 3 would have fluctuated over their symptomatic period, with periods of increased need and periods of increased independence. One such period of increased requirements would have followed the pathological factures identified in this individual. While it is reported in the clinical literature that pathological fractures in multiple myeloma can occur following minor impacts, like most trauma they would have been associated with pain and other care requirements. The sacral fracture in particular would have required a higher level of care directly following the trauma. This would have included pain management, increased rest, and increased assistance requirements for essential functions. While the condition of the sacrum does suggest that this injury completely healed before the time of death, one does wonder if this trauma signalled a significant decrease in the quality of life for this individual.

At the peak of need, likely lasting weeks to months, Grave 3 would have been almost completely dependent on the community. While they may have been able to feed themselves, assistance in food preparation was probably limited and assistance in food and water provisioning beyond the scope of this individual. It is probable that they needed assistance with mobility, maintaining personal hygiene, position changes to prevent bed sores, and assistance in maintaining body temperature. As such, it would have required significant supervision to make sure that Grave 3 was as comfortable and safe as the community could accommodate. This would have all been especially true once Grave 3 became bed-ridden and required dedicated care from one or two individuals. This level of care would have continued until their death.

6.3.4 Step 4 – Interpreting Care

As explored above, there would have been social and emotional aspects to the care required by Grave 3. Disease processes like the one identified in Grave 3, with quick and

extensive changes to the physical condition and needs of an individual, are often associated with reductions in mental quality of life outcomes. This is particularly well documented in relation with multiple myeloma in the clinical literature, often with comorbidities of depression. While it is possible that some of these negative outcomes associated with multiple myeloma are linked to the terminal diagnosis, something which would not have been understood in the same way in the Early Bronze Age, Grave 3 would have needed emotional support as their disease progressed. However, other elements of this process would have held true regardless. As explored with individual 1935:799, it is probable that the onset of symptoms was associated with a shift in expectations of self, as their concepts of their future self disappeared. Grave 3 would have needed emotional support across this period, and considering their survival, it was likely provided. While elements of their pre-disease communal identity would have carried over, changes in their social identity likely accompanied the changes in self-identity, particularly as their dependency on the community increased.

The unusual nature of this disease process, it is likely that the cultural understanding of the disease may have borrowed from, or been rooted in, another disease. Considering the pain, activity avoidance, decreased productivity, and fatigue, it is possible that the social identity of this disease process may have had links to age. As such, it is possible that an 'aged' role like an elder may have become an element of identity in Grave 3, with contributing to food preparation, childcare, and/or knowledge transfer allowing for this individual to feel needed by their community. It is also possible that the unusual disease process of Grave 3 resulted in the development of a ritually focused social identity, like that suggested for 1935:799. If they were seen as someone between life and death, this position of liminality may have been considered as influential by their community. The mortuary treatment of this individual, buried in the central cist of a large cairn, does support that this individual was an important member of the community.

Chapter 7: Discussion

One key element of bioarchaeology is the integration of the osteological data with the other strands of archaeological information. By considering the bioarchaeological data within the context of the other stands of the archaeological contexts, this chapter reflects on the social relations, organisation, practice, and identity in the Early Bronze Age of Ireland. Three main avenues were identified to structure this chapter. The first of these approaches the demographics of the period, and asks what elements of society and organisation can be seen through the lens of the grave. The second focuses on how the body has acted as a record of lived experience, looking at elements of health, disease, and trauma. The third considers how the communities of the Early Bronze Age of Ireland responded to their lived experience, what practices can be identified and how these interfaced with concepts of identity.

Before approaching the discussion, outlined below is an overview of the key points identified in the analyses of the previous chapters:

- Higher proportion of male burials, no demographic groups excluded from burial
- Relaxation of the impact of gender ideology in the old adult cohort
- Higher proportion of female burials with complex non-ceramic grave goods
- Population levels of frailty are generally low, with neither gender or status ideology seem to have played an important role in health outcomes
- Evidence of high levels of physical activity within the assemblage
- Noticeably low levels of trauma in this assemblage, with no definitive evidence for interpersonal violence
- Healthcare was present in the Early Bronze Age in Ireland which recognised a wide range of situations
- Care consisted of both physical, emotional, and social elements
- The need for care did not disqualify an individual from formal burial

7.1 Society as Reflected in the Individualised Burial Tradition

As mentioned in section 2.5, the burial record has formed a core element of understandings of Bronze Age social structure across Europe, with age and gender ideology often of interest within discussions of society during this period. The evidence for these considerations of age and gender have often been rooted in demographic analyses of excavated cemeteries, with a focus on estimated sex and age-at-death. However, past discussions of demographics often ignore a key element: an understanding of the nature of the burial record itself. In bioarchaeology, it is understood that the burial record never perfectly reflects the living population. This is due to multiple factors, some of which can be controlled for, including excavation and curation, and others which are uncontrollable, including burial practices and preservation (Mays, 2021). Each of these factors introduce the possibility of losses and biases in the burial record (see figure 7.1). As such, a skeletal assemblage always represents a sub-sample of the once living population, and an understanding of how various factors impact the burial record is important when interpreting skeletal assemblages.

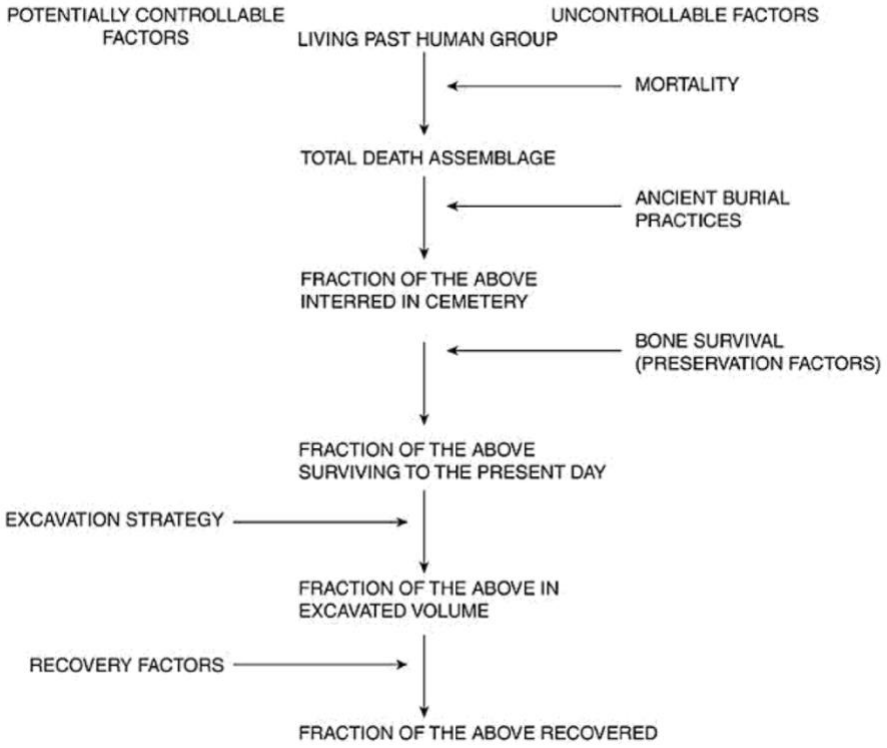


Figure 7.1: Factors impacting skeletal assemblages. Source: Mays (2021)

One of the larger impacts on the creation of the skeletal assemblage is mortality, as it is through mortality that a living population enters the death assemblage – "skeletal collections are collections of the dead" (*ibid,* p.20). Thus, recognising the impact of this is important as mortality also does not act on a population at random. This results in a death assemblage does not neatly reflect the living population. While the most obvious impact of this can be seen in age, as the risk of death changes over the lifespan, mortality bias influences multiple elements of bioarchaeology and continues to be a focus for debate (Wood et al., 1992; Wright and Yoder, 2003; DeWitte and Stojanowski, 2015; McFadden and Oxenham, 2020).

While the impact of preservation bias on the skeletal record cannot be ignored, it is the other uncontrollable factor identified by Mays (2021) that arguably has the largest impact on the skeletal record after mortality – burial practices. In most communities there are culturally mediated rules associated with the disposal of the dead. These rules can govern all aspects of the treatment of the dead, including modes of disposal/burial, burial location, orientation, and grave goods (*ibid*, p.21). They also can differ between members of the community, along axes such as age, gender, kinship, and status. One distinct impact of burial practices is the question of archaeological visibility. If an individual is not buried in the soil or in a tomb, it is very unlikely that they will be preserved in a manner that allows for excavation and visibility in the archaeological record. If different sections of the population were subject to different burial practices, the skeletal record will only document a fraction of the living population. As such, it is vital to remember that the burial record consists only of the part of the total death assemblage who were disposed of in an archaeologically visible manner and were subsequently excavated.

Since burial practices are created through the implementation of culturally mediated rules, the study of these practices can act as a proxy for the study of societal structures. As such, it is unsurprising that they are often of interest to archaeologists. This holds true for the Early Bronze Age in Ireland, particularly as the settlement record is comparatively poor. As outlined in section 2.5, burial practices have been a focus of study into the society of this period, investigating evidence of social stratification, relational personhood, and age and gender ideology. However, before investigating how the burial practices of the

Individualised Burial Tradition as seen in this assemblage reflect society, it must first be considered to what degree is the skeletal record is a record of who died, the question of if formal burial was restricted. This is important, as the answer directly impacts the interpretation of other aspects of the burial practices of the Early Bronze Age in Ireland and how they reflect culture during this period as it changes how representative of the population the burial assemblage is for this period. Interrogation of restricted burial has mostly been approached through demographic analysis, with a focus on identifying evidence of preferential rates of burial for one section of the population. Consistent with, and using comparisons to, past publications, this study will examine the demographic composition of this skeletal assemblage in an attempt to answer the question of whether formal burial was restricted in the Individualised Burial Tradition. Following this, the burial attributes of the Individualised Burial Tradition will be considered. Multiple elements of burial practices will be probed, particularly the ways in which they relate to age and gender ideology, in order to investigate the picture of society that the burial practices reflect.

7.1.1 Demographics and Restricted Formal Burial

Demographic analysis, particularly estimated sex and age-at-death, of past assemblages has suggested to some that the Individualised Burial Tradition was one of restricted formal burial. Mount (1995; 1997) identified biases in both the estimated sex and age-at-death breakdown of his sample, including almost twice the number of male burials compared to female burials and an under-representation of children, which led him to propose that the Individualised Burial Tradition favoured adult males. This restriction in who qualified for burial was reflected in other burial attributes, with Mount proposing a model of social status centred on adult males. While agreeing with Mount's identification of social status associated with adult males, McSparron rejected the proposal of a restricted burial tradition (McSparron, 2017, p.74). Demographic analysis of McSparron's assemblage identified only a slightly higher proportion of male burial compared to female burial (26.3% compared to 21.3%), along with a higher proportion of non-adult burial as compared to Mount (32.3% in McSparron compared to 20% in Mount) (*ibid*, pp.197–198). While Haughton (2020; 2021; 2023) did not directly address the question of restricted formal burial, the demographic analysis of his assemblage painted a picture that does not match either Mount or McSparron. Regarding estimated sex, Haughton identified a similar bias towards male

burials as that seen in Mount, while the age-at-death analysis supported McSparron's proposal of a representative sample.

Analysis of estimated sex within this assemblage identified a higher percentage of males buried, roughly two male burials for every female burial. As such, the distribution of sexed burials in this assemblage is similar to the assemblages studied by Mount (1995, p.109; 1997, p.161) and Haughton (2020, p.94). As it is unlikely that the mortality rates of males were twice that of females, the identification of such a notable impact of sex on burial numbers suggest a cultural element at play. One commonly proposed interpretation for sex differences in burial rates is high levels of violence within societies, particularly warfare, as these tend to preferentially involve males. However, considering the low levels of trauma identified in this assemblage (see section 7.2.3), this is unlikely to be the case. Instead, this difference in the number of male and female burials supports the identification of restricted formal burial, where sex ideology impacted who qualified for formal burial. Further evidence for restricted burial has been identified by Haughton (*ibid*, pp.217– 220), who highlighted how this population trend of male bias is inverted in some regions with the identification of cemeteries with a female bias in the demographics (including Ballynacarriga (Lehane and Leigh, 2010) and Oldtown (Mount et al., 1998)).

Another thread of interest when considering the question of restricted formal burial is the impact of age ideology. The identification of all age categories within the assemblage, even if the proportion of individuals was not equal across the categories, does illustrate that there was not an age demographic which was excluded from formal burial in this period. Alongside considering if any were excluded from burial, the other element of age ideology which receives the most interest is that of the representation of non-adult burials with the Individualised Burial Tradition. As mentioned above, Mount reported that his sample contained 20% non-adults, which he used to support his interpretation of the restricted nature of formal burial in this period. Referencing work by Morris (1987), Acsádai and Nemeskéri (1970), and Weiss (1973), Mount identified an expected level of 45.2-51.8% of non-adult burial for pre-industrial agricultural societies (Mount, 1995, pp.108–109; 1997, pp.159–160). This suggested to Mount that non-adults were underrepresented in the Individualised Burial Tradition by more than half. In their analyses, both McSparron (31.2%;

2021, pp.197–198) and Haughton (39.5%; 2020, p.93) identified a higher proportion of non-adults, closer to that identified in this assemblage (29.2% of burials). McSparron and Haughton reference Chamberlain (2006), Lewis (2007), and Goodman and Armelagos (1989b), in identifying an expected proportion of 30% to 40% of non-adult burials. Considering the identification of low levels of frailty within this assemblage (see 7.2.1.1 below), it is possible that child mortality was at the lower end of the proposed range. If so, this would suggest that the identified proportion of non-adult burials in this assemblage (29.2%) would be approaching the level expected in the population, suggesting that non-adults and adults were buried at roughly equal rates. As such, there is no clear evidence of restricted formal burial within the age-at-death demographics.

One element of demographics that has not been explicitly investigated in previous publications is sex distribution within the age-at-death categories. Considering the identification of a clear sex bias within the Individualised Burial Tradition, but a lack of a clear age-at-death bias, this analysis provides another avenue to interrogate how closely the Individualised Burial Tradition represents the total death assemblage. Analysis of the adults within the assemblage identified a decreasing bias in estimated sex as age-at-death increased, with the proportion of young adult males noticeably higher than young adult females while the proportion of old adult males is only slightly higher than that of old adult females. This change in the sex bias of the assemblage from over two male burials for every one female burial in the young adults, to under two male burials for every female burial in the middle adults, to an equal burial proportion on old adults supports the identification of a restricted formal burial tradition, as such a mortality bias is highly unlikely. This supports that a cultural element is impacting on the creation of this burial assemblage – a restricted formal burial.

Considering that the archaeological record suggests that small farmsteads seem to have formed the base unit of community during this period (McLaughlin et al., 2016, p.137; Ginn and Plunkett, 2020, p.52; Johnston, 2021, pp.140–153), it is possible that an element of physical prowess, as agriculture is a physically demanding activity, was associated with qualifying for formal burial at least for young adults. When considering the almost equal gender distribution in the old adults, two interpretations present themselves – either

qualification for old adults was dependant on a different 'rule' than young adults or that the 'rule' which resulted in the male preference still held but females now met the requirements at an equal rate to the males in this age category. Considering the variation identified between the demographics across different cemeteries (Haughton, 2020, pp.217–220), it is likely that these 'rules' would have differed both temporally and geographically, as well as across the life course.

When considering evidence for restricted formal burial in this assemblage, one other consideration if the size of this assemblage itself. The Individualised Burial Tradition was practiced over a period of roughly 700 years, and this assemblage contains 198 individuals. If this assemblage consisted of all individuals buried during this period it would calculate to one individual buried roughly every 3.5 years. Even considering that the primarily period of inhumation burial lasted roughly 400 years, that is still only one burial roughly every 2 years. However, this assemblage does not account for all individuals buried in the Individualised Burial Tradition. The assemblage for this project consists of curated inhumed individuals and thus excludes both the extensive cremated burial record for this period and the significant number of inhumations which did not receive curation. While exact number of all burials of the Individualised Burial Tradition is unknown, work completed by Murphy *et al* (2010) on the Peoples of Prehistoric Ireland database identified roughly 2500 individuals dating to the Early Bronze Age, which calculates to a burial rate of 3.6 individuals per year. Even considering the impact of preservation and excavation, the number of individuals represented within the Individualised Burial Tradition is still smaller than any predicted population size for the island of Ireland in this period (Quinn, 2015; McLaughlin et al., 2016). While this number of burials associated with the Individualised burial tradition does support the interpretation of restricted formal burial, it does also highlight how important and complementary a large-scale, modern bioarchaeological re-assessment of the cremation burials from this period would be to this project.

The analysis of estimated sex and age-at-death within this assemblage supports the identification of restricted formal burial in the Individualised Burial Tradition. However, no section of the population was excluded from formal burial. Elements of age and gender ideology have been identified within the requirements for formal burial, particularly though

the preferential burial of young adult males. However, it does seem that the specific requirements for qualification differed across these ideological axes as reflected in the even gender distribution of older adults. While this assemblage only represents the curated inhumations from the Early Bronze Age of Ireland, this analysis is broadly consistent with previous analyses which have included the cremated material. The identification of restricted formal burial does raise a question around how representative this assemblage is of the broader Early Bronze Age population. As such, we must recognise that this assemblage represents the portion of the population which qualified for formal burial.

7.1.2 Burial Attributes and Ideology

Considering the identification of age and gender ideology within the restrictions to formal burial, it would be expected that elements of these ideologies would also be present in other parts of society and thus the Individualised Burial Tradition. To investigate this, analysis of the differences in the distributions of male/female and non-adult/adult across the burial attributes was undertaken. This is not the first study to probe the Individualised Burial Tradition for the influence of these ideologies. While a clear connection between these ideologies and the burial attributes could not be consistently identified within this assemblage, the outcomes do paint a slightly different picture than that in previous studies. For ease of discussion, the burial attributes were split into three groups: *The Grave* (grave type, grave occupancy, and body position), *Grave Goods* (ceramic and non-ceramic grave goods), and *Distribution* (geographic and temporal distribution).

7.1.2.1 The Grave

It is not surprising that the form of the grave itself has received interest regarding interpretations of burial practices. Mount (1997, pp.126, 130–131) identified correlations between both age and gender ideology and grave type, proposing that cist burial was the higher status rite due to the larger output of energy required for its construction, which was predominantly afforded to both adults and males. This neat relationship, however, has not been seen in other publications, with McSparron (2017, pp.218–224) finding no evidence of either age or gender ideology associated with grave type. Haughton (2020, pp.96–97) found no sex-based difference in the proportion of individuals in each grave type, however he did identify a statistically significant increase in the proportion of non-adult cist burial within his

sample, contradicting Mount's findings. Within the assemblage that formed the basis of this study, there was no definite evidence of either age or sex having an influence on choice of grave type in the Individualised Burial Tradition. There was no noticeable difference between the proportion of males and females who received cist burial and a higher proportion of non-adult in cist burials, while notable, was not statistically significant. As such, this analysis suggests that for those who qualified for formal burial, factors outside of age or gender governed the choice of grave type.

Grave occupancy has been linked with both age and gender ideologies by previous studies. Mount (1995, p.109; 1997) associated single burial with higher status, with a multiple burial reflecting those who needed to 'pool' their status to be afforded the rite, with a higher proportion of both adults and males within single burials. Both McSparron (2017, p.224) and Haughton (Haughton, 2020, pp.99–101) identified a significant relationship between non-adults and multiple burial, however no evidence of a gender-based preference within single adult burials was identified. The trends identified by both McSparron and Haughton were also seen in this study, with no association between gender and grave occupation but a statistically significant higher proportion of non-adults buried with other individuals. It should be noted that single burials of individuals from all age categories were identified, suggesting that while it was more common for a non-adult to be buried with another individual, this was not an essential requirement even for the youngest members of the community.

The clear preference for crouched burial in the Individualised Burial Tradition identified in previous research was also seen in this study. This does suggest that the cases where an individual was buried in another body position may be significant, and it is interesting to note that all individuals identified buried on their back were male. The lack of a clear relationship between burial side and sex has been previously noted in the Individualised Burial Tradition. McSparron (2017, p.222) identified a slight preference for females to be buried on their right and males on their left, although it was not statistically significant. In his sample, Haughton (2020, p.109) identified a preference for lying on the right side in males, females, and subadults, although his results were also not statistically significant. The assemblage that formed the basis of this study mirrored what was identified by McSparron,

with a descriptive preference for females to be buried on their right and males on their left, but no statistically significant relationship between either sex or age and on which side the individual was placed. This lack of sided preference is often compared to parts of Britain, in particular Wessex, where there is a clearly defined link between these variables during the Early Bronze Age (Shepherd, 2012). This suggests that either there may have been a different ritual understanding around body positioning in Ireland than in parts of Britain, or that other variables were more important to this decision than the sex of the individual.

7.1.2.2 Grave Goods

Grave goods have received significant interest within discussions of social structure for the Early Bronze Age, having been linked both to investigations of status and evidence of the relational nature of personhood during this period. One element that both of these approaches to grave goods have had to interface with is that the majority of individuals were not buried with grave goods. This raises the question of why the communities of this period buried some individuals with grave goods and others with none. Regarding the most common class of grave goods, ceramics, Mount (1997, pp.163–164) identified that within his assemblage there was a higher proportion of males buried with ceramics. While this difference was not statistically significant, Mount interpreted this trend to support his identification of a predominance of adult males within the Individualised Burial Tradition. Perhaps due to their rare occurrence within his assemblage, Mount did not comment extensively on non-ceramic grave goods (Mount, 1997, pp.140–142).

In his study, McSparron (2017) almost exclusively approached grave goods as markers of status, subscribing to energy expenditure models for interpreting the diverse but rare nature of the non-ceramic grave goods. McSparron identified a number of interesting trends in his data, including: a higher proportion of males buried with a ceramic (when Urn burials were excluded from the assemblage), a greater likelihood for non-adults to be buried with a ceramic (when excluding Urn burials), an over representation of adolescents with grave goods class 2 (well-made artifacts from common material such as plano-convex knife), and a greater likelihood for inhumation burials to have no grave goods compared to cremation burials (McSparron, 2017, pp.218–247). McSparron interpreted this as indicating an increase in social complexity across the Early Bronze Age, general preference for adult males within

the social structure, and evidence of mourning within non-adult burials. Explicitly aiming to investigate age and gender ideology within the Individualised Burial Tradition, Haughton identified some different trends within his study sample. Haughton (2020, pp.104–109) found no statistically significant association between age or sex with regards to ceramic grave goods, however he did identify some sex and age-based distributions in non-ceramic grave goods. Considering groups based around materials, Haughton identified a higher proportion of adolescents with worked stone; no difference in associations with animal remains; a lack of metal in burials of those younger than adolescence; a higher proportion of female burials with metal; no difference in associations with bone artifacts; a male preference for the inclusion of a fossil in the burial; and no difference in those buried with beads.

In this study, it is interesting that while there were a few trends identified within the age- and sex-based analysis of grave goods (higher proportion of males compared to females buried with Bowl food vessels, higher proportion of aceramic female burials than aceramic male burials, higher proportion of adult aceramic burials than non-adult aceramic burials, higher proportion of adults than non-adults with no non-ceramic grave goods, higher proportion of non-adults than adults with simple non-ceramic grave goods, and no non-adults with 'rare material' non-ceramic grave goods), the only statistically significant association was a higher proportion of females with complex non-ceramic grave goods. The identification of a proportionally higher number of female burials with non-ceramic grave goods, especially those made from rare materials, is notable due to traditional links between these objects and status. It is interesting to note that the trends of more males with ceramic grave goods and more female burials with rare material grave goods point to opposing trends within the Individualised Burial Tradition. This suggests that there may have been differing requirements for the inclusion of ceramic and non-ceramic grave goods that may have favoured one sex over the other for different categories.

7.1.2.3 Distribution

When investigating the distribution of the Individualised Burial Tradition, it has been noted that there is both a geographic and temporal element to the development of the tradition. Multiple previous studies have identified a geographical bias in the distribution of burials,

with a higher proportion of burials uncovered in the east and north of the island of Ireland (Mount, 1995; 1997; Brindley, 2007; McSparron, 2017; 2021). It has been suggested that some element of the Leinster distribution bias in the Individualised Burial Tradition may be associated with the more intensive tillage agriculture in that region, which resulted in more find opportunities for burials (Brindley, 2007, pp.52–53). However, it is more widely recognised that the distribution bias is more closely associated with the development of the burial tradition. McSparron (2017; 2021) has suggested that the tradition spread to Ireland from Scotland, spreading through Ulster into Leinster, then into Connacht and finally into Munster. While the spread of the tradition into all provinces, apart from Munster, is thought to have occurred relatively quickly, the temporal aspect to the spread does support the distribution preference for Ulster and Leinster seen in the assemblage. When considering the temporal distribution of this assemblage, the high number of individuals without ceramics or a radiocarbon date was somewhat surprising, considering the traditional view of the Individualised Burial Tradition as one consisting of single inhumations with ceramics. The low number of individuals in Phase C is consistent with McSparron (2017; 2021), who argued that by the start of Phase C inhumation had almost entirely been replaced by cremation. It is somewhat surprising to see more individuals in Phase B as inhumation was being replaced with cremation across this phase. It is possible that these results indicate a generalised increase in burials of the Individualised Burial Tradition across the Early Bronze Age, however the large number of undated burials complicates any such interpretation.

As noted, one of the two statistically significant results from the investigations of associations between estimated sex or age with burial attributes was in the geographic distribution with males predominating in Ulster and Leinster and females outnumbering males in Connacht. The identification of a sex-based difference in the distribution of burials across the province suggests that there may have been different requirements for qualification for formal burial in the different regions, although the small sample sizes urge caution. Noticeable regionality in the Individualised Burial Tradition has been identified by Haughton (Haughton, 2020), supporting this result. This is compared to the lack of a sex- or age-based difference seen across the temporal distribution of the Individualised Burial Tradition, suggesting that there was not a significant change in the sex- or age-based requirements for formal burial across the development of the tradition.

The analysis of burial attributes undertaken in this study identified only a limited influence of age or gender ideology. Only three of the analyses were statistically significant: a higher proportion of non-adults in multiple burials, a higher proportion of females with complex non-ceramic grave goods, and a higher proportion of male burials in Ulster and female burials in Connacht.

7.2 The Body and a Lived Experience of the Early Bronze Age

One key element of the lived experience of an individual is the body itself, as it is through the body that the individual experiences their world. Another reason that the body is important in considerations of the lived experience is the reciprocal relationship between the body and the environment, with the body shaping the interactions between the person and their environment and interactions with the environment shaping the body (Sofaer, 2006). As such, an understanding of the body can act as a way to interact with the lived experience of the past. One of the primary impacts on this physical lived experience of an individual is health. The health of an individual has a direct relationship with their environment through the actions the individual can perform and through the ability to assist others or the need for assistance in turn. In this study, health and the lived experience during the Early Bronze Age in Ireland was assessed through multiple approaches. The Biological Index of Frailty was used for population level analysis, while paleopathological analysis and evidence of trauma was used to examine lived experience on a more individual level.

7.2.1 Frailty

Some interesting trends were identified in the skeletal markers that were selected to act as proxies for population health individually. The level of porotic hyperostosis and cribra orbitalia within the assemblage can be interpreted to suggest a low to moderate level of nutritional stress within the population, or alternatively as a reflection of a well-nourished group with endemic parasitic infestation. The comparatively higher level of enamel hypoplasia does suggest that there were moderate levels of childhood metabolic stress during the period. The metabolic stress that is associated with enamel hypoplasia can be

either dietary or disease-related and can last between a week and a few months. Most interesting was the noticeably low level of periostitis, suggesting low levels of generalised inflammation in the population, and the higher than expected average attained stature, suggesting that while there might have been nutritional and metabolic stress during childhood that it did not lead to significant growth stunting. The level of degenerative joint disease (DJD) identified within this assemblage suggests that manual labour was common for the population. While considering the markers individually identified some important trends, the Biological Index of Frailty was utilised to illustrate a more integrated and complete picture of health during this period.

7.2.1.1 Population Health

When comparing the average BIF score of this assemblage (26.78, SD 19.58) to other published assemblages, of which there are only a small number due to the recent publication of the method, there was noticeably lower average frailty than in all of the other published assemblages; including an English medieval monastic sample (40.28, SD 22.57), an English medieval non-monastic sample (31.58, SD 22.99), a 17th century Italian plague cemetery (40.21, SD 24.46), and a 17th century Italian attritional cemetery (46.10, SD 21.11) (Zedda et al., 2021, p.468; 2022, p.199). This does suggest that the population of the Early Bronze Age was reasonably healthy, at least those who qualified for formal burial. One element contributing to this lower average frailty in the population may be settlement density. As mentioned, the Early Bronze Age landscape consisted of dispersed settlements based on possibly seasonal mobility and single farmsteads (Ginn and Plunkett, 2020, pp.47–48; Johnston, 2021, pp.138–140). This is in comparison to the higher population density which was found in urbanised societies such as medieval England and 17th century Italy (Hallam, 1961; Barry, 2000; Walter and DeWitte, 2017; Mocarelli et al., 2019). Population density and urbanisation are known contributors to decreased health outcomes in archaeological contexts (Cohen, 1989; Stuart-Macadam and Kent, 1992; Steckel and Rose, 2002; Kjellstrom and Mercado, 2008; Stock and Pinhasi, 2011). One outcome of this identification of relatively low frailty is a question of the validity of the life tables used to identify the expected proportion of non-adults within the burial record. These life tables are often based on pre-industrial agricultural settings or 18th or 19th century subsistence agriculturalists (Chamberlain, 2006, pp.90–91). While population levels of frailty are not the

only indicator of childhood mortality, the comparatively lower levels of frailty identified in the Early Bronze Age population do suggest that more appropriate life tables need to be identified and implemented.

7.2.1.2 Health and Age and Gender Ideology

Considering the identification of restricted formal burial in the Individualised Burial Tradition, and the influence of elements of age and gender ideology within the society, it could be expected that such influences may be identifiable in frailty. The identification of an impact of age on frailty was to be expected, due to the cumulative nature of many of the frailly markers, and the lack of any clear of any gender association with frailty is noticeable. While the descriptive identification of lower average frailty in the female group suggests that women had more positive health outcomes during the Early Bronze Age, the lack of a statistically significant difference within frailty between the sex groups suggests that gender did not play a significant role in health outcomes for those who qualified for formal burial.

7.2.1.3 Health and Status

As mentioned earlier, elements of the burial tradition have been associated with higher status, mainly through the energy expenditure model. When considering frailty and status, it is reasonably common to expect better health outcomes in those of higher status, as traditionally status is associated with increased access to resources. As such, one could expect to see evidence of this status ideology within frailty. However, there was no clear evidence of a link between assumed higher status burial attributes and decreased frailty.

The identification of no difference in frailty between single burial and multiple burial groups suggests that the factor determining grave occupancy did not affect frailty during life. Cist burial, as compared to pit burial, is one of the burial attributes most often linked with higher status individuals. As such, it was interesting when the descriptive analysis identified that this grave type had the higher average frailty score. While this difference was not statistically significant, the descriptive trend does indicate that the relationship between status and cist burial is likely more complex than that traditionally implied. There was no difference in frailty based on body position. The lack of an identified statistically significant difference between ceramic burials and aceramic burials does suggest that the inclusion of

ceramics in the grave does not seem to be linked with health status. Descriptive analysis identified a trend of decreasing frailty with an increase in complexity of non-ceramic grave goods. While this is consistent with the traditional understandings of status, as this association was seen not to be statistically significant it cannot be seen to be representative of a larger population. It is possible that due to the small sample sizes in both of the 'higher' two non-ceramic grave good categories that one or two individuals could be skewing the average BIF score.

Considering distribution, it was interesting that a descriptive pattern of similar frailty in Ulster and Leinster was identified, as both of these provinces share similar land quality and proximity to British and European trade routes. However, the lack of statistical significance in the difference between these two provinces and Connacht, which had lower average frailty, does suggest that this may be an artefact of sample distribution rather than differences in health outcomes. Similarly, the identified increase in frailty into Phase C is likely associated with sample distribution rather than reflecting the population.

The analysis of frailty within this assemblage identified reasonably low levels of frailty within the population, which increased across the lifespan. Compared to the identification of an influence of gender ideology within burial practices, no definitive influence of gender ideology could be seen in frailty outcomes. There was also no clear evidence for the influence of status ideology in frailty outcomes, as seen through 'higher status' burial attributes.

7.2.2 Pathology

Pathological changes were identified on most individuals in the skeletal sample available for inspection, consisting of a range of disease processes. Some of the pathological changes identified, such as those associated with degenerative conditions, were expected as it has been well-documented that such changes are common in archaeological samples from pre-industrial societies. When considering the specific disease processes identified, it is notable that this consisted of not only a wide range of disease processes (including developmental, degenerative, and neoplasms) but also that some of these disease processes are not commonly reported in the archaeological record. It was not surprising that only a small

section of the population were identified with specific disease processes as diagnosis of non-specific disorders is more easily achieved with skeletal assemblages. The identification of those with significant pathological changes in the study samples suggests that serious disease processes did not disqualify an individual from formal burial.

7.2.2.1 Impact of Lifeways

A key element of the lived experience of an individual is their lifeways. Due to the habitual nature of day-to-day activities, these actions can become part of the fabric of the skeleton through skeletal plasticity. The current understanding of subsistence in the Early Bronze Age is one based on agriculture and animal husbandry based around the communal unit of a single farmstead (McLaughlin et al., 2016, p.137; Ginn and Plunkett, 2020, p.52; Johnston, 2021, pp.140–153). Mobility is also thought to have played a significant role for these communities: linking the wider community together, trade, ritual activity, and suggestions of seasonal mobility. Considering this, it was unsurprising that high levels of DJD were identified in the assemblage, alongside the identification of a number of individuals with exostoses and enthesopathies. These bony changes suggest that manual labour and mobility would have been key activities with the population. As such, the paleopathological analysis of this assemblage supports the identification of these lifeways for the Early Bronze Age in Ireland.

When considering the traditional interpretation of the Individualised Burial Tradition as one of high status, the identification of significant proportions of bony changes associated with high levels of labour is of interest. It is often assumed that those with higher status would be excused from the more physically demanding aspects of lifeways, and thus we would not expect to see such high levels of degenerative joint disease. However, this does not seem to be the case in this assemblage. Considering the identified lifeways, it is unsurprising that all members of the community were required to participate in these demanding activities. A question this does then raise is, if everyone was required to assist in the lifeways of the community, then what did high or low status entail for the Early Bronze Age in Ireland? Becker (2013, pp.244–251) has proposed that 'specialised identities', which may have been a basis for social differentiation, were taken up and shed throughout the year based on communal or ritual cycles. This suggests that differentiated status may have been associated

with specific events, either with the seasons or the landscape, with limited impact on day-to-day activities.

7.2.2.2. Disease, a Condition of Life

Alongside those related to the identified lifeways of the Early Bronze Age, several other bony changes were identified within the sample available for inspection. These can be divided into two categories: bony changes which would have had a low impact on the individual and those which would have had a high impact. Most of the pathological changes identified in the assemblage falls into the first category of low impact. These consist of bony changes that would have impacted the individual with the condition but would not have prevented them from participating in lifeways. These 'aches and pains' would have likely been common within the population, as they are within living populations today. One common impact of the bony changes identified in the assemblage was likely to be back pain. This is also one of the most common complaints in modern populations, so it is unsurprising to find evidence of this in past populations (Harrell, 2016; Urits et al., 2019). Other outcomes include reduced grip strength, ankle weakness, and generalised pain. The identification of these bony changes suggests that the inconvenient, but not life threatening, impact of disease was a condition of life in the Early Bronze Age, just as it is today.

The second category of bony changes are those which would have had a significant impact on the life of the affected individual. In this category are those with disease processes that would have impacted them across their life course and those with disease processes that would have likely been associated with the death of the individual. One of the outcomes of identifying individuals with these high impact bony changes is the identification of evidence of healthcare provisioning. This is further discussed in Section 7.3 below. It is important to note that there were no identified trends within the disease processes that resulted in serious impacts, as well as no individuals that shared these serious disease processes. The lack of identified trends of specific diseases suggest that these cases represent the interplay between the individual and their environment.

The analysis of pathological changes in this assemblage identified reasonably high levels of degenerative changes within the population, likely associated with lifeways. The identification of a number of minor conditions within the assemblage highlight the consistency of the human experience of aches and pains. The range of specific disease processes identified in this assemblage highlight the range of human experience that can be found within a population, there was no identified pattern of disease, and that healthcare provisioning was an aspect of Early Bronze Age society.

7.2.3 Trauma

The low rate of trauma identified in this assemblage is striking. Only nine individuals were identified with trauma in a sample of 192, a rate of 0.05%. This is compared to an approximate rate of 13% for weapon trauma within excavated medieval populations in Ireland (Geber, 2015). Considering the restricted nature of formal burial in the Individualised Burial Tradition, and the identification of such a low rate of trauma, it does suggest that trauma may impact the qualifications for formal burial. However, as there is evidence for trauma within the burial record, it cannot have disqualified an individual from formal burial.

When considering the types of trauma identified within the study sample, another difference from medieval samples can be identified. Only one example of sharp force trauma was identified, with six instances of trauma associated with accidents, one the result of a pathological process, and one either a trepanation associated with pathological changes or a pseudotrepanation. This patterning of trauma suggests that accidents were the main aetiology for trauma within this assemblage. The majority of trauma showed evidence of healing, suggesting that death associated with trauma was rare in this assemblage. Complications in the healing process were identified in four individuals, with two of these situations related to the injuries themselves. This suggests that there was some level of communal understanding around how best to respond to fractures, however that this was limited to simple responses applicable to simple fractures. It is likely that these responses included splinting and immobilisation of the affected area. There does not seem to be any evidence for traction.

7.2.3.1 Impact of Accidents

Six of the nine identified fractures within the study sample were likely the result of accidents. These fractures can be divided into two categories: low impact fractures and high impact fractures. Half of the identified accidental fractures fall into the first of these categories: fractured finger, toe, and rib. While these and similar injuries likely occurred at a higher rate within the population than that seen in this assemblage, they are indicative of a general injury risk for the population. This category of low impact fracture is associated with risk factors that would have been commonplace within communities. There is no doubt that these fractures would have hurt at the time of injury, however all instances show evidence of effective healing and would not have impacted the participation of the individual in the lifeways once bony repair had completed. The other half of the accidental fractures belong to the second category: fractured ulna, fractured forearm, and the fractured tibia and fibula. Compared to the first category, the risk factors for these fractures would have been less common, so it is interesting that there were an equal number of individuals in both categories. All of the fractures in this second group are noticeably more serious and would have had a lasting impact on the individual across their life, including pain and reduced mobility in the affected limbs.

One element of interest is the identification of a strong possibility that falls were the causal factor for the high impact fractures. Falls, alongside impact from an object, are one of the most common causal factors for fractures, with 10-15% of falls resulting in the formation of a fracture (Berry and Miller, 2008). In modern contexts, there is particular focus placed on the elderly when discussing falls, as not only do they tend to have a larger number of risk factors but falls often have an outsized impact due to their higher frailty and slower recovery (Ambrose et al., 2013). However, falls can occur at any age, with one of the major risk factors in younger individuals being the physical environment and particularly uneven ground. As mentioned, it has been identified that mobility likely played an important role in the lifeways of the Early Bronze Age, with travel across the landscape associated with connection between kin-groups, trade, exchange, and ritual (McLaughlin et al., 2016, p.137; Ginn and Plunkett, 2020, p.52; Johnston, 2021, pp.140–153). While some forms of travel, including travel by water, would not have increased the risk of falls, overland travel likely would have, particularly in the more mountainous regions. Considering this narrative of

mobility in the archaeological record, it is not surprising that a significant proportion of trauma can be associated with falls.

7.2.3.2 Violence in the Early Bronze Age

The Bronze Age in often considered to have the first evidence of organised warfare in Europe. The identification of specialised weapons, fortification, weapon trauma on skeletal material, and the identification of battlefields have all contributed to this understanding (Jantzen et al., 2011; Brinker et al., 2016; O'Brien and O'Driscoll, 2017, p.393). This 'war corpus' has become associated with the concept of a 'warrior chief' who sat at the top of a complex societal pyramid. While the validity of this concept likely had a biases in some societies, as complex societies with larger populations are thought to be a requirement for this scale of violence, this would have varied both regionally and temporally (O'Brien and O'Driscoll, 2017, pp.394–396). When considering levels of trauma in the Early Bronze Age of Ireland, it is the proposed rise in social stratification that has drawn the most interest.

Of the nine individuals with trauma in this assemblage, three individuals were identified with trauma which may have been associated with interpersonal violence. However, reanalysis of these three individuals failed to identify any definitive evidence. As such, no individual within this assemblage can confidently be associated with interpersonal violence. Considering the lack of definite examples of interpersonal violence within inhumation burials of the Early Bronze Age in Ireland, what can be said about violence during this period? While the lack of evidence cannot be taken as an indication of a total lack of violence within this period, it does suggest two situations. Either there were low levels of interpersonal violence within Early Bronze Age communities, or alternatively violence at or around the time of death disqualified the individual for formal inhumation burial or qualified them for an archaeologically-invisible death rite.

Other elements of the archaeological record seem to support the identification of low levels of interpersonal or intercommunal violence during the Early Bronze Age. There is a significantly lower level of settlements that show evidence of enclosure during this period in Ireland compared to Britain (Ginn and Plunkett, 2020, p.48). Enclosure, and then fortifications, became an element of settlement during the Middle to Late Bronze Age in

Ireland, as seen through the constructions of hillforts after 1400 BC (O'Brien and O'Driscoll, 2017, pp.340, 402; Ginn and Plunkett, 2020, p.54). This later period also sees the movement away from the tool-weapons of the Early Bronze Age, such as axes and archery, to more specified weapons, such as the sword, shield, and spear. It is the rise of this weaponry in the Middle Bronze Age that is considered to indicate shifts in social relationships (O'Brien and O'Driscoll, 2017, p.406). This suggests not only that the shift to warfare and more structured communal violence did not occur in the Early Bronze Age, but also that the social structures associated with such a shift did not yet exist during this earlier period. As such, it is possible that the hierarchical 'warrior chiefdoms' which are associated with organised intercommunal violence (O'Brien and O'Driscoll, 2017, pp.396–397), did not fully develop until the Middle Bronze Age.

In this study, the analysis of trauma identified an extremely low rate of fractures within the sample. A significant portion of fractures were associated with accidental trauma. The proportion of trauma associated with falls does support the identification of a significant element of mobility within the population. The identification of no definitive evidence of interpersonal violence in the assemblage may indicate that violence at or around the time of death likely disqualified an individual from formal burial, but when considered alongside the rest of the archaeological record, it can be argued more forcefully that violence was not a considerable factor of life in the Early Bronze Age.

7.3 A Community of Care in the Early Bronze Age

As explored above, disease would have been a factor of the lived experience in the Early Bronze Age in Ireland. While these disease processes would have impacted individuals in many ways, it is likely that one element of the communal response to disease would have been the provision of health care. Much of this care is invisible to archaeologists, however some evidence can be identified through the survival of individuals with disease processes which necessitated care to achieve their age-at-death. Three case studies were identified within the skeletal assemblage that demonstrated evidence of health care provisioning. While these do not represent a complete record of care in the Early Bronze Age, it is interesting to explore what these different categories of disease processes – degenerative,

traumatic, congenital, and terminal – can illustrate about the range of healthcare provisioning in the period. To do this a Community of Care analysis was undertaken, structured around interrogating and integrating the series of Bioarchaeology of Care case studies for behavioural consistencies to explore insights into social relations, practice, organisation, and identity.

7.3.1 Approaching Care

The identification of a range of cases from across the island where care was provided illustrate that the communities of the Early Bronze Age in Ireland recognised a number of situations that required care and that they were able to adapt care strategies to address the challenges that each situation presented. When considering how these communities approached healthcare provisioning, the degenerative and terminal cases in particular offer an interesting juxtaposition.

The identification of high proportions of DJD within the assemblage suggest that degenerative conditions would have been rather common within the community. As such, in SK5 we have a situation where the community provided care within the context of a long-term, but somewhat known, disease progress. The decision to give care could have been eased by the communal knowledge of past instances of care for similar situations and how best to accommodate these individuals. Considering the level of these conditions within the wider community, it is likely that there were also social structures directly associated with care for these individuals, many of whom would have been older.

This is in contrast with the case of probable multiple myeloma, a disease process which likely did not have any analogues. As mentioned, the presentation of multiple myeloma is often delayed in regard to the development of the cancer, due to the 'smouldering' phase. While symptoms would have been limited during this period, the developing symptoms likely indicated to the community that this individual would be needing care. As such, it is probable that the decision to provide care to this individual was made not realising the terminal nature of the disease nor with an understanding of the full range of the care requirements. Once the cancer reached the next phase, it would have become clear that care was a requirement, with the needs only increasing as the cancer progressed. This is

especially true after the fracture to the sacrum. While there would have been identifiable parallels to other disease processes and required care, for example pain management, it would have been clear for the community that this was not a common disease process. However, even with the care requirements only increasing, care was still provided to this individual for the full course of their disease process, with the community seemingly adapting care strategies to provide the required care. It should also be noted that this unfamiliar disease process did not seem to have impacted on the provision of a high-status burial.

7.3.2 Care and Identity

Alongside the physical aspects of care, there would have also been an emotional and social component to communal responses to pathology. Disease and its symptoms almost always result in a need to renegotiate elements of identity. As changes to the physical capabilities of the individual manifest, these result in challenges to the person's expectations of self and future. Often, these are challenges to unconscious expectations of the future: people do not consider their expectation to be able to walk until they suddenly cannot. While the magnitude of this challenge is associated with the magnitude of the disease process, it nonetheless forces the individual to reconceptualise elements of their identity. Thus, not only is the individual dealing with their disease process, they are also processing identity changes. Another element of self-identity which would have been impacted through care is the concept of independence, or rather dependency. The care identified within the Bioarchaeology of Care analyses all contain an element of dependency of the individual on others, which would have impacted both those receiving care and those providing care. Considering the power that one relinquished when they become dependent on another, and in turn the power the carer gains over those who become dependent, this would have impacted both the individual and the community, even in a society with relationally situated personhood (Gowland, 2017, p.245). Thus, not only would the self-identity of the care-receiver be impacted, so would the identity of the caregiver. This change could be positive or negative, or a combination of both.

Alongside self-identity, social identity would have also been impacted by the need for care. Communal understandings of the disease processes and the social identity of the disease

itself (*ibid,* p. 243), would have interacted with the differing physical capabilities of these individuals and together influenced their social identity. One element of this was likely to be changes to social roles. Within modern western populations, social role changes are associated with reductions in mental quality of life as individuals feel that they lose their position within their community and sometimes struggle to establish a new one. However, this may not have been the case in the Early Bronze Age in Ireland. Alongside a suspected generally high level of communal emotional support associated with small settlement sizes and more close-knit communities, it is possible that components of new roles may have provided elements of new identity – teacher, caregiver, ritual practitioner – which assisted in maintaining the mental quality of life of these individuals. In all three individuals we see no evidence for a reduction in care associated with this transition, suggesting either that care provisioning and social role were not closely bound or possibly that there were social roles explicitly associated with care provisioning.

Disease-related changes to social identity may have been eased if roles already existed within the social structure that were associated with the social identity of the disease, as the 'destination' and expectations associated were known by both the individual and the community. One example of this would be the role of 'elder' associated with the 'aged' members of the community. Traditionally, such a role is associated with subsistence, specialist, and ritual knowledge transfer, and thus those who have 'achieved' this role are held in high regard. The identification of a relaxing of the gender ideology in formal burial does support the inference of a 'elder' role within Early Bronze Age society, which could have been gender-neutral and associated with other elements of social identity. If this role was linked with a social identity of 'aged', then if a disease process itself had a social identity of 'aged', the development of this disease process could have pre-emptively resulted in the conferring of this social role. It is also possible that non-normative roles explicitly associated with the social identity of specific diseases existed, which probably would have been less well defined. Elements of a non-normative role could have been ritual if the altered identity of this individual had parallels to existing understandings of ritual within the community, with the individual possibly marked as different or coming to inhabit a new liminal position. An example of this ritually-linked non-normative social role has been proposed for the Princess of Vix, whose torticollis has been suggested to be directly linked to their proposed

religious responsibilities (Knüsel, 2002). The fact that all three individuals survived for some time after the onset of their disease process and that all received formal burial strongly suggests that both physical and emotional support was included in healthcare provisioning in the Early Bronze Age in Ireland.

7.3.3 Care and Burial

One element seen in two of the case studies is non-normative burial positions. While these burials could be described as 'deviant', it may be more apt in these situations to describe the burials of SK5 and 1935:799 as atypical. SK5 does not seem to fit the colloquial concept of deviant in any significant way. The body position of SK5 only differs slightly from the standard for the period, with other elements of the mortuary treatment of this individual, except the placement of one leg, consistent with standard burial for the period. SK5 was also buried in a central position and with the largest number of grave goods in the cemetery, both traditionally interpreted as indicators of status. In fact, the change in burial position appears to support the identification of care and accommodation in the individual more than anything else. The identification of possible apotropaic elements to the burial of this individual, with the placement of the knee and ankle on the stones, suggests that elements of the care of this individual continued from life into death.

1935:799 is a slightly more complicated situation, as their burial position differs from the norm more than SK5. While there would have been mobility difficulties associated with the non-union fracture, there is nothing to suggest that a crouched position on one side would not have been physically available to this individual due to that injury. It is possible that the torticollis could have complicated the positioning of the individual on the side, but it likely would have been possible with the aid of a 'pillow' to support the head. As there are only a small number of individuals recorded in a similar position to 1935:799, it suggests that this body position could represent those outside the normal social structure of the period. The National Museum of Ireland excavation record for one of these other individuals, excavated in Whitestown, Lusk, Co. Dublin (Cahill and Sikora, 2011, pp.190–194), mentions a band of ornamented substance around the skull, which disintegrated upon disturbance. As this could not be properly recorded, it is not known of what substance this band could have been. However, if this burial position represented membership in a particular social group

or role shared by this individual and 1935:799, one would expect more such examples in the archaeological record.

7.3.4 Care and Status

When reflecting on what these examples of care can reveal about Early Bronze Age Ireland, it is necessary to be cognisant of the ongoing discussion about status in this period. While the true nature of the relationship between status and all elements of the Individualised Burial Tradition is, and will be, an ongoing debate, the identification of restricted formal burial does suggest that this assemblage represents a portion of the population whose presumed higher status qualified them for formal inhumation burial. As such, a question is raised around the relationship between care provision and status. One interpretation of the identification of evidence of healthcare provisioning in this assemblage of individuals which received formal inhumation burial is a link between status and care, with the possibility that healthcare was restricted to those with the status that qualified them for formal burial. However, this statement implies that care was not given to lower status individuals. Due to the lack of an identified 'lower' status population from this period, it is impossible to judge if care provision was restricted to a subset of the population, as there is no assemblage for comparison. This is an important distinction to make, as it is always possible that evidence of health care provisioning would be more common in those who did not receive formal burial. It is possible to state that the requirement of care did not prevent an individual from qualifying for formal burial, suggesting that the requirement of care within life did not eliminate the status of the individual or kin group.

When pondering the relationship between care and status, it is interesting to consider this suggestion that the need for healthcare provisioning did not disqualify one from formal burial in contrast to the evidence for trauma. As mentioned above, there is very limited evidence of trauma in this assemblage, and no definitive evidence for interpersonal violence. This suggests that while the requirement of care from the community did not disqualify you for formal burial, violence associated with death may have. While the lack of data is not firm evidence, this may indicate that violence may not have been viewed favourably within Early Bronze Age society, and thus the correct response to these situations involved a non-normative and archaeologically invisible burial rite. Although this

interpretation may suggest a negative connotation for violence during this period, the utilisation of alternative burial rites may have had an important ritual meaning – possibly one associated with caring for the dead in this unpleasant situation.

Chapter 8: Conclusion

I began this work with Waddell's 1990 call for a more in-depth study of the osteology of the inhumation burials of the Early Bronze Age in Ireland. In the three decades since that publication, analysis of human remains from the period has remained mostly within the confines of site reports and demographic tables. Prior to the work described in this study, there was no attempt to reanalyse skeletal material recovered before the development of modern bioarchaeology nor was there any synthesis of the disparate strands of available data. While the graves and the artefacts they contained have formed the foundations for many of the understandings of the period, the skeletal remains from these contexts have predominantly acted as 'hooks' on which to hang interpretations. While Brück and others have made noticeable inroads into placing personhood back onto these 'hooks', these efforts were mainly focused on external evidence for personhood rather than interacting with the physical evidence of their lived experience as identified through osteological analysis. This focus on demographics and grave goods is not due to a lack of evidence for varied and challenging lives in the Early Bronze Age. However, when atypical individuals have been identified, the insights these burials provide has not been incorporated into wider discussions of the period. This has resulted in a bioarchaeology of the Early Bronze Age that has been fragmented and incomplete.

In order to address this under-use of a key resource for understanding the Early Bronze Age in Ireland, I completed the first modern, integrated bioarchaeological analysis of the available unburnt remains from the period. I used up-to-date techniques of bioarchaeological analysis on all of the skeletons from the period curated in the National Museum of Ireland, National Museum of Northern Ireland, and Northern Ireland Environment Agency: Built Heritage – a total of 94 individuals. This was supplemented with 98 individuals from the literature who had received modern bioarchaeological analysis, resulting in a total collection of 192 individuals. This assemblage consisting of the curated unburnt human skeletal remains from the Irish Early Bronze Age was then analysed at both the population level – to provide an understanding of biological and cultural responses to the environment – and also at the individual level in order to explore both the lived

experience of people and the individual and communal reactions to elements of this lived experience. By combining both approaches, this study has increased understandings of societal relation, organisation, practice, and identity in the Irish Early Bronze Age.

8.1 A Reflection of Society?

As noted throughout this work, social structure has been central to the discussions of the Early Bronze Age in Ireland. The changes identified in formal disposal of the dead from the 'collective' burial of the Neolithic to the individualised burial of the Early Bronze Age as well as the introduction of metal working, have resulted in a traditional interpretation of this period focused around increasing social stratification. Previous analyses have identified the influence of age and gender ideology within these structures, leading to an understanding of this period as a time of 'big men'. This is particularly clear in discussions focused on social organisation, with social stratification and the 'ideology of the individual' reflected in the naming conventions for the period. While the use of the term 'Single Burial Tradition' does act to highlight an important change in formal burial compared to the Neolithic, it oversimplifies the reality of grave occupancy during this period. In explicitly addressing the skeletal remains found in the graves, an important outcome of the approach taken in this study has been a reconsideration of the terminology used for the formal burial tradition of the Early Bronze Age in Ireland. Considering that roughly half of all individuals identified by both McSparron (2017, p.238; 2021, p.108) and Haughton (2020, pp.99–101) were buried in a grave with another, I have suggested that the formal burial tradition of the Early Bronze Age in Ireland formerly known as the 'Single Burial Tradition' instead be referred to as the 'Individualised Burial Tradition'. Adopted from Cleary (2016) and referring to burials with a constructed component separating them from simpler forms of disposal, this term allows for an acknowledgment of the important change in grave form, while not implicitly excluding multiple interments. As these interpretations have been built on a foundation of burial demographics, it was important to begin the interpretation of the bioarchaeology of this period with a reassessment of the demography. When investigating the demographics, one question was asked: in what ways was social structure impacting the 'rules' of burial?

It was perhaps not surprising that the age and sex data in the assemblage does not provide a neat narrative of social organisation in the Early Bronze Age. While no demographic group was excluded from any one element of burial, the identification of a clear male preference in the proportion of burials suggests that gender ideology was a consideration in qualification for formal burial. However, it is interesting that this only holds true for young adults. As an individual progressed through adulthood, the impact of gender ideology on the qualifications for formal burial seems to have decreased. This trend suggests that both age and gender impacted qualification for formal burial. Another interpretation of this trend could be that the impact of gender ideology may have changed across the life course, with a stronger impact during young adulthood (possibly rooted in physical prowess) and a reduced impact in older adults (perhaps rooted in accumulated knowledge). This possible identification of reduced gender bias in 'elders' highlights the need to move away from simplistic understandings of social organisation and 'big men' and calls for a more nuanced and complex understanding of status.

When considering questions of social stratification, the identification of restricted formal burial does support the identification of preferential grouping within Early Bronze Age society, at least regarding treatment after death. Compared to the identifiable impact of age and gender ideology in the qualifications for formal burial, no clear and consistent influence of these ideologies could be identified in the burial attributes, particularly those elements which have been traditionally associated with status. This suggests that the factors that influenced qualification for formal burial differed from those that influenced how one was buried. It would be incorrect to state that there was no impact of age and gender ideology across a selection of these burial practices, but it does not seem to have occurred in a uniform manner. The statistically supported trend of more non-adults buried with another individual is placed against descriptive trends of a higher proportion of non-adult burials in in cists. The higher proportion of males with ceramic grave goods (although not statistically significant) is juxtaposed against the higher proportion of females with complex non-ceramic grave goods. This does illustrate that while age and gender ideologies did seem to impact burial attributes, they impacted each in different ways.

It is not surprising that the reflection of society as seen through burial practices is complex and, in some ways, contradictory. The lack of a clear identified link between burial attributes and particular cohorts of the population as represented by the assemblage undermines some of the more simplistic conclusions of those who have focused on social stratification in the Early Bronze Age. However, the identification of restricted formal burial that favoured young adult males complicates the complete rejection of this idea. As such, the burial practices of the Individualised Burial Tradition reflect a society where the influence of age and gender ideologies can be felt, with the importance of these ideologies changing in impact at different point in an individual life. However, neither of these concepts acted as the central force in society. This complex reflection supports the identification by Haughton (2020, p.228) of regional variability and temporal fluctuations in social structure and stratification.

8.2 Towards a Lived Experience

The body and the lived experience are deeply intertwined. The deep and mutual relationship between the environment and the body means that bioarchaeology provides an important avenue for considering the lived experience of past peoples. By considering the lived experience of the Early Bronze Age in Ireland, this study moves past considering these remains as 'hooks' in social structure and explored elements of agency. This study identified three avenues for investigating the lived experience: health, disease, and trauma. By applying and integrating both population and individual level analysis, this study was able to identify multiple elements of a lived experience and explore a more complex understanding of life in Early Bronze Age Ireland.

Health is one of the most important factors that impacts the lived experience of an individual. While health continues to be a complex concept within bioarchaeology, the Biological Index of Frailty model allowed for a methodological approach that suited the mixed preservation of the assemblage. The identification of low levels of frailty in comparison to Medieval English and 17th century Italian populations suggests that the dispersed nature of settlement in this period resulted in generally positive health outcomes for the population. The identification of low to moderate nutritional and metabolic stress is consistent with this identification of a reasonably healthy population.

One notable element of the frailty analysis is the absence of the influence of gender or status ideology in the results of the analysis. Traditional models of status often consist of an element of differential health due to preferential access to resources. Similarly, impacts of menstruation, pregnancy, childbirth, and breastfeeding, along with an often-associated lower status, commonly mean that females have higher frailty outcomes. However, no association between aspects of burial that are associated with higher status and frailty could be identified, with a similar result for frailty and gender. In fact, while it was only a descriptive difference, females had the lowest average frailty score in this assemblage. These results suggests that gender did not play a significant role in health outcomes for those who qualified for formal burial, and that the relationship between status and health during this period was more complex than traditionally expected.

The identification of a range of disease processes in the assemblage attests to a variety of lived experiences during this period and suggests that the development of serious disease processes did not disqualify an individual from formal burial. The identification of high levels of degenerative joint disease within the assemblage is consistent with previously identified lifeways of this period, suggesting that the lived experience was centred around agriculture and mobility. The range of bony changes identified within the assemblage suggest that minor 'aches and pains' were a common aspect of the lived experience, just as they are today. One interesting element is the assumed relationship between status and lifeways. The identification of high levels of degenerative changes associated with high levels of physical labour suggests that the qualifications associated with formal burial did not disqualify an individual from participating in subsistence-based activities. Considering this alongside the lack of clear status ideology in the burial attributes and in frailty, the bioarchaeological evidence does support Becker's (2013, pp.244–251) proposed model for social organisation centred around 'specialised identities', where status was associated with specific events, locations, or activities.

It is interesting to note the low levels of trauma encountered in this assemblage. The instances of trauma that have been identified are suggestive of accidents, both low impact and high impact. The narrative of mobility as a key part of the Early Bronze Age lived experience is evidenced in the high percentage of the identified trauma associated with

falls. Another element of the lived experience highlighted was the complete absence of definite examples of interpersonal violence. While this contradicts generalised understanding of the European Bronze Age as the period of 'warrior chiefs', it is consistent with the archaeological record of the Early Bronze Age in Ireland. The lack of identified skeletal trauma from this period matches with the lack of enclosed settlements, suggestions of seasonal mobility, and a predominance of tool-weapons. This is consistent with models that suggest that it was not until the Middle and Late Bronze Age that violence began to have sufficient impact on the lived experience. One alternative, and possibly synergistic, interpretation is that violence at or around the time of death disqualified an individual for formal burial. If violent death was considered repugnant, it is possible that it required distinct and different communal responses which are archaeologically invisible.

8.3 Responding to the Lived Experience

The lived experience of most individuals would have included periods of illness where they were not able to fully participate in their community lifeways. One of the communal responses to these situations was the provision of health care to individuals in need. The identification of multiple individuals in this assemblage who were unlikely to have survived to their attained age-at-death without assistance from their communities attests to this societal response to disease and trauma. As disease and responses to disease are both culturally mediated, exploring these examples of care provisioning can provide insights into social relations, practice, and identity. To explore the provision of care in the Early Bronze Age in Ireland, three Bioarchaeology of Care case studies were undertaken. Following the completion of the Bioarchaeology of Care analysis, a Community of Care approach was implemented to investigate these elements across the period.

The identification of three cases of health care provisioning across a range of disease processes (degenerative, traumatic, congenital, and terminal illness) strongly suggests that care was a part of the communal responses to disease. The spatial distribution of these instances across the island also suggests that it was not only one community, but rather Early Bronze Age society in Ireland more broadly that incorporated care into communal responses to individuals' lived experience. The identification of care requirements over

significant portions of the life course of these individuals suggests that the care was not only provided, but also effective. The range of ailments that received care suggest that these communities recognised a range of diseases that required a response. Considering the identification of a group of symptoms expected across more than one of the case studies, such as pain and fatigue, it is highly likely that care strategies were adapted from a cultural 'playbook' of care strategies to address the challenges that each situation presented, and that these were communicated between different communities.

Alongside the identification physical care, burial treatment and understandings of disease processes strongly suggest that emotional and social care was also a key element in the health care provided to these individuals. One element of this emotional and social care explored was in relation to concepts of identity. The changes to expectations of self which accompany large alterations to the lived experience require the individual to renegotiate elements of identity. This is a process that is easier to complete with the support of the community, even under the influence of increasing dependency. Another element of identity which needs to be considered is the concept of the social identity of the disease itself. As the social identity of a disease became overlayed onto the identity of the individual, this likely resulted to changes in their social identity. One outcome of this could have been associated with be changes to the social role of the individual. This could have taken the form of a move to a normative social role (including that of an elder) if the social identity of the disease was linked with a particular life stage or social role, or possibly a non-normative role (including a ritual role) if the disease process had parallels within communal ritual elements. These social role changes could have provided a framework for the self-identity of these individuals and are indicative of one response to the lived experience of disease.

Considering the identification of health care provisioning within the context of those who qualified for formal burial, it is important to consider the relationship between health and status. While only a small number of definitive examples of care were identified in the assemblage, it can be stated that the need for care did not disqualify individuals from formal burial. Considering the suggestion of status being rooted in 'specialised identities', it is quite possible that care, which would have been situated in the day-to-day life of the community,

was divorced from status altogether. However, due to the lack of a 'low status' population for comparison, it cannot be stated with any certainty that care was restricted based on status. When considering the implications of care regarding responses to lived experience, it is interesting to contrast the evidence for care against the lack of evidence for interpersonal violence. This suggests that while care did not disqualify you from formal burial, violence at or around the time of death may have done so. Considering the difference between the lived experiences of disease and violence, it is not surprising that there was a difference in the reactions within communities of the Early Bronze Age in Ireland.

8.4 Future Directions

While the Early Bronze Age is a rare period in Irish prehistory where inhumation burial was the dominant mode of disposal, it is not the only period that suffers from a fragmented and incomplete bioarcheology. The integrated approach used in this study highlights the strength of combining methodologies based both on population-level analysis and individual-level analysis within one study, allowing for the more detailed understanding of the lived experience to be identified. Applying this approach to other prehistoric assemblages would allow for a more complex understanding of the levels of lived experience for past peoples, both in Ireland and elsewhere.

While the inhumation record is a key resource for bioarchaeological analysis, it does not account for all of the archaeological human remains dated to the Early Bronze Age on the island. A systematic reanalysis of the cremations from this period would act as an important companion study to this one, as many of the deposits have not received modern bioarchaeological analysis. Not only would this allow more material to be included in up-to-date analysis of the Individualised Burial Tradition, but due to the longer use of cremation across this formal burial tradition it could also identify possible temporal changes that occurred across the period. An initial reanalysis of an Early Bronze Age cremation burial also supports the reconsideration of how 'single' burial was in this period (Dale, 2021). By identifying a higher number of individuals than initial analysis proposed, including multiple young children, this latter study highlighted both the importance of a systematic reanalysis

of the cremation record and supports the changes to the terminology for the formal burial tradition proposed in this thesis.

Another direction for future study lies within ancient DNA (aDNA) studies. These studies can greatly increase the quality of the biological information we have for past societies, including increasing reliable sex estimation in past populations, identify evidence of genetic disease in the past, allow a greater understanding of population level migration, and elucidate kinship and family structure. Particularly when combined with other scientific analyses, such as isotopes used to examine diet and mobility, these approaches have the ability to increase understandings about social organisation and practice. However, while aDNA is certainly a powerful tool, the understanding of the context for the individuals sampled is of vital importance. This study provides an important foundation for aDNA-based research into the Early Bronze Age in Ireland.

8.5 Final Words

In this thesis I set out to explore what the bioarchaeology of the Individualised Burial Tradition could contribute to understandings of social relations, organisation, practice, and identity in the Early Bronze Age in Ireland. What was uncovered was a complex set of interactions that, when considered along with the archaeological record, come into sharper focus. While the identification of restricted formal burial does strongly suggest some level of differential social organisation in the communities of the Early Bronze Age, the nature of this organisation seems to have impacted individuals differently across their life course. The identification of high levels of labour-associated degenerative changes in the assemblage and the preferential deposition of 'high status' artefacts within the landscape rather than in the grave, supports previous suggestions that status was linked with 'specialised identities'. While the roles associated with these identities were likely taken up and shed across the seasons and life course, it is possible that they played a role in the qualifications for formal burial – either for individuals or for kin groups. The identification of health care provisioning compared to the lack of interpersonal violence, suggest that not all elements of the lived experience had equal impact on the qualifications for formal burial. The identification of care across a wide range of situations within the assemblage speaks both to individual and

communal responses to challenging elements of the lived experience. The evidence uncovered in this analysis suggests that care was not just limited to physical assistance, but also extended to the emotional and social elements of the self.

This study provided the first modern integrated bioarchaeological analysis of the curated inhumations from the Early Bronze Age of Ireland. Through the modern reanalysis of skeletal material along with the synthesis of existing bioarchaeological data, the lived experience of the period was explored. Through the deployment and integration of both population and individual level analysis, this study investigated elements of social relations, organisation, practice, and identity. By considering these identified elements of lived experience alongside the archaeological record, it is hoped that this novel approach of intentionally combining multiple levels of analysis provided a more a more nuanced and complex understanding of life in Early Bronze Age Ireland.

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Appendix 1: Assemblage Catalogue

NOTE: All skeletal analysis reported in italics was not completed by the author and was reproduced from the primary publication for the relevant site

ANTRIM 260

Rathlin Island, Church Bay 260

Rathlin Island, Glebe 271

CARLOW 275

Ballon 275

Ballyhacket Upper 276

Baunogenasraid 278

Boherduff 285

Knocknatubbrid 287

Sliguff 290

CAVAN 294

Brackloney 294

CLARE 296

Coolnatullagh 296

DERRY 298

Drumahoe 298

Straid 300

DONEGAL 306

Carrickballydooey 306

Drung 309

Liscooly 316

Lisnamulligan 318

Loughfad 320

DUBLIN 326

Aghfarrell 326

Deansgrange 329
Edmondstown 331
Glassamucky 334
Jamestown 338
Kilshane 341
Rush 343
Stillorgan Park 344
Whitestown, Lusk 347
Whitestown 350

FERMANAGH 352
Tonyglaskan 352

GALWAY 358
Annaghkeen 358
Carrowntober East 360
Kilcornan 362
Moyveela 365

KILDARE 368
Ballymount 368
Brownstown 370
Graney West 371
Halverstown 374
Hempstown Commons 380
Hempstown Commons 384
Moone 385
Mullamast 400
Newtownmacabe 402
Oldtown 405
Ploopluck 409
Punchestown Great 412
Timolin 416
Timolin 421

KILKENNY 425
Ardra 425
Freestone Hill, Coolgrange 427

LIMERICK 430
Morenane 430

LOUTH 431
Carn More, Dundalk 431
Crumlin 432

MAYO 433
Ballykine Upper 433
Carrownacon 434
Clooneen 436
Cuillare 438
Kinard 441
Stonepark 443

MEATH 445
Betaghtstown 445
Crossakeel 450
Fourknocks II 452
Harlockstown 456
Keenoge 458
Martinstown 468
Mosney 474

OFFALY 477
Ballickmoyler 477
Ballicknahee 478
Ballynamona 481
Cappydonnell Big 483
Lug 485

ROSCOMMON 489
Grange 489

SLIGO 492
Culleens 492
Treanmacmurtagh 494

TYRONE 498
Dungate 498

WESTMEATH 503
Ballybrennan 503
Benalbit and Derryroe 510
Cartenstown 512
Clonickilvant 515
Conranstown 519
Gneveebeg 521
Greatdown 522
Kilgaroan 524
Knockast, Coolatore 526
Milltown 531
Rahinashurock 534
Redmondstown 537
Rickardstown 541
Riverstown 544

WEXFORD 546
Annagh More 546
Bolinready 548

WICKLOW 551
Ballybrew 551
Haylands 561
Liscolman 567
Tornant Lower 569
Tulfarris 572

Reg Number: RATH **SMR Number:** ANT 001:044

Physical Setting

Townland: Rathlin Island, Church Bay

County: Antrim **Province**: Ulster

Year of Excavation: 1983-1984

Monument Type: Flat Cemetery, possible multiple small tumuli

Conditions of Discovery: Gravel-quarrying

Total Burials: 11 **Total Inhumations:** 10

Excavation Report: Published

Primary Reference: Wiggins, K., Higgins, V., and Power, C. 2000. A rescue excavation on Rathlin Island, County Antrim. *Ulster Journal of Archaeology,* 59, 47-70.

Description of Grave

Grave Number: Grave 1

Grave Type: Polygonal Cist, disturbed

Orientation of the Grave: East/West

Body Position: Crouched, right side

Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK1

The remains of this individual were well preserved, the best preserved of the site. The skull is represented by a complete frontal, fragmentary left parietal, complete right parietal, partial left temporal, complete right temporal, fragmentary occipital, complete sphenoid, complete zygomatics, complete maxillae, complete palatines, complete nasal bones, complete ethmoid, poor vomer, and a complete mandible. The shoulder girdle consisted of the complete left clavicle, partial left scapula, the shaft and lateral potion of the right clavicle, and the complete right scapula. The thorax consisted of the complete manubrium, complete sternal body, 11 right ribs, 10 left ribs, including both first ribs, one left rib head fragment, complete C1-C5, partial C7, complete T1-T6, complete T9-12, complete L2 and L3, and partial L4 and L5. The pelvic girdle was complete except for the right pubis, which was partial. Both acetabula were complete, so was the sacrum. The upper limbs were complete, except for the right humerus which had some damage to the head. The lower limbs were complete except for the right fibula, which consisted of the shaft and distal portion. The hands consisted of the left scaphoid, lunate, triquetrum, trapezium, trapezoid, capitate, hamate, poorly preserved MC1-MC5, five proximal phalanges, four middle phalanges, one distal phalanx; right scaphoid, lunate, trapezium, capitate, hamate, complete MC1-MC5, five

proximal phalanges, four middle phalanges, one distal phalanx, and one unidentified carpal. The feet were complete except for a poor left cuboid, poor right cuboid, absent right intermediate cuneiform, poor right MT4. Nine foot proximal phalanges, two middle phalanges, and one sesamoid bone were also identified.

There was some increased robusticity changes on the right humerus and both femora.

Age and Sex
Based on the completed fusion and the eruption of the third molars, it was identified that this individual was a young adult. The identification a fusion line on the clavicle and the level of tooth wear resulted in an estimated refined age-at-death of 24-30.

Stature
A stature estimate of 145.27 ± 3.72 cm was gained from a maximum femoral length measurement of 36.9 cm.

Skeletal Pathology
There were some mild DJD changes to the spinal column, including mild lipping on T10 and T12, and small Schmorls nodes on T9, L3, and L4. The presence of these Schmorls nodes suggests that the spinal column was under some stress during adolescence, and this combined with the robusticity changes in the right humerus and both femora suggest that this individual had an active adolescent and early adulthood.

No cribra orbitalia or periostitis was identified. Due to outer table erosion, this individual was not scorable for porotic hyperostosis.

Dentition

P	P	P	P	P	P	P	MP	P	P	MP	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
MP	P	P	P	P	P	P	P	P	P	P	P	MP	P		P

Lower left second molar taken for aDNA analysis

Attrition: There was mild to moderate attrition

Calculus: There was mild calculus on all teeth except for the right second molars and the left first molars, which had moderate calculus.

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on all present canines, upper left first incisor and on the lower right first molar.

Description of Grave

Grave Number: Grave 2
Grave Type: Cist, disturbed
Orientation of the Grave: Roughly North/South
Body Position: Skeleton 3 was Crouched, skull at South end; other remains disarticulated
Associated Material: Vase Urn, inhumed remains of 5 individuals
Dating Information: Skeleton 2 dated to 3520 ± 70 BP (OxA-2674; human bone), calibrated to 2030–1680 cal BC (calibrated at 2σ, calibrated by Richard Warner of the Ulster Museum, Belfast)
Comments: Grave within a ring ditch. This grave contained the remains of five inhumations, in various levels of articulation, with the report suggesting that skeleton 3 was the last individual to be placed into this grave (crouched, skull at south end). It is suggested that the ceramic was associated with skeleton 3.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK2

The remains of this individual were moderately to poorly preserved. It was suggested that this was the original occupant in the cist. The skull was represented by a partial right parietal and a poorly preserved mandible. The shoulder girdle consisted of the shaft of the left clavicle and the fragmentary remains of the right scapula. The thorax consisted of a partial L1, complete L3, and complete L5. The pelvic girdle consisted of partial left ilium, partial left ischium, fragmentary right ilium, partial right ischium, and a partial right pubis. The left acetabulum was partial, the right was fragmentary. The upper limb was represented by the shaft and proximal portion of the left humerus, shaft of the left ulna, shaft of the left radius, shaft and head of the right humerus, shaft of the right ulna, and the shaft and proximal portion of the right radius. The lower limb was represented by the fragmentary right tibia and the shaft of the right fibula. The hand was absent, the foot consisted of the left calcaneus, right talus, and right calcaneus.

Age and Sex
The complete fusion and eruption of the third molars identified this individual as a young adult. Refined age-at-death of 25-35 was estimated based on the morphology of the right auricular surface and right pubic symphysis. Based on the morphology of the pelvis this individual was estimated to be a possible male.

Skeletal Pathology

Mild Schmorls nodes were identified on the superior L3 centrum and the inferior L5 centrum. There was mild lipping on the left L3 inferior facet, and both superior L5 facets. This individual was not scorable for Cribra Orbitalia or Porotic Hyperostosis. No Periostitis was identified.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	MP	P	P	P	P	P	P	P	P

Calculus: Mild to moderate calculus was identified, with moderate calculus on the molars.

Caries: No caries identified

Hypoplasia: Due to the damage to the teeth, it was not possible to assess for hypoplasia.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK3

The remains of the individual found semi-articulated in the cist were those of a young adult male, aged between 25-35. The remains consisted of the left shaft and distal humerus, the proximal portion of the left ulna and radius, the left femora which was missing the joint surfaces, the proximal left tibia, left distal fibula, shaft and distal portion of the right tibia, distal portion of the right tibia, and a selection of phalanges. It was noted that this individual was robust, particularly the attachment for the left deltoid muscle. Enough dental material was identified to report no caries, no hypoplasia, moderate calculus, and moderate alveolar resorption.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK4

Within the disarticulated material a smaller young adult, likely 25-35, was identified. Sex could not be estimated. This included distal humeri, right shaft and proximal portion of the ulna, proximal portion of the left ulna and radius, mostly complete femora, and mostly complete tibiae. Enough dental material was identified to report one caries, two hypoplasia insults, severe calculus, and severe alveolar resorption.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK5

The remains of this individual were poorly preserved, and identifiable from the disarticulated bone due to their smaller size and unfused state. The skull was absent. The shoulder girdle was absent. The thorax was absent. The pelvic girdle was represented by a partial left ilium, complete right ilium, complete right ischium, and the right acetabulum was partial. The upper limb consisted of the shaft of all upper limb bones. The lower limb was represented by the shaft and proximal portion of the left femur, the shaft of the left tibia, the shaft and distal portion of the right femur, and fragments of a fibula. The hands and feet were absent.

Age and Sex

Based on the size and lack of fusion this individual was estimated to have an age-at-death of roughly 8 to 16. Due to the poor preservation this could not be refined further. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology

This individual was not scorable for Cribra Orbitalia or Porotic Hyperostosis. There was no Periostitis.

Dentition

There was no preserved dentition.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK6

Few isolated remains of another adult were also found within the disarticulated remains. This included partial scapulae, shaft of the left clavicle, partial sacrum, selection of vertebra, head of the left humerus, distal right radius, right patella, left talus and calcaneus. Enough dental material was identified to report no caries, four hypoplasia insults, no calculus, and slight alveolar resorption.

Description of Grave

Grave Number: Grave 3
Grave Type: (Polygonal?) Cist, disturbed
Orientation of the Grave: Roughly Northeast/Southwest (description of cist unclear)
Body Position: Disturbed, Head at south end
Associated Material: Pygmy Cup, animal bone
Dating Information: 3660 ± 70 BP (OxA-2675; human bone), calibrated to 2280–1880 cal BC (calibrated at 2σ, calibrated by Richard Warner of the Ulster Museum, Belfast)

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK7

The remains of this individual were moderately to poorly preserved, with high levels of fragmentation. The skull was represented by six fragments, including fragments of the right frontal parietal, temporal, and occipital. The shoulder girdle was represented by the shaft and medial portion of the left clavicle, fragmentary right scapula, complete right clavicle, and partial right scapula. The thorax consisted of seven left rib fragments, 31 unsided rib fragments, partial C1, complete C2-4, partial C6-T7, partial T9, and four partial lumbar neural arches. The pelvic girdle consisted of partial left ilium, ischium, pubis, and a partial right ilium. Both acetabula were absent. The upper limbs were represented by a fragmentary left humerus, shaft of the left ulna, fragmentary left radius, poorly preserved right humerus, proximal portion of the right ulna, and fragmentary right radius. The lower limbs were represented by the shaft of the left tibia, fragmentary left fibula, the shaft and distal portion of the right femur, the shaft of the right tibia, and the shaft of the right fibula. One unsided metacarpal and seven unsided metatarsals were identified.

Age and Sex
The size and lack of fusion in this individual identified it as a child, with a refined age-of-death based on the presence of erupting first molars in the excavation report. As this individual was a child, no sex estimation was undertaken.

Skeletal Pathology
This individual was not scorable for Cribra Orbitalia or Porotic Hyperostosis. No Periostitis was identified.

Dentition
No dentition was identified within the curated remains, although the excavation report mentions erupting permanent first molars. No Hyperplasia was reported in the published analysis.

Description of Grave

Grave Number: Grave 4
Grave Type: Cist, disturbed
Orientation of the Grave: Northeast/Southwest
Body Position: Disturbed
Associated Material: N/A
Dating Information: N/A

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK8

The remains of this individual were poorly preserved and had become highly fragmented. The skull was highly fragmented and had significant bone surface loos. Fragments of the left and right fontal, both parietals, both temporals, and the occipital were identified. There was no preservation of the shoulder girdle. The thorax consisted of fragments of L5 and S1. The pelvic girdle was represented by fragments of the left ilium and left ischium. Both acetabula were absent. There was significant quantity of long bone fragments, not all of which could be identified. The shaft of the left humerus, shaft and distal portions of the left ulna, fragments of the right humerus, shaft of the left femur, fragments of the left patella, fragments of the left tibia, fragments of the right femur, and fragments of the right tibia could be identified. There was no preservation of the hands or the feet.

Age and Sex
Based on the size of the individual, it was estimated that this was an adult individual. Due to the preservation no estimation of the refined age-at-death or sex could be undertaken.

Skeletal Pathology
This individual was not scorable for Cribra Orbitalia or Porotic Hyperostosis. No Periostitis identified.

Dentition
No surviving dentition

Description of Grave

Grave Number: Grave 6
Grave Type: Cist, paved
Orientation of the Grave: Northwest/Southeast
Body Position: Crouched, right side, head to the South
Associated Material: Tripartite Bowl among the feet, possible animal bones
Dating Information: 3560 ± 70 BP (OxA-2676; human bone), calibrated to 2140–1740 cal BC (calibrated at 2σ, calibrated by Richard Warner of the Ulster Museum, Belfast)
Comments: Cist described as the finest of the excavation

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK9

The remains of this individual were moderately preserved, with good representation of skeletal areas. The skull was represented by poorly preserved front, fragmentary left parietal, fragmentary right parietal, fragmentary left temporal, complete right temporal fragmentary occipital, partial right sphenoid, complete right zygomatic, partial left maxilla, partial right maxilla, partial nasal bones, and a mostly complete mandible. The shoulder girdle was represented by the shaft and medial portion of both clavicles and partial scapulae. The thorax consisted of the complete manubrium, partial sternal body, both first ribs, 21 unsided rib fragments, 10 articular rib ends, complete C1-C7, T1, 8 thoracic vertebrae bodies, partial L3-L5. The pelvic girdle consisted of the partial left ilium, partial left ischium, complete left pubis, complete right ilium, partial right ischium, partial right pubis. The left acetabulum was partial, the right acetabulum was complete, S1-S3 were identified. The upper limb consisted of a fragmentary left humerus, complete left ulna, poor left radius, and fragmentary right radius and ulna. The lower limb was represented by a fragmentary left femur, partial left patella, poor left tibia, shaft of the left fibula, fragmentary right femur, fragmentary right tibia, and the shaft and proximal portion of the right fibula. The hands consisted of the left scaphoid, lunate, triquetrum, capitate, shaft and distal portion of MC1, shaft and proximal portion of MC2-MC4 five proximal phalanges, three middle phalanges, three distal phalanges; right scaphoid, lunate, trapezium, capitate, hamate, shaft and distal portion of MC1, shaft and proximal portion of MC2-MC4 five proximal phalanges, two middle phalanges, two distal phalanges; one unidentified carpal and one unidentified metacarpal. The feet consisted of the left talus, calcaneus, navicular, medial cuneiform, intermedial cuneiform, complete MT1, shaft and proximal portion of MT2; right talus, calcaneus, cuboid, navicular, medal cuneiform, intermedial cuneiform, lateral cuneiform, shaft of MT1, shaft and proximal portion of MT2-MT4, and three foot phalanges.

Age and Sex

Based on the level of fusion identified – distal humerus, proximal ulna, ischium, and erupting third molars this individual was identified as an adolescent, with an estimated

refined age-at-death of 15-18. As this individual was an adolescent, no sex estimation was undertaken.

Skeletal Pathology
Mild Cribra Orbitalia was identified in both orbits. No Porotic Hyperostosis or Periostitis was identified.

Dentition

PU	P	P	P	MP	MP	P	P	MP	P	P	MP	P	P	P	PU
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
CA	P	P	DR	P	P	P	P	P	P	P	P	P	P	P	CA

The lower right deciduous molar was retained. *The published analysis mentions that the second lower premolar was identified within the mandible.*

Calculus: Mild to moderate calculus was identified, with mineral accretion preventing all teeth from being scored.

Caries: No caries identified

Hypoplasia: The mineral accretion obscured the scoring of hypoplasia.

Description of Grave

Grave Number: Grave 7
Grave Type: Cist, paved
Orientation of the Grave: North/South
Body Position: Supine, knees drawn up below the chin and the arms folded across the chest, skull at the South
Associated Material: Comb-decorated bowl, upright on the ribs
Dating Information: 3690 ± 70 BP (OxA-2677; human bone), calibrated to 2300–1900 cal BC (calibrated at 2σ, calibrated by Richard Warner of the Ulster Museum, Belfast)

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_SK10

The remains of this individual were moderately to poorly preserved, with most skeletal areas represented. The skull was represented by partial right parietal, complete right temporal, partial occipital, partial right sphenoid, partial left maxilla, partial right maxilla, partial right palatine, and a complete mandible. The hyoid was identified. The shoulder

girdle represented by the shaft and medial portion of the left clavicle, partial left scapula, shaft and lateral portion of the right clavicle, and the partial right scapula. The thorax consisted of the partial sternal body, seven left ribs, ten right ribs, four unsided rib fragments, mostly complete cervical vertebrae, T1, neural arches of T2-T5, complete T6, complete T7, neural arches of T8-T12, complete L3, and fragmented neural arches of the remaining lumbar vertebrae. The pelvic girdle was represented by the poorly preserved right ilium, and partial right ischium and pubis. The right acetabulum was partial, S1 was identified. The upper limb consisted of both humeri; however, they were damaged. The lower limb was represented by a fragmentary left femur. The hands consisted of complete left MC1 and MC2, right scaphoid, right lunate, complete right MC1, shaft and proximal portion of the right MC3, and seven phalanges. The feet consist of the left talus, calcaneus, medial cuneiform, and poorly preserved MT5; right talus, calcaneus, and poorly preserved MT5. Four unidentified tarsals and two phalanges were also noted.

Age and Sex

The fusion – iliac blade fusion line visible, medial clavicle unfused; and eruption of the third molars identify this individual as a young adult, with an estimated refined age-at-death of 18-13. Based on the morphology of the mastoid process, nuchal crest, and sciatic notch it was estimated that this individual was male.

Skeletal Pathology

Schmorls nodes were identified on the inferior T6 and T7 centrum, and on the inferior and superior surface of the L3 centrum. These are indicative of stress through the spinal column during adolescence.

This individual was not scorable for cribra orbitalia or porotic hyperostosis. No periostitis identified.

Dentition

MP	P	P	P	P	MP	MP	P	MP	MP	MP	P	P	P	P	MP
18	17	16	15	14	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
MP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Upper left canine removed for aDNA testing in 2013

Calculus: Mild calculus was identified, there was surface damage

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on both lower first incisors and canines, on the upper left second premolar, and the lower left third molar showed enamel quality changes

Description of Grave

Grave Number: a
Grave Type: N/A
Orientation of the Grave: N/A
Body Position: N/A
Associated Material: N/A
Dating Information: N/A
Comments: Associated with the curated remains from Rathlin Island Church Bay was an unaccounted for individual. This individual was noted in the collection as - Ulster Quarries cutting below road junction of Rocket and Shore Road. Sand context below ricks and tarmac.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** RATH_a

This individual was poorly preserved and represented an adolescent. The skull was represented by a fragmentary left parietal. The shoulder girdle was absent. The thorax consisted of two rib fragments. the pelvic girdle consisted of a partial left ilium, partial left ischium, and the coccyx. The upper limb consisted of the shaft and distal portion of the left humerus. The lower limbs consisted of two femoral shafts. No preservation of hands or feet.

Due to the fusion of the distal humerus and the lack of fusion in the distal femur, a refined age-at-death of 15-18 could be estimated. As this individual was an adolescent, no sex estimation was undertaken.

Due to the poor preservation this individual was no scorable cribra orbitalia, porotic hyperostosis, enamel hypoplasia, or periostitis.

Additional References

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Reg Number: Rath_G **SMR Number:** ANT 001:094

Physical Setting

Townland: Rathlin Island, Glebe

County: Antrim **Province:** Ulster

Year of Excavation: 2006

Monument Type: Flat Cemetery

Conditions of Discovery: Construction

Total Burials: 4 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: Sloan, B., Carver, N., Murphy, E.M. and McGranaghan, C. 2008. A Bronze Age Cist Burial at Glebe, Rathlin Island, County Antrim. *Ulster Journal of Archaeology*, 67, 60–83.

Description of Grave

Grave Number: C112

Grave Type: Disturbed Cist

Orientation of the Grave:

Body Position: Disturbed

Associated Material: Disarticulated remains of 3 individuals

Dating Information: Skeleton C122 was dated to 3539 ± 54 BP (UBA-8705; human bone), calibrated to 2024–1741 cal BC (calibrated at 2σ); skeleton C105 was dated to 3354 ± 28 BP (UBA-8706; human bone), calibrated to 1736–1534 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** C122

The remains of this individual were poorly preserved, with noticeable fragmentation and surface damage. Based on the morphology of the skull, this individual was estimated to be male, with an age-at-death estimation of young adult (refined 17-25 years) based on dental eruption and fusion. An estimated attained stature of 175.3cm was calculated based on the right humerus.

Skeletal Pathology

Porotic hyperostosis identified on the right parietal. No periostitis or cribra orbitalia identified.

Dentition

					MP	MP	MP	MP	MP	MP	MP	MP	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	U	P	P	P	P	P	P	P	P	P	P	P	P

retained second deciduous right mandibular molar, impacted right mandibular third molar. Mild to moderate attrition, mild calculus

Human Remains

Curation Location: Unreported **Reg:** C105

The remains of this individual were poorly preserved, with noticeable fragmentation and surface damage. Based on the morphology of the skull, this individual was estimated to be male, with an age-at-death estimation of young adult (refined 17-25 years) based on dental eruption and fusion. An estimated attained stature of 175.3cm was calculated based on the left humerus.

Skeletal Pathology
Periostitis identified on the right scapula. Cribra Orbitalia and Porotic Hyperostosis was not scorable.

Dentition

		P	P	MP	MP	MP	MP								
~~18~~	~~17~~	16	15	14	13	12	11	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	47	46	45	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	36	37	38
	MP	P	MP										P	P	LA

38 might have been congenitally absent. Mild to moderate attrition, mild calculus

Human Remains

Curation Location: Unreported **Reg:** RathG_Dis

Disarticulated remains of a third individual, likely a young adult female.

Skeletal Pathology
Enamel hypoplasia identified on all loose canines associated with this individual

Description of Grave

Grave Number: C124
Grave Type: Cist
Orientation of the Grave: North-South
Body Position: Crouched, left side, skull to the North and facing East
Associated Material: Tripartite Bowl near the South-East corner of Cist
Dating Information: 3591 ± 29 BP (UBA-8707; human bone), calibrated to 2026–1885 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** C127

The remains of this individual were moderately to well preserved, with all skeletal regions represented. Surface erosion was noticed on most bones. Based on the morphology of the skull and the pelvis, this individual was estimated to be male, with an age-at-death estimation of Middle Adult (refined age-at-death estimate of 40-60). Estimation of attained stature was 1.81cm, based on the femur and tibia.

Skeletal Pathology
DJD was identified on the right acromioclavicular joint, right glenohumeral joint, the ulnar notches of the right and left radii, the inferior margin of the proximal end of the right first metacarpal, and on the posterior surfaces of the medial condyles of the femora.

DJD was identified on most vertebral joints. Schmorls nodes were identified on the inferior surface of the T7 centrum, all surfaces of the T8-T11 centra, and the superior surface of the T12 centrum.

The spinous processes of the third and fourth lumbar vertebrae displayed an oblique malalignment in which their superior aspect was skewed to the left by some 45°, which may have been due to long-standing strain to the ligaments of the lower spine.

No periostitis identified. Cribra orbitalia and porotic hyperostosis not scorable.

Trauma
A sub-oval area of lytic activity, which measured approximately 19mm medio-laterally by 30mm supero-inferiorly, was identified on the medial aspect of the left calcaneal tuber. The morphology of the lesion would tend to suggest that it had been due to an overlying soft tissue injury, possibly the Achilles tendon.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition was mild or moderate. Caries was identified on lower right second premolar. Mild calculus was identified. No enamel hypoplasia was identified.

Reg Number: 1928:459 **SMR Number:**

Physical Setting

Townland: Ballon

County: Carlow **Province:** Leinster

Year of Excavation: 1928

Monument Type: Burial

Conditions of Discovery: Unrecorded

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Journal of the Kildare Archaeological Society 1933, 235; NMI Files

Description of Grave

Grave Number: Burial 1

Grave Type: Not recorded

Orientation of the Grave: N/A

Body Position: N/A

Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1928:459

The remains of this individual consisted of four skull vault fragments, partial T7, complete T8-T10, partial T11-T12, complete L1-L2, partial L3, complete L4-L5, distal and shaft portion of the left femur and tibia, and the proximal and shaft of the left fibula.

Age and Sex

Completed fusion identified this individual as an adult.

Skeletal Pathology

Mild DJD was identified on the right superior facet of T11, right inferior facet of T12, right inferior facet of L2, left superior facet of L3, both inferior facets of L3, and the left inferior facet of L4. Moderate DJD was identified on both superior facets of L4, the left superior facet of L5, and the right inferior facet of L5. Severe DJD was identified on the right inferior facet of L4, right superior facet of L5, and the left inferior facet of L5. Mild lipping was identified on both surfaces of the T8 centrum, both surfaces of the T10 centrum, the inferior surface of the T11 centrum, and both surfaces of the L5 centrum.

Cribra orbitalia, porotic hyperostosis, and periostitis were not scorable.

Reg Number: 1934:429 **SMR Number:** CW003-007----

Physical Setting

Townland: Ballyhacket Upper

County: Carlow **Province:** Leinster

Year of Excavation: 1934

Monument Type: Cist Burial

Conditions of Discovery: Found during farming operations

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Yes

Primary Reference: Ó Ríordáin, S. 1934. Bronze Age burial, Ballyhacket Upper, Tullow, Co. Carlow. *Journal of the Royal Society of Antiquaries of Ireland,* 4(1), 141-142.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist Burial

Orientation of the Grave: West, Northwest/East, Southeast

Body Position: Disturbed, found at the East end of the grave

Associated Material: Bipartite Vase at East end of grave, flint flake, Cremated Individual

Dating Information: Vase decoration suggests McSparron Phase B

Comments: Remains curated do not seem to match those mentioned in the excavation report. Analysis of curated individual completed.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1934:429

The remains of this individual were poorly preserved, with moderate skeletal region representation. The skull consisted of fragmentary frontals, parietals, fragmentary left temporal, fragmentary occipitals, fragmentary sphenoid, partial left zygomatic, poor right zygomatic, poor right maxilla, partial right palatine, and fragmentary left mandible. The shoulder girdle consisted of fragmentary scapulae. The thorax was represented by two unsided rib fragments, one thoracic vertebra, and S1. The pelvic girdle was represented by the fragmentary left ilium. Both acetabula were absent. The upper limb consisted of five fragments. The lower limb was represented by distal and shaft fragments of the left femur, proximal portion of the left fibula, proximal portion and shaft of the right femur, distal portion of the right tibia, and 15 long bone fragments. The hands consisted of one phalanx. The feet consisted of the poor left calcaneus, poor right MT1, and one unidentified metatarsal.

Age and Sex

Based on completed fusion and levels of attrition, this individual was estimated to have been a young adult, with no refined age-at-death estimate. The morphology of the supraorbital ridge and the orbital shape resulted in an estimation of possible male for this individual.

Skeletal Pathology

Mild lipping was identified on the inferior surface of a mid-thoracic centrum.

Mild cribra orbitalia identified in right orbit. No porotic hyperostosis or periostitis identified.

Dentition

MP	MP	P	MP	P	MP	MP	MP								
18	17	16	15	14	13	12	11	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	34	35	36	37	~~38~~
											MP	MP	P	P	

Attrition: Moderate attrition identified

Calculus: Mild calculus identified on the upper right first premolar, and moderate calculus idented on the upper right first molar.

Caries: No caries identified

Hypoplasia: Hypoplasia was not scorable

Additional References

Brindley, A., and Kilfeather, A. 1993. *Archaeological Inventory of County Carlow*. Dublin: Stationery Office (p.4)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.53)

Reg Number: BAUN **SMR Number:** CW008-031001-

Physical Setting

Townland: Baunogenasraid

County: Carlow **Province:** Leinster

Year of Excavation: 1972

Monument Type: Reused Neolithic Mound Cemetery; Central Cist Neolithic (not listed here)

Conditions of Discovery: Remains uncovered during agricultural operations, NMI excavation

Total Burials: 11 **Total Inhumations:** 6

Excavation Report: Published

Primary Reference: Raftery, B. 1974. A Prehistoric Burial Mound at Baunogenasraid, Co. Carlow. *Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature*, 74, 277–312.

Description of Grave

Grave Number: Grave 1

Grave Type: Pit burial, stone lined

Orientation of the Grave: Not recorded

Body Position: Crouched, left side, head facing Southeast

Associated Material: Necked bipartite bowl, lining of a dark organic substance with traces of a wood grain, Cremation

Dating Information: N/A

Comments: half cut away by bulldozer

Human Remains

Curation Location: National Museum of Ireland **Reg Number:** E111:11

The remains of this individual were poorly preserved, with moderate skeletal region representation. The skull consisted of four fragments, and a damaged mandible and maxillae. The shoulder girdle was represented by the shaft of the left clavicle and fragmentary left scapula. The thorax consisted of three left rib fragments and nine unsided rib fragments. The pelvic girdle was represented by four fragments. Both acetabula were absent. The upper limb consisted of the distal and shaft portion of the left humerus, fragmentary left ulna, proximal portion of the left radius. The lower limb was fragmentary, with parts of both femora, tibiae, and the left fibula identified. There were 29 unidentified long bone fragments, including two large (femur or tibia) fragments. It is assumed that the right arm was also represented in these fragments. The hands consisted of the poor right scaphoid, lunate, and trapezium. There were two unidentified carpals, two unidentified metacarpals, and four hand phalanges. No bones of the feet could be identified. There were multiple unidentified bone fragments.

Age and Sex
The level of dental eruption and attrition suggest that this individual was a middle adult. No refined age-at-death estimation was undertaken due to levels of preservation. Based on the morphology of the mandible, this individual was estimated to be a possible male.

Skeletal Pathology
Periostitis, DJD, cribra orbitalia, and porotic hyperostosis were all not scorable.

Dentition

P	P	P	P	P	P	P	MP	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

There was the loss of the enamel surface on multiple teeth

Attrition: There was moderate to moderate/severe attrition on the dentition of this individual, with severe attrition on the first molars

Calculus: Due to the loss of enamel surface, calculus was not scorable

Caries: No caries were identified

Hypoplasia: Due to the loss of enamel surface, hypoplasia was not scorable

Description of Grave

Grave Number: Grave 5
Grave Type: Pit burial
Orientation of the Grave: N/A
Body Position: Crouched
Associated Material: Inhumation of an adult male with a flint knife beside one of the long bones, inhumation of a child. Three pieces of cremated bone were found with the remains, likely belonging to grave 4.
Dating Information: N/A
Comments: Disturbed by grave 4 and rabbits

Human Remains

Curation Location: National Museum of Ireland **Reg Number:** E111:15.1

The remains of this individual were poorly preserved. The skull consisted of a total of seven fragments, including partial temporals, left zygomatic, and a fragment of the mental

eminence. Dentition was preserved. The shoulder girdle consisted of the shaft of the left clavicle and partial scapulae. The thorax was represented by right rib fragments, two cervical vertebrae fragments, two partial lower thoracic vertebrae, and three unidentified vertebral fragments. The pelvic girdle was absent. The upper limb was represented by the shaft of the left humerus, shaft of the left ulna, and fragmentary left radius. The lower limb was represented by the fragmentary remains of the left femur, tibia, and fibula. There was a large amount of unidentified bone fragments, including long bone fragments. From this 14 femur or tibia fragments were identified, along side five radius, ulna, or fibula fragments. five hand phalanges were identified; no other hand or foot bones identified.

Age and Sex

Based on the dentition, an age grouping of middle adult was estimated. While no skeletal elements used in sex estimation were identified, this individual was noticeably robust. This suggests that this individual was estimated to be a possible male.

Skeletal Pathology

Periostitis, DJD, cribra orbitalia, and porotic hyperostosis were all not scorable.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
	P	P	P	P		P		P	P	P	P	P	P	P	

Attrition: Moderate attrition was noted on the incisors, canines, upper first molars, and lower present molars. Mild attrition was noted on other surviving teeth

Calculus: Due to damage, calculus was not scorable

Caries: Two caries were identified. The upper right second premolar had suffered gross destruction. There was an interproximal mesial caries on the upper right first molar. Due to the lack of the dental arcade, it is unknown if there were any abscesses.

Hypoplasia: Due to damage, hypoplasia was not scorable

Human Remains

Curation Location: National Museum of Ireland **Reg Number:** E111:15.2

The remains of this individual were poorly preserved, with only fragments of skull and one tooth crown identified. 26 skull vault fragments were observed, from which parts of the

frontal, partials, temporals, and occipital were all identified. No other bone fragments were identified.

Age and Sex
The identification of an upper molar crown, along with the size and thickness of the skull fragments suggest that this was a child. Due to the level of preservation, no refined age-at-death could be estimated.

Skeletal Pathology
Periostitis, DJD, cribra orbitalia, and porotic hyperostosis were all not scorable

Dentition
The crown of an upper molar was present

Description of Grave

Grave Number: Grave 7
Grave Type: Pit burial
Orientation of the Grave: N/A
Body Position: Disturbed
Associated Material: N/A
Dating Information: N/A
Comments: Disturbed by rabbits

Human Remains

Curation Location: National Museum of Ireland **Reg Number:** E111:17

The remains of this individual were poorly preserved. The skull was represented by 13 fragments, including partial maxillae. There was a significant number of bone fragments, from which a fragmentary left clavicle, shaft of left humerus, four rib fragments, one partial cervical vertebra, three vertebral fragments, possible iliac blade boarder, and 42 long bone fragments were identified.

Age and Sex
Based on dental eruption and attrition, this individual was estimated to be a young adult, with a refined age-at-death of 17-25. Due to the level of preservation, sex could not be estimated.

Skeletal Pathology
Periostitis, DJD, cribra orbitalia, and porotic hyperostosis were all not scorable.

Dentition

PE	P	P	P	P	MP	MP	MP	MP	MP	MP	P	P	P	P	
18	17	16	15	14	13	12	11	21	22	23	24	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

The upper right third molar is erupting on an angle towards the second molar

Attrition: Mild attrition was identified

Calculus: Moderate calculus was identified on the upper right premolars and first molar, with mild calculus on the second molar. The upper left teeth were not scorable for calculus

Caries: No caries were identified

Hypoplasia: Hypoplasia was identified on the upper right second premolar, and one both upper left premolars

Description of Grave

Grave Number: Grave 8
Grave Type: Pit burial
Orientation of the Grave: N/A
Body Position: Disturbed
Associated Material: N/A
Dating Information: N/A
Comments: Disturbed by faunal activity

Human Remains

Curation Location: National Museum of Ireland **Reg Number:** E111:18

The remains of this individual were poorly preserved, consisting of a skull and one right rib fragment. The skull was represented by 26 large skull vault fragments, occipital condyles, partial maxillae, and dentition. From the fragments the partial frontal, fragmentary parietals, partial left temporal, fragmentary right temporal, fragmentary occipital, and fragmentary sphenoid.

Age and Sex

This individual was estimated to have been a young adult based on dental attrition and lack of suture closer. Based on the morphology of the mastoid process it is estimated that this individual was a possible male.

Skeletal Pathology
Periostitis, DJD, cribra orbitalia, were not scorable. Mild porotic hyperostosis was identified on the multiple skull vault fragments, include a large piece of the left parietal.

Dentition

								P	P	P					P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P	P							P		P			P	P

Attrition: Attrition was mild

Calculus: Moderate calculus was identified on the present teeth

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on the upper left first incisor and the canine

Description of Grave

Grave Number: Grave 9
Grave Type: Pit burial, stone lining
Orientation of the Grave: N/A
Body Position: Crouched, left side, head to the East, facing South
Associated Material: N/A
Dating Information: N/A
Comments: Disturbed by grave 2

Human Remains

Curation Location: National Museum of Ireland **Reg Number:** E111:19

The remains of this individual were poorly preserved, but had better skeletal region representation than the other Early Bronze Age inhumations from this site. The skull was represented by nine moderately sized vault fragments, and 12 smaller vault fragments. From this, parts of the formal, both parietals, both temporals including the petrous portions, and the occipital were identified. The shoulder girdle consisted of fragmentary scapulae. The thorax was represented by partial manubrium, partial sternal body, four left rib fragments, eleven right rib fragments, 32 unsided rib fragments, partial C6 and C7, partial T1 and T2, 20 probably thoracic centrum fragments, 28 probably thoracic neural arch fragments, partial L5, four probable lumbar centrum fragments, and three probable lumbar neural arch fragments. The pelvic girdle was represented by the partial left ilium, poor left

ischium, and the poor right ischium. The left acetabulum was partial, S1 was present. The upper limb was represented by the fragmentary remains of the right humerus, fragmentary right ulna, and the proximal portion of the right radius. The lower limb consisted of fragmentary femora, and the distal portion of the right fibula. There was a significant number of long bone fragments, including 10 larger and 97 smaller fragments. There were four shaft fragments that were ulna or radium or fibula, but could not be positively identified due to preservation. The hands consisted of one unidentified carpal and five phalanges. The feet consisted of a poor right talus, partial right calcaneus, and one phalanx. There were 66 large unidentified fragments.

There was a mostly complete right ilium unlabelled in the BC with this individual, but it could not be positively identified. This individual was reasonably robust.

Age and Sex
Ans estimated age of middle adult was obtained through observation of the ossification of sternal end rib cartilage and suture closure. Based on the morphology of the mastoid process, the sciatic notch, and the general robustness, this individual was estimated to be a possible male.

Skeletal Pathology
Mild to moderate DJD was observed in the spinal column. Both right articular facets of C5 and C6 had significant DJD, including porosity. The superior right articular facet on T1 had moderate DJD. Six fragments of lower thoracic centrums had lipping; two mild, four moderate. One lumbar centrum had mild lipping, and the centrum of S1 looked as if it was undergoing degenerative change. Schmorls nodes were identified on the superior centrum of T1.

Periostitis, DJD, cribra orbitalia, and porotic hyperostosis were all not scorable.

Dentition
One premolar and one molar were identified, with moderate attrition. There was also a bag of decade teeth that were labelled as representing a second individual – a child. However, with their state of preservation I am not comfortable either accepting or rejecting outright this statement. No mention of a second individual was in the excavation report.

Additional References

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.53)

Reg Number: 1956:11 **SMR Number:** CW016-016----

Physical Setting

Townland: Boherduff

County: Carlow **Province:** Leinster

Year of Excavation: 1956

Monument Type: Cist

Conditions of Discovery: Found by Farmer

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Prendergast, E.M. 2011. Boherduff, Co. Carlow, E1032. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 66–68.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Crouched, right side with head to the Northeast, western half of cist

Associated Material: None

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1956:11

The remains of this individual were moderately well preserved, with good skeletal region representation. The skull was represented by partial left frontal, poor right frontal, fragmentary left parietal, poor right parietal, fragmentary occipital, partial temporals, partial maxillae, partial mandible, and multiple skull vault fragments which could not be positively identified. The shoulder girdle consisted of the medial portion of the left clavicle, and partial scapulae. The thorax was represented by six right rib fragments, six left rib fragments, eight unsided rib fragments, unfused parts of C1 and C2, two fragments of cervical neural arches, six thoracic centrum, six fragments of thoracic neural arches, two lumbar centrum, and one lumbar neural arch. The pelvic girdle consisted of partial left and right ilium. Both acetabula and the sacrum were absent. The upper limb was represented by poor left humerus, the shaft of the left ulna, shaft of the left radius, poor right humerus, proximal and shaft portion of the right ulna, and the shaft of the right radius. No epiphyses were identified. The lower limb was represented by poor left femur, poor left tibia, shaft of the left fibula, poor right

femur, proximal and shaft portion of the right tibia, and the shaft of the right fibula. No epiphyses were identified. Nine unidentified hand or foot bones were noted.

Age and Sex
Based on the level of tooth eruption and formation, this individual was estimated to have been an infant, with a refined age-at-death estimate of 18 months to 2.5 years. Due to the young age of this individual, sex estimation was not possible.

Stature
The length of the left humerus, 11.6cm, and the right femur, 14.4cm, is consistent with the average height of an individual for the identified age group.

Skeletal Pathology
No periostitis was identified, and no porotic hyperostosis was identified, although there was large areas of bone surface damage. This individual was not scorable for cribra orbitalia.

Dentition

							PU	PU							
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
		PU			PU		PU	PU		PU			PU		
					MP	MP	MP	MP	MP	P					
			~~55~~	~~54~~	53	52	51	61	62	63	~~64~~	~~65~~			
			85	84	83	82	81	71	72	73	74	75			
			PE	P	MP	MP	P	P	P	MP	P	PE			

Attrition: No to mild attrition was identified

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Additional References

Brindley, A., and Kilfeather, A. 1993. *Archaeological Inventory of County Carlow*. Dublin: Stationery Office. (p.5)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.53)

Reg Number: 1930:57 **SMR Number:** CW016-016----

Physical Setting

Townland: Knocknatubbrid

County: Carlow **Province:** Leinster

Year of Excavation: 1930

Monument Type: Cist Burial

Conditions of Discovery:

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: No

Primary Reference: O'Toole, E., and Mitchell, G. 1939. A group of grooved standing stones in North Carlow. *Journal of the Royal Society of Antiquaries of Ireland,* 9(2), 99-111.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Not recorded

Body Position: Crouched

Associated Material: Animal bone was found with the remains during analysis

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1930:57

The remains of this individual were poorly preserved, with significant fragmentation. The skull was represented by a partial frontal, nine vault fragments, fragmentary temporal, fragmentary sphenoid, partial right zygomatic, partial maxillae, four facial fragments, and a partial hyoid. The shoulder girdle consisted of the shafts of both clavicles, and the fragmentary remains of both scapulae. The thorax was represented by the fragmentary remains of the sternal body, ten left rib head fragments, six right rib head fragments, four unsided rib head fragments, two sternal ends, 42 unsided body fragments, partial remains of C4-C7, centrum of T3-T11, partial T12, multiple thoracic neural arch fragments of which eight neural arches could be identified, complete lumbar centrum, and multiple fragments of lumbar neural arches of which four arches could be identified. The pelvic girdle consisted of the fragmentary left ilium, fragmentary left ischium, partial right ilium, and the partial right ischium. The left acetabulum was partial, with the right poorly preserved. The upper limb was represented by the fragmentary left humerus, proximal and shaft portion of the left ulna, poor left radius, distal and shaft portion of the right humerus, poor right ulna, and the distal and shaft portion of the right radius. The lower limb was represented by the distal and shaft portion of the left femur, the proximal and shaft portion of the left tibia,

fragmentary left fibula, poor right femur, poor right patella, fragmentary right tibia, and the poor right fibula.

Age and Sex
Based on the morphology of the right auricular surface and dental attrition, this individual was estimated to have been a middle adult. Only the sciatic notch was available for sex estimated and based on the morphology of this, the individual was estimated to be male.

Stature
Statures estimate of 169.94 ± 3.94 cm was obtained based on a right maximum femur measurement of 45.6cm.

Skeletal Pathology
Mild diffuse DJD was identified, particularly in the vertebral column. DJD was identified on one left rib head, three left rib articular facets, and two right rib articular facts. Mild lipping was identified on both glenoid fossae, and on the right proximal fibula.

Mild lipping was identified on the inferior border of the C5 centrum, the interior border of the C7 centrum, the interior border of the T3 centrum, the superior border of the T4 centrum, the superior border of the T4 centrum, and the inferior border of the T12 centrum. Moderate lipping was identified on the inferior border of the T8 centrum and the superior border of the T9 centrum. DJD was identified on six thoracic rib facets. Schmorls notes were identified on the inferior T6 centrum, the inferior T7 centrum, the inferior T8 centrum, the inferior T9 centrum, and the superior T12 centrum. Mild lipping was identified on the superior border of the L2 centrum, the inferior border of the L3 centrum, both borders of the L4 and L5 centrum. One articular facet could be identified with clear evidence of DJD, with damage to others preventing a positive identification. Bony changes, including porosity, were identified on the inferior centrum of L1, superior centrum of L2, inferior centrum of L3, inferior centrum of L4, and both surfaces of the L5 centrum.

No periostitis was identified. Both cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

P	P	P	P	P	MP	MP						P	P	P	P
18	17	16	15	14	13	12	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	33	34	35	36	37	38
										P	P	P	P	P	CA

Attrition: Moderate levels of attrition were identified

Calculus: Only the upper right molars were scorable for calculus. Moderate calculus was identified

Caries: No caries were identified

Hypoplasia: There had been severe damage to the tooth surfaces, with large areas of enamel loss. Hypoplasia was identified on the lower left canine

Additional References

Brindley, A., and Kilfeather, A. 1993. *Archaeological Inventory of County Carlow*. Dublin: Stationery Office (p.6)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.54)

Reg Number: 1974:27 **SMR Number:** CW019-004----

Physical Setting

Townland: Sliguff

County: Carlow **Province:** Leinster

Year of Excavation: 1974

Monument Type:

Conditions of Discovery: Ploughing

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.54)

Description of Grave

Grave Number: Cist 1

Grave Type: Short rectangular cist

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, right side, head to the North

Associated Material: Tripartite Bowl, placed in front of the face

Dating Information: 3570 ± 70 BP (OxA-2671; human bone [collagen]; $\delta^{13}C$ = –22.4‰), calibrated to 2135-2079 cal BC (6.3%), 2064-1740 cal BC (88.3%), and 1711-1699 cal BC (0.9%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020]); Brindley Stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1974:27

The remains of this individual were well preserved, with good skeletal region representation. The skull was moderately preserved, with a complete left frontal, poor right frontal, complete parietals, complete temporals, complete let occipital, poor right occipital, poor left sphenoid, fragmentary right sphenoid, partial right zygomatic, poor maxillae, partial parietals, complete left mandible, and fragmentary right mandible. The hyoid was partial. The right parietal had been sampled for aDNA analysis. The shoulder girdle consisted of the medial and shaft portion of the left clavicle, partial left scapula, complete right clavicle, and fragmentary right scapula. The thorax was represented by a complete manubrium, fragmentary sternal body, 10 left ribs, 10 right ribs, 17 unsided rib fragments, complete C1-C5, partial C6, complete C7, partial T1, complete T2-T6, partial T7-T8, complete T9-T12, complete L1-L4, and partial L5. The pelvic girdle consisted of a poor left ilium, fragmentary left ischium, fragmentary left pubis, complete right ilium, complete right ischium, and complete right pubic. The left acetabulum was fragmentary, right acetabulum

was complete, and S1-S4 was complete. The upper limb was represented by a complete left humerus, ulna, and radius, and a fragmentary right radius. The lower limb consisted of a complete left femur and patella, poor left tibia, poor left fibula, complete right femur, complete right patella, poor right tibia, and the distal and shaft portion of the right fibula. The hands were represented by the left complete scaphoid, trapezium, capitate, poor MC1, proximal and shaft portion of MC2-MC3, poor MC4, two distal phalanges, and one distal phalanx; the right complete scaphoid, trapezium, trapezoid, capitate, hamate, MC2-MC4, poor MC5, 4 proximal phalanges, 2 middle phalanges, and 2 distal phalanges. The foot consisted of the left complete talus, complete calcaneus, poor cuboid, complete navicular, complete medial cuneiform, complete intermediate cuneiform, complete distal cuneiform, complete MT1, poor MT2-MT3, complete MT4, 5 proximal phalanges, 1 middle phalanx, and 1 distal phalanx; the right poor talus, complete calcaneus, complete cuboid, poor navicular, , poor intermediate cuneiform, complete MT1-MT2, fragmentary MT3, complete MT4-MT5, and 1 distal phalanx.

Right humerus and ulna are replicas.

Age and Sex
Based on completed fusion and the morphology of the right auricular surface and both pubic symphyses, this individual was estimated to be a young adult, with a refined age-at-death of 25-35. The morphology of the supraorbital ridges, mastoid process, nuchal crest, ventral arc, subpubic concavity, ischiopubic ramus ridge, and sciatic notch, this individual was estimated to have been male.

Stature
An attained stature estimate of 178.03 ± 3.94cm was calculated based on a maximum femur measurement of 49cm for the left and 49.7cm for the right. A maximum tibia measurement of 40.2cm for the left and 40.6cm for the right produced a stature estimate of 179.92 ± 4.00cm.

Non-metric Traits
Multiple large Wormian bones.

Skeletal Pathology
Mild DJD was identified on the left glenoid, proximal humerus, trochlea, acetabulum, distal femur, and patella. Two left ribs and two right ribs had mild DJD changes.

Mild DJD was identified on the right occipital condyle, the right superior facet of C1, left inferior facet of C5, right inferior facet of C7, right superior facet of T1, left inferior facet of T1, left superior facet of T2, right inferior facet of T3, both right facets of T4, right superior facet of T5, left superior facet of T6, right superior facet of T7, left inferior facet of T7, all

facets of T8, left inferior facet of T10, all facets of T12, both superior facets of L1, right superior facet of L2, left inferior facet of L3, all facets of L4, and the right inferior facet of L5. Mild lipping was identified on the inferior surface of the T3 centrum, both surfaces of the T11 centrum, superior surface of the T12 centrum, both surfaces of the L3 centrum, and the inferior surface of the L4 centrum. Moderate lipping was identified on the superior surface of the L4 centrum. Schmorls nodes were identified on the inferior surface of the T7 centrum, inferior surface of the T10 centrum, superior surface of the T12 centrum, inferior surface of the L2 centrum, both surfaces of the L3 centrum, and both surfaces of the L4 centrum.

No cribra orbitalia, porotic hyperostosis, or periostitis was identified.

Dentition

P	P	MP	P	P	P	P	P	MP	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	MP	P	P	P	P	P	P	P	P	P	P

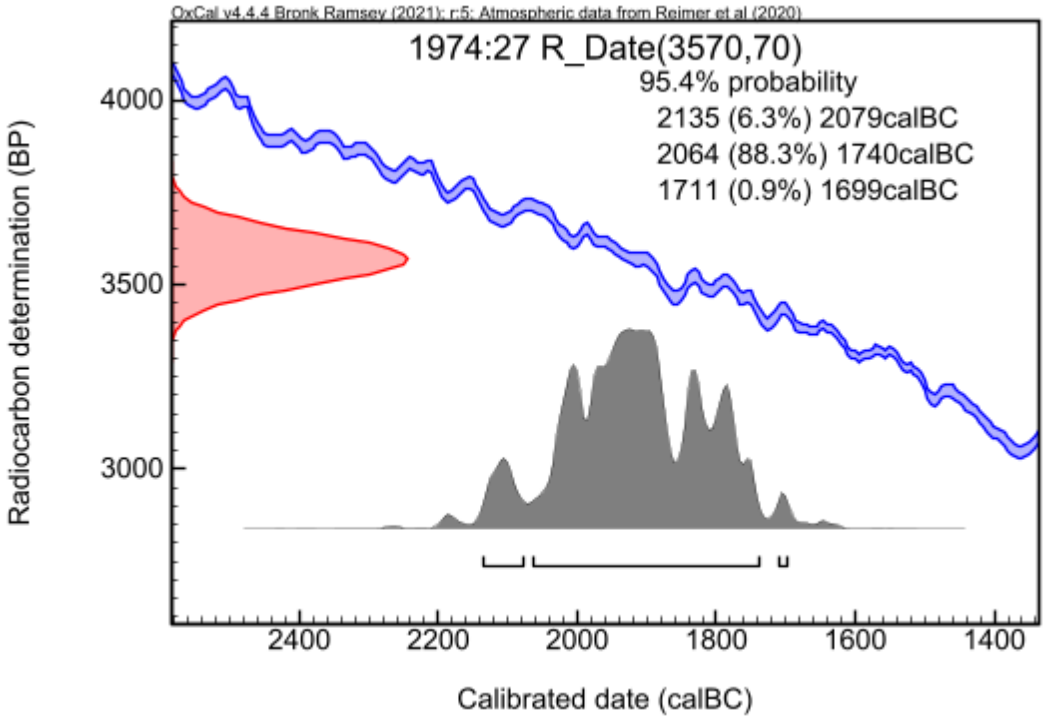
Attrition: Mild to moderate attrition

Calculus: Mild calculus was identified on the upper right second incisor, canine, and premolar; upper left canine and first premolar; and lower left second incisor. Moderate calculus was identified on the upper right first premolar, second molar, and third molar; upper left second premolar, and all three molars; lower left premolars and molars; and lower right premolars and molars.

Caries: No caries identified

Hypoplasia: A single line of enamel hypoplasia was identified on the upper right canine, the upper left second incisor, lower left second incisor, lower left first premolar, and lower right first premolar. Two lines of hypoplasia was identified on the upper left canine.

Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.56)

Brindley, A., and Kilfeather, A. 1993. *Archaeological Inventory of County Carlow*. Dublin: Stationery Office (p.6)

Excavations.ie 1974:0007

Reg Number: 2009:181 **SMR Number:** CV042-049----

Physical Setting

Townland: Brackloney

County: Cavan **Province:** Ulster

Year of Excavation: 2009

Monument Type: Cist Burial

Conditions of Discovery: Accidental, NMI excavation

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: NMI Files

Description of Grave

Grave Number: Grave 1

Grave Type: Rectangular Cist

Orientation of the Grave: Not recorded

Body Position: Disturbed, crouched, possibly left side

Associated Material: Tripartite bowl, 5 fragments of cremated bone

Dating Information: Brindley Stage 3 Bowl

Comments: After discovery, some bones were removed by Gardi for safekeeping and analysis before recording.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 2009:181

The remains were moderately preserved however fragmentary, with the majority of the skeletal regions represented. The skull had become highly fragmentary, represented by fragmentary frontal, fragmentary parietals, partial left temporal, fragmentary right temporal, fragmentary occipital, partial sphenoid, partial zygomatics, martial maxilla, and fragmentary mandible. The shoulder girdle was represented by the shaft of the left clavicle, and the fragmentary remains of the right clavicle and both scapulae. The thorax consisted of 21 left rib fragments, 17 right rib fragments, 29 unsided rib fragments, fragmented remains of all 7 cervical and 12 thoracic vertebrae, and some fragments that most likely represented the lumbar vertebrae. The pelvic girdle was represented by a complete left ilium and ischium, fragmentary left pubis, and the fragmentary remains of the right ilium, ischium, and pubis. The right acetabulum is partial. The upper limb consists of the fragmentary left humerus, shaft and proximal portion of the left ulna, fragmentary left radius, shaft of the right humerus, and the fragmentary remains of the right radius and ulna. The lower limbs are represented by the shaft and proximal portion of the left femur, the shaft of the left tibia, fragmentary left fibula, shaft of the right femur, shaft of the right tibia, and the

fragmentary remains of the right fibula. The hands consist of four unidentified carpals, five unidentified metacarpals; and the feet by two unidentified metatarsals.

Age and Sex

The stage of dental eruption and lack of fusion identifies this individual as a child. Based on the dental eruption, a refined age-at-death of 6-7 ±2 years was estimated. As this individual was a child, no sex estimation was undertaken.

Skeletal Pathology

Moderate, unhealed cribra orbitalia was identified on both orbits. No porotic hyperplasia was identified. A small area of periostitis was identified on a fragment of the right radius.

Dentition

	PU	P				PU	PE	PE	PU				P	PU	
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	PU	P		PU		PU	PU	PU	PU		PU		P		
			P	P	P	P			P	P	P	P			
			55	54	53	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P	P	MP	MP	MP	P	MP	P	P	P			

Calculus: No calculus identified

Caries: No caries or abscesses identified

Hypoplasia: Hypoplasia was identified on the erupting upper first incisors and on the unerupted lower right first incisor

Additional References

Brindley, A., and Kilfeather, A. 1993. *Archaeological Inventory of County Carlow*. Dublin: Stationery Office. (p.4)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.53)

Reg Number: 97E0204 **SMR Number:** CL006-044----

Physical Setting

Townland: Coolnatullagh

County: Clare **Province:** Munster

Year of Excavation: 1997

Monument Type: Cairn

Conditions of Discovery: Farm Improvement Works

Total Burials: 8 **Total Inhumations:** 5

Excavation Report: Published

Primary Reference: Eogan, J. 2022. Excavations at a Cairn in Coolnatullagh townland, Co. Clare. *North Munster Antiquarian Journal*, 42, 113–150.

Description of Grave

Grave Number: F5

Grave Type: Pit, within cairn

Orientation of the Grave: N/A

Body Position: Right

Associated Material: Two cremation deposits, cattle jaw, six pig teeth

Dating Information: 3425 ± 40 BP (OxA-10572; human bone; $\delta^{13}C$ = –20.9‰), calibrated to 1880-1610 cal BC (calibrated at 2σ)

Comments: Only individual with confirmed dating to the Early Bronze Age, as the central cist could be earlier and the remaining deposits are heavy disturbed

Human Remains

Curation Location: Unreported **NMI Reg:** F5

The remains of this individual were poorly preserved, with significant fragmentation. An age-at-death estimation of adolescent, with a refined age at death of 13-14 based on fusion. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis was not scorable.

Dentition

PU	PE	P			P		P	P	P	P			P	PE	
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	PE				P	P		P	P	P	P				

It is not clear how much of the mandible and maxilla was present. Attrition was mild. Abscess or dental trauma resulting in infection identified on the right side (11-13, 42-47). Enamel hypoplasia identified on incisors.

Additional References

Excavations.ie 1997:018

Reg Number: AE/06/19 **Licence Number:** AE/06/19

Physical Setting

Townland: Drumahoe

County: Derry **Province:** Ulster

Year of Excavation: 2006

Monument Type: Flat Cemetery

Conditions of Discovery: Construction

Total Burials: 8 **Total Inhumations:** 2

Excavation Report: Unpublished

Primary Reference: Donnelly, E. and Ward, K. 2010. *Final Archaeological Excavation Report: For a Sewerage Transfer Scheme at Drumahoe, Co. Derry, Townlands: Ballyoan, Carn, Lisneal, Ardlough & Ardnabrock, Licence No: AE/06/19*.

Description of Grave

Grave Number: Cist 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, right side, head to the South and facing East

Associated Material: None reported

Dating Information: 3392 ± 22BP (UBA-13452; human bone [collagen]; $\delta^{13}C = -24.7‰$), calibrated to 1743-1630 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** F127

The remains of this individual were poorly preserved. Age-at-death was estimated to be a child, with a refined age-at-death of 8-10. As this individual was a non-adult, no sex estimation was undertaken.

Periostitis, cribra orbitalia, and porotic hyperostosis absent. No hypoplasia was reported.

Description of Grave

Grave Number: Cist 2

Grave Type: Cist

Orientation of the Grave: Southwest/Northeast

Body Position: Crouched, right side, head to the Southwest

Associated Material: Bronze dagger, with remains of daggers bark and leather sheath (possibly decorated with embossed swirl and line pattern). Fragments of a pig's left radius

and ulna were found beneath the spinal column and the ribs of the inhumation. Body placed on a bed of quartzite pebbles.
Dating Information: 3565 ± 21 BP (UBA-13453; human bone [collagen]; $\delta^{13}C$ = –22.5‰), calibrated to 2010-1785 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** F133

The remains of this individual were moderately to well preserved. Age-at-death was estimated to be young adult, with a refined age-at-death of 26-35, based on the identification of completed fusion and the morphology of the auricular surface and the public symphysis. Sex was estimated to be male based on the morphology of the pelvis. An attained stature of 177cm was calculated from the left femur.

Skeletal Pathology
DJD was identified on the lateral cuneiform and the third metatarsal of the right foot. Osteophytosis and marginal erosion was identified on the superior edge of the centrum of the T11. There were also schmorl's nodes in the inferior surface of the T7 centrum and L2-L4 centra.

The body of the first sacral vertebra was slightly tilted and the two halves of the neural arch of this vertebra were closed but mal aligned. The tilt in the vertebra would have given a slight scoliosis (lateral bend) of the vertebral column but this would have been barely discernible during life.

No periostitis, cribra orbitalia, porotic hyperostosis, or enamel hypoplasia was identified.

Reg Number: STRD **SMR Number:** LDY 030:049

Physical Setting

Townland: Straid

County: Derry **Province:** Ulster

Year of Excavation: 1985

Monument Type: Flat Cemetery

Conditions of Discovery: Accidental, near quarrying

Total Burials: 6 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Brannon, N., Williams, B., and Wilkinson, J. 1990. The Salvage Excavation of Bronze Age cists, Straid Townland, County Londonderry. *Ulster Journal of Archaeology,* 53,29-39.

Description of Grave

Grave Number: Grave 1

Grave Type: Trapezoidal Cist

Orientation of the Grave: East/West

Body Position: Crouched, right side, skull to the East

Associated Material: Tripartite Bowl found next to skull in North-East corner of the cist

Dating Information: 3810 ± 40 BP (GrN-15491; human bone; $\delta^{13}C$ = –21.83‰), calibrated to 2450–2140 cal BC (calibrated at 2σ); Brindley (2007, pg 56) suggests freshwater fish effect has resulted in older than anticipated dates; Brindley identified Bowl as stage 1

Comments: Partial disturbance of cist contents during discovery

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg Number:** STRD_1

The remains of this individual were well preserved, with all regions were well represented. The skull was represented by a mostly complete frontal, complete left parietal, partial right parietal, complete left temporal, partial right temporal, fragmentary occipital, fragmentary sphenoid, poorly preserved zygomatics, complete nasal bones, and a complete mandible. The shoulder girdle consisted of the shaft and lateral portion of the eft clavicle, partial left scapula, complete right clavicle, and partial right scapula. The thorax consisted of a partial manubrium, partial sternal body, 11 left rib fragments, seven right rib fragments, eight unsided rib fragments, complete spinal column except for C5 and T9 which were absent. There was minimal damage to T7, T10, T12, and L2. The sacrum was complete. The pelvic girdle was represented by the partial left ilium, ischium, and pubis; and the partial right ilium, ischium, and pubis. The acetabula were complete. The upper limb was represented by a fragmentary left humerus, complete left ulna, complete left radius, poor right humerus,

shaft and proximal portion of the right ulna, and a complete right radius. The lower limb was represented by poorly persevered femora, complete patellae, complete tibiae, and the fragmentary remains of both fibulae. The hands consisted of the left lunate, capitate, and all metacarpals; the right capitate and all metacarpals. Nine phalanges were identified. The left foot consisted of the talus, calcaneus, cuboid, navicular, intermediate cuneiform, lateral cuneiform, and all metatarsals. The right foot consisted of the talus, calcaneus, medial cuneiform, intermediate cuneiform, lateral cuneiform, and all metatarsals. Five left and seven right foot phalanges were identified.

This individual was overall notably large and robust. The clavicles were particularly robust, with the right costo-clavicular ligament attachment more pronounced than the left, suggestive of right-handedness. This was mirrored with a sided-robusticity of the upper third of the right humerus. The right femur had been replaced with a replica, associated with the radiocarbon dating of this individual before the move to Accelerator Mass Spectrometry (AMS) dating.

Age and Sex

The eruption of the third molars indicated that this was an adult individual. The unfused state of the medial epiphysis on the right clavicle along with visible fusion lines along the iliac blade, distal radius, and distal ulna suggest that this was a young adult, likely 18-25. Based on the morphology of the supraorbital ridges, mastoid process, nuchal crest, and mandible of the cranial markers along with the sciatic notch on the pelvis, this individual is estimated to be male.

Stature

This individual was remarkably large, and all of the bones were robust. The left femur was 53.9 cm long, with the replica right femur reconstructed to be 53.4cm long. The head of the right femur was 48.93mm in diameter. The left and right tibia were 44.1 and 44.3 cm long respectively. The reconstructed height of this individual based on the femur measurements is 189.69 ± 3.94 cm. The reconstructed height of this individual based on the tibia measurements is 190.26 ± 4.00 cm.

Skeletal Pathology

There was no evidence of degenerative joint disease was identified in any of the present synovial joints. There was extensive Schmorl's Nodes identified across the vertebral column. The superior centrum of T5, inferior centrum of T6, inferior centrum of T7, both superior and inferior centrum of T8, superior centrum of T10, and inferior centrum of T11 had single Schmorl's Nodes. Multiple Schmorl's Nodes were identified on the superior centrum on T11, and bony changes to the superior centrum of T12 has resulted in a 'raised' appearance of the ventral portion of the centrum. All lumbar vertebrae have severe changes to the disk surfaces, with multiple vertebrae having increases to the centrum height. Multiple very

deep nodes were observed on the superior and inferior centrum of L1, a single node on the inferior centrum on L2, single nodes on both surfaces of the centrum of L3, multiple nodes on the superior surface of L4 and a single node on the inferior surface of the centrum, a single node was observed on both surfaces on L5. These extensive changes to the disk surfaces suggest that this individual experienced significant loading stress through the vertebral column during adolescence.

No cribra orbitalia, porotic hyperostosis or periostitis was identified.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	MP	MP	MP	P	MP	MP	P	MP	MP	MP	P	P	PE

Partial impaction of third molars particularly left, no related infection

Attrition: Mild attrition was noted across the dentition

Calculus: Mild calculus was identified on all present teeth except for the lower left second incisor which had no calculus

Caries: No caries or abscesses identified

Hypoplasia: There was no evidence of hypoplasia

Description of Grave

Grave Number: Grave 3
Grave Type: Trapezoidal Cist
Orientation of the Grave: Roughly Northeast/Southwest
Body Position: Crouched, left side/supine, skull to the North
Associated Material: Simple Bowl in North-East corner. Below left elbow of the inhumation, against the East face of the cist was a cremation. A second cremation lay below the right leg, against the South face of the cist. Both cremations, both mature females, seem to predate the inhumation.
Dating Information: Inhumation dated to 3840 ± 35 BP (GrN-15492; human bone), calibrated to 2460-2140 cal BC (calibrated at 2σ); Brindley (2007, pg 56) suggests freshwater fish effect resulting in older than anticipated dates. Cremation dated to 3690 ± 40 BP (GrN-14825; carbonate from cremated bone; $\delta^{13}C = –22.31‰$), calibrated to 2200-1945 cal BC (calibrated at 2σ)

Human Remains

Curation Location: On display at Ulster Museum **Reg Number:** STRD_2

Mature Adult Male, of at least 35 years. Estimated height of 1.80m.

Moderately well preserved. Skull represented by large pieces, including both parietals, occipital, right frontal, right temporal, right zygomatic, both maxillae, and the mandible. Skull noted to be robust and unusually thick. Lower right 1st and 2nd molars lost antemortem due to abscess formation, all other teeth noted – however two upper incisors and one molar were lost during excavation. Relatively few vertebrae are intact – five partial cervicals, five mentioned thoracic, two lumbar centrums and three spinous processes. S2-S5 mentioned. Significant damage to the hip bones. Ribs are fragmentary, with the right side more represented. Shoulder girdle consisting of partial right scapula and the shaft of the right clavicle. Damage to the greater tuberosity of the left humerus, with the right represented by the proximal section. The left ulna and radius are represented by shafts, with the right represented by the shaft and proximal sections. The lower limbs were represented by both femora with ends damaged, complete right tibia, shaft and proximal portion of the left tibia, both patellae, and damage fibulae. Hand represented by one damaged metacarpal, and the feet by the right talus, calcaneus and five metatarsals.

Extensive diffuse degenerate osteoarthritis was identified. This included lipping on the right humeral head, lipping of the sacroiliac joint, severe lipping on the lower femora articular surfaces, lipping on both articular surfaces of the tibiae, and severe lipping on the patellae. Lipping was also identified on the odontoid process, severe lipping on two lower cervical vertebrae, and severe lipping anterolaterally on five thoracic centrums. This level of DJD would have resulted in significant pain and may have reduced activity or mobility, particularly in the knees.
There is no mention of cribra orbitalia, porotic hyperostosis, periostitis, or hypoplasia.

Description of Grave

Grave Number: Grave 4
Grave Type: Trapezoidal Cist
Orientation of the Grave: Roughly Northeast/Southwest
Body Position: Crouched, right side, skull to the South and spine against West side of cist
Associated Material: Constricted bowl, South-East corner of the cist
Dating Information: 3845 ± 40 BP (GrN-15493; human bone; $\delta^{13}C$ = –22.54‰), calibrated to 2460-2140 cal BC (calibrated at 2σ); Brindley (2007, pg 57) suggests freshwater fish effect resulting in older than anticipated dates

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg Number:** STRD_3

This individual was significantly less well preserved than STRD_1. There was a higher degree of bone fragmentation and significant bone surface damage to the lower limbs. The skull was represented by a complete frontal, partial left parietal, complete right parietal, fragmentary left temporal, complete right temporal, partial left and complete right occipital, fragmentary sphenoid, partial right zygomatic, partial right maxilla, partial vomer, and partial nasal bones. The shoulder girdle is represented by the shaft of the left clavicle, partial left scapula, poor right clavicle, and poor right scapula. The thorax consisted of partial manubrium, six right rib fragments including an identified 1st rib, three left rib fragments, four unsided rib fragments, moderately preserved C1 and C2, fragments of two further cervical vertebrae, nine thoracic vertebral arch fragments, five thoracic centrums, possible S1. The only part of the pelvic girdle identified was the partial left ilium. Both acetabula were absent. The upper limb is represented by the poorly preserved left humerus, shaft and proximal portion of the left ulna, poor left radius, and the complete right humerus, radius, ulna. The lower limb was represented by the shaft and distal portion of both femora, partial patellae, shaft and proximal portion of both tibiae, and fragmentary fibulae. There was significant bones surface damage on the lower limbs. The left hand is absent, and the right hand is represented by the scaphoid, lunate, trapezium, trapezoid, capitate, hamate, MC1-MC4, and 13 phalanges. The feet are represented by the left calcaneus, right talus, calcaneus, cuboid, intermediate cuneiform, lateral cuneiform, MT2-MT5, four unidentified tarsals, and three unidentified metatarsals.

This individual has moderate robusticity changes in the femurs, but the bone loss hampers further assessment of muscle attachments. Interestingly, the published excavation report lists the presence of bones that are no longer associated with these remains. As such, the published skeletal report was used to supplement the analysis undertaken, this will be indicated by italics. Left humerus is a replica, likely associated with radiocarbon dating.

Age and Sex

Fusion was complete, and the identification of a third molar suggest that this individual was an adult. The fusion of the spheno-occipital synchondrosis and the lack of degenerative changes on the skeleton are suggestive of a younger adult above the age of 25. *Age estimate based on the attrition suggest an age of 25-30* (Brannon *et al.,* 1990, pg. 37).
The morphology of the supraorbital ridges and mastoid process estimate that this individual was a possible made, the nuchal crest is undetermined. Based on this morphology combined with the identified robusticity changes, this individual is estimated to be a possible male.

Stature

The reconstruction of the right femur suggests that it was larger than 41cm during life, and the right fibula has a maximum length of 35.3cm. Based on these measurements this individual is estimated to have an attained height of between 160cm and 170cm.

Skeletal Pathology

No degenerative joint disease was identified in this individual. Porotic hyperostosis and cribra orbitalia were not scorable. No periostitis was identified.

Dentition

P	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*	*P*

One loose 3rd Molar was identified. *Report lists upper central teeth subsequently lost. Attrition age approximately 25-30, no caries* (Brannon *et al.,* 1990, pg. 37).

Hypoplasia: Not scorable due to lack of teeth preserved

Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.56-57)

Excavations.ie 1985:16

Reg Number: 1976:11 **SMR Number:** DG054-041----

Physical Setting

Townland: Carrickballydooey

County: Donegal **Province:** Ulster

Year of Excavation: 1976

Monument Type: Cist Burial

Conditions of Discovery:

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: NMI Files

Description of Grave

Grave Number: Grave 1

Grave Type: Polygonal cist

Orientation of the Grave: North/South

Body Position: Crouched, left side, head south facing West

Associated Material: Plano-convex flint knife found under the ribs

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1976:11

The remains of this individual were moderate to well preserved, with all regions well represented. The skull was represented by a complete frontal, poor left parietal, partial right parietal, complete left temporal, partial right temporal, complete occipital, poor sphenoid, complete left zygomatic, complete left maxilla, poor right maxilla, complete palatines, partial nasal bones, and a poorly preserved mandible. The shoulder girdle consisted of the shaft and lateral sections of both clavicles and the fragmentary remains of both scapulae. The thorax was represented by a partial sternal manubrium, three left rib fragments, three right rib fragments, six unsided rib fragments, fragmentary remains of six cervical vertebrae, six fragments of thoracic vertebrae, and the fragmentary remains of three lumbar vertebrae. The pelvic girdle was represented by the partial left ilium, poor left ischium, partial right ilium, complete right ischium and pubis. Both acetabula are complete. The upper limb consists of the shaft and distal portion of the left humerus, fragmentary left ulna, poor radius, distal section of the right humerus, and the shaft of the right radius. The lower limbs consist of the shaft and proximal portion of the left femur, poor tibia, shaft and distal portion of the left fibula, the shaft and proximal portion of the right femur, distal portion of the right tibia, and the poorly preserved right fibula. The hand consists of the left scaphoid, triquetrum, capitate, MC1, MC2, MC4; right scaphoid, lunate, triquetrum,

trapezoid, MC1 – MC4. There was one unidentified carpal and seven phalanges. The feet consisted of the left talus, calcaneus, cuboid, navicular, medial cuneiform, intermediate cuneiform, lateral cuneiform, and all five metatarsals; the right talus, calcaneus, cuboid, navicular, medial cuneiform, intermediate cuneiform, lateral cuneiform, and all five metatarsals. No foot phalanges were identified.

This individual was noticeably robust, with sizeable muscle attachments on both femora, including a pulled back *linea aspera*.

Age and Sex
The eruption of the third molars and the completed fusion indicates that this is an adult individual. The level of dental attrition and the diffuse mild DJD suggest that this was a Middle Adult. Based on the morphology of the supraorbital ridges and shape, the mastoid process, metal protuberance, ventral arc, subpubic concavity, and the sciatic notch this individual is estimated to be male.

Stature
Stature was estimated to be 178.91 ± 4.00 cm based on a measurement of 39.8 cm for the maximum length of the left tibia.

Non-metric Traits
Small left septal aperture.

Skeletal Pathology
Diffuse mild DJD was identified in this individual. Mild lipping was identified on the left medial clavicle, the right humerus trochlea, left proximal ulna, left proximal radius, both acetabula, both proximal femora, both tali, and the left calcaneus. Mild lipping was also noted on the left C5 superior facet. One Schmorls node was identified on the inferior L4 centrum. This is consistent with the identification of this individual as a middle adult.

No cribra orbitalia, porotic hypoplasia or periostitis identified.

Dentition

P	P	MP	P	P	P	MP	P	P	P	P	P	P	P	P	LA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Upper left 1st premolar has rotated almost 90°, and all four lower front teeth are on a slight angle

Attrition: Moderate to high attrition was identified on all teeth in occlusion

Calculus: Due to extensive surface damage, with all teeth missing some enamel, calculus is not scorable

Caries: No caries or abscesses identified. Upper left 3rd molar socket was completely healed, suggesting that this tooth may have either been lost during life with time to heal, or congenitally absent

Hypoplasia: Due to the extensive surface damage hypoplasia is not scorable

Additional References

Ryan M. 1977. A burial in a polygonal cist at Carrickballydooey near Manorcunningham. *Donegal Annual,* 12:49-52

Saluja, P.G., 1986. Evidence of Spina Bifida in skeletal remains from Ireland. *Irish Medical Journal*, 79(6), pp.145–149.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.71)

Excavations.ie 1976:16

Reg Number: 1961:231,244,245 **SMR Number:** DG004-018----

Physical Setting

Townland: Drung

County: Donegal **Province:** Ulster

Year of Excavation: 1961

Monument Type: Flat Cemetery

Conditions of Discovery: Gravel Quarrying

Total Burials: 3 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Rynne E, and Erskine L. 1963. Bronze Age burials at Drung, Co. Donegal. *Journal of the Royal Society of Antiquaries of Ireland,* 93(2), 169-179.

Description of Grave

Grave Number: Cist A

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Crouched, right side, head to the Northeast corner

Associated Material: Pygmy cup behind head, animal bone

Dating Information: 3545 ± 30 BP (GrN-11896; human bone [collagen]; $\delta^{13}C = –21.66‰$), calibrated to 2010-2022 cal BC (1%), 1973-1866 cal BC (58.2%), and 1853-1769 cal BC (36.3%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1961:231

The remains of this individual were moderately to well preserved, with good skeletal region representation. The skull was represented by a poor frontal, poor parietals, fragmentary left temporal, partial right temporal, poor occipital, partial left zygomatic, poor maxillae, partial palatines, and a collection of fragmentary facial bones which likely included parts of the sphenoid. The shoulder girdle consisted of a poor left clavicle, medial and shaft portion of the right clavicle, and a fragmentary right scapula. The thorax was represented by a poor manubrium, partial sternal body, five left rib fragments, eleven right rib fragments, twelve unsided rib fragments, one partial lower cervical vertebra, complete T2, complete T5-T7, complete T9-T12, and complete lumbar vertebrae. The pelvic girdle consisted of a poor left ilium, poor left ischium, complete left pubis, complete right ilium, partial right ischium, and fragmentary right pubis. The left acetabulum was poor, the right complete; the sacrum was mostly complete. The upper limb was represented by a poor left humerus, proximal and shaft portion of the left ulna, poor left radius, distal and shaft portion of the right humerus,

poor right ulna, and poor right radius. The lower limb was represented by a poor left femur, complete left patella, poor left tibia, distal and shaft portion of the left fibula, fragmentary right tibia, and the distal and shaft portion of the right fibula. Most of the right femur is a replica, taken for radiocarbon dating, however the distal end is real. The hands consist of the left poor capitate, poor MC1-MC3; right partial scaphoid, poor trapezium, poor capitate, poor hamate, complete MC1, poor MC2, poor MC4 or MC5. One pair of proximal hand phalanges were identified. The feet were represented by the left complete talus, complete calcaneus, partial cuboid, poor MT1-MT5, and the proximal and distal first phalanges; right complete talus, poor calcaneus, partial cuboid, partial navicular, poor medial cuneiform, poor middle cuneiform, poor lateral cuneiform, poor MT1-MT5, and one proximal phalanx.

Age and Sex

Based on the level of fusion, dental eruption, and the morphology of the auricular surface and the pubic symphysis, this individual was estimated to have been a young adult. A refined age-at-death estimate of 19-25 was made. The morphology of the skull of this individual was noticeably intermediate for sex estimation, however the morphology of the subpubic concavity, ischiopubic ramus ridge, and the sciatic notch all suggest female. As such, this individual was estimated as possible female.

Stature

An attained stature estimate of 160.80 ± 3.72 cm was obtained from a left femur maximum length measurement of 43.2 cm. A left maximum tibia measurement of 35.4 cm resulted in an attained stature estimate of 164.19 ± 3.66 cm.

Non-metric Traits

Noticeable parietal bossing was observed on this individual.

Skeletal Pathology

Schmorls nodes were identified on the superior T9 centrum, both sides of the T11 centrum, the superior L1 centrum, both sides of the L2 centrum, and the superior L3 centrum.

The sacrum consisted of six vertebrae, the first of which was partly fused to the sacrum. As 5 lumbar vertebrae were identified, this could represent a partial sacralisation of a 6th lumbar vertebra, or a partial lumbarisation of a 6th sacral vertebrae.

Periostitis was absent, and porotic hyperostosis was not scorable due to surface damage. Moderate cribra orbitalia was identified in both orbits.

Dentition

MP	P	P	P	P	P	CA	MP	MP	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	MP

The lower left medial incisor did not develop properly, resulting in a smaller tooth with a lumpy appearance. There was also significant incisor crowding, with upper lateral left incisor rotated to an almost 45° angle.

Attrition: Mild attrition was identified in the majority of the dentition, with the incisors showing moderate attrition.

Calculus: Mild calculus was identified

Caries: One occlusal caries was identified on the lower right first molar; no abscess was associated.

Hypoplasia: Due to surface damage and discolouration, not all teeth could be scored for hypoplasia. However, hypoplasia was identified on the upper left first premolar, the lower left canine, and the lower right medial incisor.

Description of Grave

Grave Number: Cist B
Grave Type: Cist
Orientation of the Grave: North/South
Body Position: Crouched, right side, head to the South
Associated Material: Piece of rock crystal near the left hand, a bronze awl near to the right elbow
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1961:244

The remains of this individual were well preserved, with good skeletal region representation. The skull was complete, however there was surface damage on the frontal, parietals, right temporal, zygomatics, maxillae; and some damage to the nasals, lacrimals, internal nasal conchae, and the ethmoid. The shoulder girdle was represented by a poor left clavicle, partial left scapula, and poor right clavicle. The thorax consisted of a complete

manubrium, poor sternal body, mostly complete rib cage with some fragmentation, complete C1-C3, complete C6, complete thoracic vertebrae, and complete lumbar vertebrae. The pelvic girdle was complete, with some damage to the left posterior ilium and some reconstructable fragmentation to the left pubis. Both acetabula were complete, the sacrum was complete. The upper limb was represented by a complete left humerus, poor left ulna, fragmentary left radius, poor right humerus, fragmentary right ulna, and a fragmentary right radius. The lower limb was represented by a poor left femur, poor left patella, poor left tibia, distal and shaft portion of the left fibula, complete right femur, complete right patella, complete right tibia, and complete right fibula. The hands consisted of the left poor scaphoid, complete lunate, poor triquetrum, complete capitate, poor hamate, proximal and shaft portion of all left metacarpals, one proximal phalanx, and two middle phalanges; the right complete scaphoid, complete lunate, partial triquetrum, poor pisiform, complete trapezium, poor trapezoid, complete capitate, complete hamate, proximal and shaft portion of MC1 and MC2, complete MC33-MC5, three proximal phalanges, three middle phalanges, and one distal phalanx. The feet consisted of left complete talus, complete calcaneus, partial cuboid, poor navicular, poor medial cuneiform, poor middle cuneiform, complete MT1, proximal and shaft portion of MT2, complete MT3, poor MT4 and MT5, and the proximal and distal first phalanges; the right complete talus, complete calcaneus, complete cuboid, poor medial cuneiform, poor middle cuneiform, complete MT1 and MT2, poor MT3-MT5, and three proximal phalanges.

Age and Sex

The level of fusion, medial clavicle and S1 both undergoing fusion, suggests that this individual was a young adult. A refined age-at-death estimate of 25-30 was made using this level of fusion as well as the level of dental attrition. Like the individual from Cist A, this individual was an intermediate skull for sex estimation, however their jaw was more gracile. This was supported by a possible female estimation based on the morphology of the ventral arch, subpubic concavity, and the ischiopubic ramus ridge. As such, this individual was estimated to be a possible female.

Stature

An attained stature estimate of 159.57 ± 3.72 cm was obtained from maximum femur measurements of 42.9 cm for the left and 42.5 cm for the right. The left maximum tibia measurement was 35.2 cm, while the left was 34.6 cm. Due to this noticeable difference in the tibial lengths, and stature estimate was not obtained. It was the only measured bone which has this noticeable asymmetry in maximum length.

Non-metric Traits

Parietal bossing was noticeable on the skull of this individual

Skeletal Pathology

Mild Schmorls and small amounts of ossification for the longitudinal ligaments in the lower thoracic suggest and upper lumbar (T10 to L2) some stress through the spinal column during adolescence.

An area of abnormal bone formation was identified 53.15mm below the greater tubercle of the left humerus along the crest extending distally from the greater tubercle. This area of bony growth measured 13.21mm proximo-distally, 6mm medio-laterally, and extends 3.60mm above the bone surface. There is a small spur extending distally. This area of bony change is most likely associated with stress to a muscle attachment, which when ossified in response. As this area of bone formation smooth compact bone suggests that it was an old injury which healed well.

Periostitis was absent and the right orbit was scorable for Cribra Orbitalia, it was absent. Porotic Hyperostosis was not scorable due to surface damage.

Dentition

P	P	P	P	P	P	P	MP	MP	P	MP	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Mild to moderate attrition was identified on the incisors and canines, with mild attrition on the premolars and molars

Calculus: Moderate calculus was identified on the teeth which could be scored. The upper pre-molar dental arcade had surface damage resulting in no calculus scoring

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on the right upper canine and first premolar, the lower left canine and first premolar, and on the lower right incisors and first premolar

Description of Grave

Grave Number: Cist C
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Unrecorded; poorly preserved
Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1961:245

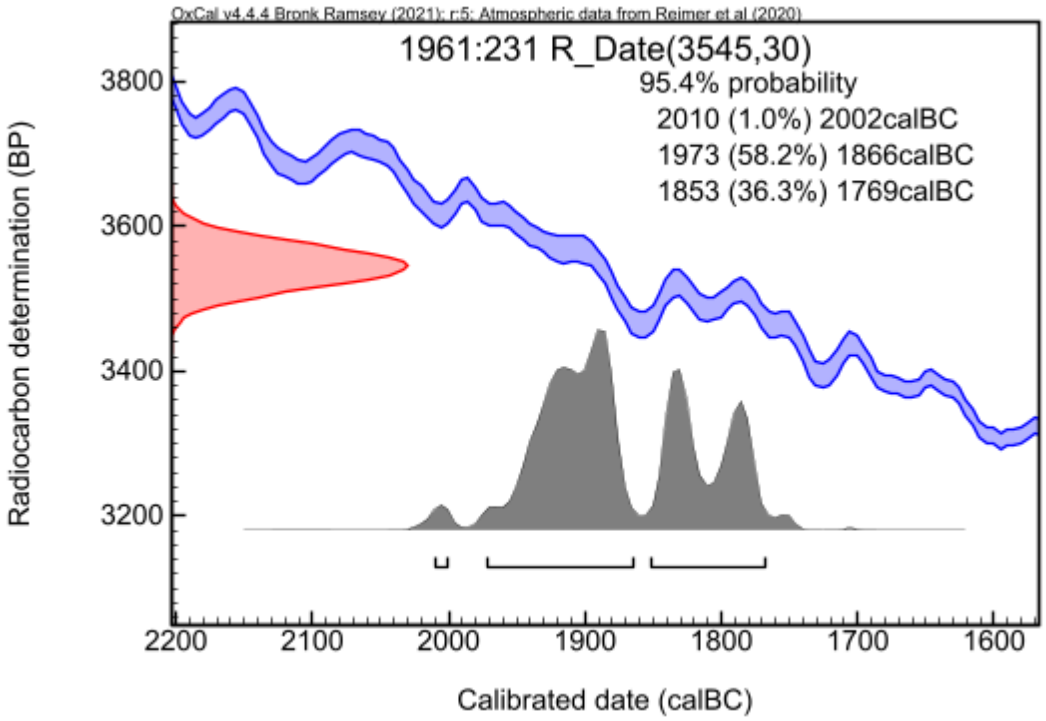
The remains of this individual were very poorly preserved, likely associated with the thinner bones of the young individual. The remains mainly consisted of fragments of bone, from which a badly preserved petrous portion, one upper first deciduous incisor, two rib fragments, three long bone fragments, and two possible vertebrae fragments were identified.

Age and Sex

Based on the formation of the tooth, crown almost complete, this individual was identified as an infant, estimated to have been late foetal to 3 months old. No sex estimation was attempted.

Due to the level of preservation, no other skeletal analysis was possible.

Calibration Curve



Additional References

ApSimon, A. 1969. The earlier Bronze Age in the North of Ireland. *Ulster Journal of Archaeology,* 32, 28-72.

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.156)

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum*, 3(2), 7-20.

Kavanagh, R. 1977. Pygmy cups in Ireland. *Journal of the Royal Society of Antiquaries of Ireland,* 107, 61-95.

O'Donnabhain, B., and Brindley, A.L. 1989/1990. The Status of Children in a Sample of Bronze Age Burials containing Pygmy Cups. *Journal of Irish Archaeology*, 5, 19–24.

Rynne, E., and Erskine, L. 1963. Bronze Age burials at Drung, Co. Donegal. *Journal of the Royal Society of Antiquaries of Ireland*, 93(2), 169-179.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.72)

Reg Number: 04E0505 **SMR Number:** DG079-044001-

Physical Setting

Townland: Liscooly

County: Donegal **Province:** Ulster

Year of Excavation: 2004

Monument Type: Flat Cemetery

Conditions of Discovery: Construction

Total Burials: 4 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Sikora, M., Shine, L., Buckley, V. and Buckley, L. 2011. Liscooly, Co. Donegal, 04E0505. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 140–152.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Disturbed

Associated Material: Bipartite Bowl

Dating Information: 3755 ± 40 BP (GrA-29067; human bone), calibrated to 2290-2030 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 04E0505:2

The remains of this individual were poorly preserved, with moderate skeletal region representation and noticeable surface erosion. Age-at-death was estimated to be young adult, with a refined age-at-death estimate of 18-22, based on the partial fusion of the sternal end of the clavicle. Sex was estimated to be possible male based on the morphology of the skull and the sciatic notch. Attained stature was calculated to be 171cm based on the femur.

Skeletal Pathology

Periostitis was absent, cribra orbitalia and porotic hyperostosis was not scorable.

Dentition

Dentition was represented by loose teeth - upper two central incisors, the upper right canine, the upper left first molar, the upper left second molar and the mandibular right second

molar. Mild attrition, mild calculus. Enamel hypoplasia was identified on the canine.

Description of Grave

Grave Number: Grave 4
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, right side
Associated Material: Bipartite Bowl placed near the elbow
Dating Information: 2268–1775 BC (3640 ± 70 BP; 2s; OxA-2667)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 04E0505:6

The remains of this individual were poor to moderately preserved. Age-at-death was estimated on the state of epiphyseal fusion, suggesting that this individual was a child with a refined age-at-death estimate of 7-12. As this individual was a non-adult, sex estimation was not undertaken.

Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were absent.

Reg Number: 1989:46 **SMR Number:** DG079-043----

Physical Setting

Townland: Lisnamulligan

County: Donegal **Province:** Ulster

Year of Excavation: 1984

Monument Type: Flat Cemetery

Conditions of Discovery: Ploughing

Total Burials: 2 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: O'Connor, N. and Ó Floinn, R. 2011. Lisnamulligan, Co. Donegal, E1054. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 153–158.

Description of Grave

Grave Number: Grave 2

Grave Type: Trapezoid Cist

Orientation of the Grave: North/South

Body Position: Crouched, left side, head to the Northeast

Associated Material: Bowl vessel in Northeast corner

Dating Information: 3640 ± 70 BP (OxA-2667; human bone [collagen]), calibrated to 2205-1776 cal BC (calibrated at 2σ); Brindley stage 1 Bowl

Comments: Remains from Grave 1 have not been located

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1989:46

The remains of this individual were poorly preserved. The age-at-death was estimated to be Adult, based on completed fusion, with no sex estimation undertaken due to the preservation of the remains.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

									P			P	P	P		
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
														P	P

Moderate attrition was identified. Enamel hypoplasia was absent.

Reg Number: 1938:9729-9730 **SMR Number:** DG064-013002-

Physical Setting

Townland: Loughfad

County: Donegal **Province:** Ulster

Year of Excavation: 1937 or 1938

Monument Type: Burial Mound

Conditions of Discovery: Excavation

Total Burials: Up to 5 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Raftery, J. 1942. Finds from three Ulster Counties. *Ulster Journal of Archaeology,* 5, 120-131.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist, divided into two compartments (Cist A and Cist B) each with a capstone

Orientation of the Grave: East/West

Body Position: Disarticulated

Associated Material: N/A

Dating Information: N/A

Comments: One disarticulated skeleton found in each of the compartments. When it was opened, a certain amount of mixing took place. While some bones could be united with the correct skeleton, four fibula fragments and one right calcaneus could not be associated with either individual

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1938:9729

The remains in Cist A were moderate to well preserved. The skull was mostly complete, with damage to the left temporal, zygomatic, maxilla, nasal; right occipital; both lacrimal bones, both internal nasal conchae, the ethmoid, and vomer. The mandible was complete. The shoulder girdle was represented by the medial and shaft portion of the left clavicle, partial left scapula, shaft of the right clavicle, and partial right scapula. The thorax consisted of 13 left rib fragments, 13 right rib fragments, 19 unsided rib fragments, complete C1-C4, partial C5, complete C6, partial C7, partial T1 and T2, T3-T12 was mostly complete with damage to the centrums, and partial lumbar vertebrae. An extra thoracic vertebrae was identified. The pelvic girdle was represented by partial right ilium, partial right ischium, and partial right pubis. The right acetabulum was poor, S1-S3 were partial. The upper limb consisted of the complete left humerus, poor left ulna, poor left radius, complete right humerus, complete right ulna, and the complete right radius. The lower limb was represented by a complete left

femur, complete left tibia, complete right femur, and complete right tibia. The hands consisted of the left scaphoid, left MC2, and one hand phalanx. The feet consisted of the complete left talus, complete left MT3, complete left MT5, complete right MT3, complete right MT4, and two unidentified metatarsals.

This individual had robust gluteal tuberosity, pectineal line, and linea aspera on both femora, which indicated strong and regular use of the gluteal muscles and the adduction of the leg.

Age and Sex

Based on the completed fusion, presence of DJD, and dental wear, it was estimated that this individual was a middle adult. No refined age-at-death estimate was made. Almost all of the morphological sex indicators for this individual were intermediate, with those not suggesting differing sex estimations. Metric sex estimation resulted in either intermediate or female sex estimation. Based on this information, this individual as identified as intermediate, however female equations were used for stature estimation.

Stature

The maximum femur measurement of 44.0 cm for the left and 44.4 cm for the right resulted in an attained stature estimate of 163.27 ± 3.72 cm. An estimate of 164.77 ± 3.66 cm was attained from a maximum tibia measurement of 35.5 cm.

Non-metric Traits

This individual had a retained metopic suture. Multiple ossicles were identified along the right lambdoid suture, including one almost half the length between the lambda and the asterion.

Skeletal Pathology

In the anatomical analysis that is included in the excavation report, it is mentioned that there was some 'disuse-atrophy' in the left forearm. While there was identification of increased porosity around the distal end of the left radius, the taphonomic damage on the left ulna and radius in comparison to the right ulna and radius does act to mask some of the bony changes that would be associated with atrophy, however enough changes can be identified to support this identification.

Diffuse DJD was identified in this individual. Three left rib articular facets and four right rib articular facets showed degenerative changes. The left glenoid, proximal humerus, trochlea, and distal radius showed mild DJD. Mild to moderate DJD was identified on the right glenoid and proximal humerus, with pitting on the posterior-superior border of the glenoid suggestive of joint stress alongside degenerative changes. Mild DJD was also identified in the right distal radius, left scaphoid, left distal tibia, right distal femur, right distal tibia, and

the left talus. The right sacroiliac joint also showed evidence of degenerative changes, with pitting and some minimal new bone formation.

DJD was also identified in the spinal column. Mild DJD was identified on the right occipital condyle, left C1 superior facet, right C1 superior facet, left C5 superior facet, and the right C7 inferior facet. Moderate DJD was identified on the C1 and C2 dens articulation, with severe DJD on the right C2 inferior facet, both C3 right facets, and the right C4 superior facet. The level of bony change on C3 leads me to question if the right superior facet formed correctly during development. Mild lipping was identified on the inferior border of C2 centrum, both borders of C3 centrum, superior border of C4 centrum, both border of C5 centrum, inferior border of C6 centrum, and both border of C7 centrum. The superior border of C6 centrum exhibited moderate lipping. Porosity was identified on the C4-C6 centrums.

Mild DJD was identified on the left inferior facet of T1, left inferior facet of T2, left superior facet of T3, both inferior facet of T10, the left superior facet of T10b, the right inferior facet of T10b, and the left superior facet of T12. Mild lipping was identified on the inferior surface of the T3 centrum, the superior surface of T4, the superior surface of T5, the superior surface of T7, the inferior surface of T9, the centrum of T10b, and the superior surface of the T11 centrum. Porosity was identified on the centrum on T1 and T9.

Mild DJD was identified on both inferior facets of L3, both superior facets of L4, the right inferior facet of L4, and both inferior facets of L5. Moderate DJD was identified on the right inferior facet of L2, both superior facets of L3, and both superior faces of L5. Moderate lipping was identified on the inferior surface of the L1 centrum, mild lipping on the superior surface of the L2 centrum, fusion associated with lipping on the inferior surface of the L2 centrum and the superior surface of the L3 centrum, and moderate lipping on the inferior surface of the L3 centrum. Porosity was identified on the centrum on all observable lumbar vertebrae.

Periostitis and porotic hyperostosis were absent, moderate cribra orbitalia was identified in the right orbit.

Dentition

LA	P	P	P	P	P	P	P	P	P	P	P	P	P	MP	LA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	~~41~~	~~31~~	32	33	34	35	36	37	38
P	P	P	P	P	P	P	MP	MP	P	P	P	P	P	MP	MP

Attrition: Attrition was moderate on all teeth that were present, except for the first molars, which displayed severe attrition.

Calculus: This individual displayed moderate to gross calculus

Caries: No caries was identified

Hypoplasia: Hypoplasia was identified on the upper right canine and first premolar, upper left first premolar, lower right canine and first premolar, and the lower left second incisor, canine, and first premolar

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1938:9730

The remains in Cist B were moderately preserved, with moderate skeletal region representation. The skull was represented by the partial left fontal, poor right frontal, poor left parietal, complete right parietal, partial left temporal, poor right temporal, partial occipital, complete right zygomatic, and complete mandible. The shoulder girdle consisted of the shaft of the left clavicle, fragmentary left scapula, medial and shaft portion of the right clavicle, and poor right scapula. The thorax was represented by a partial sternal body, two left ribs, two right ribs, six unsided rib fragments, complete C1, partial C2, complete C3-C4, partial cervical neural arch, three partial upper thoracic vertebrae, two lower thoracic vertebrae, partial T12, and partial L1-L5. The pelvic girdle consisted of a poor left ischium, complete left pubis, partial right ilium, and fragmentary right ischium. The left acetabulum was complete. The upper limb was represented by the distal portion of the left humerus, fragmentary left ulna, complete right ulna, and the complete tight radius. The lower limb consisted of the fragmentary left femur, fragmentary left tibia, complete right femur, and the poor right tibia. The hands were absent. The feet were represented by the left complete talus, complete calcaneus, poor navicular, complete lateral cuneiform, poor MT2-MT3, and the proximal and shaft portions of MT4-MT5; right poor calcaneus, complete medial cuneiform, and the poor MT3.

Age and Sex

Based on the completed fusion, presence of DJD, dental wear, and the morphology of the left auricular surface and public symphysis, it was estimated that this individual was a middle adult. A refined age-at-death of 40-50 was estimated. Based on the morphology of the mastoid process, nuchal crest, gonial flare, ventral arc, subpubic concavity, and the ischiopubic ramus ridge, a sex estimation of male was identified.

Stature

The maximum femur measurement of 48.4 cm for the left and right resulted in an attained stature estimate of 176.6 ± 3.94 cm. An estimate of 175.64 ± 4.00cm was attained from a maximum left tibia measurement of 38.5 cm.

Skeletal Pathology

Mild DJD was identified on the right medial clavicle, the left proximal ulna, the right distal radius, both proximal femora, the left distal tibia, and the left navicular. Moderate DJD was identified on both distal femora, and the right proximal tibia.

Mild DJD was identified on both superior and inferior facets of C1, the left superior facet of C2, the right superior facet of C3, both inferior facets of C3, and all facets of C4. The dens articulation on both C1 and C2 had severe DJD. Mild lipping was identified on the inferior surface of the C2 centrum, both surface of the C3 and C4 centrum. Porosity was identified on the C2 centrum, and the inferior surface of the C3 and C4 centrum. Mild DJD was identified on the right superior facet of T3, both inferior facets of T4, the left superior facet of T7, and both inferior facets of T12. Moderate DJD was identified on the right superior facet of T4 and both inferior facets of T9. Mild lipping was identified on the centrum of T5, the inferior surface of the T7 centrum, and the T12 centrum. A schmorls node was identified on the inferior surface of the T9 centrum. Mild DJD was identified on the inferior facets of L1, the right superior facet of L2, both inferior facets of L2, the left inferior facet of L3, the left inferior facet of L4, and both inferior facets of L5. Moderate DJD was identified on the left superior facet of L2, both superior facets of L4, and both superior facets of L5. Severe DJD was identified on the left superior facet of L3 and the right inferior facet of L4. Mild lipping was identified on the inferior surface of the centrum of L3 and both surfaces of the L4 centrum. Porosity was identified on the inferior L2 centrum, the superior L3 centrum, the inferior L4 centrum, and both surfaces of the L5 centrum.

Enthesopathies were identified along the length of the *linea aspera* of both femora and on the right calcaneus.

No cribra orbitalia, porotic hyperostosis, or periostitis was identified.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	~~42~~	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	LA	LA	LA	LA	P	P	P	P	P	MP

Attrition: Moderate attrition was identified on all observable teeth

Calculus: Calculus could not be assessed due to taphonomic damage

Caries: No caries was identified

Hypoplasia: Hypoplasia was identified on the right first premolar, on the left canine, left second premolar, and left second molar

Additional References

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139 .

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.74)

Reg Number: 1938:9690 **SMR Number:** DU024-048001-

Physical Setting

Townland: Aghfarrell

County: Dublin **Province:** Leinster

Year of Excavation: 1938

Monument Type: Possible Flat Cemetery

Conditions of Discovery: Found during excavation of a sand pit

Total Burials: 2, possible third **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Raftery, J. 1938. Two Bronze Age burials at Aghfarrell, Co. Dublin. *Journal of the Royal Society of Antiquaries of Ireland,* 8(2), 300-304.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Unrecorded

Body Position: Crouched, right side

Associated Material: Bowl Food Vessel placed mouth upwards in the top right corner of the cist, behind the head

Dating Information: Brindley stage 3 Bowl; Brindley reported a date for the cremation in the second grave from this site, 3670 ± 50 BP (GrA-14599; human bone [carbonate]), calibrated to 2200-2162 cal BC (6.4%), 2152-1921 cal BC (88.2%), and 1911-1901 cal BC (0.9%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1938:9690

The remains of this individual were poorly to moderately preserved, with the left side more preserved than the right. The skull was represented by a complete left frontal, partial right frontal, complete left parietal, poor left temporal, fragmentary right temporal, partial occipital, partial right maxilla and palatine, and partial mandible. The shoulder girdle consisted of a fragmentary left clavicle, partial left scapula, and the shaft and medial portion of the right clavicle. The thorax was represented by eight left rib fragments, portion of the left C1, six thoracic vertebrae body fragments, and three lumbar vertebrae fragments. The pelvic girdle consisted of the partial left ilium, fragmentary left ischium, complete right ilium, and partial right ischium. Both acetabula were partial, S1 was identified. The upper limbs were represented by a complete left humerus, poor left ulna, the shaft and distal portion of the left radius, and the fragmentary right ulna. The lower limbs were represented

by a mostly complete left femur, partial left patella, complete left tibia and fibula, fragmentary. Right femur, partial right patella, and the shaft and distal portion of the right tibia. The hands consisted of the partial 1, 3, and 4 left metacarpals, two unidentified carpals, three unidentified metacarpals, and three phalanges. The feet consisted of partial left talus and calcaneus, and one unidentified tarsal.

Age and Sex

All fusion was complete, sutures were beginning to be obliterated, and moderate tooth wear suggest a middle adult age.

The supraorbital ridges, mastoid process, and the nuchal crest of the skull as well as the sciatic notch of the pelvis suggest a possible male.

Skeletal Pathology

Diffuse mild DJD was identified. The left glenoid was beginning to develop lipping along with the left proximal ulna. Both distal femurs showed mild lipping, similarly the right proximal femur. The left superior facet of L4 also had mild to moderate osteophyte growth. One lateral rib demifact showed mild lipping. The left calcaneus shows slight ossification of the Achilles tendon. This mild degenerative disease is consistent with the individual being a young middle adult.

The left parietal and occipital were present, no porotic hyperostosis identified. Both orbits present, not cribra orbitalia identified. No periostitis identified.

Dentition

MP	P	LA	MP	MP											
18	17	16	15	14	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	MP	P	P	P	P	P	P	P

There was significant taphonomic damage to the tooth surfaces. One molar couldn't be identified.

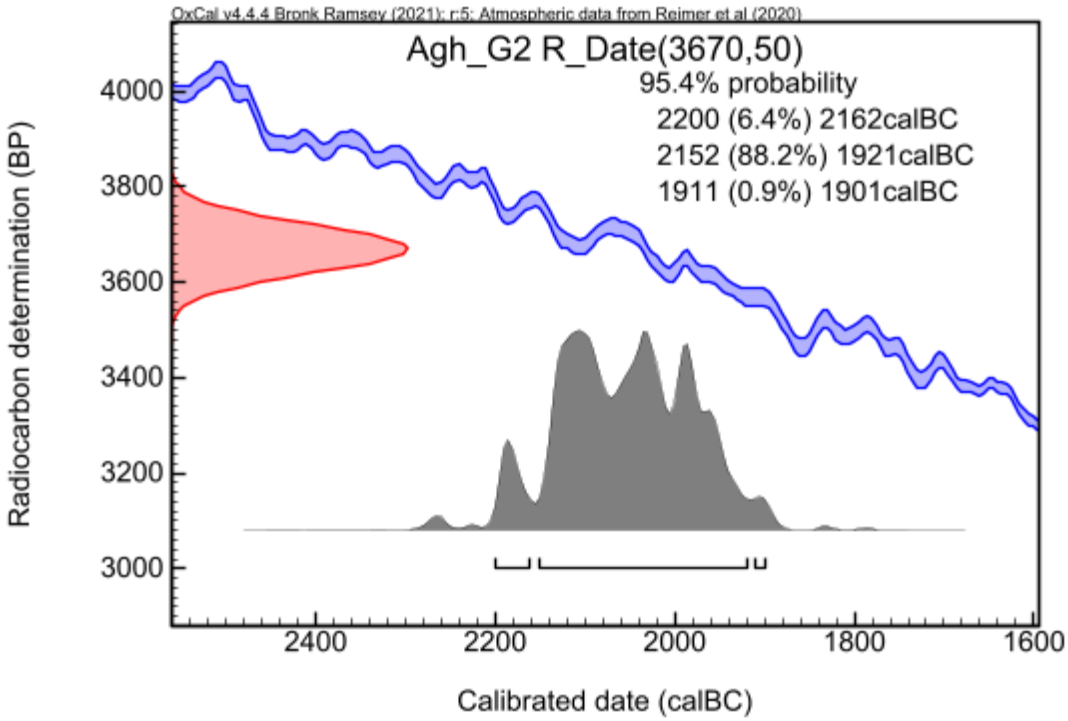
Attrition: Moderate attrition was identified on the teeth which had not lost crown surface due to taphonomy

Calculus: Calculus was not scorable due to surface damage

Caries: No caries were noted. Abbesses were associated with the upper right first and third molars.

Hypoplasia: Due to the surface damage the teeth were not scorable for hypoplasia

Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.122)

Flanagan L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum,* 3(2), 7-20.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.80)

Reg Number: 1965:11 **SMR Number:** DU023-042----

Physical Setting

Townland: Deansgrange

County: Dublin **Province:** Leinster

Year of Excavation: 1965

Monument Type: Short Cist

Conditions of Discovery: Garden of a house

Total Burials: 3 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Ó Ríordáin, B. 2011. Deansgrange, Co. Dublin, E1060. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 174–176.

Description of Grave

Grave Number: Grave 1

Grave Type: Short Cist

Orientation of the Grave: Northwest/Southeast

Body Position: Unrecorded

Associated Material: 19 pieces of cremated bone; one animal bone

Dating Information: N/A

Comments: Discovered in a short cist in the garden of house

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1965:11

This collection of curated skeletal remains consists of the poorly preserved and highly fragmented remains of two individuals (and a small collection of cremated remains). While a small number of materials is identified at the individual level, mandibles and a small number of teeth, that majority of the remains are co-mingled and cannot be distinguished due to the level of fragmentation. Three petrous portions and two right orbits were identified, along with two fragmentary mandibles, identifying this collection as representing two individuals. One skull (Skull 1) is represented by 19 fragments, with the morphological characteristics of the partial right orbital and partial right temporal inconclusive for sex estimation. The other skull (Skull 2) is noted though different bone quality, colour, and a distinct thickening of the skull vault. This skull is represented by 24 fragments, and the morphology of the partial right orbit and two partial temporals results in a sex estimation of probably male. There are 60 further skull fragments. The shafts of two humeri were identified (one in two large fragments), with a further one likely humeral fragment. Also identified were four femur

fragments, three tibia fragments, two fibula fragments, and four lower arm fragments. There were 57 unidentified long bone fragments. 17 fragments of metacarpals/metatarsals/phalanges were identified, alongside three possible carpals/tarsals. Three fragments of the shoulder girdle were identified, with nine fragments of the pelvic girdle identified. Ten fragments of vertebra were identified, including the dens of C2. Three fragments of rib were identified. There was a large number of unidentified fragments.

One set of dentition was that of an older young adult/younger middle adult based on attrition (Individual B; three poorly preserved fragments of dental arcade and 10 teeth), while the other was of an old adult based on attrition (Individual A; one poorly preserved mandible, 8 teeth). Unfortunately, it is impossible to identify which set of dentition is associated with which skull. Hypoplasia was identified on two lower canines and one premolar of the younger individual, while the teeth of the older individual were not scorable. No other pathology was scorable.

Additional References

Lucas, A. 1968. National Museum of Ireland Archaeological Acquisitions in the year 1965. *Journal of the Royal Society of Antiquaries of Ireland,* 98(2), 93-159.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.81)

Reg Number: 1952:29a, 1951:30a **SMR Number:** DU022-029----

Physical Setting

Townland: Edmondstown

County: Dublin **Province:** Leinster
Year of Excavation: 1950
Monument Type: Flat Cemetery
Conditions of Discovery: Landscaping
Total Burials: 18 **Total Inhumations:** 2

Excavation Report: Published
Primary Reference: Mount, C., Hartnett, P.J. and Buckley, L. 1993. Early Bronze Age Cemetery at Edmondstown, County Dublin. *Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature*, 93C(2), 21–79.

Description of Grave

Grave Number: Cist 1
Grave Type: Cist
Orientation of the Grave: East/West
Body Position: Crouched, right side, head to the East facing North
Associated Material: Tripartite Bowl placed in Northwest corner
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1952:29a

The remains of this individual were moderate to poorly preserved, with good skeletal region representation but notable surface erosion. Age-at-death was estimated to be young adult, with a refined age-at-death estimate of 17-25, based on the identification of fusion lines on the proximal femur and tibia, and the lack of fusion in the medial clavicle. Sex was estimated to be male. Attained stature was estimated at 182cm.

Skeletal Pathology
Schmorls nodes were identified on the centrum of T7 to L4. Periostitis and cribra orbitalia were absent, porotic hyperostosis was not scorable.

Trauma
A semi-circular lesion with accompanying cut marks was identified on the left temporal bone, with no evidence of healing associated with either the semi-circular lesion or the cut marks. The patterning of this trauma is indicative of a trepanation. Buckley, who performed the initial skeletal analysis of this individual, interpreted the location of the trepanation to

suggest that the trepanation could have been performed in response to mastoiditis, although this could not be assessed as the mastoid area was heavily decayed.

In a 2003 overview of all Irish evidence of trepanation, O'Donnabhain (2003, p.80) *identified that while the lesion was located near the squamosal suture, there were no bony changes on the parietal, it was also noted that the cut marks associated with the lesion resembled rodent gnawing. This suggested that this lesion was more likely a pseudotrepanation associated with taphonomic processes.*

Dentition

								P	MP	P	P	P	P	P	CA
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

Mild attrition and mild calculus were identified. No enamel hypoplasia was identified.

Description of Grave

Grave Number: Cist 2
Grave Type: Cist
Orientation of the Grave: Roughly East/West
Body Position: Crouched, left side, head to the Northeast facing South
Associated Material: Tripartite Bowl placed in Southeast corner, in front of skull
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1951:30a

The remains of this individual were well preserved with good skeletal region representation. The age-at-death was estimated to be adolescent, with a refined age-at-death estimation of 15-18, based on the fusion and dental development. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Widespread periostitis was identified on multiple long bones. Cribra orbitalia and porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	MP	MP	MP	MP	P	P	MP	P	P	PE
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
PE	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild attrition and mild calculus were identified. Enamel hypoplasia was identified on the first and second upper molars.

Additional References

O'Donnabhain, B. 2003. Trepanations and Pseudotrepanations: Evidence of Cranial Surgery from Prehistoric and Early Historic Ireland. In Arnott, R., Finger, S. and Smith, C.U.M. (eds). *Trepanation: History, Discovery, Theory*. Lisse: Swets & Zietlinger. 79–94.

Reg Number: 1978:343 **SMR Number:** DU025-057001-

Physical Setting

Townland: Glassamucky

County: Dublin **Province:** Leinster

Year of Excavation: 1978

Monument Type: Flat Cemetery

Conditions of Discovery: Quarrying

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Kelly, E.P. 1998. Burials At Glassamucky, Glenasmole Valley, Co. Dublin. In Manning, C. (eds). *Dublin and Beyond the Pale: Studies in honour of Patrick Healy*. Bray: Wordwell Ltd. 113–116.

Description of Grave

Grave Number: Grave 1

Grave Type: Trapezoidal Cist

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, left side, head to the Northeast

Associated Material: Bowl behind right shoulder

Dating Information: 3765 ± 40 BP (GrN-11899; human bone [collagen]; $\delta^{13}C = -21.37‰$), calibrated to 2297-2111 cal BC (78.8 %) and 2104-2036 cal BC (16.7%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Comments: Second possible inhumation nearby, but not found (part of right tibia found)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1978:343

The remains of this individual were moderately to well preserved, with good skeletal region representation. The skull was heavily fragmented, with a partial left frontal, fragmentary parietals, partial left temporal, fragmentary right temporal, partial left occipital, fragmentary right occipital, fragmentary sphenoid, poor left zygomatic, partial left maxilla, fragmentary right maxilla, partial left nasal, poor left mandible, partial right mandible, and complete hypoid identified. The shoulder girdle was represented by fragmentary clavicles, poor left scapula, and complete right scapula. The thorax consisted of a complete manubrium, poor sternal body, twelve left ribs in a total of 16 fragments, twelve right ribs in a total of 18 fragments, ten cervical vertebrae fragments which included a mostly complete C1, partial C2 and two partial cervical vertebrae; partial T1-T3, complete T4-T12, and complete lumbar vertebrae. The pelvic girdle was represented by a complete left ilium, complete left ischium, partial left pubis, poor right ilium, complete right ischium, and partial

right pubis. The left acetabulum was complete, with the right poor; the sacrum was complete. The upper limbs were complete. The lower limbs were represented by a poor left tibia, proximal and shaft portion of the left fibula, complete right femur, complete right patella, poor right tibia, and the poor left fibula. The hands consisted of complete left carpals with only the trapezium suffering some damage, complete left metacarpals, five proximal phalanges, three middle phalanges, and two distal phalanges; right complete carpals, complete MC1 and MC2, and MC5, five proximal phalanges, three middle phalanges, and four distal phalanges. The feet consisted of right complete talus, partial calcaneus, fragmentary cuboid, and fragmentary navicular.

In the excavation report, both femora are mentioned as complete, so it is likely that the left femur was the bone sample sent for radiocarbon dating.

Age and Sex
Based on level of fusion, dental eruption and attrition, and the morphology of the left auricular surface, this individual was estimated to be a young adult; with a refined age-at-death estimate of 20-30. Based on the morphology of the supraorbital ridge, nuchal crest, mental protuberance, gonial flare, subpubic concavity, and the sciatic notch this individual was estimated to be possible male.

Stature
An attained stature estimate of 166.61 ± 3.94 cm was calculated based on a right maximum femur measurement of 44.2 cm. A maximum left tibia length of 38.8 cm and a maximum right tibia length of 38.2 cm resulted in an attained stature estimate of 174.63 ± 4.00 cm.

Non-metric Traits
Septal aperture was identified in the left humerus. The sternal body had not fused in the standard way – with the sternum consisting of the manubrium, a single body segment, then the fused lower body segments.

Skeletal Pathology
Mild Schmorls nodes were identified on the inferior centrum of T11, both sides of the T12 centrum, and the superior L1 centrum. Schmorls-like depressions were observed on the other lumbar centrum, but they did not have the typical ‘node’ appearance.

Slight bowing and twisting identified on the right femur, resulting in the head slightly anterolateral than normal. While this might have had a slight effect on how this individual walked, it would not have had any significant impacts.

One additional vertebra was identified. Neatly sacralised, expect for the lower articular facets, this vertebra represented the sacralisation of L6 or a slight incomplete fusion of S1 in the presence of six sacral vertebra.

Periostitis was absent. Both cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

P	P	P	P	P	P	MP	P	MP	MP	P	P	P	MP	P	P
18	17	16	15	14	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	44	43	42	41	31	32	33	34	35	36	37	38
	P	MP	P	P	P	P	P	P	P	P	P	P	P	P	CA

The upper third molars were smaller than standard, supporting identification of congenitally absent lower third molars.

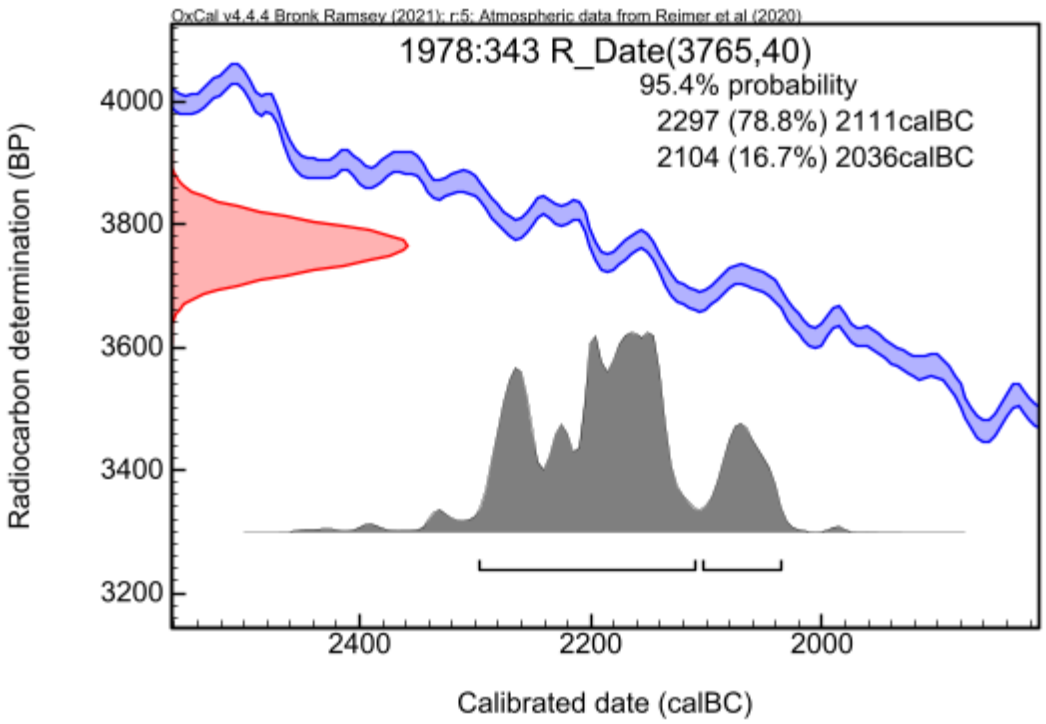
Attrition: Attrition was mild

Calculus: Calculus was not scorable due to taphonomic damage

Caries: No caries identified

Hypoplasia: Due to taphonomic damage to the surface enamel, hypoplasia was not scorable

Calibration Curve



Additional References

Kelly, E. 1987/1988. Glassamucky. *Journal of Irish Archaeology,* 4, 73.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.81)

Excavations.ie 1977-79:0038

Reg Number: RIA1908:158.1; 1929:1290 **SMR Number:** DU026-015----

Physical Setting

Townland: Jamestown

County: Dublin **Province:** Leinster

Year of Excavation: 1908, 1929

Monument Type: Possible flat cemetery

Conditions of Discovery: Sand quarrying

Total Burials: 4 **Total Inhumations:** 2

Excavation Report: Unpublished

Primary Reference: NMI Files; Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.83)

Description of Grave

Grave Number: Grave 3

Grave Type: Cist, paved

Orientation of the Grave: Not recorded

Body Position: Not recorded

Associated Material: Bowl

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** RIA1908:158.1

The remains of this individual are partial; however the bone quality is moderate to good. Three bones are in the collection, one fragment of the skull vault, the shaft of the left femur and the shaft of the right tibia. The identification of unfused epiphysis on both the tibia and femur identifies this individual as a child, with the length of the shafts suggesting an age-at-death of around four.

Description of Grave

Grave Number: Grave 4

Grave Type: Not recorded

Orientation of the Grave: Not recorded

Body Position: Not recorded

Associated Material: Bowl

Dating Information: N/A

Comments: Found in 1929 in the same sand pit, but in a different section as the other burials

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:1290

The remains of this individual are moderate to poorly preserved, with poor skeletal region representation. The skull consisted of poor frontal, complete parietals, complete temporals complete occipitals, poor sphenoid, partial maxillae, and partial palatines. The postcranial skeleton consisted of the distal and shaft portion of the left humerus, poor left femur, partial right lilium, and partial right ischium. The right acetabulum is partial.

Age and Sex

This individual was identified as an adult based on the fusion, with the level of attrition identified on the few remaining teeth and the morphology of the right auricular surface suggesting an estimation of a late middle adult to a young old adult, with a refined age-at-death estimation of 45 or greater. The morphology of the mastoid process and the sciatic notch suggest a sex estimation of possible female. This is supported by the left femur head diameter of 43.21 mm; with the female determination being below 43mm.

Stature

An attained stature estimate of 159.32 ± 3.72 cm was calculated from a left maximum femur measurement of 42.6 cm.

Skeletal Pathology

Mild to moderate DJD was identified in the occipital condyles and the left femur, mild DJD in the proximal femur and moderate DJD in the distal femur. Mild DJD was also identified in the right acetabulum.

No periostitis, cribra orbitalia, or porotic hyperostosis was identified.

Dentition

MP	MP	P	MP	MP	MP	MP	MP	MP		LA	MP	MP	P	MP	MP
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

Due to the bony changes in the alveoli bone correlating to the second left incisor it is unsure if this tooth was lost or the changes are associated with the loss of the canine or reflected an unusual positioning of the tooth during life

Attrition: Both present first molars show severe attrition, with the almost complete loss of the crown height.

Calculus: Moderate calculus was identified on both molars

Caries: No caries were identified

Hypoplasia: Due to the loos of crown height, hypoplasia was not scorable

Additional References

Kavanagh R. 1973. The encrusted urn in Ireland. *Proceedings of the Royal Irish Academy*, 73, 507-617.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139

Reg Number: 03E1359 **SMR Number:** DU014-093----

Physical Setting

Townland: Kilshane

County: Dublin **Province:** Leinster

Year of Excavation: 2004

Monument Type: Flat Cemetery

Conditions of Discovery: Road Scheme

Total Burials: 6 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Clutterbuck, R. and Carroll, F.O. 2009. *N2 Finglas-Ashbourne Road Scheme. Report on Archaeological Excavation of Site 5 Kilshane, County Dublin*.

Description of Grave

Grave Number: F5111

Grave Type: Pit

Orientation of the Grave: N/A

Body Position: Crouched, right side, head to the East

Associated Material: None Reported

Dating Information: N/A

Human Remains

Curation Location: Unreported **Reg:** 03E1359

The remains of this individual were poorly preserved, with moderate to poor skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death estimate of 20-40, based on joint condition and dental attrition. Sex was estimated to be possible male based on the morphology of the mandible and sciatic notch.

Skeletal Pathology

Periostitis was identified on both tibiae, with evidence of healing. Porotic hyperostosis was absent, and cribra orbitalia was not scorable.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	42	41	31	32	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
		P	P	P	P	P	P	P	P	P	P		P	P	

Moderate to severe attrition was identified, with mild calculus. Caires was identified on lower left second molar, with an area of possible developing caries on the lower left first molar. Enamel hypoplasia was identified on the mandibular canines.

Reg Number: 1934:433 **SMR Number:** DU008-013002

Physical Setting

Townland: Rush

County: Dublin **Province:** Leinster

Year of Excavation: 1934

Monument Type: Cairn, Secondary Burials

Conditions of Discovery: Reclaiming Land

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Ó Ríordáin, S.P. and Price, L. 2011. Rush, Co. Dublin, E1062. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 176–180.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Unrecorded

Body Position: Unrecorded

Associated Material: Necked Bipartite Bowl

Dating Information: 3670 ± 40 BP (GrA-24157; human bone [collagen]; $\delta^{13}C = –21.66‰$), calibrated to 2195-1939 cal BC (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1934:433

The remains of this individual were poorly preserved and were very fragmented. Based on dental formation and attrition, this individual was estimated to be a young adult. Due to the condition, no sex estimation was undertaken.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

Dentition was represented by a few loose teeth. Enamel hypoplasia pits were identified on the second maxillary molar.

Reg Number: 1955:42 **SMR Number:** DU023-050---

Physical Setting

Townland: Stillorgan Park

County: Dublin **Province:** Leinster

Year of Excavation: 1955

Monument Type: Cist

Conditions of Discovery:

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Raftery, J. 2011. Stillorgan Park, Co. Dublin, E1063. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 180–184.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Disturbed, head to the North

Associated Material: Flint Flake, tibial epiphysis of a juvenile cow

Dating Information: N/A

Comments: Another burial known from this townland (Waddell, 1990)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1955:42

The remains of this individual were moderately well preserved, with good skeletal region representation. The skull was represented by the poor left frontal, complete right frontal, partial left parietal, partial right parietal, poor left temporal poor right temporal, complete left occipital, complete right occipital, partial right sphenoid, partial right zygomatic, partial right maxilla, partial vomer, poor left mandible, and partial right mandible. The shoulder girdle consisted of the lateral and shaft portion of the left clavicle, poorly preserved left scapula, lateral and shaft portion of the right clavicle, and the complete right scapula. The thorax was represented by the partial sternal manubrium, ten left rib fragments including the first and second rib, ten right rib fragments including the first and second ribs, 16 unsided rib fragments, C2 dens articulation, three fragmentary cervical vertebrae, right neural arch fragment of T1-T2, neural arch of T3, partial T4-T6, neural arch of T7, partial T8-T9, neural arch of T10-T11, right neural arch of T12, partial neural arch of L1-L3, neural arch of L4, partial L5. The pelvic girdle consisted of the partial left ilium, poor left ischium,

complete left pubis, complete right ilium, poor right ischium, and the poor right pubis. The left acetabulum was complete, the right acetabulum was poorly preserved, and the sacrum was represented by a complete S1 and a partial S2-S3. The upper limb consisted of the complete left humerus, complete left ulna, distal and shaft portion of the left radius, poor right humerus, complete right ulna, and poor right radius. The lower limb consisted of the poor left femur, complete left patella, complete left tibia, fragmentary left fibula, complete right femur, partial right patella, complete right tibia, and the fragmentary right fibula. The hands were represented by the left complete lunate, poor capital, complete hamate, and the complete MC1-MC3; right complete lunate, complete trapezoid, poor capitate, and the complete MC2 and MC3. The distal portion of two metacarpals could not be identified; four proximal and two middle phalanges were identified. The feet were represented by the left complete talus, complete calcaneus, partial cuboid, complete navicular, complete medial cuneiform, complete intermediate cuneiform, complete distal cuneiform, complete MT2, and the proximal and shaft portion of MT3-MT5; the right complete talus, complete calcaneus, complete cuboid, poor navicular, complete intermediate cuneiform, complete distal cuneiform, complete MT1, and the distal and shaft portion of MT2-MT5. Three proximal left phalanges and one proximal right phalanx was identified.

Age and Sex

Based on the united fusion line of S1/S2, this individual was estimated to be a young adult, with a refined age-at-death estimate of 25-30. The morphology of the mastoid process, ventral arc, subpubic concavity, ischiopubic ramus ridge, and sciatic notch support the estimation of possible male for this individual.

Stature

A stature estimation of 157.8 ± 3.94 cm was calculated based on a maximum right femoral measurement of 40.5 cm. A stature estimation of 162.03 ± 4cm was calculated based on an averaged maximum tibial measurement of 33.1 cm.

Non-metric Traits

Both humeri displayed septal apertures.

Skeletal Pathology

No DJD was identified in the non-vertebral joints. Mild DJD was identified on only one vertebral facet, the superior left L4 facet. There was some mild ossification of the ligamentum flavum.

There was no periostitis or cribra orbitalia identified, porotic hyperostosis was not scorable.

Dentition

P	MP	MP	P	P	MP	P	MP								
18	17	16	15	14	13	12	11	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
MP	P	P	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP

Attrition: Mild attrition was identified on all present teeth except for the lower right first molar, which had moderate attrition

Calculus: Mild calculus was identified on all upper right present teeth, with the lower right present teeth not scorable for calculus

Caries: No caries was identified

Hypoplasia: No hypoplasia was identified

Additional References

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.86)

Reg Number: 1932:5614.1 **SMR Number:** DU008-085----

Physical Setting

Townland: Whitestown, Lusk

County: Dublin **Province:** Leinster

Year of Excavation: 1932

Monument Type: Partial Cist

Conditions of Discovery: Ploughing

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Mahr, A. and Price, L. 2011. Whitestown, Co. Dublin, E1065. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 190–194.

Description of Grave

Grave Number: Grave 1

Grave Type: Partial Polygonal Cist

Orientation of the Grave: Roughly North/South

Body Position: Crouched, lying on back with legs bent up to chest

Associated Material: Necked Bowl South of skull, some animal bone. The NMI File references a band of ornamented substance around the skull, which disintegrated upon disturbance. Small amount of cremated bone

Dating Information: Brindley (Mahr and Price 2011, p.192) suggest a date of 2080-1980 based on the decoration style of the necked bowl.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1932:5614b

The remains of this individual were moderately preserved, with good skeletal area representation but significant bone surface damage. The skull was represented by partial left frontal, complete right frontal, complete parietals, complete temporals, complete occipital, partial sphenoid, complete zygomatics, complete maxillae, complete palatines, complete left portion of the mandible, and partial right portion of the mandible. The shoulder girdle was represented by the fragmentary left scapula, shaft of the right clavicle, and the fragmentary left scapula. The thorax consisted of 13 left rib fragments, 14 right rib fragments, partial C1, partial C2, fragment of one cervical centrum, three thoracic fragments, and a partial lumbar vertebra. The pelvic girdle was represented by the partial left and right ilium. Both acetabula were partial. The upper limb was represented by the shaft of the left humerus, shaft and proximal portion of the left ulna, fragmentary left

radius, fragmentary right humerus, complete right ulna, and the fragmentary right radius. The lower limbs were represented by the shaft and distal portion of the left femur, complete left patella, shaft and proximal potion of the left tibia, distal portion of the left fibula, complete right femur, shaft and proximal portion of the right tibia, and the shaft of the right fibula. The hands consisted of the left pisiform, shaft and distal portion of MC1, poor MC2, shaft and proximal section of MC3-4; a right distal metacarpal and one phalanx. The feet consisted of the left partial talus, partial calcaneus, poor cuboid, partial lateral cuneiform, complete MT1, poor MT2, shaft and proximal portion of MT3, proximal portion of MT5; right partial navicular, poor medial cuneiform, fragmentary MT1, shaft and proximal portion of MT2 and MT3, and partial MT5.

Age and Sex

Based on size, dentition, and evidence of DJD this individual was identified to be a middle adult. A refined age-at-death of 35-45 was estimated based on the morphology of the auricular surface. Based on the morphology of the supraorbital ridges, mastoid process, nuchal crest, and mandible it was estimated that this individual was male.

Stature

A stature estimate of 174.94 ±3.94 cm for this individual was made based on a right maximum femur measurement of 47.7 cm.

Skeletal Pathology

Mild DJD was identified in the left proximal ulna, right humeral trochanter, right proximal ulna, and both surfaces on the right femur. Mild DJD was also identified on the dens articulation, both left C1 facets, and on one right inferior thoracic facet. Mild osteophytes were identified on one cervical and one lumbar centrum, with the lumbar centrum also displaying a Schmorls node.

No cribra orbitalia, porotic hyperostosis, or periostitis was identified.

Dentition

CA	P	P	P	P	P	P	MP	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

It is unclear if the upper right third molar was congenitally absent or lost antemortem and very well healed.

Attrition: There was moderate attrition on all teeth except for the molars, which had moderate to high attrition levels.

Calculus: Mild levels of calculus on all teeth

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on the upper left lateral incisor, canine, first premolar; lower left canine, both premolars, enamel quality change on the third molar; lower right canine, and on both premolars.

Additional References

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.86)

Reg Number: 1989:53.1 **SMR Number:** DU008-084----

Physical Setting

Townland: Whitestown

County: Dublin **Province:** Leinster

Year of Excavation: 1989

Monument Type: Pit Burial

Conditions of Discovery: Sand Pit

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: NMI File

Description of Grave

Grave Number: Grave 1

Grave Type: Pit

Orientation of the Grave: Unrecorded

Body Position: Unrecorded

Associated Material: N/A

Dating Information: N/A

Comments: Skull and long bones found in a sand pit. No recorded of context or grave cut. Curated remains consist of well preserved skull and a portion of the right femur.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1989:53.1

The remains of this individual were well preserved, however only the skull and a portion of the right femur were curated. It is unclear how much was originally found. The skull was represented by a complete frontal, complete parietals, complete temporals, complete occipitals, partial sphenoid, complete zygomatics, complete maxillae, complete palatines, complete nasal bones, complete lacrimals. The post-cranial skeleton consisted of the shaft and distal portion of the right femur.

Age and Sex

Based on the partial eruption of one third molar and suture closer, this individual was identified as a young adult, with a refined age-at-death estimate of 17-15. Based on the morphology of supraorbital ridge, mastoid process, nuchal crest, mental protuberance, it was estimated that this was a possible male.

Skeletal Pathology

Mild cribra orbitalia was identified in the right orbit, no cribra orbitalia was identified in the left orbit. No porotic hyperostosis or periostitis was identified.

Dentition

PE	P	P	P	P	P	P	P	P	P	P	P	P	P	P	PE
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

Calculus: Mild Calculus was identified on all erupted teeth

Caries: No caries identified

Hypoplasia: No hypoplasia was identified.

Reg Number: FER194:040 **SMR Number:** FER 194:040

Physical Setting

Townland: Tonyglaskan

County: Fermanagh **Province:** Ulster

Year of Excavation: 2000

Monument Type: Flat Cemetery

Conditions of Discovery: Gravel Quarry

Total Burials: 3 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Hurl, D., and Murphy, E. 2004. The Excavation of a flat cemetery at Tonyglaskan, County Fermanagh, and a single cist at Lislaird, County Tyrone. *Ulster Journal of Archaeology*, 63, 19-40.

Description of Grave

Grave Number: Cist A

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Disturbed. Probably crouched, head North, left side

Associated Material: Bipartite bowl, fragment of a possibly perforated stone object

Dating Information: 3685 ± 34 BP (UB-6599; human bone), calibrated to 2195-1962 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** FER194:040_1

The remains of this individual were poorly preserved, especially post-cranially. The skull was represented by poorly preserved frontal, fragmentary parietals, fragmentary temporals, fragmentary occipital, fragmentary sphenoid, poor left zygomatic, fragmentary right zygomatic, martial maxillae, and a partial mandible. The shoulder girdle was absent. The thorax consisted of partial C1 and C2. The pelvic girdle was represented by a partial left ilium, and a partial left acetabulum. The upper limb consisted of the proximal section of the left radius. The lower limbs consisted of a poorly preserved left femur. There was no preservation of the hands or the feet.

A piece of the parietal was taken for aDNA analysis.

Age and Sex

The presence of the erupted third molars identifies this individual as an adult. Based on the presence of open sutures and the level of attrition it was estimated that this individual was

a young adult. Due to the poor preservation, a refined age-at-death could not be estimated. Based on the morphology of the supraorbital ridges, mastoid process, and the nuchal crest it was estimate that this individual was male.

Stature
The left femur had a maximum length of 46.5 cm. Based on this measurement the stature of this individual was estimated to be 173.18 ± 3.94cm.

Skeletal Pathology
Mild porotic hyperostosis was identified on the left and right frontal, and the left and right parietals. This individual was not scorable for cribra orbitalia. No periostitis was identified.

Dentition

P	P	P	P	P	MP	MP	MP	P	MP	MP	P	P	P	P	P
~~18~~	17	16	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	25	26	27	28
48	47	46	45	44	43	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	34	35	36	37	38
P	P	P	P	P	P	MP	P	P	MP	MP	P	P	P	P	P

An extra socket was identified after the upper right third molar, indicating that this individual had a supernumerary tooth.

Attrition: Mild to moderate attrition was identified, with attrition to third molars suggesting that they had been in occlusion.

Calculus: Mild calculus was identified on the right molars.

Caries: A small occlusal surface caries was identified on the lower left third molar.

Hypoplasia: Areas of discoloured enamel, were noted on all second and third molars. A single line of hypoplasia was identified on the lower right canine.

Description of Grave

Grave Number: Cist B
Grave Type: Cist
Orientation of the Grave: Roughly Northeast/Southwest
Body Position: Crouched, left side, head Northeast
Associated Material: Flint flake
Dating Information: 3667 ± 36 BP (UB-6600; human bone), calibrated to 2189-1943 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** FER194:040_2

The remains of this individual were moderately to well preserved, however there was significant surface damage. The skull was represented by a complete frontal, complete parietals, complete temporals, complete occipital, complete sphenoid, partial left zygomatic, poor right zygomatic, poor maxillae, complete palatines, partial lacrimals, partial ethmoid, partial vomer, complete mandible. The shoulder girdle was represented but complete clavicles, and poorly preserved scapulae. The thorax consisted of nine left ribs, nine right ribs, including both first ribs, 15 unsided rib fragments, complete cervical vertebra, complete T1-T10, partial T12, and partial T12. The pelvic girdle was absent. The upper limbs were represented by the shaft and proximal portion of the humeri, the shaft and proximal portion of the left ulna, and the shaft of the left radius. The lower limbs were represented by the shaft and distal portion of the left femur, the shaft and proximal section of the left tibia, fragmentary left fibula, the distal portion of the right femur, the shaft and proximal portion of the right tibia, and the shaft and proximal portion of the right fibula. The hands consisted of one unidentified carpal, five unidentified metacarpals, and one phalanx.

Age and Sex

Based on the size, this individual was identified as a child. A refined age-at-death estimate of 7 (±2 years) was made based on tooth development and eruption.

Stature

Previous analysis mentions that an age-at-death estimate of 3.5 to 4.5 based on the length of the long bones. As tooth eruption suggests age-at-death of 7 years, this suggests that this individual was of small stature, possibly indicating poor health.

Non-metric Traits

An ossicle at the lambda, with two left and four right within the lambdoid suture.

Skeletal Pathology

Mild cribra orbitalia was identified in both orbits. No porotic hyperostosis identified. No periostitis identified.

Dentition

	PE	P				PU	MP	MP	PU				P	PU	
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	PU	P				PU	P	P	PU				P	PU	
			P	P	P	MP				P	P	P			
			55	54	53	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P	P	MP					P	P	P			

Calculus: Mild calculus was identified on the upper right first molar, lower right first molar, and all second deciduous molars.

Carries: No caries identified

Hypoplasia: No hypoplasia identified

Description of Grave

Grave Number: Cist C
Grave Type: Cist
Orientation of the Grave: Roughly North/South
Body Position: Extended supine, upper arms along sides, whilst the forearms had been flexed back up towards the shoulders. The pelvis and legs had been removed but were recovered from the disturbed material around the grave
Associated Material: Sherds of a highly decorated simple bowl
Dating Information: 3724 ± 35 BP (UB-6601; human bone), calibrated to 2274-1985 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** FER194:040_3

The remains of this individual were well preserved, with good skeletal area representation. The skull was represented by a partial frontal, poor parietals, complete temporals, complete occipital, partial sphenoid, partial zygomatics, complete maxillae, complete palatines, and a complete mandible. The shoulder girdle was complete; however, the right clavicle had been damaged. The thorax consisted of a complete manubrium, complete sternal body, almost complete ribs, complete cervical vertebrae, complete thoracic vertebrae, complete L1, and partial L2-L4. The pelvic girdle was represented by the complete left ilium, partial left ischium, partial right ilium, and the partial right ischium. The left acetabulum was complete,

the right acetabulum was partial. The upper limbs were represented by complete left humerus, shaft and proximal portion of the left ulna, complete left radius, poor right humerus, shaft and proximal portion of the right ulna, and a poorly preserved right radius. The lower limbs were represented by a poor left femur, complete left patella, fragmentary left tibia, shaft of the left fibula, shaft and distal portion of the right femur, complete right patella, poor right tibia, and the shaft and distal portion of the right fibula. The hands were represented by the left pisiform, trapezium, trapezoid, capitate, complete MC1-MC5; the right scaphoid, lunate, trapezium, capitate, and hamate, poor MC1, shaft and proximal portion of MC2, and complete MC3-MC5. 22 hand phalanges were noted. The left foot was represented by the talus, calcaneus, partial cuboid, navicular, poor medial cuneiform, partial lateral cuneiform, shaft and distal portion of MT1, complete MT3, and the shaft and distal potion of MT4. The right foot was represented by a talus, partial calcaneus, partial cuboid, poor navicular, partial medial cuneiform, intermediate cuneiform, partial lateral cuneiform, and poorly preserved MT1-3. Two unidentified metatarsals and three phalanges were noted.

Age and Sex

The state of the dentition indicated that this individual was a young adult. A refined age-at-death of 25-35 was estimated based on the attrition and auricular surfaces. Based on the morphology of the supraorbital ridges, mastoid process, nuchal crest, mandible, sciatic notch, and preauricular sulcus, this individual was estimated to be male.

Stature

The left femur had a maximum length of 45.9 cm. Based on this measurement the stature of this individual was estimated to be 170.65 ±3.94 cm.

Skeletal Pathology

Schmorl's nodes were identified on the superior T9 centrum, inferior T10 centrum, inferior T11 centrum, both surfaces of the T12 centrum, both surfaces of the L1 centrum, and on the inferior L2 centrum. The superior L2 centrum, and the rest of the lumbar centrum were absent. This suggests compression through the spinal column during adolescence.

Moderate porotic hyperostosis was identified on both parietals and on the occipital of this individual. No cribra orbitalia or periostitis was identified.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Mild to moderate attrition

Calculus: Mild calculus on the premolars, with moderate calculus on the lower second and third molars

Carries: No evidence of carries

Hypoplasia: Due to surface damage, the teeth were not scorable for hypoplasia

Additional References

Excavations.ie 2000:0360

Reg Number: 1984:34 **SMR Number:** GA055-008----

Physical Setting

Townland: Annaghkeen

County: Galway **Province:** Connacht

Year of Excavation: 1984

Monument Type: Cist Burial

Conditions of Discovery: Discovered through ploughing

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Ó Floinn, R. 2011. Annaghkeen, Co. Galway, E1068. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 194–199.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, right side, head to the South corner, one arm towards head and one arm towards legs

Associated Material: Bipartite Vase below knees, small flint blade in western corner, mussel shells, unburnt proximal ulna and radius of a juvenile pig (radius with multiple cut marks)

Dating Information: 3440 ± 70 BP (OxA-2665; human bone [collagen]; $\delta^{13}C = –22.5‰$), calibrated to 1937-1537 cal BC (calibrated at 2σ); Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1984:34

The remains were well to moderately preserved, with the majority of skeletal areas represented. The skull was fragmentary, represented by the fragmentary frontal, parietals, temporals, and occipital. Both the sphenoid and maxilla were partial, with the left mandible partial and the right mandible fragmentary. The shoulder girdle was represented by the shaft of the left clavicle, partial left scapula, and the fragmentary remains of the right clavicle and scapula. The thorax consisted of a partial sternal body, 11 right rib fragments, 11 unsided rib fragments, fragments of three cervicale vertebrae, and partial to good preservation of all thoracic and lumbar vertebrae. The pelvic girdle was represented by partial left ilium, partial left ischium, complete right ilium, and poorly preserved right ischium. Both acetabula were partial. The lower limbs consisted of complete femora, poorly preserved patellae, complete left tibia, the shaft of the left fibula, and the fragmentary right

tibia. The hands were represented by the left scaphoid and trapezoid; the right scaphoid, triquetrum, trapezium, and hamate; partial left MC2, partial right MC2, partial right MC3, along with 4 unidentified metacarpals and 13 hand phalanges. The left foot was represented by the poorly preserved talus, poor calcaneus, partial cuboid, partial navicular, poor medial cuneiform, partial intermediate cuneiform, partial lateral cuneiform, and the poorly preserved 1-4 metatarsals. The right foot was represented by a partial talus, poor calcaneus, partial cuboid, partial lateral cuneiform, and the proximal section of metatarsal 4 and 5. Two unidentified metatarsals and seven phalanges were noted.

The left femoral shaft is a replica, associated with the radiocarbon dating before the development of AMS dating. The associated epiphyses are original. The right petrous bone was taken for aDNA analysis.

Age and Sex

Due to no evidence of fusion of the long bones, this individual was identified to have been an adolescent. Based on teeth eruption, a refined age-at-death of 13-15 $\pm$ 2.5 years was estimated. As this individual was an adolescent, no sex estimation was undertaken.

Skeletal Pathology

No evidence of porotic hyperostosis was identified on the flat bones of the cranium, although there was significant damage to the outer table of the bone. This individual was not scorable for cribra orbitalia as neither of the orbits were preserved. There was no evidence of periostitis in this individual.

Dentition

PU	P	MP	P	MP	P	P	P	MP	P	MP	MP	P	P	P	PU
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
PU	P	P	P	P	P	P	P	P	P	P	P	P	P	P	PU

Attrition: Mild attrition identified

Calculus: Mild calculus was identified on all of the present teeth, with the exception of 47

Caries: There was no evidence of either caries or dental abscesses in this individual

Hypoplasia: Hypoplasia was identified in this individual, with both lower canines and the lower right first premolar displaying multiple light lines

Reg Number: 1931:167.1-2 **SMR Number:** GA084-045----

Physical Setting

Townland: Carrowntober East

County: Galway **Province:** Connacht

Year of Excavation: 1931

Monument Type: Cist Burial

Conditions of Discovery: Quarrying

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Mahr, A. 2011. Carrowntober East, Co. Galway, E1071. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 200–216.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, right side, head to the Southwest facing South

Associated Material: Bipartite Vase, two flint scrappers, cremation, animal bone

Dating Information: Inhumation dated to 3755 ± 30 BP (GrN-11354; human bone), calibrated to 2285–2040 cal BC (calibrated at 2σ); Cremation dated to 3670 ± 40 BP (GrN-24168; human bone [carbonate]), calibrated to 2195–1939 cal BC (calibrated at 2σ); Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1931:167.1-2

The remains of this individual were well preserved, with good skeletal region representation. The age-at-death was estimated to be adolescent, with a refined age-at-death estimate of 14-18, based on dental development and fusion. Based on the morphology of the pelvis this individual was estimated to be female. However, as this individual was a non-adult, this will be included in the analysis as a possible female.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

PE	P	P	P	P	MP	MP	MP	MP	MP	MP	P	P	P	P	P

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	~~41~~	31	32	33	34	35	36	37	38
CA	P	P	P	P	MP	P		MP	MP	MP	P	P	P	P	PU

No attrition was identified, mild calculus was noted on premolars. No enamel hypoplasia identified.

Reg Number: 2013:124 **SMR Number:** GA095-061----

Physical Setting

Townland: Kilcornan

County: Galway **Province:** Connacht

Year of Excavation: 1948

Monument Type: Flat Cemetery

Conditions of Discovery: Sand Quarrying

Total Burials: 3 **Total Inhumations:** 1

Excavation Report: NMI Files

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.94)

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: South, Southeast/North, Northwest

Body Position: Crouched, right side, head to the West and facing South

Associated Material: Bipartite Vase, placed at the back of the skull

Dating Information: N/A

Comments: Six pieces of cremated bone were found with the remains, likely belonging to the remains from Grave 2.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 2013:124.2; 124.3

The remains of this individual were moderately to well preserved, with good skeletal region representation. The skull was represented by a complete left frontal, poor right fontal, complete left parietal, fragmentary right parietal, complete temporals, complete occipital, complete sphenoid, complete right zygomatic, poor maxillae, complete palatines, poor nasals, partial right lacrimal, partial internal nasal conchae, partial ethmoid, and a partial vomer. The shoulder girdle was complete. The thorax was represented by nine left ribs, ten right tibs, eight unsided rib fragments, six mostly complete cervical neural arches representing C1-C2 and C4-C7, 15 partial thoracic neural arches, six thoracic centrums, three partial lumbar neural arches, and four partial lumbar centrums. The pelvic girdle consisted of a complete left ilium, poor left ischium, poor left pubis, complete right ilium, and complete right ischium. The left acetabulum was partial. The upper limb was represented by a complete left humerus, proximal and shaft portion of the left ulna, proximal and shaft portion of the left radius, poor right humerus, complete right ulna, and a fragmentary right radius. The lower limb consisted of a complete left femur, poor left tibia, shaft of left fibula,

poor right femur, shaft of right tibia, and the shaft of the right fibula. There were four partial epiphyses. The hands were represented by the shafts of the left metacarpals and the shafts of right MC1 and MC3-MC5; there were five hand phalanges. The feet were absent.

Age and Sex

Based on the dental formation, this individual was identified to be a child, with a refined age-at-death of three years, plus or minus one year. As this individual was a non-adult, sex estimation was not undertaken.

Stature

The metrics of the long bones suggest an age-at-death of 2.5 years to 3.5 years, consistent with the stage of dental development.

Skeletal Pathology

A circular to D shaped patch of highly spiculated bone was identified on the left parietal along the lambdoid suture. This area measured 45.25mm x 40.66mm and was located 32.32mm from the lambda. A corresponding area of porosity was identified on the occipital. An area of highly spiculated bone was also identified on the right parietal, although this area had received more taphonomic damage. This area measured 64.65mm x 42.52mm, however the taphonomic damage could have masked the identifiable bony changes. Areas of porosity were also identified in both orbits, on the hard palate, on the greater wings of the sphenoid, the maxilla, the mandible, and in the supraspinous fossae of both scapulae. There was some taphonomic damage to the greater wings of the sphenoid and the posterior portion of the maxilla which reduced the visibility of the porosity. No porosity was identified on the epiphyseal portions of the long bones, however taphonomic damage did obscure some of these regions.

Based on the diagnostic criterion outlined in Geber and Murphy (2012, pp.515–516), the pattern of bony changes in this individual match the diagnosis of probable scurvy, as some of the lesions required for a definite diagnosis were missing (such as porosity on the mandibular rami).

Dentition

													PU			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
		PU					PU						PU			
			P	P	P	P	MP	MP	MP	MP	P	P				
			55	54	53	52	51	61	62	63	64	65				
			85	84	83	82	81	71	72	73	74	75				
			P	P	MP	MP	MP	MP	P	MP	P	P				

Attrition: Attrition was mild

Calculus: No calculus was identified

Caries: No caries was identified

Hypoplasia: No hypoplasia was identified

Photos









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Additional References

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum*, 3(2), 7-20.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139

Waddell J. 1974/1975. The Bronze Age burials of County Galway. Journal of the Galway

Reg Number: 1928:381.1 **SMR Number:** GA095-152----

Physical Setting

Townland: Moyveela

County: Galway **Province:** Connacht

Year of Excavation: 1928

Monument Type: Mound Cemetery

Conditions of Discovery: Partially exposed capstone identified during Ordnance Survey

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Sea, S. 1935. The Moyveela (Co. Galway) skeleton. *Journal of the Galway Archaeological and Historical Society*, 16(3/4), 182-185.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Unrecorded

Body Position: Unrecorded, likely crouched

Associated Material: Bipartite Vase, 123 pieces of cremated bone (possible infant), 50 animal bones (possible juvenile pig)

Dating Information: 3755 ± 35 BP (GrN-12273; human bone [collagen]; $\delta^{13}C = -21.37‰$), calibrated to 2288-2115 cal BC (74.8%) and 2100-2037 cal BC (20.7%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Comments: Cremated and animal remains found co-mingled with the individual. There is no mention of these in the excavation report

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1928:381.1

The remains of this individual were moderately to well preserved, with good skeletal region representation. The skull consisted of a complete left frontal, poor right frontal, complete left parietal, poor right parietal, complete left temporal, poor right temporal, complete left occipital, poor right occipital, partial sphenoid, complete left zygomatic, complete left maxillae, partial right maxilla, poor nasal bones, partial ethmoid, partial mandible. The shoulder girdle consisted of complete right clavicle and partial scapulae. The thorax was represented by the complete manubrium, partial sternal body, fragments of 7 left ribs, fragment of 11 right ribs, 35 unsided rib fragments, fragmentary C1-C7, fragmentary T3-T7, complete T8-T12, and complete L1-L5. The pelvic girdle consisted of the complete left ilium, partial left ischium, partial left pubis, complete right ilium, complete right ischium, and partial right pubis. The left acetabulum was absent, the right acetabulum was partial, the

sacrum was unfused and consisted of S1-S4. The upper limb was represented by the shaft of the left humerus, poor left ulna, poor left radius, shaft of the right humerus, fragmentary right ulna, and fragmentary right radius. The lower limb consisted of the distal portion of the left femur, poor left patella, proximal and shaft portion of the left tibia, distal portion of the right femur, poor right patella, and the distal and shaft portion of the right tibia. The hands were represented by the left complete scaphoid and capitate; the right complete scaphoid, trapezoid, capitate, distal and shaft of MC1, and the proximal and shaft of MC4. One unidentified metacarpal was located, along with 5 proximal, 5 middle, and one distal phalanges. The feet were represented by the left partial calcaneus, navicular, medial cuneiform, and proximal portion of MT2-MT4; right complete talus, partial calcaneus, partial cuboid, partial navicular, poor medial cuneiform, complete MT1, proximal portion of MT2 and MT4, and the proximal and shaft portion of MT5. Two unidentified tarsals and one unidentified metatarsal was located, along with 5 phalanges.

Age and Sex

Based on tooth formation and fusion, this individual was estimated to be an adolescent, with a refined age-at-death of 12-14. As this individual was not an adult, no sex estimation was undertaken.

Skeletal Pathology

DJD was absent. Cribra orbitalia, porotic hyperostosis, and periostitis were absent.

Dentition

PU	P	P	P	P	P	P	P	MP	P	P	P	P	P	P	
~~18~~	17	16	15	14	13	12	11	21	22	23	24	25	26	27	~~28~~
~~48~~	47	46	45	44	43	42	41	31	32	33	34	~~35~~	36	37	~~38~~
PU	P	P	P	P	P	P	P	P	P	P	P	PU	P	P	PU

Retained 75, with root reabsorbing; 35 present within tooth crypt

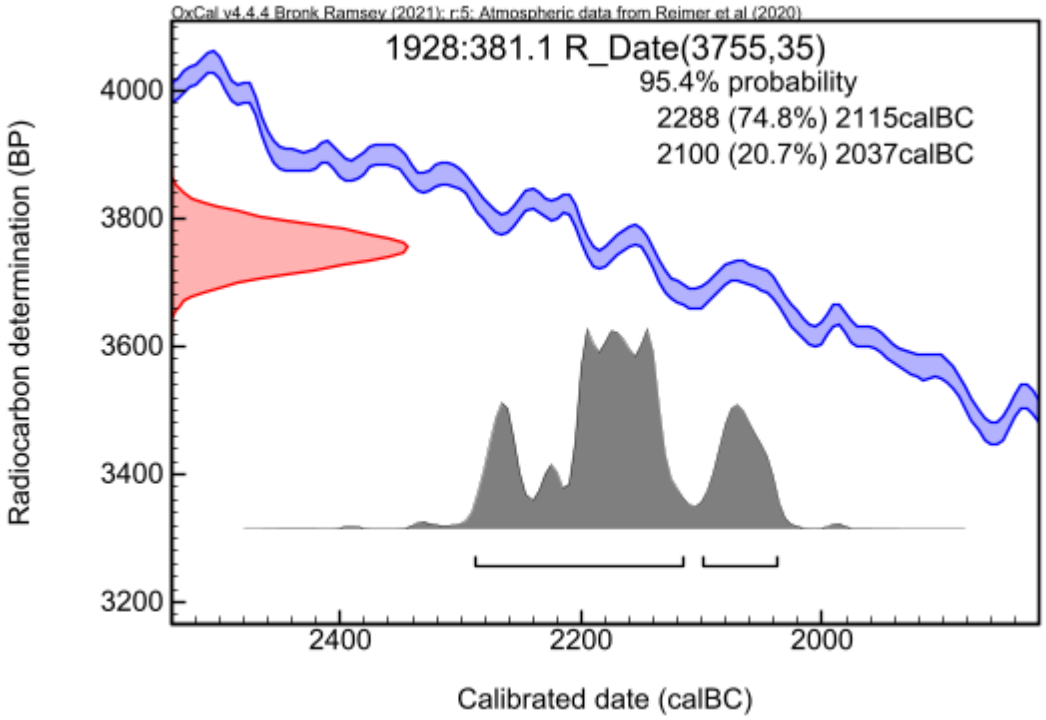
Attrition: Mild attrition was identified

Calculus: Mild calculus was identified on all dentition present

Caries: No caries identified

Hypoplasia: Hypoplasia was absent

Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.86)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.94)

Reg Number: E2873 **SMR Number:** N/A

Physical Setting

Townland: Ballymount

County: Kildare **Province:** Leinster

Year of Excavation: 2007

Monument Type: Pit burial

Conditions of Discovery: Road Scheme

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Hanbidge, R. 2010. *N9 / N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 5 – Resolution, Kilcullen to Moone and Athy Link Road. Final Report on archaeological investigations at Site E2873, in the townland of Ballymount, Co. Kildare*.

Description of Grave

Grave Number: Grave 1

Grave Type: Pit

Orientation of the Grave: East/West

Body Position: Crouched, right side, head to the East facing North

Associated Material: Four sherds of a Bipartite Vase, five lithics, water-rolled stone appeared to be placed on top of the skull

Dating Information: 3525 ± 30 BP (SUERC-24992; human tooth; $\delta^{13}C = -21.4‰$), calibrated to 1940-1750 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** E2873

The remains of this individual were poorly preserved, with significant surface erosion. Age-at-death was estimated to have been middle adult based on dental attrition. Due to the poor preservation of this individual, sex estimation could be undertaken.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

	P	P	P	P	P					P	P		P			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
				P	P	P	P	P	P	P	P	P	P	P	P

It is unclear how many of the tooth sockets were present. Moderate to severe attrition. Caries were identified on the upper right second molar, lower right first premolar, and on the lower left second and third molars.

Reg Number: E00978 **SMR Number:** KD023-027----

Physical Setting

Townland: Brownstown

County: Kildare **Province:** Leinster
Year of Excavation: 1935, 1943
Monument Type: Flat Cemetery
Conditions of Discovery: Quarrying
Total Burials: 8 **Total Inhumations:** 5

Excavation Report: Published
Primary Reference: Mount, C., Buckley, L. and Lynch, P. 1998. Five Early Bronze Age Cemeteries at Brownstown, Graney West, Oldtown and Ploopluck, County Kildare, and Strawhall, County Carlow. *Proceedings of the Royal Irish Academy, Section C: Archaeology, Celtic Studies, History, Linguistics and Literature*, 98C(2), 25–99.

The remains from this site became co-mingled before skeletal analysis. As such, a summary of the analysis will be presented below.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:447

The remains from this site consisted of five individuals: two young adult females, an adult male, a child with a refined age-at-death of 6-8, and an adolescent with a refined age-at-death of 12-16. Attained stature estimates of 165cm and 163cm were calculated based on femur lengths, however it is not clear which estimate should be associated with which individual.

Skeletal pathology
Cribra orbitalia was observed in the left orbit of one of the female skulls. Spina bifida occulta was observed down the length of one sacrum. Osteochondritis dessicans was observed on the proximal joint surface of the first proximal phalanx of a foot. Another first proximal foot phalanx had osteoarthritis of the distal joint surface. Unfortunately, as the bones from this site were so intermingled, it is impossible to know to which burial these foot bones belonged.

Reg Number: E00979 **SMR Number:** KD040-011----

Physical Setting

Townland: Graney West

County: Kildare **Province:** Leinster

Year of Excavation: 1953

Monument Type: Flat Cemetery

Conditions of Discovery: Quarrying

Total Burials: 4 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Mount, C., Buckley, L. and Lynch, P. 1998. Five Early Bronze Age Cemeteries at Brownstown, Graney West, Oldtown and Ploopluck, County Kildare, and Strawhall, County Carlow. *Proceedings of the Royal Irish Academy, Section C: Archaeology, Celtic Studies, History, Linguistics and Literature*, 98C(2), 25–99.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched; Crouched

Associated Material: Ribbed Bowl placed near the skull; a second inhumation with a Necked Bowl placed near the skull, along with sheards of a shouldered Bowl

Dating Information: (P1953:3a dated to 3638 ± 46 BP (UB-3987; human bone [collagen]), calibrated to 2172-1889 cal (calibrated at 2σ); P1953:3b dated to 3595 ± 34 BP (UB-3988; human bone [collagen]), calibrated to 2112-1883 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:3a

The remains of this individual were well preserved, with moderate skeletal representation and some surface erosion. Age-at-death was estimated to be adult, with a sex estimation of male. Attained stature was estimated to be 165cm, calculated from the length femur.

Skeletal Pathology

Mild DJD was identified on the acetabula and on the 7th and 8th right ribs. Mild DJD was identified on T3-T5, with Schmorl's on T7-T8, and T10. A small smooth exostosis was identified on the lateral surface of right fibula.

Periostitis and cribra orbitalia were absent, porotic hyperostosis was not scorable.

Dentition

P	P	P	P	P	MP	MP	MP	MP	MP	MP	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild to moderate attrition. Mild to moderate calculus. Enamel hypoplasia was identified on the lower incisors and canines, the lower left first premolar, the upper left canine, and the upper left first premolar.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:3b

The remains of this individual were poorly preserved, but with good skeletal region representation. Age-at-death was estimated to be adult, with sex estimation of male. Attained stature was estimated to be 172cm, calculated from the femurs.

Skeletal Pathology
Mild DJD was identified in the right acetabulum and the right distal femur. DJD was identified in some posterior joints of the thoracic spine.

Cribra orbitalia was present in both orbits, mild porotic hyperostosis was identified on the occipital and both parietals. Periostitis was absent. Enamel hypoplasia was not scorable.

Description of Grave

Grave Number: Grave 3
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Crouched, left side, head to the West facing South
Associated Material: Sheards of a Bowl vessel
Dating Information: 1430 ± 32 BP (UB-3989; human bone [collagen]), calibrated to 562-660 cal AD (calibrated at 2σ); date anomalous

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:31

The remains of this individual were moderately preserved, with moderate skeletal region representation. Age-at-death was estimated to be older adult, with sex estimated to be male. Attained stature was estimated to be 174cm, calculated from the length of the femurs.

Skeletal Pathology

Mild DJD was identified on the right acetabulum, right patella, and left patella, distal femoral, left wrist, and left elbow. Areas of eburnation were identified on the medial surface of the left patella, and the proximal left MC1. Fusion was identified through the T10/T11 disc. Schmorl's nodes were identified in the lower thoracic vertebrae.

DISH was identified, with fusion through the right side of T7-T9. Alongside this there was ossified insertions on the iliac crest and ischium, on the linea aspera of the right femur, and several costal cartilages had ossified. This can occur with age but is probably also affected by DISH, which makes bone formation more likely. Possible early stages of Paget's identified on right distal femur.

Periostitis was absent, cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

		P	P	P	P	P	MP	P	P	P	P	P	P	P	MP
~~18~~	~~17~~	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	34	35	36	37	38
											P	P	P	P	P

Moderate to severe attrition, mild to moderate calculus. Caries were identified on the crowns of the upper second premolars, upper left first premolar, and the upper left canine. Enamel hypoplasia identified on the upper second incisors and the left canines.

Reg Number: 1939:1142,1143 **SMR Number:** KD028-054----

Physical Setting

Townland: Halverstown

County: Kildare **Province:** Leinster

Year of Excavation: 1938-1939

Monument Type: Flat Cemetery

Conditions of Discovery: Unrecorded

Total Burials: 6 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Raftery, J. 1940. Bronze Age burials at Halverstown, Co. Kildare. *Journal of the Royal Society of Antiquaries of Ireland*, 10(1), 57-61.

Description of Grave

Grave Number: Burial 4

Grave Type: Pit Burial

Orientation of the Grave: N/A

Body Position: Crouched, right side

Associated Material: Decayed organic material, possibly representing a body covering.

Dating Information: N/A

Comments: Mentioned in the NMI Files as not being curated with Burials 5 and 6. Analysed by a different Anatomy Professor from Trinity than the other two inhumations.

Human Remains

Curation Location: Unknown

Poorly preserved. Female adult, age-at-death of 25-40. Retained metopic suture.

Description of Grave

Grave Number: Burial 5

Grave Type: Pit Burial

Orientation of the Grave: N/A

Body Position: Crouched, facing East

Associated Material: Fragments of charcoal and parts of a right ox femur

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1939:1142

The remains of this individual were well preserved, with good skeletal region representation. The skull was very well preserved, complete except for some slight damage to the lacrimal bones, the internal nasal conchae, ethmoid, and vomer. The hypoid was absent. The shoulder girdle consisted of the medial and shaft portion of the right clavicle, and a mostly complete scapula. The thorax was represented by a partial manubrium, five left rib fragments, nine right rib fragments, one unsided rib fragment, complete C1-C3, complete C5, partial C6 and C7, partial T1 and T2, two partial upper thoracic vertebrae, one partial middle to lower thoracic vertebra, partial T12, partial L1, and partial L4 and L5. The pelvic girdle consists of partial left ischium, partial left pubis, complete right ilium, complete right ischium, and poor right pubis. The right acetabulum was complete, the sacrum was complete. The upper limb was represented by the distal and shaft portion of the left humerus, complete right humerus, proximal and shaft portion of the right ulna, and the fragmentary right radium. The lower limb was represented by the complete left femur, complete left tibia, complete right fibula, complete right femur, complete right tibia, and the poor left fibula. The hands consisted of the left poor scaphoid, triquetrum, capitate, hamate, proximal and shaft potion of MC2 and MC3, poor MC4 and MC5, five proximal phalanges, and one middle phalanx; right poor capitate, hamate, poor MC1-MC3, fragmentary MC4, poor MC5, five proximal phalanges, two middle phalanges, and one distal phalanx. The feet were absent.

Moderately robust humeri, strong lesser trochanters and glutaeal lines in both femurs.

Age and Sex

This individual was identified as an adult. The post cranial skeleton suggest that this individual was a young adult, with an estimated refined age-at-death of 23-35. However, the skull suggests an older individual. The coronal suture is starting to fuse, the sagittal suture is partly obliterated, lambdoid is closed but not fused, the squamosal is quite open, and the identified significant levels of attrition. While these are more suggestive of a late middle to early old adult, these could also be associated with premature closure of the sutures and an offset bite, which is supported by the significant angling of the attrition seen in the dentition.

Based on the morphology of the supraorbital ridges, mastoid process, nuchal crest, mental protuberance, gonial flare, central arc, subpubic concavity, ischiopubic ramus ridge, and the sciatic notch, this individual was estimated to be male.

Stature

There was an observable difference in the maximum length of the femora, with the left (47.8 cm) 1 cm longer than the right (49.9 cm). This resulted in an attained stature estimate of 175.17 ± 3.94 or 173.03 ± 3.94 cm dependant on which femur was used. A stature estimate of 173.62 ± 4.00 cm was obtained from the maximum tibial length measurement of 37.7 cm (for both left and right).

Non-metric traits

Changes to the right posterior border of the right glenoid suggest that this individual might have been right arm dominate.

Trauma

A healed oblique greenstick fracture to the right proximal 5th phalanx was observed. The fracture line was predominantly palmer, slightly below the medial edge of the head of the phalanx, before traveling proximally toward the lateral edge. It resulted in the formation of a small callus on the medial side, and a slight angling of the head laterally.

Skeletal Pathology

Evidence of torsion, likely occurring during development, was identified in both femora (the left more than the right), and the right tibia. This could be associated with the length disparity in the femora, and is likely causal to the DJD identified in the left knee.

As mentioned, DJD was observed in this individual. The right medial clavicle showed mild DJD and some porosity. Moderate DJD was identified in the left distal femur, with mild DJD observed in the left proximal tibia.

Mild lipping was identified on the inferior border of the C3 centrum. Mild DJD was identified in the right inferior articular facet of C5 and the right superior articular facet of C6. Moderate DJD, including porosity was identified in the right inferior facet of T12, with mild DJD in the left inferior facet. The right superior facet of L1 showed mild DJD, along with the L4 left superior fact, both left L5 facets, and the inferior right inferior L5 facet. Schmorls nodes were identified on both sides of one of the partial upper thoracic vertebrae, both sided of the T12 centrum, and the inferior centrum of L1. Bony changes to the centrum of S1 were identified.

Periostitis and cribra orbitalia were both absent. Porosity was observed on the occipital, but with damage to the outer table on the parietals and frontal, the presence of porotic hyperostosis could not be confirmed.

Dentition

	LA	LA	MP	P	P	MP	MP	MP	MP	MP	P	P	MP	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
LA	LA	LA	P	P	P	P	MP	MP	MP	P	P	MP	LA	LA	

The areas of the lost right molars had healed over completely, on both the mandible and the maxilla. The area of molar loss of the left mandible had not healed, suggesting that this was a more recent area of tooth loss

Attrition: Severe attrition, including complete loss of the crown surface, was identified on all but the lower right second incisor and canine teeth, which had moderate attrition. All attrition was noticeably asymmetrical, suggesting that the mandible sat 'inside' the dental arch of the maxillae

Calculus: Due to the level of attrition and taphonomic damage to the remaining tooth surfaces, calculus was not scorable

Caries: No caries were identified on the surviving teeth, there were no abscesses identified. however there was severe alveolar reabsorption around the surviving premolars and molars, which might have masked any evidence for abscesses.

Hypoplasia: Due to the level of attrition and taphonomic damage to the remaining tooth surfaces, hypoplasia was not scorable

Description of Grave

Grave Number: Burial 6
Grave Type: Pit Burial
Orientation of the Grave: N/A
Body Position: Crouched, facing East, one hand supporting the head
Associated Material: Bowl placed behind the head
Dating Information: 3520 ± 70 BP (OxA-2666; human bone [collagen]; $\delta^{13}C = –22.5‰$), calibrated to 2033-1669 cal BC (94.1 %) and 1656-1635 cal BC (1.4%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020]); Brindley stage 3 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1939:1143

The remains of this individual were moderately to poorly preserved, with significant fragmentation and surface damage. The skull consisted of a total of 28 fragments, from

which three fragments of frontal, multiple smaller fragments of parietal, two fragments of temporal, three fragments of occipital, partial right zygomatic, two fragments of maxillae, and two fragments of mandible were identified. The shoulder girdle was represented by the shafts of the clavicles and the fragmentary remains of the scapulae. The thorax consisted on 13 unsided rib fragments, complete C1 and C2, three partial cervical vertebrae, seven thoracic neural arch fragments, two thoracic body fragments, four lumbar neural arch fragments, and 3 lumbar centrum fragments. The pelvic girdle consisted on the left partial ilium. The left acetabulum was partial, S1 was partial. The upper limb was represented by the fragmentary right humerus, proximal and shaft portion of the right ulna, fragmentary right radius. The lower limb was represented by the proximal portion of the right femur, fragmentary right tibia, and fragmentary right fibula. There were 48 unidentified long bone fragments, including 5 shaft fragments from either the radius, ulna, or fibula. The hand consisted of the poor right scaphoid, one unsided first metacarpal, seven unidentified metacarpals, and nine phalanges. The feet consisted of two unidentified tarsals, one unsided metatarsal, five unidentified metatarsals, and one phalanx.

Age and Sex

Based on dental attrition, this individual was identified to be a middle adult. The morphology of the mental protuberance was slightly male, but the morphology of the supraorbital shape, mastoid process, gonial flare, and the sciatic notch were all more female. As such, this individual is estimated to be a possible female. The femoral head measurement of 47.41 mm is intermediate.

Skeletal Pathology

Due to the fragmentation, DJD, periostitis, and porotic hyperostosis were all not scorable. Moderate cribra orbitalia was identified in the right orbit. The left orbit was not scorable.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	~~34~~	~~35~~	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

The upper left canine has become twisted, sitting lingually compared to the rest of the teeth. This was resulted in the upper left second incisor also not sitting in the standard position

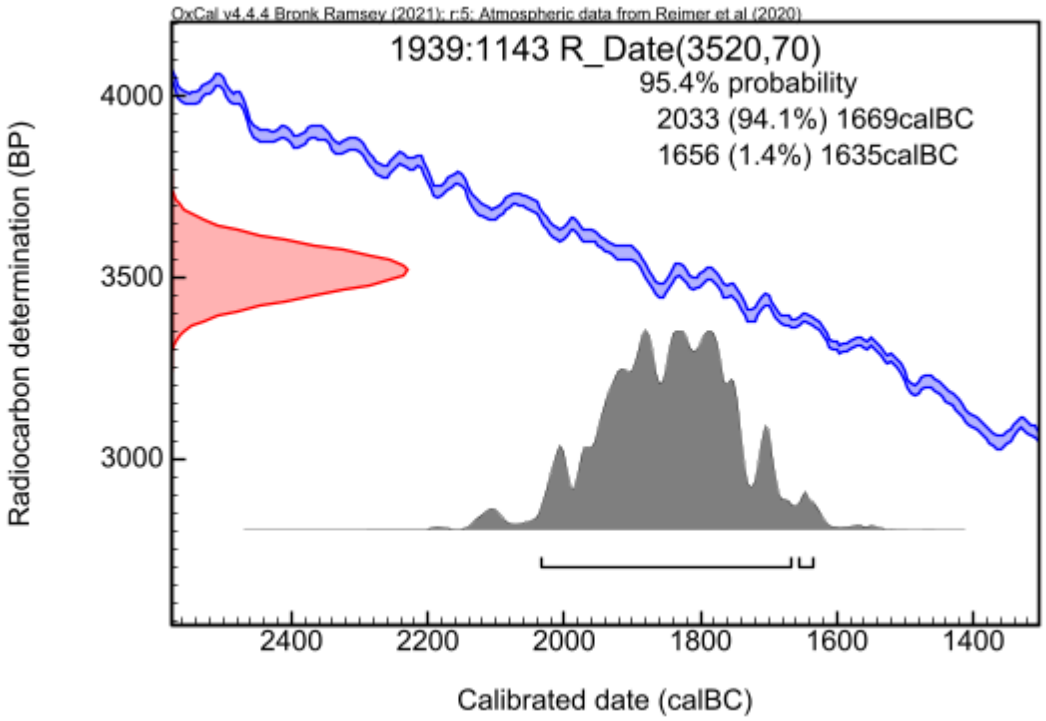
Attrition: Moderate attrition was identified, in the majority of teeth, with moderate to severe in the upper first incisors, and mild attrition on the third molars

Calculus: While calculus was not scorable, there was noticeable alveolar reabsorption.

Caries: No caries were identified

Hypoplasia: Hypoplasia was not scorable

Calibration curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.59)

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum*, 3(2), 7-20.

Ó Ríordáin, B., and Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age*. Galway: Galway University Press. (p.114)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.98)

Reg Number: 1949:84 **SMR Number:** KD020-015001-

Physical Setting

Townland: Hempstown Commons

County: Kildare **Province:** Leinster

Year of Excavation: 1949

Monument Type: Cist Burial

Conditions of Discovery: Uncovered by a bulldozer on a farm

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Hartnett, P. 1950. A crouched burial at Hempstown Commons, Co. Kildare*. Journal of the Royal Society of Antiquaries of Ireland,* 80(2), 193-198.

Description of Grave

Grave Number: Grave 1

Grave Type: Trapezoidal Cist, paved, decorated under surface of capstone

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, left side, hands towards knees, head rolled to Northwest corner

Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1949:84

The remains of this individual were well preserved, with good skeletal region representation. The skull was complete, except for some damage at the left zygomatic process and some damage to the lacrimal bones and the internal nasal conchae. The shoulder girdle was represented by complete left clavicle, fragmentary left scapula, complete right clavicle, and partial right scapula. The thorax consisted of poor manubrium, poor sternal body, a total of 16 left rib fragments representing ten ribs, a total of 20 right rib fragments representing eleven ribs, complete C1, partial C2, complete C4, partial C5 and C6, complete C7, eleven complete thoracic vertebrae, and complete lumbar vertebrae. The pelvic girdle was complete except for a partial right ilium. Both acetabula were complete, the sacrum was complete. The upper limb was complete. The lower limb was represented by complete left femur, complete left patella, poor left tibia, distal and shaft portion of the left fibula, complete right femur, complete right patella, complete right tibia, and the distal and shaft potion of the right fibula. The hands consisted of the left complete MC2-MC4, two proximal phalanges, two middle phalanges; right complete MC1, poor MC2, proximal and shaft portion of MC5, three proximal phalanges, and one middle phalanx. The feet consisted of the left complete talus, complete calcaneus, complete MT1, complete MT3-MT5, the

proximal and distal phalanges of the first toe, one addition proximal phalanx; the right complete talus, complete calcaneus, complete cuboid, partial navicular, poor MT1, proximal and shaft portions of MT3-MT5, and one proximal phalanx.

Age and Sex

Based on the completed fusion, dental eruption, level of dental attrition, and the morphology of the auricular surface and the pubic symphysis, this individual was suggested to be a late young adult to early middle adult; with a refined age-at-death estimate of 30-40. The morphology of the supraorbital ridge, mastoid process, ascending ramus, gonial flare, ventral arc, subpubic concavity, and ischiopubic ramus ridge support a sex estimation of male.

Stature

An attained stature estimate of 171.13 ± 3.93 cm for this individual was based on a maximum femur length of 46.1 cm (maximum length for both femurs). An average of the maximum length of the tibiae (left 37.9 cm, right 38.3 cm) of 38.1 cm resulted in a stature estimate of 174.63 ± 4.00 cm.

Skeletal Pathology

Diffuse mild DJD was identified in this individual. Mild DJD was identified on the left distal femur, left patella, right acetabulum, and right distal femur. Mild DJD was also identified on both occipital condyles, the C2 dens articulation, the right inferior C6 articular facet, left inferior T9 facet, both inferior T10 facets, both superior T11 facts, the right inferior T11 facet, right inferior T12 facet, left superior L2 facet, left superior L3 facet, left superior L5 facet, the right inferior L5 facet, both superior lumbarised S1 facets, and the inferior left lumbarised S1 facet.

Schmorls nodes were identified on the superior centrum surface of T5, superior centrum surface of T8, inferior centrum surface of T9, superior centrum surface of T10, superior centrum surface of L1, both surfaces of the L3 centrum, and inferior centrum surface of L4.

This individual had an unusual fusion of the sternum, with the first segment of the sternal body fusing to the manubrium. As the other segments of the sternal body fused together, this still resulted in then the standard number of sternal parts.

It was noted that one cervical vertebra and one thoracic vertebra were not present. This was noted as unusual due to the preservation level of the rest of the vertebrae. While it is possible that one cervical vertebra and one thoracic vertebra were taken or lost either during antiquity or around discovery, it is also possible that one or both of these vertebrae could have been congenitally missing. This is particularly true for the thoracic vertebrae, as all of the vertebrae articulated neatly together, leaving no identifiable point where the

missing vertebrae would have been. The concept of a congenitally absent thoracic vertebrae is somewhat supported by the complete and neat lumbarisation of S1, which would have resulted in the standard number of vertebrae in the spinal column.

Spina bifida occulta was identified in this individual, with the neural arches of S5, S4, and S3 had not developed, with the neural arch of S2 developing, however with an area of non-fusion through the spinous process. The neural arch of S1 has developed, however with an area of non-fusion in the right lamina. While the non-development of the sacral neural arches up to S2 is considered borderline Spina Bifida Occulta, the border-shifting that resulted in the lumbarisation of S1 does suggest that this case could be considered to be open up to S1.

Dentition

P	P	P	P	P	P	MP	MP	MP	MP	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	MP	P	P	P	MP	MP	P	P	P

Attrition: Moderate attrition was seen on the first molars and the present first incisors, with the rest of the dentition having mild attrition

Calculus: Moderate calculus was identified on all present teeth

Caries: No caries were identified

Hypoplasia: No hypoplasia was identified

Photo



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Additional References

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.98)

Reg Number: 1937:2746 **SMR Number:** KD020-016----

Physical Setting

Townland: Hempstown Commons

County: Kildare **Province:** Leinster
Year of Excavation: 1937
Monument Type: Cist burial
Conditions of Discovery: Quarrying
Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: Price, L. and Danaher, K. 2011. Hempstown Commons, Co. Kildare, E1082. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 221–223.

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, right side
Associated Material: None reported
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1937:2746

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be adult, with a sex estimation of possible female based on metric analysis.

Skeletal Pathology
Mild DJD and a schmorl's node was noted on the superior centrum of a lumbar vertebrae.

Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Reg Number: E2980 **Licence Number:** E002980

Physical Setting

Townland: Moone

County: Kildare **Province:** Leinster
Year of Excavation: 2007
Monument Type: Flat Cemetery
Conditions of Discovery: N9/N10 Road Scheme
Total Burials: 19 **Total Inhumations:** 16

Excavation Report: Unpublished
Primary Reference: Hackett, L. 2010. *N9 / N10 Kilcullen to Waterford Scheme: Phase 3, Kilcullen to Carlow. Archaeological Services Contract No. 6 – Resolution, Moone to Prumplestown. Final Report on archaeological investigations at Site E2980, in the townland of Moone, Co. Kildare.*

Description of Grave

Grave Number: Grave 1
Grave Type: Pit
Orientation of the Grave: East/West
Body Position: Crouched, left side, facing South
Associated Material: Unworked quartz; grave fill contained cattle ulna, pig metacarpal, two unidentified animal bone fragments
Dating Information: 3745 ± 30 BP (SUERC-24984; human bone; $\delta^{13}C$ = –20.6‰), calibrated to 2280-2250 cal BC (5.7%), 2230-2220 cal BC (1.2%), and 2210-2030 cal BC (88.5%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 10

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be infant, with a refined age-at-death of 2 ± 8 months, based on dental development and eruption. As this individual was a non-adult sex estimation was not undertaken

Skeletal Pathology
Bilateral non-specific periostitis was identified on the proximal diaphyses of the humeri, femora and tibiae. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

		PU											PU			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
													PU			
			P	P	P	P	P	P	P	P	P	P				
			55	54	53	52	51	61	62	63	64	65				
			85	84	83	82	81	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~				
			P	P	P	P	P	P	P	P	P	P				

Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 2
Grave Type: Pit
Orientation of the Grave: East/West
Body Position: Crouched, left side, facing South
Associated Material: Sheards of a Tripartite Bowl found by head; grave fill contained cattle, large mammal, red deer, and unidentified animal bone fragments
Dating Information: 3715 ± 30 BP (SUERC-24974; human bone; $\delta^{13}C$ = –20.7‰), calibrated to 2200-2020 cal BC (95.4%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 3

The remains of this individual were well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death of 30-35, based on the morphology of the auricular surface and pubic symphysis. Sex was estimated as female based on the morphology of the skull, pelvis, and metric analysis. Attained stature was estimated as 167cm, calculated from a maximum length measurement of 447mm from the left femur and 369.5mm from the left tibia.

Skeletal Pathology
Moderate DJD identified on two right ribs. Mild DJD was identified on the left superior processes of L1-L4 and S1. Severe DJD of the inferior centrum of L5 and superior centrum of S1. Schmorl's nodes identified on L1-L4.

Periostitis and porotic hyperostosis was absent. Cribra orbitalia was not scorable.

Dentition

									P		P				
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P	P	P	P	PM	P	P	P	P	P	P	P	P	P	P

Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 3
Grave Type: Pit
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, left side, facing Southwest
Associated Material: Grave contained the remains of a child in the arms of an adult; metacarpal of a pig in grave fill
Dating Information: SK 1 was dated to 3695 ± 30 BP (SUERC-24972; human bone; $\delta^{13}C$ = –21.1‰), calibrated to 2200-2160 cal BC (6.5%), 2150-2010 cal BC (85.4%), and 2000-1970 cal BC (3.6%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 1

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death estimate of 25-35, based on the morphology of the auricular surface and dental attrition. Sex was estimated as female based on the morphology of the skull, sciatic notch, and metric analysis. Attained stature was estimated as 165.74cm, calculated from a maximum length measurement of 452mm from the right femur.

Skeletal Pathology
Mild DJD was identified on two left ribs and three right ribs. Schmorl's nodes were identified on the centrum of T10, and L1-L4.

Cribra orbitalia was identified in the left orbit, with mild porotic hyperostosis identified on both parietals. Periostitis was absent.

Dentition

PM	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
P	P	P	P	P	PM	P	P	P	P	P	P	P	P	P	P	

Enamel hypoplasia was identified on both first upper incisors, upper left canine, upper left second and third molars, lower left premolars, lower right premolars, lower right first molar, and the lower right third molar.

Human Remains

Curation Location: Unreported **Reg:** SK 12

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 6-8, based on dental development and eruption. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Periostitis was not scorable. Cribra orbitalia and porotic hypoplasia were absent.

Dentition

	PU	PE				PU	PE	PE	PE				PE			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
CA	MP	PE	PU	PU	PU	PE	PE	PE	PE	PU	PU	PU	PE	PU	CA	
			P	P	P					P	P	P				
			55	54	53	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65				
			~~85~~	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~				
			P	P	MP					P	P	P				
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Enamel hypoplasia identified on the upper adult incisors

Description of Grave

Grave Number: Grave 4
Grave Type: Pit
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, left side, facing southeast
Associated Material: Ribbed Tripartite Bowl behind skull, bronze awl found in two pieces (one half at the head the other at the wrist of the right hand), fragment of a flint core, overshot flint flake, chert core, red flint flake blank, flint core, quartz hammerstone, piece of haematite or limonite, sandstone polisher with staining placed under the right knee, shale honestone placed under the right ankle
Dating Information: 3695 ± 30 BP (SUERC-24976; human bone; $\delta^{13}C = –20.9‰$), calibrated to 2200-2160 cal BC (6.5%), 2150-2010 cal BC (85.4%), and 2000-1970 cal BC (3.6%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 5

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be middle adult, with a refined age-at-death estimate of 35-45, based on the morphology of the auricular surface and dental attrition. Sex was estimated as female based on the morphology of the skull, sciatic notch, and metric analysis. Attained stature was estimated as 165.74cm, calculated from the left femur.

Skeletal Pathology
Mild DJD on the glenoid cavity on both scapulae, on the medial and lateral aspects of the right clavicle. Moderate DJD identified on three left ribs, left acetabulum. DJD identified on all cervical vertebrae, T1, T11-T12, L1-L5 and S1. Severe Schmorl's nodes on T12, L1-L4.

Moderate porotic hyperostosis was identified on the frontal and both temporals. Periostitis and cribra orbitalia were absent.

Trauma
Healed mid-shaft fracture of the right radius and ulna.

Dentition

LA	LA	P	LA	LA	LA	LA	P	P	LA	LA	LA	P	P	LA	LA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
LA	LA	LA	P	P	P	LA	LA	LA	LA	P	P	LA	LA	LA	LA

Significant toot loss, with severe attrition. Caries identified on the distal side of the upper right first molar.

Description of Grave

Grave Number: Grave 5
Grave Type: Pit
Orientation of the Grave: North/South
Body Position: Crouched, left side, head to the South facing West
Associated Material: Ribbed Tripartite Bowl in front of skull, leaf-shaped thin projectile rough out (possibly an unfinished or apprentice piece), minimally retouched inner flint flake (thought to be an apprentice's piece), the distal fragment of a finely retouched plano-convex knife blade or elongated projectile point, a unifacially retouched chert artefact fragment, two debitage flakes, Cattle skull fragment and teeth
Dating Information: 3685 ± 30 BP (SUERC-24981; human bone; $\delta^{13}C$ = –20.6‰), calibrated to 2200-2170 cal BC (3.0%) and 2150-1960 cal BC (92.4%) (calibrated at 2σ); Brindley stage 1 Bowl

Human Remains

Curation Location: Unreported **Reg:** SK 7

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be adolescence, with a refined age-at-death estimate of 13-15, based on dental development and eruption. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Moderate cribra orbitalia was identified in both orbits, with mild porotic hyperostosis identified on the left parietal. Periostitis was absent.

Dentition

P	P	P	P	P	P	P	MP	P	P	P	P	P	P	P	P
18	17	16	15	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	24	25	26	27	28
48	47	46	45	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	CA

Mild calculus on the lower left dentition.

Description of Grave

Grave Number: Grave 6
Grave Type: Pit
Orientation of the Grave: North/South
Body Position: Crouched, right side, facing West
Associated Material: Ribbed Tripartite Bowl behind skull
Dating Information: 3685 ± 30 BP (SUERC-24982; human bone; $\delta^{13}C$ = –20.6‰), calibrated to 2200-2170 cal BC (3.0%) and 2150-1960 cal BC (92.4%) (calibrated at 2σ); Brindley stage 1 Bowl

Human Remains

Curation Location: Unreported **Reg:** SK 8

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death estimate of 17-25, based on the morphology of the auricular surface and dental attrition. Sex was estimated as male based on the morphology of the skull and metric analysis. Attained stature was estimated as 189 cm, calculated from a maximum measurement of 536mm from right femur.

Skeletal Pathology
Mild DJD identified on the right superior process of T7. Schmorl's nodes on T8 and T10.

Periostitis, cribra orbitalia and porotic hyperostosis was absent.

Dentition

CA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	CA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild attrition and mild calculus identified. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 7
Grave Type: Pit
Orientation of the Grave: East/West
Body Position: Crouched, left side, facing Southwest
Associated Material: Fragments of Ribbed Tripartite Bowl, five sherds of a Bowl vessel, marine shell with perforation
Dating Information: 3680 ± 30 BP (SUERC-24983; human bone; $\delta^{13}C$ = –20.8‰), calibrated to 2190-2180 cal BC (1.5%) and 2150-1960 cal BC (93.9%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 9

The remains of this individual were moderately well preserved, with moderate skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 3-5, based on dental development, eruption, and fusion. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

		PU											PU			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
			PU										PU			
			P	P	P	P	P	P	P	P	P	P				
			55	54	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	63	64	65				
			85	84	83	82	81	71	72	73	74	75				
			P	P	P	P	P	P	P	P	P	P				

Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 8
Grave Type: Pit
Orientation of the Grave: North/South
Body Position: Crouched, left side, facing South
Associated Material: Ribbed Bipartite Bowl in hands of individual (may have been near head originally), chert core fragment
Dating Information: 3665 ± 30 BP (SUERC-24987; human bone; $\delta^{13}C$ = –20.6‰), calibrated to 2140-1950 cal BC (95.4%) (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: Unreported **Reg:** SK 15

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death estimate of 30-35, based on the morphology of the auricular surface, pubic symphysis, and dental attrition. Sex was estimated as male based on the morphology of the skull, pelvis, and metric analysis. Attained stature was estimated as 184 cm, calculated from a maximum measurement of 512.8 mm from the right femur.

Skeletal Pathology
Mild DJD was identified on the left and right superior articular facets of T6-T9 and the right inferior articular facets of T7 and T8.

Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Moderate calculus. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 9
Grave Type: Pit
Orientation of the Grave: North/South
Body Position: Crouched, left side, facing East
Associated Material: Grave contained the remains of a child in the arms of an adult
Dating Information: SK6 was dated to 3655 ± 30 BP (SUERC-24977; human bone; $\delta^{13}C$ = –20.8‰), calibrated to 2140-1940 cal BC (95.4%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 6

The remains of this individual were well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death of 22-25, based on the morphology of the auricular surface, pubic symphysis, and dental attrition. Sex was estimated as female based on the morphology of the skull, pelvis, and metric analysis. Attained stature was estimated as 16ccm, calculated from a maximum length measurement of 356.5mm from the left tibia.

Skeletal Pathology
Mild DJD identified on the centrum of L5 and S1.

Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

CA	P	P	P	P	P	P	LA	P	P	P	P	P	P	P	CA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	~~27~~	28
48	47	46	45	44	43	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P	LA	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild calculus identified. Severe caries identified on the lower left second premolar and first molar, with a large abscess associated with 36. Enamel hypoplasia was absent.

Human Remains

Curation Location: Unreported **Reg:** SK 11

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 6-8, based on dental development and eruption. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Periostitis was not scorable. Cribra orbitalia and porotic hypoplasia were absent.

Dentition

	PU	PE				PU	PE	PE	PE				PE			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
CA	MP	PE	PU	PU	PU	PE	PE	PE	PE	PU	PU	PU	PE	PU	CA	
			P	P	P					P	P	P				
			55	54	53	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65				
			~~85~~	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~				
			P	P	MP					P	P	P				

Enamel hypoplasia identified on the upper adult incisors

Description of Grave

Grave Number: Grave 10
Grave Type: Pit
Orientation of the Grave: East/West
Body Position: Crouched, left side
Associated Material: Grave fill contained an unidentified animal tooth fragment and a fossil shell
Dating Information: 3600 ± 30 BP (SUERC-24985; human bone; $\delta^{13}C$ = –20.2‰), calibrated to 2040-1880 cal BC (95.4%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 13

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be infant, with a refined age-at-death of 2 ± 8 months, based on dental development, eruption, fusion, and metric analysis. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia and porotic hypoplasia were absent.

Dentition

								PU					PU			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
		PU							PU				PU			
			P	P	P	P	P	P	P	P	P	P				
			55	54	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65				
			85	84	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	74	75				
			P	P	P	MP	MP	P	P	P	P	P				

Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 11
Grave Type: Pit
Orientation of the Grave: East/West
Body Position: Crouched, facing South
Associated Material: Grave contained the remains of a child, a pair of fleshed adult feet, and other adult bones
Dating Information: 3625 ± 30 BP (SUERC-24986; human bone; $\delta^{13}C$ = –21.2‰), calibrated to 2130-2090 cal BC (6.0%) and 2050-1890 cal BC (89.4%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 14

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be infant, with a refined age-at-death of 1 ± 4 months, based on dental development, eruption, and fusion. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Periostitis identified on the diaphysis of the right tibia. Cribra orbitalia was not scorable. Porotic hypoplasia were absent.

Dentition

		PU				PU	PU	PU	PU				PU		
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
		PU				PU	PU	PU	PU				PU		
			PU	PU	PU	PE	PE	PE	PE	PU	PU	PU			
			~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	~~64~~	~~65~~			
			~~85~~	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~			
			PU	PU	PU	PE	PE	PE	PE	PU	PU	PU			

Enamel hypoplasia was absent.

Human Remains

Curation Location: Unreported **Reg:** SK 16

The remains of this individual were moderately well preserved, with poor skeletal region representation. Age-at-death was estimated to be adult, based on level of fusion. Sex was estimated as male based on metric analysis. This individual was represented primarily by a pair of feet.

Skeletal Pathology
Moderate DJD on the right first metatarsal (distal end) with non-polished grooves of eburnation and porosity. Corresponding proximal end of phalanx displays slight lipping and porosity.

Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Description of Grave

Grave Number: Grave 12
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, right side, facing Northwest
Associated Material: None Reported
Dating Information: 3575 ± 30 BP (SUERC-24973; human bone; $\delta^{13}C$ = –20.3‰), calibrated to 2030-1970 cal BC (90.7%), 1850-1820 cal BC (3.1%), and 1800-1780 cal BC (1.7%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 2

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 3 ± 12 months, based on dental development and eruption. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Cribra orbitalia was identified in both orbits, with porotic hyperostosis identified on the right parietal. Periostitis was absent.

Dentition

		PU			PU		PU		PU				PU		
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
													PU		
			P	P	P	P	P	P	P	P	P	P			
			55	54	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65			
			~~85~~	84	~~83~~	~~82~~	~~81~~	71	72	73	74	~~75~~			
			P	P	P	P	P	P	P	P	P	P			

Mild calculus was identified on the deciduous upper first molars and lower first incisors. Enamel hypoplasia identified on the unerupted upper right first incisor and the unerupted upper left first molar.

Description of Grave

Grave Number: Grave 13
Grave Type: Pit
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, right side, facing West
Associated Material: Cremation in chest area, small plain intact tub-shaped vessel at the back of skull
Dating Information: 3665 ± 30 BP (SUERC-24975; human bone; $\delta^{13}C$ = –20.7‰), calibrated to 2140-1950 cal BC (95.4%) (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** SK 4

The remains of this individual were well preserved, with good skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 8-10, based on

dental development and eruption. As this individual was a non-adult sex estimation was not undertaken.

Skeletal Pathology
Moderate cribra orbitalia identified in both orbits, moderate porotic hyperostosis identified on the left parietal and occipital. Periostitis was absent.

Soft tissue trauma with ossification exostosis on distal medial aspect of right femur (insertion point for adductor magnus muscle).

Dentition

CA	PU	P	PU	PU	PU	P	P	P	P	PU	PU	PU	P	PU	CA
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	~~47~~	46	45	44	43	42	41	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	36	37	38
CA	PU	P	PU	PU	PU	P	P	P	P	PU	PU	PU	P	PU	CA
			P	P	P										
			~~55~~	~~54~~	~~53~~	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P									P			

Mild calculus. Enamel hypoplasia identified on 11, 12, 14, 16, 21-24, 26-27, 33-34, 36, 46-47.

Additional References

Excavation.ie 2007:834

Reg Number: 08E0100_1 **Licence Number:** 08E0100

Physical Setting

Townland: Mullamast

County: Kildare **Province:** Leinster

Year of Excavation: 2008

Monument Type: Pit Burial

Conditions of Discovery: Road Scheme

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Troy C. 2010. Appendix 9: The osteological remains from Mullamast, Co. Kildare 08E0100. In: Hackett L, editor. *Final report on archaeological investigations at site 08E0100, in the townland of Mullamast, Co Kildare*. Unpublished archaeological report: Headland Archaeology Ltd. 76-99.

Description of Grave

Grave Number: Grave 1

Grave Type: Pit Grave

Orientation of the Grave: Northwest/Southeast

Body Position: Crouched

Associated Material: Grave fill contained hazel charcoal, stones, and burnt bone

Dating Information: Hazel charcoal from the fill dated to 3448 ± 27 BP (UBA-12023; hazel charcoal; $\delta^{13}C = –24.9‰$), calibrated to 1878-1839 cal BC (21.4%), 1829-1792 cal BC (12.4%), and 1785-1688 cal BC (66.2%) (calibrated at 2σ)

Human Remains

Curation Location: Rubicon

The remains of this individual were poorly preserved, with poor skeletal region representation. The skull consisted of a fragmentary mandible and maxillary teeth. Fragments of the femora, tibiae, and fibulae were also identified.

Age and Sex

Based on dental attrition, this individual was estimated to be a young adult, with no refined age-at-death. Due to the high fragmentation, no sex estimation was undertaken.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis was not scorable.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	42	41	31	32	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Mild attrition was identified

Calculus: Mild calculus was identified on the upper right canine, first molar, and second molar; upper left canine, first molar, and second molar; lower left canine, first molar, and second molar; and lower right canine, first molar, second molar, and third molar

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Reg Number: 1971:903 **SMR Number:** KD010-020----

Physical Setting

Townland: Newtownmacabe

County: Kildare **Province:** Leinster

Year of Excavation: 1971

Monument Type: Cist

Conditions of Discovery: Likely Quarrying

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.99)

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Northwest/Southeast

Body Position: Skull lay at Northwest end of the grave; likely crouched

Associated Material: Bowl; skull of an adult female

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1971:903

The curated material for this site consists of two skulls and one set of post-cranial remains. While Waddell makes no mention of this 'extra' skull, the NMI files reports that the site consists of a middle-aged adult male, buried in a destroyed cist with a bowl decorated with three transverse ridges and the skull of an adult female. Based on the curated material alone it is not clear which skull is consistent with the post-cranial remains. However, as one skull was identified as a young-to-middle aged adult male (henceforth referred to as skull one) and the other as a young adult of indeterminate sex (skull two respectively), it was assumed based on the NMI file report that the male skull is consistent with the post-cranial remains.

Skull one consisted of a complete left frontal, partial right partial, poor left temporal, poor left occipital, partial right occipital, and a partial sphenoid. The morphology of the neural crest, mastoid process, and supraorbital ridge suggest an estimated sex of male. Cribra orbitalia and porotic hyperostosis were not scorable.

Skull two consists of a complete frontal, complete left parietal, partial left parietal, poor left temporal, partial occipital, partial sphenoid, and partial nasal bones. The morphology of the supraorbital ridge, neural crest, and mastoid were intermediate. Open sutures suggest a young individual. Cribra orbitalia and porotic hyperostosis were not scorable.

The post cranial remains consist of the medial and shaft portion of the left clavicle, the complete right scapula, partial sternal body, five partial right ribs, one partial left rib, partial T7 and T8, complete T11, poor right ilium, partial right acetabulum, shaft of the left humerus, poor left tibia, distal portion of the left fibula, poor right femur, poor right tibia, and the right calcaneus.

Age and Sex
Based on the identification of complete fusion, this individual was identified to have been an adult. No sex estimation was undertaken.

Stature
Attained stature was estimated to have been 167.56 ± 3.94 cm based on a maximum right femur measurement of 44.6 cm. The left maximum tibia measurement of 38.3 cm and a right maximum tibia measurement of 37.4 cm suggest an attained stature of 175.39 ± 4.00 cm.

Skeletal Pathology
Mild DJD was identified on the right distal femur and one right rib fragment. Mild lipping was identified on two thoracic centrums.

An enthesopathy was identified associated with the achilles tendon. An exostosis was identified located on the lateral side of the right calcaneus, placed inferiorly to the peroneal tubercle. This exostosis forms a u-shape and had internal maximum dimensions of 78.8mm by 15.77mm, external maximum dimensions 12.3mm by 18.52mm and 7.70 mm proud of the bone surface. This exostosis is associated with the tendons of the *fibularis longus* and *brevis* muscles, which plantarflex and evert the foot.

No periostitis was identified.

Photo



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Additional References

Ó Ríordáin, B., and Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age*. Galway: Galway University Press. (p.114)

Raftery, J. 1971. Prehistoric burial at Newtownmacabe. *Journal of the County Kildare Archaeological Society*, 15, 19-22.

Reg Number: E00980 **SMR Number:** KD023-026----

Physical Setting

Townland: Oldtown

County: Kildare **Province:** Leinster

Year of Excavation: 1955

Monument Type: Flat Cemetery

Conditions of Discovery: Quarrying

Total Burials: 5 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Mount, C., Buckley, L. and Lynch, P. 1998. Five Early Bronze Age Cemeteries at Brownstown, Graney West, Oldtown and Ploopluck, County Kildare, and Strawhall, County Carlow. *Proceedings of the Royal Irish Academy, Section C: Archaeology, Celtic Studies, History, Linguistics and Literature*, 98C(2), 25–99.

Description of Grave

Grave Number: Burial 1

Grave Type: Pit

Orientation of the Grave: N/A

Body Position: Crouched, head to the Northwest

Associated Material: Sherds of a Ribbed Bowl

Dating Information: 3565 ± 43 BP (UB-3986; human bone [collagen]; $\delta^{13}C = –21.30‰$), calibrated to 2035-1775 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1955:83

The remains of this individual were moderately preserved, with fragmentation of the skull. Age-at-death was estimated to be young adult, with sex estimated to be female. Attained stature was estimated to be 162cm, calculated from the femora.

Skeletal Pathology

Periostitis and cribra orbitalia were absent, porotic hyperostosis was not scorable.

Dentition

								MP	MP	MP	P	MP	MP	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	~~41~~	~~31~~	32	33	34	35	36	37	38
MP	MP	MP	MP	MP	MP	MP			MP	MP	P	P	P	MP	MP

Attrition was mild, calculus was mild. Enamel hypoplasia was identified on the lower first molar, and upper second molar.

Description of Grave

Grave Number: Burial 2
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Disturbed
Associated Material: Sheards of a Bipartite Vase and a small Vase Urn
Dating Information: 3666 ± 41 BP (UB-3985; human bone [collagen]; $\delta^{13}C$ = –21.59‰), calibrated to 2192-1937 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1955:84

The remains of this individual were moderately preserved, with moderate skeletal region representation. *Age-at-death was estimated to be middle adult, with sex estimated to be female.*

Skeletal Pathology
Mild DJD on C2-C4, and T5. Severe DJD on C7 and T1.

Periostitis and cribra orbitalia were not scorable. Porotic hyperostosis was absent.

Dentition

												P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	25	26	27	28
~~48~~	~~47~~	46	45	44	43	42	41	31	32	33	34	35	36	37	38
		P	MP	MP	P	P	P	MP	MP	MP	P	P	P	P	CA

Moderate to severe attrition, with moderate to severe calculus. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Burial 3
Grave Type: Stone-lined Pit
Orientation of the Grave: N/A
Body Position: Crouched, left side
Associated Material: Cremation placed on and around the lower limbs, Tripartite Bowl in front of face
Dating Information: Inhumation dated to 3655 ± 35 BP (GrN-11902; human bone [collagen]; $\delta^{13}C$ = –21.0‰), calibrated to 2141-1928 cal BC (95.4 %) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1955:88

The remains of this individual were well preserved, with good skeletal region representation but some fragmentation. Age-at-death was estimated to be middle adult, with sex estimated to be female. Attained stature was estimated to be 167cm, calculated from the femora.

Skeletal Pathology
Moderate to severe DJD on the distal femora, patellae, and proximal tibia. DJD identified on the proximal right MC1.

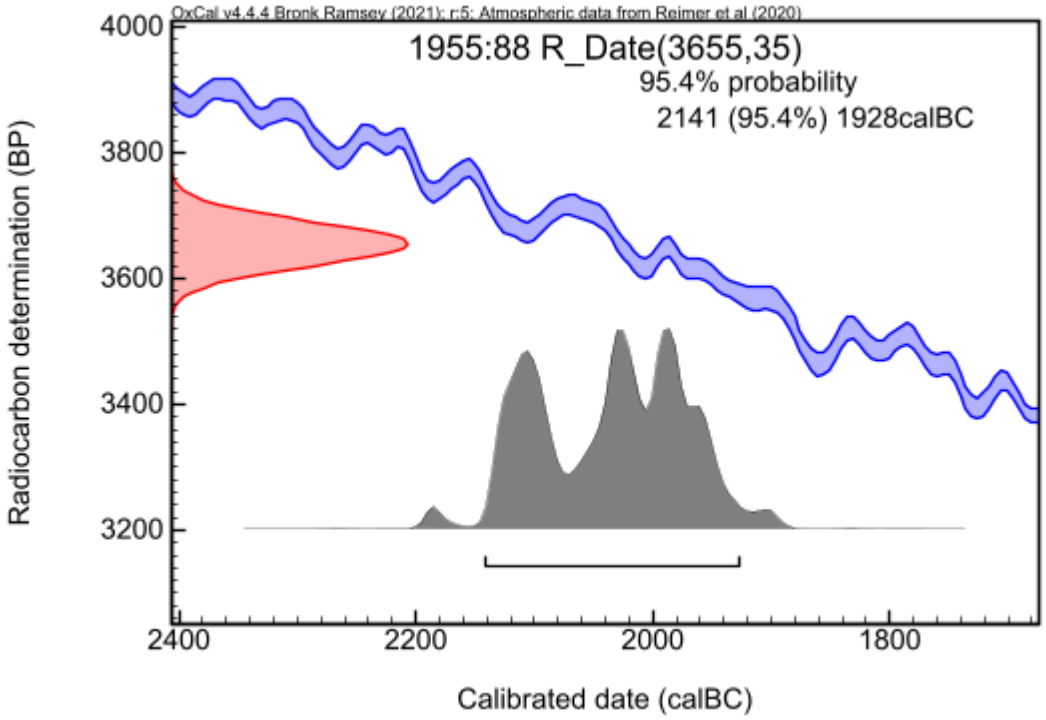
Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

	P	P	P	P		P	P	P	P	P	P	P	P	P	P	P
~~18~~	17	16	15	14	~~13~~	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild to moderate attrition, moderate to severe calculus. A cavity was identified on the lower right first molar. Enamel hypoplasia was identified on the upper right second molar.

Calibration Curve



Reg Number: E00981 **SMR Number:** KD019-017----

Physical Setting

Townland: Ploopluck

County: Kildare **Province:** Leinster

Year of Excavation: 1933, 1935

Monument Type: Quarrying

Conditions of Discovery: Flat Cemetery

Total Burials: 10 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: Mount, C., Buckley, L. and Lynch, P. 1998. Five Early Bronze Age Cemeteries at Brownstown, Graney West, Oldtown and Ploopluck, County Kildare, and Strawhall, County Carlow. *Proceedings of the Royal Irish Academy, Section C: Archaeology, Celtic Studies, History, Linguistics and Literature*, 98C(2), 25–99.

Description of Grave

Grave Number: Grave 3

Grave Type: Pit

Orientation of the Grave: N/A

Body Position: Crouched, facing North

Associated Material: Ribbed Bowl behind head

Dating Information: Brindley stage 1 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:546

The remains of this individual were well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death between 17-23 based on the state of fusion. Sex was estimated to be male. Attained stature was estimated to be 180cm, calculated from the femora.

Skeletal Pathology

Cribra orbitalia was identified in both orbits. Periostitis and porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild attrition and mild calculus. Caries identified on the lower right canine and the lower left second premolar. Enamel hypoplasia was identified on all teeth apart from the first molars.

Description of Grave

Grave Number: Grave 5
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Not recorded
Associated Material: None reported
Dating Information: 3735 ± 35 BP (GrN-11353; human bone [collagen]; $\delta^{13}C$ = –21.13‰), calibrated to 2282-2251 cal BC (5.5 %), 2230-2221 cal BC (0.8%), and 2210-2028 cal BC (89.2%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:548

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be adolescent based on fusion. As this individual was a non-adult, sex estimation was not undertaken.

Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

A number of skeletons were disturbed during initial quarrying before being reburied, then re-excavated. Of these skeletons, two were curated. It is unclear what form their original burials took, but they were likely pit burials.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:3-5

The remains of this individual were moderately preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with sex estimated to be male. Attained stature was estimated to be 172cm, calculated from the femora.

Skeletal Pathology
Schmorl's nodes were identified in the centrum of T7-L4.
Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

					P	P									
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	13	12	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	MP	MP	MP	MP	MP	MP	MP	MP	P	MP	P	P	P

Mild attrition and mild calculus were identified. Enamel hypoplasia was absent.

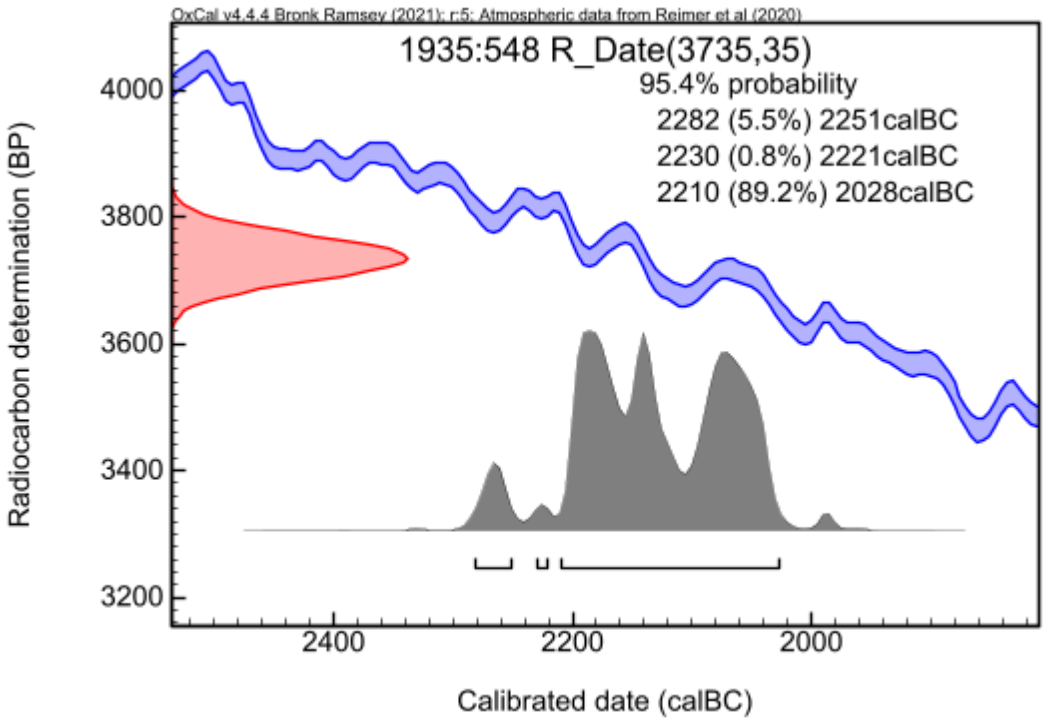
Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:6

The remains of this individual were poorly preserved, with significant surface erosion. Age-at-death was estimated to be adult, with sex estimated to be male.

Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Calibration Curve



Reg Number: 1982:355-356 **SMR Number:** KD024-057----

Physical Setting

Townland: Punchestown Great

County: Kildare **Province:** Leinster

Year of Excavation: 1981

Monument Type: Cist Burial

Conditions of Discovery: Ploughing

Total Burials: 4 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Kelly, E.P. and Mullarkey, P. 2011. Punchestown Great. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 224–227.

Description of Grave

Grave Number: Burial 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, individuals placed back to back

Associated Material: Cremated remains of two individuals

Dating Information: N/A

Comments: Buried in the same grave, the inhumed remains became somewhat mixed. During analysis, it was identified that the skulls had become associated with the incorrect post-cranial remains due to the age-at-death difference between the individuals. Presented below is the corrected analysis

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1982:355

The remains of this individual were well preserved, with good skeletal region representation. The skull consisted of complete frontal, complete parietals, complete temporals, complete occipital, complete sphenoid, complete zygomatics, complete maxillae, complete left palatine, partial right palatine, complete nasal bones, poor lacrimal bones, poor internal nasal conchae, poor ethmoid, complete vomer, poor left mandible, and complete right mandible. The shoulder girdle consisted of the complete left clavicle, fragmentary left scapula, poor right clavicle, and fragmentary right scapula. The thorax was represented by the partial sternal body, fragmentary remains of nine left ribs, fragmentary remains of 10 right ribs, 18 unsided rib fragments, complete C2-C4, complete C7, complete T1-T3, partial T4-T6, complete T8-T12, and partial L5. The pelvic girdle consisted of complete

left ilium, fragmentary left ischium, and the fragmentary left pubis. The left acetabulum was partial. The upper limb was represented by the distal and shaft portion of the left humus, complete right humerus, complete right ulna, and the poor left radius. The lower limb consisted of the complete left femur, complete left patella, complete left tibia, poor left fibula, poor right femur, complete right tibia, and complete right fibula. The hands were represented by the left trapezium; right scaphoid, lunate, triquetrum, pisiform, trapezium, trapezoid, capitate, hamate, MC1-MC3, and one phalanx. The feet were absent.

Age and Sex

Based on the fusion of the medial clavicle and the morphology of the auricular surface, this individual was estimated to be a young adult, with an estimated age-of-death of 25-35. The morphology if the sciatic notch and the supraorbital ridge suggest an estimated sex of possible female.

Stature

An estimated attained stature measurement of 169.94 ± 3.73 cm was obtained from maximum femur measurement of 46.9 cm for the left and 47.6 cm for the right, with a maximum tibia measurement of 39 cm for the left and 39.3 cm for the right resulting in an estimated attained stature measurement of 174.63 ± 3.66 cm.

Non-metric Traits

Mis-fusion of the sternal body

Skeletal Pathology

Mild DJD was identified in the left acetabulum, left proximal femur, left distal femur, right distal femur, and right proximal tibia. Mild DJD was identified in the right inferior T2 facet, left inferior T8 facet. Moderate DJD was identified on both superior L5 facets. Mild lipping was identified on the inferior surface of the T8 centrum, the superior surface of the T9 centrum, and the superior surface of the L5 centrum. Schmorls node was identified in the inferior surface of the T11 and T12 centra. Spondylolysis of the lower facets was identified in L5. Moderate lipping was identified on the right sacral-illiac joint.

Moderate cribra orbitalia was identified in both orbits. No periostitis or porotic hyperostosis was identified.

Dentition

P	P	P	P	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	MP	MP	MP	MP	MP	MP	MP	MP	MP	MP	P	P	P

Attrition: Moderate attrition was identified on the upper right second premolar, upper right first molar, lower right first molar, and lower left first molar. Mild attrition was identified on the remaining dentition

Calculus: Moderate calculus were identified on all present first and second molars, with mild calculus identified on all present third molars.

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1982:356

The remains of this individual were moderate to well preserved, with good skeletal region representation. The skull consisted of poor frontal, poor parietals, fragmentary temporals, fragmentary occipital, fragmentary sphenoid, poor maxillae, complete nasal bones, poor lacrimal bones, partial left mandible, and poor right mandible. The shoulder girdle consisted of the complete clavicles and fragmentary scapulae. The thorax was represented by the poor manubrium, partial sternal body, fragments of 11 left ribs, fragments of 11 right ribs, eight unsided rib fragments, complete C1-C2, partial C3-C7, partial T1-T2, complete T3, partial T4, complete T5-T12, and complete L1-L5. The pelvic girdle consisted of the complete left ilium, poor left ischium, complete right ilium, poor right ischium, and partial right pubis. Both acetabula were poorly preserved. The upper limb was represented by the complete left humerus, complete left ulna, fragmentary left radius, complete right humerus, complete right ulna, and poor right radius. The lower limb consisted of the poor left femur, complete left patella, complete left tibia, complete left fibula, complete right femur, complete right patella, complete right tibia, and complete right fibula. The hands were represented by the left complete scaphoid, lunate, triquetrum, pisiform, trapezoid, hamate, MC1, proximal and shaft portion of MC2, complete MC3-MC5, four proximal phalanges and one middle phalanx.; right complete scaphoid, lunate, trapezium, trapezoid, capitate, hamate, fragmentary MC1, complete MC2-MC5, and three proximal phalanges. The feet were represented by the left complete talus, calcaneus, cuboid, navicular, lateral cuneiform, intermedial cuneiform, lateral cuneiform, MT1, poor MT2, proximal and shaft portion of the MT3-MT4, poor MT5, one proximal phalanx, and one distal phalanx; right complete talus, calcaneus, cuboid, navicular, lateral cuneiform, intermedial cuneiform, lateral cuneiform, MT1-MT5; five proximal phalanges, four middle phalanges, and two distal phalanges.

Age and Sex

Based on the level of fusion (including the identification of fusion lines on the proximal humeri, distal ulnae, femoral heads, distal femora, proximal tibiae, and the fibulae; united

iliac blade, distal radii, ischial tuberosities, rib heads, and unfused medial clavicles) suggests an age-at-death estimation of adolescent, with a refined age-at-death estimate of 17-21. Sex estimation was completed on the pelvis, with the morphology of the ischiopubic ramus ridge and the sciatic notch resulting in an estimation of male.

Stature
An estimated attained stature measurement of 167.08 ± 3.94 cm was obtained from maximum left femur measurement of 44.4 cm, with a maximum left tibia measurement of 36.1 cm resulting in an estimated attained stature measurement of 169.59 ± 4.00 cm.

Non-metric Traits
Biforcated tails identified on the cervical vertebrae.

Skeletal Pathology
No periostitis, cribra orbitalia, and porotic hyperostosis was identified.

Dentition

MP	P	MP	P	P	P	MP	MP	MP	MP	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
PE	P	P	P	P	P	P	P	P	P	P	P	P	P	P	PE

The roots of the third molars have yet to close

Attrition: Mild attrition was identified across the dentition

Calculus: Mild calculus was identified on the upper left canine, premolars, and the first molar

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on the upper canines and the upper left third molar

Additional References

Excavations.ie 1980-84:0122

Reg Number: 1981:360.2; 1982:121 **SMR Number:** KD036-036----

Physical Setting

Townland: Timolin

County: Kildare **Province:** Leinster

Year of Excavation: 1981

Monument Type: Flat Cemetery

Conditions of Discovery: Ploughing

Total Burials: 2 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Ó Floinn, R. and O'Connor, N. 2011. Timolin, Co. Kildare, E1091. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 227–231.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Northwest/Southeast

Body Position: Disarticulated

Associated Material: Complete Tripartite Bowl in Northeast corner of the grave near the skull, sherds of Bipartite Bowl likely broken in antiquity

Dating Information: 3700 ± 30 BP (GrN-11364; human bone [collagen]; $\delta^{13}C = -21.14‰$), calibrated to 2200–1980 cal BC (calibrated at 2σ); Brindley stage 2 Bowls

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1981:360.2

The remains of this individual were moderately well preserved, with moderate skeletal region representation. The skull was represented by a fragmentary left frontal, fragmentary left parietal, partial right parietal, complete left temporal, poor right temporal, complete occipital, partial left sphenoid, and partial left mandible. The shoulder girdle consisted of the shaft of the left clavicle and the partial right scapula. The thorax was represented by the complete manubrium, partial sternal body, fragments of 9 left ribs, fragments of 7 right ribs, 17 unsided rib fragments, partial C1, 2 mid-cervical vertebrae, partial T1-T2, partial T4-T5, partial T7-T12, partial L1-L2, and complete L5. The pelvic girdle consisted of partial left ilium, partial right ilium, and partial right ischium. Both acetabula were partial, with the sacrum consisting of compete S1-S2 and partial S3. The upper limb was represented by the distal and shaft portion of the left humerus, complete left ulna, complete left radius, complete right humerus, proximal and shaft portion of the right ulna, and the proximal and shaft

portion of the right radius. The lower limb consisted of a poor left femur, complete left patella, poor left fibula, poor right femur, compete right patella, poor right tibia, and poor fibula. The hands were represented by the proximal and shaft of the left MC2, complete left MC3, poor left MC4, and two left proximal phalanges. The feet were represented by the left complete talus, poor calcaneus, complete cuboid, complete navicular, complete medial cuneiform, complete intermediate cuneiform, complete lateral cuneiform, complete MT1, proximal and shaft of MT2, complete MT3-MT4, poor MT4, 3 proximal phalanges; the right complete talus, partial calcaneus, partial navicular, poor MT1, proximal and shaft of MY2-MT3, and poor MT5.

Age and Sex

Based on the morphology of the left auricular surface, this individual was estimated to be a young adult, with a refined age-at-death estimate of 30-40 years. The morphology of the mastoid process, nuchal crest, and ascending ramus suggest an estimated sex of possible male.

Stature

An attained stature estimate of 173.27 ± 3.94 cm was calculated from a right maximum femur measurement of 47 cm. A right tibia maximum measurement of 39.3 cm resulted in an attained stature estimate of 177.66 ± 4.00 cm.

Skeletal Pathology

Mild DJD was identified on 2 left ribs, 1 right ribs, both proximal ulnae, left distal femur, both proximal fibulae, left distal fibula, both calcanei, both navicular bones, both proximal surfaces of MT1, and the proximal surface of the left MT5.

Mild DJD was identified on both inferior facets of the upper middle cervical vertebra, the right superior facet of the lower middle cervical vertebra, the right inferior surface of T1, the left superior surface of T2, the right inferior surface of T2, the left superior facet of T4, the right inferior facet of T7, both superior facets of T8, the right inferior facet of T8, the right superior facet of T9, both inferior facets of T10, both superior facets of T11, both left facets of T12, the right superior facet of L1, the right superior facet of L2, both inferior facets of L2, the left superior facet of L3, both inferior facets of L3, all facets in L4, the left superior facet of L5, and both inferior facets of L5. Schmorls nodes were identified on the inferior surface of the T11 centrum, the inferior surface of the L2 centrum, the inferior surface of the L4 centrum, and the superior surface of the L5 centrum.

Partial sacralisation of L5. Mild porotic hyperostosis was identified on the parietals and occipital. Cribra orbitalia was not scorable, periostitis was absent.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	37	38
														MP	P

Attrition: Mild attrition was identified on the lower left third molar

Calculus: Calculus was not scorable

Caries: An occlusal caries was identified on the lower left third molar

Hypoplasia: Hypoplasia was not scorable

Description of Grave

Grave Number: Grave 2
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Disarticulated or disturbed
Associated Material: N/A
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1982:121

The remains of this individual were poorly preserved, with moderate skeletal region representation. The skull consisted of the partial right temporal, partial occipital, and partial right mandible. The shoulder girdle consisted of fragmentary scapulae. The thorax was represented by 4 right rib fragments, 10 unsided rib fragments, one cervical vertebra fragment, two partial mid-thoracic vertebrae, 10 fragments of thoracic vertebrae, partial T12, partial L1-L4, and a possible L5 fragment. The pelvic girdle consisted of partial ilia and ischii. Both acetabula were partial, a fragment of sacrum was identified. The upper limb was represented by a fragmentary right humerus and the proximal portion of the right ulna. The lower limb consisted of the proximal portion of the left femur, the distal and shaft of the left tibia, proximal and shaft portion of the right femur, distal portion of the right tibia, and a fragmentary right fibula. The hands were represented by one unidentified metacarpal. The feet were represented by a partial left talus, partial right talus, partial right calcaneus and 2 unidentified metatarsals.

Age and Sex

Based on dental attrition and the morphology of the auricular surface, this individual was estimated to be a middle adult with a refined age-at-death estimate of over 45. This individual was identified as intermediate based on the morphology of the mastoid process, nuchal crest, and sciatic notch.

Skeletal Pathology

Mild DJD was identified on the right trochlea, right proximal ulna, and the right proximal femur. Mild DJD was identified on two middle-thoracic vertebrae, on the right inferior facet of one vertebra and the left inferior facet of the other. Mild DJD was also identified on both inferior facets of T12, the right superior facet of L1, both inferior facets of L1, both superior facets of L2, the left inferior facet of L2, the right superior facet of L3, both inferior face of L3, the right inferior face of L4. Moderate DJD was identified in the left facets of a fragmentary cervical vertebra and on the right superior facet of L4.

Cribra orbitalia and porotic hyperostosis were not scorable, periostitis was absent.

Trauma

A healed fracture was identified on a rib fragment. The fracture line was identified on the superior surface of the rib and had a maximum length of 28.2mm. A portion of the mineralised callus projected from the surface of the bone, reaching a maximum distance of 4.16mm from the surface. This projection was 8.1mm wide at the point it met the rib surface.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P	LA													

Attrition: High levels of attrition identified

Calculus: Gross calculus identified on the lower right second and third molars

Caries: No caries identified

Hypoplasia: Hypoplasia was not scorable

Photo



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Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.60)

Reg Number: 99E0203 **SMR Number:** KD036-047003-

Physical Setting

Townland: Timolin

County: Kildare **Province:** Leinster

Year of Excavation: 1999

Monument Type: Flat Cemetery

Conditions of Discovery: Road Scheme

Total Burials: 4 **Total Inhumations:** 2

Excavation Report: Unpublished

Primary Reference: Keeley, V.J. 1999. *Archaeological Investigations, Site 43, N9 Realignment, Moon-Timolin-Ballitore Hill, Co. Kildare, 99E0203*.

Description of Grave

Grave Number: Feature 6

Grave Type: Pit

Orientation of the Grave: Unrecorded

Body Position: Disarticulated/disturbed

Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 99E0203.6

This individual had fragmentary preservation, with moderate skeletal region representation. The skull was represented by 77 fragments, from which parts of the frontal, both parietals, both temporals, occipital, left zygomatic, left maxilla, and the mandible were identified. The shoulder girdle was represented by the partial left scapula, complete right clavicle, and partial right scapula. The thorax was represented by 56 rib fragments, of which 15 where rib head fragments, 8 cervical vertebrae fragments, and 43 thoracic and lumbar vertebrae fragments. The pelvic girdle consisted of the fragmentary left ilium. Both acetabula were absent. The upper limb was represented by the fragmentary left humerus, proximal and shaft portion of the left ulna, distal and shaft portion of the left radius, the distal and shaft portion of the right humerus, distal and shaft portion of the right ulna, and the shaft of the right radius. The lower limb consisted of the fragmentary left femur, fragmentary left tibia, shaft of the left fibula, fragmentary right femur, and the fragmentary right tibia. Four epiphyses were present. The hands were represented by one unidentified metacarpal and five phalanges. The feet were represented by one unidentified metatarsal.

Age and Sex

Based on dental development, this individual was estimated to have been an infant, with a refined age-at-death estimation of 5 to 7. As this individual was a non-adult, sex estimation as not undertaken.

Skeletal Pathology

No DJD, periostitis, or porotic hyperostosis was identified in this individual. Cribra orbitalia was not scorable.

Dentition

													PU			
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
		PU				PU	PU	PU	PU	PU	PU		PU			
			P	P							P	P				
			55	54	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65				
			85	84	83	82	~~81~~	~~71~~	72	73	74	75				
			P	P	P	P			P	P	P	P				

Attrition: Attrition was mild

Calculus: No calculus identified

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Description of Grave

Grave Number: Feature 7
Grave Type: Cist
Orientation of the Grave: North/South
Body Position: Crouched, right side, head South, facing West
Associated Material: N/A
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 99E0203.7

The remains of this individual were moderately to poorly preserved, with moderate skeletal region representation. The skull was represented by a poor left frontal, complete right

frontal, partial left parietal, complete right parietal, poor left temporal complete right temporal, poor left occipital, complete right occipital, poor left sphenoid, complete right sphenoid, complete right zygomatic, partial left maxilla, complete right maxilla, partial left palatine, complete right palatine, partial nasals, partial right lacrimal, partial right internal nasal concha, partial ethmoid, partial vomer, partial left mandible, and complete right mandible. The shoulder girdle consisted of the shaft of the right clavicle, and the partial right scapula. The thorax was represented by eight right rib fragments which included the first and second rib and five unsided rib fragments. The pelvic girdle consisted of the partial left ilium and the partial right ilium. The right acetabulum was partial. The upper limb was represented by the fragmentary right humerus, proximal and shaft portion of the right ulna, and the proximal and shaft portion of the right radius. The lower limb consisted of the distal abs shaft portion of the left tibia, poor right femur, poor right tibia, and the distal and shaft potion of the right fibula. There were eight large unidentified long bone fragments. The hands were represented by the left distal and shaft potion of MC2-MC3, and the poorly preserved MC5, two proximal phalanges, two intermediate phalanges, and three distal phalanges; the right partial scaphoid, poor pisiform, complete trapezium, complete trapezoid, poor capitate, complete MC1, poot MC2, proximal and shaft portion of MC3, the proximal and shaft portion of MC3, five proximal phalanges, four intermediate phalanges, and five distal phalanges. The feet were represented by the poorly preserved left and right talus, the poorly preserved left and right calcaneus, and two unidentified metatarsals.

Age and Sex

Based on attrition levels and the presence of DJD, this individual was estimated to be a middle adult, with no refined age-at-death. Based on the morphology of the supraorbital ridges, supraorbital shape, mastoid process, nuchal crest, mental protuberance, ascending ramus, gonial flare, and the sciatic notch, they were estimated to be female.

Stature

A stature estimate of 168.25 ± 3.66 cm was calculated based on the right tibial maximum measurement of 36.8 cm.

Skeletal Pathology

Mild DJD was identified in the right glenoid, right proximal humerus, right proximal femur, right distal fibula, and the right calcaneus. Moderate DJD was identified on the right humeral trochlea and the right proximal ulna; with severe DJD on the right humeral capitulum, and severe DJD including eburnation on the right proximal radius.

Dentition

P	P	LA	LA	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P	P	P	P	P	P	P	P	P	MP	P	P	P	P	P

Attrition: Moderate attrition was identified on all teeth present, except for the lower right first molar which had moderate to severe attrition.

Calculus: Calculus was not scorable for the upper right quadrant, with only the first incisor and the first premolar of the upper left quadrant scorable, both of which had moderate calculus. Only both incisors were scorable in the lower left quadrant, both of which were moderate. In the lower right quadrant, all teeth were scorable, with both incisors and the first premolar showing moderate calculus, and the remaining teeth showing gross calculus.

Caries: Distal cervical caries were identified on the second upper right molar and the second upper left premolar. Gross destruction was identified on all upper left molars.

Hypoplasia: Due to the combination of calculus and surface erosion, hypoplasia was not scorable.

Reg Number: 1992:24 **SMR Number:** KK005-086----

Physical Setting

Townland: Ardra

County: Kilkenny **Province:** Leinster
Year of Excavation: 1992
Monument Type: Cist Burial
Conditions of Discovery: Construction
Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: Ó Floinn, R. 2011. Ardra, Co. Kilkenny, E1093. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 232–235.

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Disarticulated
Associated Material: Cremation
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1992:24

The remains of this individual were moderately to poorly preserved. Age-at-death was estimated to be adult based on completed fusion and dental attrition. Sex estimation of possible male was undertaken based on metric analysis.

Skeletal Pathology
Mild DJD was identified in the right shoulder, right hip, and both knees.

Periostitis was identified on one rib. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

		P										MP	P	P	MP
~~18~~	~~17~~	16	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	25	26	27	28
48	47	46	45	44	43	42	~~41~~	~~31~~	32	33	34	35	~~36~~	~~37~~	~~38~~
P	P	MP	P	MP	P	MP			MP	P	P	MP			

Attrition was moderate, calculus was moderate. Chronic dental abbess associated with the lower right first molar. Enamel hypoplasia was absent.

Reg Number: E61 **SMR Number:** KK020-018001-

Physical Setting

Townland: Freestone Hill, Coolgrange

County: Kilkenny **Province:** Leinster

Year of Excavation: 1949

Monument Type: Mound Burial

Conditions of Discovery: Excavation

Total Burials: 15 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Raftery, B. 1969. Freestone Hill, Co. Kilkenny: An Iron Age Hillfort and Bronze Age Cairn: Excavations: Gerhard Bersu, 1948-1949. *Proceedings of the Royal Irish Academy*, 68, 1-108.

The human remains from this site were not well curated, with majority of the tags without key identification information. This meant that the post cranial remains could not be confidently matched with the crania. The registration numbers identified on the material did not match that within the excavation report, so it cannot be identified which individual was associated with which grave. As such, only the skulls are outlined below.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E61:382

Only the skull was present. The skull consisted of fragmentary frontal, fragmentary left partial, poor right parietal, partial temporals, fragmentary occipitals, and fragmentary sphenoid.

Age and Sex

Based on suture closer, this individual was estimated to be a young adult, with no refined age-at-death estimation. The morphology of the supraorbital ridge and the mastoid process suggest that this individual was possibly female.

Non-metric Traits

Retained metopic suture.

Skeletal Pathology

Cribra orbitalia and porotic hyperostosis were absent.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E61:386

This individual was highly fragmented, consisting of 13 cranial vault fragments, one zygomatic fragment, one occipital condyle fragment, one frontal fragment, more than 40 facial bone fragments, two mandible fragments, two rib fragments, one MC fragment, one vertebral fragment, and 10 unidentified bone fragments. One upper molar and three premolars were identified.

Age and Sex

Based on dental attrition, this individual was estimated to have been a middle adult. No sex estimation was undertaken.

Skeletal Pathology

Cribra orbitalia and porotic hyperostosis were not scorable.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E61:389

The remains of this individual consisted of two large skull vault fragments, partial zygomatics, partial maxillae, partial palatines, and partial mandible.

Age and Sex

Based on dental attrition, this individual was estimated to have been an old adult. No sex estimation was undertaken.

Skeletal Pathology

Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

MP	P	P	MP	MP	MP	P	MP	MP	MP	P	P	P	LA	MP	LA
~~18~~	17	16	15	14	13	12	11	21	22	23	24	25	26	27	~~28~~
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	~~37~~	~~38~~
	P	P	LA	P	P	P	P	P	P	P	P	P	P	P	

Attrition: Severe attrition was identified

Calculus: Moderate calculus was identified on the upper right second incisor and second molar, upper left canine, lower left canine and first premolar, and the lower right first molar. Gross calculus was identified on the upper right first molar, lower left second premolar, first molar, and second molar, lower right canine, first molar, and second molar

Caries: No caries identified

Hypoplasia: Hypoplasia was not scorable due to attrition

Additional References

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum*, 3(2),7-20.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.101)

Reg Number: Mor_1 **SMR Number:** LI030-104----

Physical Setting

Townland: Morenane

County: Limerick **Province:** Munster

Year of Excavation: 1950

Monument Type: Cist Burial

Conditions of Discovery: Quarrying

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Cantwell, D. 2011. Morenane, Co. Limerick. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 279–281.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, side not recorded

Associated Material: None reported

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland

The remains of this individual were moderate well preserved. Age-at-death was estimated to be young adult, with sex estimation of male.

Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition and calculus were mild. Enamel hypoplasia was absent.

Reg Number: E3976 **Licence Number:** A010/002

Physical Setting

Townland: Carn More, Dundalk

County: Louth **Province:** Leinster

Year of Excavation: 2003

Monument Type: Cist Burial

Conditions of Discovery: Road Scheme

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Hayes, A. 2007. *Archaeological Excavation of a cist burial at Site 137, Carn More 6, Dundalk, Co. Louth M1 – Dundalk Western Bypass*.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, right side, head to the South

Associated Material: Tripartite Bowl placed in front of face

Dating Information: N/A

Human Remains

Curation Location: Unreported

The remains of this individual were poorly preserved, with significant surface erosion. Age-at-death was estimated to be young adult based on dental attrition. Sex was estimated to be male based on the morphology of the mastoid process.

Skeletal Pathology

Periostitis and cribra orbitalia were not scorable. Porotic hyperostosis was absent.

Dentition

P	P	P	P	P	P	P				P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
	P	P	P	P	P						P	P	P	P	P

Mild attrition. Mild calculus. Enamel hypoplasia was identified on the upper right incisors, upper left canine, and lower right canine.

Reg Number: 98E0615 **SMR Number:** LH007-137----

Physical Setting

Townland: Crumlin

County: Louth **Province:** Leinster

Year of Excavation: 1999

Monument Type: Cist Burial

Conditions of Discovery: Construction

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Lynch, P. 1999. *Archaeological Excavations Dunleer/Dundalk Bypass, Crumlin Townland, Co. Louth, 98E0615*.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Disturbed, likely crouched

Associated Material: None Reported

Dating Information: N/A

Human Remains

Curation Location: Unreported

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death estimation of 25-35, based on fusion and dental attrition. Sex is estimated to be male based on the morphology of the skull.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

CA	P	P	P	P	P	P	P	MP	P	P	P	P	P	P	CA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
CA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	CA

Mild attrition, with mild calculus. Caries, with associated abscess, identified on the left lower second premolar. Enamel hypoplasia was absent.

Reg Number: 1996:230 **SMR Number:** MA120-078002-

Physical Setting

Townland: Ballykine Upper

County: Mayo **Province:** Connacht

Year of Excavation: 1996

Monument Type: Cairn

Conditions of Discovery: Carin disturbed exposing burial

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Gosling, P. 2011. Ballykine Upper, Co. Mayo. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 303–306.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave:

Body Position: Disturbed

Associated Material: Cremation, five sherds of a Vase, Animal Bones (rabbit?), two Hazelnut shells

Dating Information: Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1996:230

The remains of this individual were moderately well preserved, with moderate skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death estimation of 8-16, based on fusion.

Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Reg Number: 1933:970b **SMR Number:** MA100-056----

Physical Setting

Townland: Carrownacon

County: Mayo **Province:** Connacht

Year of Excavation: 1933

Monument Type: Double Cist

Conditions of Discovery: Harvard Archaeological Expedition

Total Burials: 4 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Movius, H. 1934. Bronze Age burials from Carrownacon, near Ballyglass, Co. Mayo. *Journal of the Royal Society of Antiquaries of Ireland,* 4(1), 72-85.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Disturbed but likely initially crouched

Associated Material: Report mentions 'two decayed pottery vessels', cremation burial

Dating Information: N/A

Comments: Only the skull and the cremation burials have been curated

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1933:970b

Only the skull of this individual was curated. The skull is poorly preserved, but mostly complete, consisting of a poor left frontal, complete right frontal, poor left parietal, complete right parietal, poor occipital, poor temporals, poor sphenoid, complete right zygomatic, poor left maxilla, partial right maxilla, partial palatines, partial left nasal, complete left mandible, and poor right mandible.

Age and Sex

Based on tooth attrition and suture closer, this individual was estimated to be an old adult. The morphology of the supraorbital ridge, mastoid process, and nuchal crest suggest an estimation of female.

Skeletal Pathology

Moderate, but healed, cribra orbitalia was present in the right orbit. Porotic hyperostosis was absent and periostitis was not scorable.

Dentition

MP	P	MP	P	P	P	MP	MP	MP	MP	P	P	P	P	P	
~~18~~	17	~~16~~	15	14	13	~~12~~	11	21	22	23	24	25	26	27	~~28~~
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	37	~~38~~
	P	P	P	P	P	P	P	P	P	P	P	P	P	MP	

Attrition: High attrition was identified on the dentition

Calculus: Mild calculus was identified

Caries: Occlusal caries were identified on the upper right second molar and the lower left first incisor. Distal interproximal caries was identified on the upper left second premolar, with gross tooth destruction identified on the upper left first molar.

Hypoplasia: Hypoplasia was identified on the upper canines, lower left first incisor, and lower right canine

Additional References

Flanagan L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum* 3(2):7-20

Martin, CP. 1935. *Prehistoric Man in Ireland*. London: Macmillan and Co., Ltd. (p.105)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.117)

Reg Number: 1995:88 **SMR Number:** MA111-107---

Physical Setting

Townland: Clooneen

County: Mayo **Province:** Connacht
Year of Excavation: 1995
Monument Type: Cist burial
Conditions of Discovery: Quarrying
Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: Kelly, E.P. 2011. Clooneen, Co. Mayo, E1122. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 312–316.

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Unrecorded
Associated Material: Bipartite Vase
Dating Information: 3565 ± 40 BP (GrN-24149; human bone), calibrated to 2026-1773 cal BC (calibrated at 2σ); Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1995:88

The remains of this individual were moderately preserved, with moderate skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 3-5, based on dental development and eruption. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Cribra orbitalia was identified in the left orbit, the right was not scorable. Periostitis and porotic hyperostosis was absent.

Dentition

		P											P		
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
			P										P		
			P	P	P	MP	P	P	MP	P	P	P			
			55	54	53	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P	P	P	P	MP	MP	P	P	P	P			

A small caries was identified on the lower right second deciduous molar. Enamel hypoplasia was absent.

Reg Number: 1937:3704 **SMR Number:** MA090-111----

Physical Setting

Townland: Cuillare

County: Mayo **Province:** Connacht

Year of Excavation: 1936

Monument Type: Cist Burial

Conditions of Discovery: Gravel Quarrying

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Ó Ríordáin, S. 1937. Cist burial in Cuillare Townland Co. Mayo. *Journal of the Galway Archaeological and Historical Society*, 17(3/4), 122-123.

Description of Grave

Grave Number: Grave 1, Burial 2

Grave Type: Partial Cist built atop another cist

Orientation of the Grave: Not recorded

Body Position: Disarticulated

Associated Material: N/A

Dating Information: N/A

Comments: Remains of a disarticulated partial skeleton were found on top of the primary cist, under another cover stone which in of itself was supported by two stones also resting on the cover stone of the primary cist.

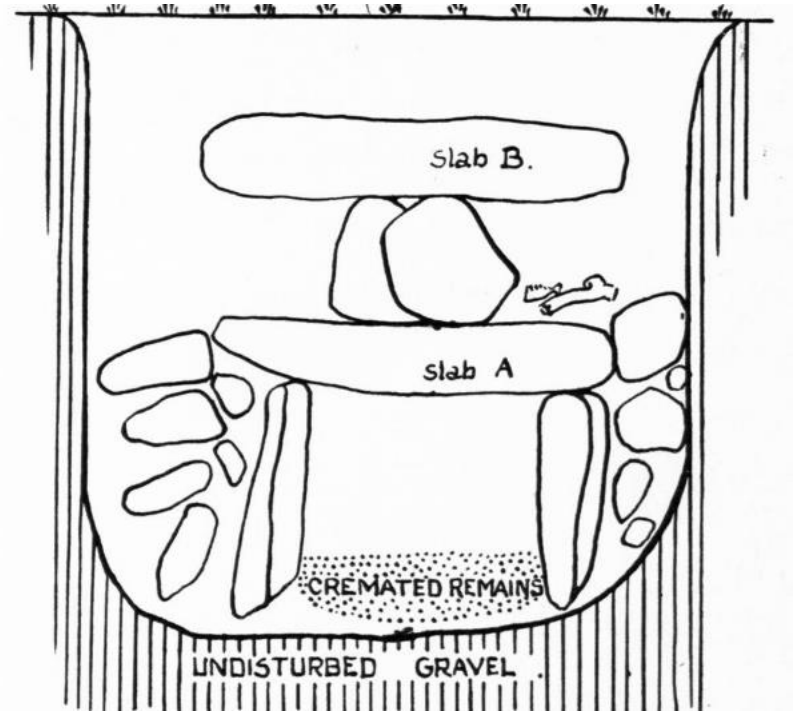


Figure 1. Section drawing of the Cuillare Cist, taken from Ó Ríordáin (1937).

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1937:3704

This individual was poorly preserved, with poor representation of skeletal regions. The skull was represented by a poor mandible and a partial left temporal. The shoulder girdle was absent. The thorax consisted of one right rib fragment. The pelvic girdle was represented by a partial left ilium and a partial left ischium; the left acetabulum was partial and the partial centrum of one sacral vertebra was present. The upper limb was absent. The lower limb consisted of the shaft portion of the left femur and a fragmentary left fibula. The hands were absent. The feet consisted of the left poor talas, partial navicular, partial medial cuneiform, and one partial proximal food phalanx.

Age and Sex

Based on dental eruption and attrition, this individual was estimated to have been an older middle adult to a younger old adult. Due to the poor preservation, sex estimation was undetermined. The anatomy report published with the excavation report identifies the individual as a male, however I am not comfortable with that estimation based on the level of preservation.

Skeletal Pathology

This individual was not scorable for DJD, periostitis, cribra orbitalia, or porotic hyperostosis.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	LA	P	MP	P	MP	MP	MP	MP	P	P	P	P	P		

Attrition: Both first molars showed severe attrition, with only a sliver of enamel remaining on the lingual surface of the tooth. The rest of the dentition had moderate attrition.

Calculus: Due to the damage to the tooth surfaces, calculus could not be scored

Caries: While no caries could be directly identified, there was a small abscess identified associated with the lower left first molar. Due to the loss of the entre crown surface, and almost all the enamel, it could not be identified the type of caries which would have resulted in this abscess.

Hypoplasia: Due to the damage to the tooth surfaces, hypoplasia could not be scored

Additional References

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.121)

Reg Number: 1935:11 **SMR Number:** MA038-133---

Physical Setting

Townland: Kinard

County: Mayo **Province:** Connacht

Year of Excavation: 1934

Monument Type: Cist Burial

Conditions of Discovery: Agricultural work

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Caulfield, P. 2011. Kinard, Co. Mayo. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 329–332.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, left side

Associated Material: Bipartite Vase in Southwest corner, mussel shells

Dating Information: 3560 ± 40 BP (GrN-24153; human bone), calibrated to 2024-1772 cal BC (calibrated at 2σ); Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:11

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death of 17-25, based on dental attrition and fusion. Sex was estimated to be possible female, based on the morphology of the skull and metric analysis.

Skeletal Pathology

Periostitis was absent. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

									MP	P	P	P	P	P	MP
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

No attrition was identified. Calculus and enamel hypoplasia could not be scored due to mineral deposits.

Reg Number: 1933:3409 **SMR Number:** MA100-145----

Physical Setting

Townland: Stonepark

County: Mayo **Province:** Connacht

Year of Excavation: 1933

Monument Type: Cist Burial

Conditions of Discovery: Antiquarian interest, previously disturbed

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Langan, S., 1934. Discovery of Cists. *Journal of the Galway Archaeological and Historical Society*, 16(1/2), 57–61.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist Burial

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, disturbed

Associated Material: Bipartite vase found in the Western half of the cist, 'curiously shaped fossil coral'

Dating Information: Brindley stage 1 Vase

Comments: Multiple other cist burials known for the surrounding townlands

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1933:3409

This individual was fragmentary, with moderate to poor skeletal region representation. The skull was represented by 23 fragments, 7 of which were large. Among the fragments, fragmentary frontal, fragmentary left parietal, fragmentary right parietal, partial right temporal. fragmentary left occipital, and a fragmentary right occipital were identified. The shoulder girdle consisted of the shaft of the left clavicle, partial left scapula, and the medial and shaft portion of the right clavicle. The thorax was represented by the partial sternal manubrium, six left rib fragments, three right rib fragments, 14 unsided rib fragments, partial C1, partial C2, partial C4, centrum of C6, poor C7, complete T1, poor T2, complete T3, partial T3, complete T4, partial T5-T6, centrum of T8, neural arch of T9, poor T10-T11, centrum of L2, partial L4-L5. The pelvic girdle consisted of the partial left ischium, partial left pubis, partial right ilium, and the partial right ischium. Both acetabula were partial, with the sacrum represented by S1. The upper limb consisted of the distal and shaft portion of the left humerus, the proximal portion of the left ulna, the shaft of the left radius, the shaft of the right humerus, and the proximal portion of the right ulna. The lower limb was

represented by the fragmentary left femur, fragmentary left tibia, shaft of the left fibula, distal portion of the right femur, and the fragmentary right tibia. There were 18 unidentified long bone fragments. The hands were absent. The feet were represented but the poor left talus, partial left calcaneus, partial right talus, partial right calcaneus, partial right cuboid, two unidentified tarsals, and one foot phalanx.

Age and Sex
Based on completed fusion, this individual was estimated to be an adult. A refined age-at-death could not be obtained for this individual. The morphology of the sciatic notch suggests that this individual was a possible male.

Stature
Due to the fragmentary nature if the long bones, stature could not be estimated.

Skeletal Pathology
Mild DJD was identified in one right medial rib facet, on the left scapula-clavicle joint, and on both acetabula. Severe DJD was identified on the left distal femur, left proximal tibia, right distal femur, and the right proximal tibia.

Mild DJD was identified on the C2 dens, the C2 left inferior facet, C7 left inferior fact, left T1 superior facet, right T2 superior facet, right T4 superior facet, left T10 inferior facet, right T10 inferior facet, and the right L4 inferior facet. Moderate DJD was identified on both left C4 facets, both right T9 facets, left T11 superior facet, right T11 superior facet, right T11 inferior facet, right L4 inferior fact, and the right L5 superior facet. Both L5 inferior facets showed severe DJD, including porosity, which could also be seen on the superior facets of S1. Mild osteophytic growth could be identified on the inferior surface of the C2 centrum, both surfaces of the C6 centrum, superior surface of the C7 centrum, inferior surface of the T8 centrum, both surfaces of the T10 centrum, and the inferior surface of the T11 centrum. Moderate osteophytic growth could be identified on both surfaces of the T4 centrum, superior surface of the T11 centrum, and both surfaces of the L2 centrum.

This individual was not scorable for periostitis, cribra orbitalia, porotic hyperostosis, or enamel hypoplasia.

Dentition
No dentition was present.

Additional References

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.112)

Reg Number: 1977:2330 **SMR Number:** ME021-010001-

Physical Setting

Townland: Betaghstown

County: Meath **Province:** Leinster

Year of Excavation:

Monument Type: Cist Burial

Conditions of Discovery: Construction

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: No detailed excavation report found

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.123)

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Unrecorded

Body Position: Crouched, head to Northeast

Associated Material: Ribbed Bowl inverted at left shoulder, two flint flakes. Identified from the skeletal material three sheep bones, two tibia epiphyses, one astragalus, mollusc shells. Fragments from an adult female(?) found in soil around cist.

Dating Information: 3745 ± 30 BP (GrN-11357; human bone [collagen]; $\delta^{13}C$ = –20.67‰), calibrated to 2281-2251 cal BC (7.2%), 2229-2222 cal BC (0.8%), and 2210-2035 cal BC (87.5%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020]); Brindley stage 1 Bowl

Comments: Might have once been covered by a mound. Iron Age flat cemetery immediately to the east uncovered in 1979.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1977:2330

The remains of this individual were well preserved, with most of the skeletal areas represented. The skull is almost complete, with just the internal nasal bones being partial. The shoulder girdle is complete. The thorax consists of a complete manubrium, partial sternal body, almost complete set of ribs, and a mostly complete spinal column; partial T9, T12, L1-L3. The pelvic girdle represented by partial left ilium and ischium, and complete right ilium and ischium. The right acetabulum is poorly preserved. All five sacral vertebra were identified. The left upper limb is complete, although the radius is poorly preserved. The right humerus is complete, and the right radius and ulna are both poorly preserved. The left lower limb consists of the shaft and distal portion of the femur, a poorly preserved

patella, complete tibia, and complete fibula. The right lower limb is represented by a complete femur, poor patella, poor tibia, and a complete fibula. The hands are mostly complete, missing five carpals (left pisiform, left trapezoid, left hamate, right pisiform, right trapezoid) and several phalanges. The feet are represented by both tali and calcanei, and four unidentified metatarsals.

The right femur of this individual is a replica, associated with the radiocarbon dating before the development of AMS dating.

Age and Sex
The level of fusion identified along with the partial eruption of the third molar suggest that this individual is a young adult, with an estimated refined age-at-death of 17-21. Based on the morphology of the supraorbital region, mastoid process, nuchal crest, and sciatic notch it is estimated that this individual was a male.

Stature
The replica right femur reconstructed to be 42.7cm long. The head of the right femur was 42.63mm in diameter. The left tibia was 36cm long. The reconstructed height of this individual based on the femur measurements is 163.04 $\pm$ 3.94 cm. The reconstructed height of this individual based on the tibia measurements is 169.34 $\pm$ 4.00 cm.

Non-metric Trait
This individual had a deviated septum.

Skeletal Pathology
Mild lipping was identified on the inferior right facet of C4 and the superior right fact of T8. Mild Schmorl's nodes identified on T11, L4 and L5.

Mild porotic hyperostosis was identified on the left frontal, and both parietal bones. There was some outer table damage to the skull, particularly the right side, which reduced bone for scoring. No cribra orbitalia or periostitis identified.

Trauma
The right humerus has a series of seven parallel cut marks on the proximal anterior surface. The seven parallel marks start just below the epiphysis, with the most proximal cut extending onto the epiphysis. The upper most three cuts are deeper than the lower four cuts. While the possibility that these cuts are post-mortem damage cannot be excluded, the fact that one extends onto the epiphysis does suggest that these occurred while the body was fully articulated and before the epiphyseal cartilage had decomposed. Comment from a zooarchaeologist present when skeletal analysis was completed remarked that these are

similar to butchery marks commonly seen on animal bones. The position of this series of cuts is unusual.

Dentition

	P	P	P	P	P	P	P	MP	P	P	P	P	MP	P	PE
~~18~~	17	16	15	14	13	12	11	21	22	23	24	25	26	27	~~28~~
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	37	~~38~~
	P	P	P	P	P	P	P	P	P	P	P	P	P	P	

There was no room in the maxilla or mandible for the third molars. The upper left third molar is erupting out of the posterior maxilla, superiorly to the tuberosity.

Attrition: Mild attrition identified, with moderate attrition on the first incisors and first molars.

Calculus: Mild calculus was identified on all but the incisor teeth.

Caries: No caries identified

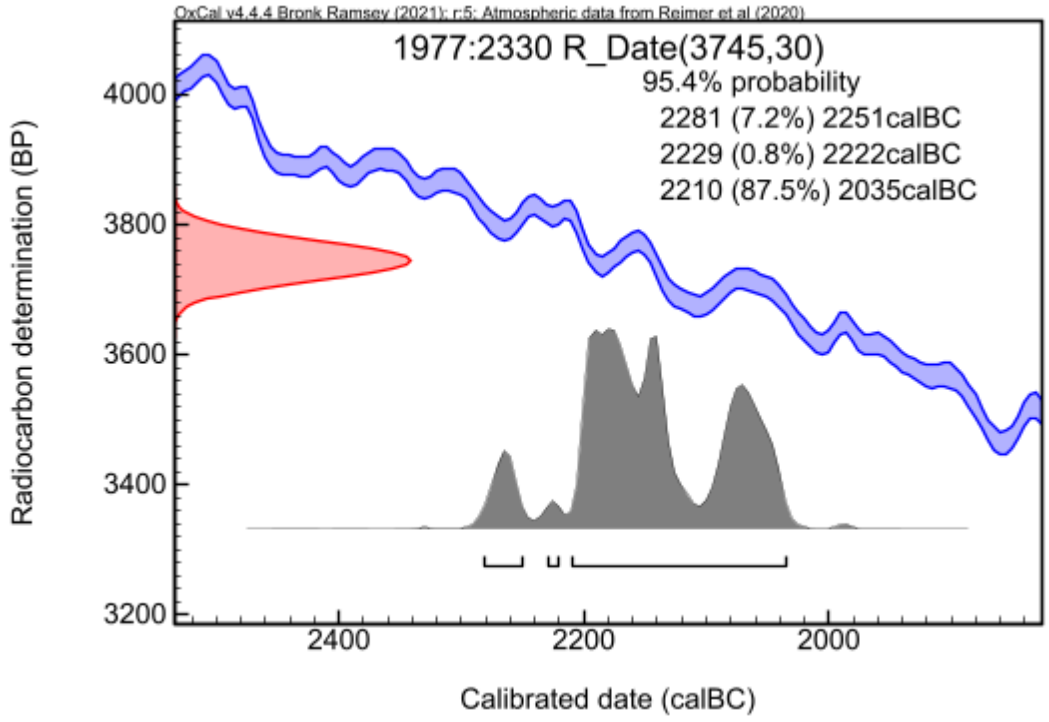
Hypoplasia: Although there was taphonomic damage to the enamel of multiple teeth, hypoplasia was identified on the upper right canine, the lower right canine and second molar.

Photo



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Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.61)

Kelly, E. 1987/1988. Excavations Bulletin 1977-1979: Summary Account of Archaeological Excavations in Ireland. *Journal of Irish Archaeology,* 4, 75.

Moore, M. 1987. *Archaeological Inventory of County Meath.* Dublin: Stationary Office. (p.37)

Ó Ríordáin, B., and Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age.* Galway: Galway University Press (p.123)

Excavations.ie 1977-79:0056

Reg Number: 1985:15 **SMR Number:** ME016-030---

Physical Setting

Townland: Crossakeel

County: Meath **Province:** Leinster

Year of Excavation: 1983

Monument Type: Cist Burial

Conditions of Discovery: Land Clearance

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Cahill, M. 2011. Crossakeel, Co. Meath, E1132. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 349–352.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Disturbed

Associated Material: None reported

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1985:15

The remains of this individual were poorly preserved, with good skeletal region representation. Age-at-death was estimated to be middle adult, based on the morphology of the costal cartilage. Sex was estimated to be possible male based on metric analysis. Attained stature was estimated to be 176cm, calculated from the length of the femur.

Skeletal Pathology

Mild DJD was identified on the olecranon of the right ulna. Moderate DJD was identified on the centrum of L3 and inferior surface of the centrum of L4. Severe DJD was identified on the superior surface of the centrum of L4 and L5.

Periostitis and cribra orbitalia were not scorable. Porotic hyperostosis was absent.

Dentition

P	P	P		P			P	P	P	P	P	P	P	P	P
18	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	~~41~~	~~31~~	~~32~~	33	34	35	36	37	38
P	P	P	P	P	P	MP				P	P	P	P	P	P

Mild to moderate attrition. Calculus and enamel hypoplasia was not scorable due to flaking enamel.

Reg Number: E18:1-144 **SMR Number:**

Physical Setting

Townland: Fourknocks II

County: Meath **Province:** Leinster

Year of Excavation: 1951

Monument Type: Neolithic Tomb

Conditions of Discovery: Excavation

Total Burials: 5 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: Hartnett, P., and O'Sullivan, W. 1971. The excavation of two tumuli at Fourknocks (Sites II and III), Co. Meath. *Proceedings of the Royal Irish Academy,* 71, 35-89.

Description of Grave

Grave Number: Burial 1

Grave Type: Cist

Orientation of the Grave: Northeast/Southwest

Body Position: N/A

Associated Material: Fragments of charcoal

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E18:128

The remains of this individual were in a very poor condition, consisting of 12 fragments of skull vault and numerous smaller bone fragments. Seven teeth were identifiable, with fragments of two more.

Description of Grave

Grave Number: Burial 2

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, right side, head South, facing North

Associated Material: Fragments of cremated bone and charcoal, possible fragments of pottery, bronze awl, flint flake, plano-convex flint blade, hazelnut shell

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E18:142.1

The remains of this individual were moderately well preserved, with good skeletal region representation. The skull consisted of poor frontal, poor parietals, complete temporals, fragmentary occipital, fragmentary sphenoid, partial left zygomatic, partial maxillae, partial nasal bones, poor left mandible, complete right mandible, and complete hypoid. The shoulder girdle consisted of the shafts of both clavicles and fragmentary scapulae. The thorax was represented by a fragmentary manubrium, 16 left rib fragments representing 11 ribs, 11 right rib fragments representing 11 ribs, 45 unsided rib fragments, complete C1-C4, partial C5-C7, complete T1, partial T2-T4, complete T5, partial T6, complete T7, partial T8-T12, complete L1-L3, and partial L4-L5. The pelvic girdle consisted of fragmentary ilia, fragmentary left ischium, poor right ischium, partial right pubis, and S1 and S2. The left acetabulum was fragmentary, the right partial. The upper limb was represented by fragmentary humeri, poor left ulna, complete left radius, fragmentary right ulna, and poor right radius. The lower limbs consisted of fragmentary femora, partial left patella, poor left tibia, complete right patella, complete right tibia, and fragmentary fibulae. The hands were represented by the left partial scaphoid, complete lunate, complete triquetrum, poor capitate, partial hamate, distal potion of MC1, poor MC2-MC5, 3 proximal phalanges, and 1 middle phalanx; the right complete lunate, poor capitate, poor MC2, shaft of MC3, distal and shaft of MC4, proximal portion and shaft of MC5, 4 proximal phalanges, one middle phalanx, and 3 distal phalanges. The feet consisted of the left poorly preserved talus, calcaneus, cuboid, navicular, complete medial cuneiform, poor lateral cuneiform, complete MT1, fragmentary MT2, poor MT3, proximal and shaft of MT4-MT5, 3 proximal phalanges, and one distal phalanx; right complete talus, poor calcaneus, complete cuboid, poor navicular, poor medial cuneiform, poor intermediate cuneiform, poor distal cuneiform, poor MT1, distal and shaft of MT2, poor MT3, proximal and shaft of MT4, complete MT5, 5 proximal phalanges, and one middle phalanx.

Portion of the right ulna sampled for radiocarbon dating, portion of the right temporal sampled for aDNA analysis.

Age and Sex

Based on attrition and morphology of the auricular surface, this individual was estimated to be an old adult, with a refined age-at-death of 45 and over. The morphology of supraorbital ridges, mastoid process, mandible, and sciatic notch indicate a sex estimation of female.

Stature

Attained stature estimate of 169.99 ± 3.66 cm was obtained from maximum tibia measurements of 37.4 cm for the left and 37.2 cm for the right.

Non-metric Traits
Retained metopic suture.

Skeletal Pathology
Mild DJD was identified in the right glenoid, left proximal humerus, both trochlae, both proximal ulnae, left proximal radius, left distal radius, right acetabulum, left proximal femur, left distal femur, right proximal tibia, both distal tibiae, right distal fibula, left scaphoid, both capitates, left distal MC1, left proximal MC4, 1 proximal surface of a proximal phalanx, 2 distal surfaces of proximal phalanges, one proximal surface of a distal phalanx, right calcaneus, right navicular, both cuboids, left lateral cuneiform, left proximal MT1, right distal MT1, right proximal MT4, right proximal MT5, 2 proximal surfaces of proximal phalanges, and one proximal surface of a distal phalanx. Moderate DJD was identified on the right proximal radius, right distal femur, right patella, left proximal tibia, and the right lateral cuneiform.

Mild DJD was identified on the C1 dens articulation, right inferior C1 facet, right superior C1 facet, left inferior C2 facet, both superior C3 facets, both inferior C4 facets, right inferior C6 facets, left inferior C7 facet. Moderate DJD was identified on both inferior C3 facets and the right superior C4 facet. Severe DJD was identified on the left superior C4 facets and the right inferior C7 facet. Mild lipping was identified on the inferior surface of the C2 centrum, both surfaces of the C3 centrum, and the superior surface of the C4 centrum.

Mild DJD was identified on the right inferior facet of T1, right superior facet of T2, right superior facet of T7, left inferior facet of T10, right superior facet of T11, and right superior facet of T12. Severe DJD was identified on the right superior facet of T1. Mild lipping was identified on the inferior surface of the T7 centrum and the superior surface of the T12 centrum. Schmorls nodes were identified on the superior surface of the T9 centrum and the superior surface of the T12 centrum. Six rib articulations were identified with degenerative changes.

Mild DJD was identified on the left superior facet, all facets on L3, both superior L4 facets, left inferior L4 facet, and the left inferior L5 facet. Mild lipping was identified on both surfaces of the L1 centrum, both surfaces of the L2 centrum, and the inferior surface of the L3 centrum. Moderate lipping was identified on the superior surface of the L3 centrum. Schmorls nodes were identified on the superior surface of the L1 centrum, both surfaces of the L2 centrum, and the superior surface of the L3 centrum.

Cribra orbitalia was absent, periostitis and porotic hyperostosis were not scorable.

Dentition

MP	P	LA	LA	P	P	MP	P	P	P	P	P	MP	LA		
~~18~~	17	~~16~~	~~15~~	14	13	12	11	21	22	23	24	25	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	LA	P	P	P	P	P	P	P	P	P	P	P	LA	LA	P

Abscesses were identified associated with the lower right first and second molar, and the lower left second molar

Attrition: High levels of attrition were identified

Calculus: Moderate calculus was identified on the upper right second molar, lower left incisors and canine, and lower right incisors, canine, and first premolar. Gross calculus was identified on the lower right second premolar, first molar, and third molar

Caries: Cervical caries were identified on the upper right first premolar and second molar. An interproximal caries was identified on the lower right second premolar, with an occlusal caries on the first molar

Hypoplasia: No hypoplasia was identified

Additional References

ApSimon, A. 1985/1986. Chronological contexts for Irish Megalithic tombs. *Journal of Irish Archaeology*, 3, 5-15.

Moore, M. 1987. *Archaeological Inventory of County Meath*. Dublin: Stationary Office. (p.24, 38)

Reg Number: 03E1526 **SMR Number:** ME045-034----

Physical Setting

Townland: Harlockstown

County: Meath **Province:** Leinster

Year of Excavation: 2004

Monument Type: Flat Cemetery

Conditions of Discovery: Road Scheme

Total Burials: 4 **Total Inhumations:** 2

Excavation Report: Unpublished

Primary Reference: Clutterbuck, R. and Carroll, F.O. 2008. *N2 Finglas-Ashbourne Road Scheme. Report on Archaeological Excavation of Site 19 Harlockstown, County Meath, Licence 03E1526*.

Description of Grave

Grave Number: B519

Grave Type: Pit

Orientation of the Grave: North/South

Body Position: Crouched, left side, head to the North

Associated Material: Necked Bipartite Bowl placed behind the base of the skull

Dating Information: 3599 ± 36 BP (WK-16290; human bone; $\delta^{13}C$ = –21.6‰), calibrated to 2120-1870 cal BC (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: Unreported **Reg:** F519

The remains of this individual were poorly preserved, with good skeletal region representation. Age-at-death was estimated to be middle adult, based on the dental attrition. Sex was estimated to be undetermined, due to preservation.

Skeletal Pathology

Periostitis and porotic hyperostosis were absent. Cribra orbitalia was not scorable.

Dentition

	P	P	P	P	P	P	P	P	P	P	P	P	P	P	CA
~~18~~	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
CA	P	P	P	P	P	MP	MP	MP	P	P	P	P	P	P	CA

Severe attrition. Moderate calculus. Enamel hypoplasia was absent.

Description of Grave

Grave Number: B601
Grave Type: Pit
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, left side, head to the Northeast
Associated Material: Pillow Stone. Ribbed Bowl behind skull
Dating Information: N/A

Human Remains

Curation Location: Unreported **Reg:** F601

The remains of this individual were moderately to poorly preserved, with good skeletal region representation. Age-at-death was estimated to be adult, based on fusion and dental eruption. Sex was estimated to be possible male, based on the morphology of the skull.

Skeletal Pathology
DJD was identified in the dens facet of C1, articular facets of T2, on the centra of T5-T9.

Periostitis and porotic hyperostosis were absent. Cribra orbitalia was not scorable.

Dentition

CA	P	P	P	P	P	P	P	P	P	P	P	P	P	LA	CA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	~~33~~	~~34~~	35	36	37	38
P	P	P	P	P	P	P	P	P	P			P	P	P	P

Mild attrition. Moderate calculus. Caries identified on the lower right third molar. Abscess associated with the upper left second molar.

Additional References

excavations.ie 2004:1249

Reg Number: 1929:14-72 **SMR Number:** ME027-030----

Physical Setting

Townland: Keenoge

County: Meath **Province:** Leinster

Year of Excavation: 1929-1936

Monument Type: Burial Mound

Conditions of Discovery: Rescue excavation

Total Burials: 26 **Total Inhumations:** 15

Excavation Report: Published

Primary Reference: Mount, C. and Buckley, L. 1997. Adolf Mahr's Excavations of an Early Bronze Age Cemetery at Keenoge, County Meath. *Proceedings of the Royal Irish Academy: Archaeology, Culture, History, Literature*, 97C(1), 1–59, 61–68.

Description of Grave

Grave Number: Grave 3

Grave Type: Pit

Orientation of the Grave: N/A

Body Position: Crouched, left side, head to the south

Associated Material: Cremation deposit beneath and behind the skull, Bipartite Bowl behind skull, small bronze dagger near skull, chipped flint and curved chert blade, Necked Bipartite Bowl behind spine. Mount suggests that the Bipartite Bowl and the bronze razor are associated with the cremation deposit

Dating Information: 3685 ± 45 BP (GrN-12272; human bone), calibrated to 2201-1940 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:14-15

The remains of this individual were poorly preserved, with moderate skeletal region representation and notable surface erosion. Age-at-death was estimated to be adult. Sex was estimated to be female. Attained stature was estimated to be 167 cm, calculated from the length of the left femur.

Skeletal Pathology

Periostitis was absent. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

										P				P	
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	23	~~24~~	~~25~~	~~26~~	27	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	31	32	33	34	35	36	37	38
P	P	P	P	P	P			MP	MP	MP	P	P	P	P	P

Mild attrition, mild calculus. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 4
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Crouched, right side, head to the North facing South
Associated Material: Cremation
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:16

The remains of this individual were well preserved, with good skeletal region representation and notable surface erosion. Age-at-death was estimated to be young adult. Sex was estimated to be male. Attained stature was estimated to be 162 cm, calculated from the length of the femora.

Skeletal Pathology
Mild DJD was identified in the acromial articular surface of the left clavicle. Mild DJD was identified on the posterior articular surfaces T3/T4, T8/T9, T10/T11. Mild osteophytic lipping was identified on the inferior surface of the centrum of T11.

Periostitis and porotic hyperostosis were absent. Cribra orbitalia was not scorable.

Dentition

P	P	P	MP	MP	MP	MP	MP	MP	MP	P	MP	MP	P	P	LA
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	~~35~~	~~36~~	~~37~~	~~38~~
P	P	P	P	P	P	P	MP	MP	P	P	P				

Mild to moderate wear, mild calculus. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 5
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Crouched, right side, head to the North
Associated Material: Sherds of a Bowl in front of head, Cremation, Animal Tooth
Dating Information: 3610 ± 35 BP (GrA-2134; human bone), calibrated to 2130-1890 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** Kee_3

The remains of this individual were poorly preserved, with poor skeletal region representation and notable surface erosion. Age-at-death was estimated to be a middle adult based on dental attrition. Sex was estimated to be male.

Skeletal Pathology
Periostitis and porotic hyperostosis were absent. DJD and cribra orbitalia were not scorable.

Dentition

LA	P	P	P	P	P	P	P		P	P					
18	17	16	15	14	13	12	11	~~21~~	22	23	24	25	26	27	28
48	47	46	45	44	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	34	35	36	37	38
P	P	P	P	P							P	P	P	P	P

Moderate attrition and mild calculus were identified. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 6
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, left side, head to the Northwest
Associated Material: Tripartite Bowl near the head. Two further Tripartite Bowls found near cist
Dating Information: Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:23

The remains of this individual were well preserved, with good skeletal region representation and notable surface erosion. Age-at-death was estimated to be adult, as dental attrition was not scorable. Sex was estimated to be female. Attained stature was estimated to be 169 cm, calculated from the length of the left femur.

Skeletal Pathology
Schmorls nodes were identified on the superior centrum of T11 and T12.

Periostitis and cribra orbitalia were absent. Porotic hyperostosis was not scorable.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	MP	MP	MP	P	P	P	P	P	P	P	P

Dentition bonded together. Mild calculus was identified. Enamel hypoplasia was identified on the canine and the upper first premolars.

Description of Grave

Grave Number: Grave 7
Grave Type: Cist
Orientation of the Grave: Square
Body Position: Unrecorded
Associated Material: Grave contained remains of an adult and an infant
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:24.1

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated to be infant, with a refined age-at-death estimate of 6 months. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, porotic hyperostosis were absent.

Dentition

18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
							PE	PE							
			~~55~~	~~54~~	~~53~~	~~52~~	51	61	~~62~~	~~63~~	~~64~~	~~65~~			
			85	84	83	82	~~81~~	71	72	73	74	75			
			MP	MP	MP	MP		MP	MP	MP	PU	MP			

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:24.2

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be adult. Preservation was too poor for sex estimation to be undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, porotic hyperostosis were not scorable.

Dentition

							P	P	P	P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	11	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

Moderate attrition. Enamel hypoplasia was not scorable.

Description of Grave

Grave Number: Grave 9
Grave Type: Cist
Orientation of the Grave: East-northeast/West-southwest
Body Position: Crouched, right side, head to the West facing South
Associated Material: Tripartite Bowl behind head, boar's tusk
Dating Information: Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:28

The remains of this individual consist of a right ilium. Age-at-death was estimated to be infant, with a refined at-at-death of 1. As this individual was a non-adult, sex estimation was not undertaken.

Description of Grave

Grave Number: Grave 11
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Crouched, left side, head to the North facing East
Associated Material: Tripartite Bowl in front of face
Dating Information: 3585 ± 35 BP (GrA-2133; human bone), calibrated to 2110-1820 cal BC (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:30

The remains of this individual were moderately well preserved, with moderate skeletal region representation. The skull was absent. Age-at-death was estimated to be adult. Sex was estimated to be male. Attained stature was estimated to be 175 cm, calculated from the length of the left femur.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Description of Grave

Grave Number: Grave 12
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Unrecorded
Associated Material: Grave containing one adult female, one adult male, one child
Dating Information: 3630 ± 35 BP (GrA-2135; human bone), calibrated to 2140-1900 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** Kee_7

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated to be adult. Sex was estimated to be female.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia and porotic hyperostosis was not scorable.

Dentition

P	P	P	P	P									P	P	
18	17	16	15	14	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	26	27	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	~~37~~	~~38~~
P	P	P	P	P	MP	MP	MP	MP	P	P	MP	P	P		

Mild attrition, mild calculus. Enamel hypoplasia was identified on the lower right incisor and lower left canine.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** Kee_8

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated to be adult. Sex was estimated to be male.

Skeletal Pathology
Periostitis and porotic hyperostosis were absent. Cribra orbitalia was not scorable.

Dentition

														P	
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	27	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	MP	MP	MP	MP	MP	MP	MP	P	P	P	P

Mild attrition, mild calculus. Impacted right lower third molar. Enamel hypoplasia was absent.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** Kee_9

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be infant, with a refined age-at-death

estimate of 1 and a half. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Description of Grave

Grave Number: Grave 13
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Crouched, right side; disturbed
Associated Material: Around the neck of the articulated inhumation, beneath the jaw, were 40 jet beads of varying sizes which formed a tight necklace or choker about 15cm in diameter. They range from 1.1cm to 2.25cm in length and all have a uniform perforation of 0.3cm. Most of the beads were perforated through their length but some have been perforated through the side. Grave also contained some bones from an adult male and three cremated bones
Dating Information: 3730 ± 35 BP (GrA-2157; human bone), calibrated to 2280-2030 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:72a

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be young adult. Sex was estimated to be female.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

P	P	P							P						
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
	P	P	P	P	P		P	P							

Dentition was represented by loose teeth. Mild attrition. Enamel hypoplasia was not scorable.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** Kee_11

The remains of this individual were represented by a partial skull. Age-at-death was estimated to be a middle adult, based on suture closure. Sex was estimated to be male.

Skeletal Pathology
Porotic hyperostosis was identified on the parietal. Periostitis, cribra orbitalia, and enamel hypoplasia were not scorable.

Description of Grave

Grave Number: Grave 14
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Crouched; disturbed
Associated Material: Bowl Vessel near the head of the articulated inhumation. Grave contained two inhumations (adult male and adolescent), and the cremated remains of two individuals (adult male and infant)
Dating Information: 3565 ± 35 BP (GrA-2132; human bone), calibrated to 2040-1780 cal BC (calibrated at 2σ)

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1929:72b

The remains of this individual were moderately preserved, with moderate skeletal region representation. Age-at-death was estimated to be adult. Sex was estimated to be male.

Skeletal Pathology
Periostitis and porotic hyperostosis were absent. Cribra orbitalia was not scorable.

Dentition

	P	P			P	P	P	P	P	P	P		P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
P	P		P	P		P	P				P				

Moderate attrition. Enamel hypoplasia was identified on the upper canines and upper left first incisor.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** Kee_13

The remains of this individual were represented by a mostly complete cranium. Age-at-death was estimated to be adolescent. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Cribra orbitalia and porotic hyperostosis were absent. Periostitis and enamel hypoplasia were not scorable.

Reg Number: E1139 **SMR Number:** ME037-026----

Physical Setting

Townland: Martinstown

County: Meath **Province:** Leinster
Year of Excavation: 1950, 1952, 1953
Monument Type: Flat Cemetery
Conditions of Discovery: Quarrying
Total Burials: 10 **Total Inhumations:** 10

Excavation Report: Published
Primary Reference: Prendergast, E.M. and Lucas, A.T. 2011. Martinstown, Co. Meath, E1139. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 359–371.

Description of Grave

Grave Number: Grave 1
Grave Type: Pit
Orientation of the Grave: North/South
Body Position: Crouched, left side, head to the Northeast
Associated Material: Sherds of an anomalous vessel, white stone pebble
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1952:2

The remains of this individual were well preserved, with good skeletal region representation. The skull had become fragmented. Age-at-death was estimated to be young adult, with a refined age-at-death of 25-34, based on the morphology of the pubic symphysis and the auricular surface. Sex was estimated to be male, based on the morphology of the skull and pelvis. Attained stature was estimated to be 169cm, calculated based on the length of the fibula.

Skeletal Pathology
Schmorls node was identified on the inferior surface of the T8 centrum, both surfaces of the T9-12, L1, L3-L4 centra. Moderate osteophytic lipping was identified on the inferior surface of the L4 centrum.

Osteochondritis was identified on middle facet of left calcaneum.
Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

	MP	P	P	P	P	P	MP									
~~18~~	17	16	15	14	13	12	11	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
												P	P	P	P

Mild to moderate attrition. Mild to moderate calculus. A small cavity was identified on the mesial surface of the crown of the lower third molar. Enamel hypoplasia was identified on the upper right second incisor, canine, and first molar.

Description of Grave

Grave Number: Grave 2
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Disturbed, multiple individuals
Associated Material: Grave contained an adult male, an adolescent, and infant
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:12.1

The remains of this individual were moderately to poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be adult. Sex was estimated to be male, based on the morphology of the skull.

Skeletal Pathology
Schmorl's nodes were identified on both surfaces of one vertebral centrum.

Periostitis, cribra orbitalia, and enamel hypoplasia were not scorable. Porotic hyperostosis was absent.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:12.2

The remains of this individual were represented by two fragments of the lower limbs. Due to the identification of unfused epiphyses, this individual was estimated to be an adolescent. Due to preservation and that this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:12.3

The remains of this individual were represented by a partial skull. This individual was estimated to be an infant, with a refined age-at-death of 15-21 months, based on dental eruption and formation. Due to preservation and that this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Severe cribra orbitalia was identified in the left orbit. Periostitis, porotic hyperostosis, and enamel hypoplasia were not scorable.

Dentition

~~16~~	~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	~~64~~	~~65~~	~~26~~
46	85	84	83	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~	~~35~~
PU	PU	P	PE								

Description of Grave

Grave Number: Grave 3
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Disturbed, multiple individuals
Associated Material: Ribbed Bowl. Grave contained an adult male, an adult female, an adolescent (plus bones which could be associated with an additional adult)
Dating Information: Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:18-19.1

The remains of this individual were represented by a mostly complete skull, with notable surface erosion. Age-at-death was estimated to be an older adult, based on dental attrition and suture closer. Sex was estimated to be male, based on the morphology of the mastoid process, supraorbital ridges, and mental eminence.

Skeletal Pathology
Deep arachnoid pits in the internal surface of the left parietal and frontal bone. Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

								MP	MP	MP	P	P	P	P	MP
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	31	32	33	34	35	36	37	38
								P	P	P	P	P	P	P	CA

Moderate to severe attrition was identified. Moderate calculus was identified. Enamel hypoplasia was identified on the lower left canine and premolars.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:18-19.2

The remains of this individual were represented by a mostly complete calvarium. Age-at-death was estimated to be an older adult, based on suture closer. Sex was estimated to be female, based on the morphology of the occipital protuberance, supraorbital ridges and orbital rims.

Skeletal Pathology
Mild cribra orbitalia was identified in the both orbits. Porotic hyperostosis was absent. Periostitis and enamel hypoplasia were not scorable.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:18-19.3

The remains of this individual were moderately well preserved, with poor skeletal region representation. Age-at-death was estimated to be adolescent, with a refined age-at-death of 15-16, based on dental eruption and development, and the level of fusion. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

								MP	MP	P	P	P	P	P	PU
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	P	P	P	MP	P	P	P	MP	P	P	P	P	P	P	

Lower left third molar was not present, it was not clear if the tooth was missing or congenitally absent. The upper left second premolar is peg-shaped. This seems to be an underdeveloped adult tooth rather than a retained deciduous tooth.

Mild attrition. Mild calculus. Enamel hypoplasia was identified on all lower incisors and premolars, all canines, and the upper left second molar.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:18-19.4

The remains of this individual consisted of a handful of post-cranial material. Age-at-death was estimated to be an adult, based on the size of the remains and the cortical thickness. Due to the preservation, sex estimation was not undertaken.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Description of Grave

Grave Number: Grave 4
Grave Type: Pit
Orientation of the Grave: N/A
Body Position: Unrecorded
Associated Material: Tripartite Bowl
Dating Information: 3670 ± 40 BP (GrA-24155; human bone [collagen]; $\delta^{13}C = –21.33‰$), calibrated to 2200-1920 cal BC (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:14

The remains of this individual were well preserved, with good skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death of 25-30, based on the identification of epiphyseal fusion lines. Sex was estimated to be male, based on the morphology of the pelvis and metric analysis. Attained stature was estimated to be 164cm, calculated based on the length of the femur and fibula.

Skeletal Pathology
Schmorl's nodes were identified on the surfaces of the T6-L3. The nodes on T11 and T12 were very severe, which could have resulted vertebral body to impinge on the spinal cord. If this occurred, this would have caused a great deal of pain and possibly some paralysis.

Periostitis, cribra orbitalia, porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	MP	MP									
18	17	16	15	14	13	12	11	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

Mild to moderate attrition. Mild to moderate calculus. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 5
Grave Type: Pit
Orientation of the Grave: North/South
Body Position: Crouched, right side, head to the South facing East
Associated Material: Ribbed Bowl
Dating Information: Brindley stage 3 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1953:16

The remains of this individual were very well preserved, with complete skeletal region representation. Age-at-death was estimated to be child, with a refined age-at-death of 5-7, based on dental development and the level of fusion. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, porotic hyperostosis were absent.

Dentition

	PU	E											MP		
~~18~~	17	16	15	14	13	12	11	21	22	23	24	25	26	~~27~~	~~28~~
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	~~36~~	~~37~~	~~38~~
	PU	P					PU	PU							
			P	P	P	P	P	P	P	P	P	P			
			55	54	53	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P	P	P	P	P	P	P	P	P	P			

Mild calculus was identified on the left deciduous canine and molars. Enamel hypoplasia was absent.

Reg Number: P1952:18 **SMR Number:** ME028-009----

Physical Setting

Townland: Mosney

County: Meath **Province:** Leinster

Year of Excavation: 1951

Monument Type: Possibly part of a larger flat cemetery with cremations

Conditions of Discovery:

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: NMI Files

Description of Grave

Grave Number: Grave 1

Grave Type: Pit Burial

Orientation of the Grave: N/A

Body Position: Likely Crouched, skull to the Southeast

Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1952:18

The remains of this individual were moderate to poorly preserved. The skull consisted of complete frontal, complete parietals, complete temporals, poor occipital, partial sphenoid, complete zygomatics, poor maxillae, poor palatines, complete nasal bones, partial vomer, and a poor mandible. There was significant damage to the outer table of the skull vault. The shoulder girdle was represented by the shaft of the left clavicle, fragmentary left scapula, shaft of the right clavicle, and the partial right scapula. The thorax consisted of four rib fragments, partial C3, fragmentary C4, partial C5 and C6, three fragmentary middle thoracic vertebrae, two partial lower thoracic vertebrae, and five fragmentary lumbar vertebrae. The pelvic girdle was represented by the fragmentary remains of the left ilium and ischium. The left acetabulum was fragmentary, S1 was fragmentary. The upper limb was represented by the shaft of the left humerus, shaft of the left radius, the distal and shaft portion of the right humerus, the proximal portion of the right ulna, and the proximal portion of the right radius. The lower limb consisted of the proximal and shaft portion of the left femur, the shaft of the left tibia, the shaft of the left fibula, and the distal and shaft portion of the right femur. The hand consisted of the right MC3, one unidentified metacarpal, and one phalanx. The feel consisted of the right talus. There was 42 unidentified bone fragments.

The humeri of this individual were noticeably robust, particularly the deltoids.

Age and Sex
The level of suture obliteration in the coronal and sagittal sutures combined with the dental attrition suggest that this individual was an late middle adult to an old adult, with a refined age-at-death estimate of greater than 45 years.

Stature
A reconstructed femur maximum measurement of 44.5 cm reconstructed to an attained stature estimate of 167.32 ± 3.94 cm.

Non-metric Traits
Ossicles were observed along the left lambdoid suture. The skull had noticeable slight asymmetry – with a larger left occipital, slight twisting to frontal and the occipital, and one mastoid process was slightly larger than the other.

Skeletal Pathology
Surprisingly little DJD was identified for the identified age-at-death of this individual, restricted to the spinal column.

Mild DJD was identified in the inferior C4 faces, the superior C5 facets, the left inferior C5 facet, and the right C6 facet. Moderate DJD was identified in the left C3 facets, in the superior left C4 facet, and the superior left C6 facet. The moderate DJD included porosity. The centrum of C5 shoed mild lipping on the superior border and moderate lipping on the inferior border. One of the partial lower thoracic vertebrae had moderate DJD in its right inferior facet. Moderate DJD was also in the right superior L1 facet. Mild DJD was identified in the right superior L2 facet and the right inferior L4 facet. The L4 centrum had moderate lipping on the superior border.

Periostitis and cribra orbitalia were absent, porotic hyperostosis was not scorable.

Dentition

MP	P	P	P	P	P	P	MP	MP	P	P	P	MP	P	MP	MP
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	MP	MP	LA	MP	MP	MP	P	MP	MP	MP	P

Attrition: Severe attrition was identified in all of the teeth, including the complete loss of crown height in the incisors and canines

Calculus: Calculus was not scorable

Caries: Gross caries was identified in the lower right first premolar

Hypoplasia: Hypoplasia was not scorable due to the loss of crown height

Additional References

Moore, M. 1987. *Archaeological Inventory of County Meath*. Dublin: Stationary Office. (p.38)

Reg Number: 1961:229 **SMR Number:** OF008-048----

Physical Setting

Townland: Ballickmoyler

County: Offaly **Province:** Leinster
Year of Excavation: 1961
Monument Type: Cist Burial
Conditions of Discovery: Quarrying
Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: Prendergast, E.M. 2011. Ballickmoyler, Co. Offaly, E1146. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 384–386

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: East/West
Body Position: Crouched, right side, head to the East
Associated Material: Cremation
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1961:229

The remains of this individual were moderately well preserved, with moderate skeletal representation. Age-at-death was estimated to be middle adult. Sex was estimated to be female. Attained stature was estimated to be 152cm, calculated based on the length of the femur.

Severe attrition was identified on the fourteen maxillary and nine mandibular teeth present. No skeletal pathology was reported.

Reg Number: 1961:228 **SMR Number:** OF008-048----

Physical Setting

Townland: Ballicknahee

County: Offaly **Province:** Leinster

Year of Excavation: 1961

Monument Type: Cist Burial

Conditions of Discovery: No Details

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Listed in Acquisitions Paper

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.129)

Description of Grave

Grave Number: Grave 1

Grave Type: Short Cist

Orientation of the Grave: East/West

Body Position: Crouched, head to the East, facing North

Associated Material: Cremation representing at least one adult in the region of the thorax

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1961:228

The remains of this individual were moderate to well preserved, with good representation of skeletal elements. The skull has suffered some significant taphonomic damage to the left side, resulting in a partial left frontal, parietal, temporal, sphenoid, and maxilla. There was also significant surface damage to the remaining left vault. The right side consisted of complete right frontal, partial, temporal, sphenoid, zygomatic, and maxilla. The occipital was complete. Both nasals were partial, the lacrimals were poor, the inferior nasal concha were poor, the vomer was complete, the left mandible was partial, and the right mandible complete. The shoulder girdle consisted of the medial portion of the right clavicle and the partial right scapula, with the glenoid absent. The thorax was represented by the complete manubrium, fragmented sternal body, eleven partial left ribs, almost complete right ribs, 16 unsided rib fragments, complete C1, partial C2 and C3, partial left portion of a lower cervical vertebra, complete T8-T10, partial T11 and T12, and complete lumbar vertebrae. The pelvic girdle consisted of a poor left ilium, complete left ischium, complete left pubis, complete right ilium, and a poor right ischium. Both acetabula were complete, the sacrum was complete. The upper limb was represented by the distal and shaft portion of the left humerus, the distal potion of the left ulna, fragmentary right humerus, the proximal and

shaft portion of the right ulna, and the distal and shaft portion of the right radius. The lower limb was represented by the proximal and shaft portion of the left femur, the distal portion of the left tibia, the proximal and shaft portion of the right femur, fragmentary right tibia, and a poor right fibula. The hands consisted of the left capitate and MC2-MC5; the right scaphoid, lunate, trapezoid, capitate, complete MC1 and MC2, poor MC 3 and MC4, and the distal potion of MC5. Eight hand phalanges were identified. The feet consisted of the left partial talus, poor calcaneus, partial cuboid, fragmentary navicular, poor medial cuneiform, complete intermediate cuneiform, complete lateral cuneiform, and the distal and shaft portion of MT1; right poor talus, poor calcaneus, fragmentary navicular, complete intermediate cuneiform, and the distal and shaft portions of MT3-MT5. Two unidentified metatarsals were observed, along with one foot phalanx.

Age and Sex

Based on the morphology of the auricular surfaces, pubic symphysis, and dental attrition this individual was estimated to be an old adult, no refined age-at-death could be estimated. This individual was estimated to be female based on the morphology of the supraorbital ridges, mastoid process, nuchal crest, gonial flare, ventral arc, ischiopubic ramus ridge, and the sciatic notch.

Stature

A right femur maximum length measurement of 42.2 cm estimates an attained stature of 158.33 ± 3.72 cm; while a right tibial maximum length measurement of 35.4 cm estimates an attained stature of 164.19 ± 3.66 cm.

Skeletal Pathology

Diffuse DJD was identified in this individual, which is not surprising considering the estimated age of this individual. DJD was identified on one left rib head, four left rib articular facets, and four right rib articular facts. Mild lipping was identified in the right distal humerus, both the trochlea and the capitellum. Moderate lipping was identified on the right proximal ulna, with lipping and eburnation on the left distal ulna. DJD was identified on the left capitate, right scaphoid, left proximal MC2-MC5, left distal MC3, and the right proximal MC5. The identified foot phalanx also demonstrated mild lipping. Mild lipping was identified on the right proximal femur.

The dens articulation on both C1 and C2 showed moderate lipping, with moderate lipping also on the right inferior facet of C3 and mild lipping on the inferior border of the C3 centrum. There was mild lipping on the superior centrum border on T8, the inferior centrum border of T9, the superior and inferior border of T10, the superior boarder of the T11 centrum, and the superior boarder of the T11 centrum. The left rib facet on T10 showed moderate lipping. Mild DJD was identified on the right superior facet of L1, the left inferior facet of L3, both superior facts of L4, and the left superior facet of L5. Moderate DJD was

identified on the left inferior facet of L5, with severe DJD, including porosity, on the right inferior facet of L4 and the superior right facet of L5. Mild lipping was identified on both borders of the L3 centrum and on the superior border of the L5 centrum; with moderate lipping on the inferior border of the L5 centrum. There was moderate lipping on the centrum border and left articular facet of S1, with some lipping and porosity on both sacroiliac joints.

No periostitis, cribra orbitalia, or porotic hyperostosis was identified.

Dentition

	LA	P	MP	P	P	MP	MP	MP	MP	MP	MP	P	P	P	
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	LA	P	P	P	P	MP	MP	MP	P	P	P	P	P	LA	

The socket for 37 was fully healed. It is unclear, partly due to damage, if the third molars were present and lost antemortem or if they were congenitally absent.

Attrition: there was moderate to severe attrition

Calculus: Due to taphonomic damage, the full extent of calculus could not be identified

Caries: Small abscesses were identified associated with all of the molars that had been lost antemortem

Hypoplasia: Distinct changes in enamel quality could be identified in the mandible, however due to some surface damage it was unsure if these truly represented hypoplasia

Additional References

Lucas, A.T., 1963. National Museum of Ireland Archaeological Acquisitions in the Year 1965. *The Journal of the Royal Society of Antiquaries of Ireland*, 93(2), 124.

Reg Number: 2018:44 **SMR Number:**

Physical Setting

Townland: Ballynamona

County: Offaly **Province:** Leinster

Year of Excavation: 1935

Monument Type:

Conditions of Discovery: Under a standing stone

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: No

Primary Reference: NMI Archives

Description of Grave

Grave Number: Grave 1

Grave Type: Pit, under a standing stone

Orientation of the Grave: Unrecorded

Body Position: Likely crouched, right side

Associated Material: None Reported

Dating Information: N/A

Comments: Also recorded as Lug and Pillar Stone Burial

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 2018:44

The remains of this individual were poorly preserved. The skull is represented by the fragmentary remains of the parietals, occipital, temporal, left zygomatic, and a partial mandible. The shoulder girdle consisted of the lateral and shaft portion of the right clavicle, fragmentary left scapula, and poor right scapula. The thorax was represented by the fragmentary sternal body, eleven right rib fragments, one unsided rib fragment, and three fragments of vertebrae. The pelvic girdle was absent. The upper limb was represented by the distal and shaft portion of the left humerus, complete left ulna, complete left radius, complete right humerus, fragmentary right ulna, and the complete right radius. The lower limb was represented by the distal and shaft portion of the left femur, poor left tibia, shaft of the left fibula, poor right femur, fragmentary right tibia, and the saft of the right fibula. The hands consisted of two left unidentifiable metatarsals, complete right MC1, poor right MC2, complete right MC3 and MC4, fragmentary right MC5, and five right phalanges. The feet consisted of the left complete talus, poor calcaneus, proximal and shaft potion of MT2-MT5; right complete talus, poor calcaneus, poor navicular, poor MT2 and MT3, and the proximal and shaft portion of MT4.

Age and Sex

Based on the eruption of the third molar and the level of attrition, this individual was estimated to have been a young adult; with no refined age-at-death estimate available. Only the nuchal crest was available for sex estimation, and as this was scored as intermediate to possible male, this individual was identified as undetermined.

Skeletal Pathology

No DJD or periostitis was identified. This individual was not scorable for cribra orbitalia. Mild to moderate porotic hyperostosis was identified on both parietals.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	~~37~~	~~38~~
P	P	P	P	P	P	MP	MP	MP	MP	P	P	P	MP	MP	MP

Attrition: Mild attrition was identified, with the first molar starting to show moderate attrition.

Calculus: Due to tooth surface damage, this individual was not scorable for calculus

Caries: No caries was identified

Hypoplasia: Hypoplasia was identified on the lower left canine and first molar, on the lower right canine and both premolars.

Reg Number: E2653 **SMR Number:** OF021-021003-

Physical Setting

Townland: Cappydonnell Big

County: Offaly **Province:** Leinster

Year of Excavation: 2005/2006

Monument Type: Flat cemetery

Conditions of Discovery: Road Scheme

Total Burials: 8? **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Coughlan, T. 2010. *N6 Kinnegad - Athlone Scheme Phase 2: Kilbeggan to Athlone Dual Carriageway. Site A016/025; E2653: Cappydonnell Big 1 OF002-021. Final report*.

Description of Grave

Grave Number: Burial 3

Grave Type: Pit

Orientation of the Grave: Roughly North/South

Body Position: Disarticulated

Associated Material: None reported

Dating Information: 3434 ± 32 BP (UBA-11072; human bone or tooth; $\delta^{13}C = –20.1‰$), calibrated to 1878-1641 cal BC (calibrated at 2σ)

Human Remains

Curation Location: Unreported **Reg:** C805

The remains of this individual were poorly preserved, with poor to moderate skeletal region representation and significant fragmentation. Age-at-death was estimated to be young adult, based on the dentition. Sex was estimated to be possible male.

Skeletal Pathology

Mild DJD was identified on the proximal end of the right ulna. Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

P	P	MP	P	P	P	P	P	MP	P	P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	33	34	35	36	37	~~38~~
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild Attrition, mild calculus. Abscess was identified associated with the upper left second molar. Enamel hypoplasia identified on the right upper second molar, upper left incisors and canine, lower left second incisor, and lower left canine.

Reg Number: E740 **SMR Number:** SMR OF009-036----

Physical Setting

Townland: Lug

County: Offaly **Province:** Leinster

Year of Excavation: 1935

Monument Type: Carin

Conditions of Discovery: Excavation

Total Burials: 10 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: Duignan, M. and Buckley, L. 2011. Lug, Co. Offaly, E704. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 393–422.

Description of Grave

Grave Number: Grave 3

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Crouched, right side, head in the Southwest

Associated Material: Small Ribbed Bowl near skull

Dating Information: 3575 ± 40 BP (GrA-24309; human bone [collagen]; $\delta^{13}C$ = –22.17‰), calibrated to 2032-1775 cal BC (calibrated at 2σ); Brindley stage 3 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E709:3

The remains of this individual were moderately well preserved, with good skeletal region representation. Age-at-death was estimated to be middle adult, based on dental attrition. Sex was estimated to be female, based on the morphology of the skull and metric analysis.

Skeletal Pathology

This individual had more than 130 lytic lesions, identifiable throughout the skeleton, strongly indicative of multiple myeloma. Associated were healed pathological fractures two multiple vertebrae and the sacrum.

The left wrist showed evidence of disarticulation, possibly due to a childhood injury.

Mild porotic hyperostosis was identified on the right frontal and parietal. Periostitis and Cribra orbitalia were absent.

Dentition

CA	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Moderate attrition and moderate calculus were identified. Caries was identified in the upper left third molar. Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 4
Grave Type: Cist
Orientation of the Grave: North/South
Body Position: Crouched, right side, head in Southeast
Associated Material: Cremation
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E709:5

The remains of this individual were poorly preserved, with good skeletal region representation but noticeable bone decay. Age-at-death was estimated to be young adult, based on the morphology of the auricular surface and dental attrition. Sex was estimated to be female based on the morphology of the skull and the sciatic notch.

Skeletal Pathology
Spondylolysis was identified on L5.

Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

P	P	P				P	P	P	P	P	P				
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	46	45	44	43	42	~~41~~	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild attrition and calculus were identified. Enamel hypoplasia was idented on the lower right incisors and canine, lower left canine, upper left canine, and upper right second incisor.

Description of Grave

Grave Number: Grave 5
Grave Type: Cist
Orientation of the Grave: Roughly square
Body Position: Crouched, head in the Southeast
Associated Material: None reported
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E709:8

The remains of this individual were moderately well preserved, with poor skeletal region representation. Age-at-death was estimated to be a young adult, with a refined age-at-death estimation of 18-20, based on the level of fusion and dental development. Sex was estimated to be male, based on the morphology of the skull and the sciatic notch.

Skeletal Pathology
Periostitis, cribra orbitalia, and porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Mild attrition, mild calculus. Enamel hypoplasia was identified on the upper canines, the lower left canines, the upper right second incisor, and the upper left second premolar.

Description of Grave

Grave Number: Grave 6
Grave Type: Cist
Orientation of the Grave: Roughly square
Body Position: Unrecorded
Associated Material: Sherds of an anomalous vessel
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E709:9

The remains of this individual were very poorly preserved, initially identified as cremated. Age-at-death was estimated to be infant, with a refined age-at-death of 6 months to one year, based on dental development. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Dentition

									PU
~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	~~64~~	~~65~~
~~85~~	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~

Reg Number: E65 **SMR Number:** RO 028-204001-

Physical Setting

Townland: Grange

County: Roscommon **Province:** Connacht
Year of Excavation: 1966
Monument Type: Cairn
Conditions of Discovery: Road works
Total Burials: 14 **Total Inhumations:** 3

Excavation Report: Published
Primary Reference: Ó Ríordáin, B., Brindley, A.L. and O'Donnabhain, B. 1997. A Bronze Age Cemetery Mound at Grange, Co. Roscommon. *The Journal of Irish Archaeology*, 8, 43–72.

Description of Grave

Grave Number: Grave 2
Grave Type: Cist
Orientation of the Grave: East/West
Body Position: Crouched, left side, head to the East (adult); Disturbed (child)
Associated Material: Grave contained a Bipartite Bowl and a Tripartite Bowl, along with two inhumation burials (middle adult and child)
Dating Information: Brindley stage 2 Bowls

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E65:41.1

The remains of this individual are poorly preserved, with moderate skeletal region representation. There was notable surface erosion. Age-at-death was estimated to be middle adult. Sex was estimated to be male, based on the morphology of the skull.

Skeletal Pathology
Mild DJD was identified in the right wrist and right foot. Moderate to severe DJD was identified in the left knee and throughout the cervical vertebrae.

Periostitis was absent. Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E65:41.2

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated as child, with a refined age-at-death of 6-7, based on dental development. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis was absent. Cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

							PU	PU	PU						
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
	PU						PU				PU		P	PU	

~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	~~64~~	~~65~~
~~85~~	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~
	P				MP	P	P	P	P

Enamel hypoplasia was absent.

Description of Grave

Grave Number: Grave 3
Grave Type: Cist
Orientation of the Grave: East/West
Body Position: Crouched, head to the east
Associated Material: Bowl vessel, hoof of a pig
Dating Information: Brindley stage 1 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** E65:10

The remains of this individual were poorly preserved, with moderate skeletal region representation. Age-at-death was estimated as child, with a refined age-at-death of roughly 7, based on dental development. As this individual was a non-adult, sex estimation was not undertaken.

Skeletal Pathology
Periostitis, cribra orbitalia, and porotic hyperostosis was absent.

Dentition

	PU	E		PU	PU	PU	PU	PU	PU	PU	PU		P		
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	PU	P					PU	PU	PU		PU		PU	PU	
			P	P	MP	MP	MP	P	MP	P	P	P			
			55	54	53	52	51	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P	P	MP	P	MP	MP	P	P	P	P			

Enamel hypoplasia was identified on the upper central incisors.

Reg Number: 2009:23 **SMR Number:** SL017-063----

Physical Setting

Townland: Culleens

County: Sligo **Province:** Connacht
Year of Excavation: 1989
Monument Type: Cist Burial
Conditions of Discovery: Ploughing
Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: Ryan, M. and Cherry, S. 2011. Culleens, Co. Sligo, E1156. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 453–458.

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: East/West
Body Position: Crouched, left side, head to the Northwest
Associated Material: Tripartite Vase
Dating Information: Two sample have been dated from this individual: 3660 ± 60 BP (GrA-5399; human bone [collagen]; $\delta^{13}C$ = –23.25‰) and 3710 ± 80 BP (OxA-3229; human bone [collagen]), giving a mean of 3685 ± 50 BP (Brindley 2007, 91), which calibrates to 2210-1920 (calibrated at 2σ); Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 2009:23

The remains of this individual were moderate to poorly preserved, with moderate skeletal region representative. Age-at-death was estimated to be middle adult. Sex was estimated to be possible female, based on the morphology of the pelvis. Attained stature was estimated to be 169cm, calculated from the length of the femora.

Skeletal Pathology
DJD identified on the remaining lumbar vertebra.

Periostitis and porotic hyperostosis were absent. Cribra orbitalia was not scorable.

Dentition

											P				
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	31	32	33	34	35	36	37	38
	P							MP	P	P	P	P	P	P	P

Mild attrition, mild calculus. Enamel hypoplasia was absent.

Reg Number: 1966:116 **SMR Number:** SL040-016002-

Physical Setting

Townland: Treanmacmurtagh

County: Sligo **Province:** Connacht

Year of Excavation: 1966

Monument Type: Mound Cemetery

Conditions of Discovery:

Total Burials: 3 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Rynne, E. 1969. Cist-burial in a cairn at Treanmacmurtagh, Co. Sligo. *Journal of the Royal Society of Antiquaries of Ireland,* 99(2), 145-150.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, left side, head North

Associated Material: Small Vase in front of face, cremated bones of an adult, shards of a possible Bowl vessel

Dating Information: Brindley stage 1 Vase

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1966:166.1

The remains of this individual were moderately to poorly preserved, with good skeletal region representation. The skull was represented by fragmentary frontal, fragmentary parietals, complete temporals, partial occipital, fragmentary sphenoid, complete left zygomatic, poor right zygomatic, complete left maxilla, poor right maxilla, complete left nasal, partial right nasal, poor left mandible, and fragmentary right mandible. The shoulder girdle consisted of the shaft of the left clavicle, complete right clavicle, and partial scapulae. The thorax was represented by the complete manubrium, partial ternal body, 9 fragmented left ribs, 9 fragmented right ribs, 23 unsided rib fragments, partial C1-C4, complete L2, partial L3 and partial L5. The pelvic girdle consisted of the complete left ilium, complete left ischium, partial left pubis, partial right ilium, fragmentary right ischium, and complete right pubis. Both acetabula were partial, one sacral vertebra was identified. The upper limb was represented by the proximal and shaft portion of the left ulna, complete left radius, complete right humerus, proximal and shaft portion of the right ulna, and the proximal and shaft portion of the right radius. The lower limb consisted of the poor left femur, fragmentary left tibia, proximal and shaft portion of the left fibula, fragmentary right femur,

fragmentary right tibia, and the proximal and shaft portion of the right fibula. The hands were represented by the left complete lunate, complete MC1-MC3, poor MC4-MC5, 5 proximal phalanges, 4 middle phalanges, and 1 distal phalanx; the right poor MC1, complete MC2-MC5, 5 proximal phalanges, 3 middle phalanges, and 2 distal phalanges. Six unidentified carpals and one unidentified metacarpal. The feet were represented by left complete talus, complete calcaneus, partial navicular, proximal and shaft portion of MT1, poor MT2-MT3, complete MT5; right poor talus, partial calcaneus, partial navicular, complete intermediate cuneiform, proximal portion of MT1, and poor MT4.

Age and Sex

Based on fusion and dental formation this individual was estimated to be an adolescent, with no refined age-at-death. As this individual was not an adult, sex estimation was not carried out.

Skeletal Pathology

Cribra orbitalia, porotic hyperostosis and periostitis were absent.

Dentition

PU	P	P	P	P	P	P	P	P	P	P	P	P	P	P	PU
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
PU	P	MP	P	P	P	P	P	P	P	MP	P	P	P	P	PU

Attrition: Mild attrition identified

Calculus: Calculus was not scorable

Caries: No caries identified

Hypoplasia: Hypoplasia was not scorable

Description of Grave

Grave Number: Grave 2
Grave Type: Cist
Orientation of the Grave: North/South
Body Position: Disturbed
Associated Material: N/A
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1966:166.2

The remains of this individual were moderately preserved, with poor skeletal region representation. The skull consisted of the complete frontal, fragmentary left parietal, partial right parietal, partial right temporal, partial occipital, complete left zygomatic, partial left maxilla, poor right maxilla, complete palatines, poor nasal bones, partial vomer, partial left mandible, and poor right mandible. The thorax was represented by a partial sternal body.

Age and Sex

Based on the dental attrition, this individual was estimated to be a young adult, with no refined age-at-death. The morphology of the supraorbital ridge, mastoid process, nuchal crest, and mandible indicate sex estimation of possible female.

Skeletal Pathology

Healed, mild cribra orbitalia was identified in both orbitalia. Porotic hyperostosis was absent and periostitis was not scorable.

Dentition

MP	P	P	P	P	P	P	MP	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	~~31~~	32	33	34	35	36	37	38
P	P	P	P	P	P	P	MP	MP	P	P	P	P	P	P	P

Attrition: Mild to moderate attrition was identified

Calculus: Moderate calculus was identified on the upper right second molar, upper left third molar, lower left molars, lower right second premolar and molars

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on the upper right incisors, canine, and second premolar; upper left second incisor, canine, and second premolar; lower left second incisor and canine; lower right second incisor, canine, and premolars

Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.65)

Lucas, A. 1969. National Museum of Ireland Archaeological Acquisitions in the year 1966. *The Journal of the Royal Society of Antiquaries of Ireland,* 2:93-115, 103.

Ó Ríordáin, B., and Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age*. Galway: Galway University Press (p.131)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.133)

Reg Number: TYR028:021 **SMR Number:** TYR 028:021

Physical Setting

Townland: Dungate

County: Tyrone **Province:** Ulster

Year of Excavation: 1973

Monument Type: Mound Barrow

Conditions of Discovery: Removal of mound for material

Total Burials: 4 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Waterman, D., Brennan, J., and Wells, C. 1977. Bronze Age Cist burials at Dungate, County Tyrone. *Ulster Journal of Archaeology,* 40, 27-31.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Approximately square; North, Northeast/South, Southwest

Body Position: Disarticulated. Suggestion that skeleton 1 (TYR028:021_1) was defleshed before burial due to the bundling of the long bones, skull to the Northwest.

Associated Material: Necked Bipartite Bowl (Tripartite Bowl in McSparron 2017) placed such that the opening was resting against the skull of skeleton 1. A skeleton of a child was identified, lying to the west of skeleton 1 with the fragmented remains of a second Necked Bipartite Bowl (Tripartite Bowl in McSparron 2017).

Dating Information: 3670 ± 30 BP (GrN-13581; human bone [collagen]; $\delta^{13}C$ = –21.40‰), calibrated to 2141-1951 cal BC (95.4 %) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Comments: Floor of the cist paved with thin flags. Grave 2 contained the cremations of a probable young adult female and an infant.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** TYR028:021_1

The remains of this individual were moderately preserved. The skull was missing (see below). The shoulder girdle was represented by the shafts of both clavicles and the partial remains of both scapulae. The thorax was represented by 11 rib fragments, including three left and three right rib head fragments. The spinal column was represented by four poorly preserved cervical vertebrae, eight poorly preserved and fragmented thoracic vertebrae, and five poorly preserved and fragmented lumbar vertebrae. The pelvic girdle was represented by a partial left ilium, poor left ischium, fragmentary left pubis, and the poorly preserved remains of the right ilium, ischium, and pubis. S1 was identified, both acetabula

were complete. The upper limb was represented by the shaft and proximal portion of the left humerus and ulna, the shaft and distal portion of the left radius, and the poorly preserved remains of the right humerus. The lower limbs were represented by the shaft and distal portion of both femora, complete left tibia and fibula, poorly preserved right patella, and the shaft of the right tibia and fibula. The feet consisted of the partial left talus, complete left calcaneus, poorly preserved right talus, partial right calcaneus, poorly preserved right second metatarsal, complete third through fifth metatarsal, and one unidentified tarsal. There was no preservation of the hands.

While the skull is presently missing from the remains, the excavation report mentions that it was present. It is reported as having been in "*fairly good condition"* with cranial architecture "*fairly typical of the British Early Bronze Age type"*. It is possible that it was curated separately due to the identification of a Catlin mark on the right parietal 19mm from the sagittal suture, with a smaller one on the left parietal. "*The presence of the Catlin mark in his R. parietal confers upon him an extremely rare, if not unique, place in British archaeological material"* (Wells in Waterman et al. 1997, 31).

Age and Sex
The completed fusion indicate that this individual was an adult. Based on analysis of the pubic symphysis and articular surfaces, along with the diffuse DJD, this individual is estimated to have been an older middle adult, with an estimated refined age of 40-50. Based on the morphology of the ventral arch, subpubic concavity, and ischiopubic ramus ridge this individual was estimated to be male.

Stature
A stature estimate of 175.94 ± 4.00 cm was made based on a tibial maximum length measurement of 38.6cm.

Nonmetric Traits
Marked mandibular tori are reported.

Skeletal Pathology
Diffuse DJD was identified in this individual, particularly in the spinal column. There was mild lipping on the left glenoid fossa, both proximal humeri, both acetabula, both distal femora, the left proximal tibia, the left proximal and distal fibula, and the left talus and calcaneus. More severe DJD was identified on the left proximal ulna, possibly associated with increased robusticity in the ulna tuberosity; and the right patella, which had a large area of osteophytes on the medio-distal corner, extending roughly 6mm from the usual surface and 19.89 mm long.

DJD was identified throughout the spinal column. Mild lipping was recorded on all identified cervical vertebrae facets, with mild osteophyte growth on the superior C3 centrum, inferior C4 centrum, superior C6 centrum, inferior C7 centrum, and moderate lipping on the superior C4 centrum and C6 inferior centrum. There was also significant porosity noted on C4 superior centrum and the inferior C6 centrum. In the thoracic section mild lipping was identified on the T1 inferior right facet, inferior T3 facets, all T4 facets, inferior T5 facets, inferior left T6 facet, and all T9 facets. Moderate lipping was identified on the superior T10 and T11 facets, with severe lipping on the right T11 inferior facet. The costal joints for T1, T3, T4, T6, T11 showed DJD changes. Mild osteophyte growth was identified on the inferior T1 centrum, superior T5 centrum, inferior T6 centrum, and moderate lipping on the T9 centrum and the T11 centrum. The lumbar section had mild lipping on the left superior L1 facet and the right L4 superior facet. Moderate Lipping was identified on the right L2 superior facet. Significant porosity was identified on the L3 centrum, along with mild superior osteophyte growth and severe inferior osteophyte growth. Matching severe osteophyte growth was identified on the superior L4 centrum, up to 10mm long. Matching mild osteophyte growth was identified on the inferior L4 and superior L5 centrum, with L5 showing significant porosity. Single schmorls nodes were identified on the inferior L3 and L4 centrums. The sacrum has large osteophyte extending superiorly from the left anterior corner. This extends 13.62mm from the joint surface and is 10.8mm at its thickest. The joint surface is also displaying marked porosity, possibly indicating some level of fusion was underway between L5 and S1.

Periostitis was identified on the posterior surface of the distal end of the left tibia and the medio-superior part of the midshaft of the left fibula. Also on the left fibula is an area of extra bone growth on the lateral side of the proximal end beginning 24.67mm from the styloid process. The extra bone is 34.82mm long, 6.3mm wide and sit 5.76mm proud of the bone surface at its height, with a small 'tail' that extends distally. There is also increased bone activity at the distal end of this fibula. It is likely that there was a soft tissue injury to the left fibula, with resulted in ossification and enthesophyte formation.

This individual was not scorable for cribra orbitalia or porotic hyperostosis due to the missing skull. Nether was mentioned in the excavation report.

Dentition
The human remains report included with the excavation report list that only the lower left first premolar survived. There was also mentioned a small abscess cavity around the sockets of the right upper and lower first molars.

Human Remains

Curation Location: Northern Ireland Environmental Agency **Reg:** TYR028:021_2

The preservation of this individual is mixed, with good bone quality in some areas and other areas not preserved at all. The skull was represented by partially preserved frontal, partial left parietal, poor right parietal, partial left and right temporal, partial occipital, mostly complete sphenoid, partial left maxilla, partial left palatine, and a mostly complete mandible. The shoulder girdle was represented by the shaft and lateral portion of the left clavicle. The thorax consisted of four rib fragments and three neural arches. The pelvic girdle by a partial left ilium and fragmentary left ischium. The limbs were represented by fragments, of which parts of the left ulna, left radium, right ulna, left femur, left tibia, and right femur can be identified. There was no preservation of hands or feet.

Age and Sex

Based on the side of the remains, this individual was a child. Dental formation and eruption produced an estimated refined age-at-death of 3-4 ± 1 year. As this individual was a child, no sex estimation was undertaken.

Skeletal Pathology

Mild cribra orbitalia was identified in the left orbit, the right orbit was not scorable. There was significant bone surface damage to the skull vault, meaning that it was not scorable for porotic hyperostosis. However, a small area of preserved outer table near the sagittal suture does have some mild pitting that could have been porotic hyperostosis. No periostitis was identified.

Dentition

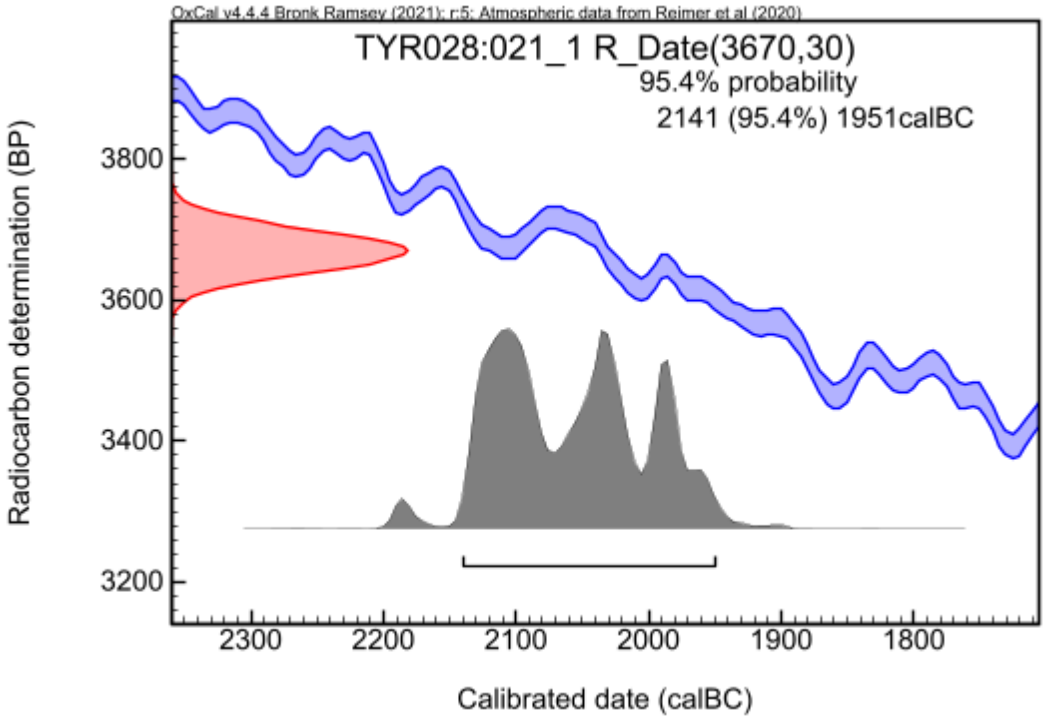
									PU	PU			PU		
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
		PU			PU										
											P	MP			
			~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	61	62	63	64	65			
			85	84	83	82	81	71	72	73	74	75			
			P	MP											

Calculus: No calculus identified

Caries: No caries identified

Hypoplasia: Hypoplasia was identified on the upper left first molar

Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.66)

Ó Ríordáin, B., and Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age*. Galway: Galway University Press (p.135)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.140)

Reg Number: BBREN **SMR Number:** WM032-055----

Physical Setting

Townland: Ballybrennan

County: Westmeath **Province:** Leinster

Year of Excavation: 1940, 1946, 1948

Monument Type: Flat Cemetery

Conditions of Discovery: Quarrying in Sandpit, multiple phases of discovery

Total Burials: 6 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: Hartnett, P.J. and Prendergast, E.M. 2011. Ballybrennan, Co. Westmeath, E1162. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 484–501.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Disturbed, likely crouched

Associated Material: Small bone pin, possibly peg pig femur pin

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1940:87

The remains of this individual were in moderate condition, with preferential preservation of the left side. The skull was represented by a poorly preserved left fontal, partial left partial, complete left temporal, partial left occipital, partial left sphenoid, partial left maxilla, partial left palatine, complete left mandible, and a partial right mandible. The shoulder girdle was represented by the shaft of the left clavicle, and a partial left scapula. The thorax consisted of 29 rib fragments, 16 partial neural arches, and two vertebral bodies. The pelvic girdle was represented by a complete left ilium, ischium, and pubis; along with a partial right ilium. The upper limb was represented by the shaft of the left humerus, fragmentary left ulna, shaft of the left radius, the shaft of the right humerus, and a fragmentary right ulna. The lower limb consisted of the shaft of the left femur, the shaft of the left tibia, and the shaft of the right tibia. Two unidentified metacarpals or metatarsals were identified.

Age and Sex

Based on the size of this individual, it was clear that it was an infant. Analysis of the dental formation and eruption identified a refined age-at-death of 18 months to 2 years, ± 8 months. As this individual was an infant, no sex estimation was attempted.

Skeletal Pathology

This individual was not scorable for cribra orbitalia. No porotic hyperostosis or periostitis was identified.

Dentition

													PU			
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28	
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	
													PU			
								MP	MP	MP	P	PU				
			~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	61	62	63	64	65				
			85	84	83	82	81	71	72	73	74	75				
			PE	P	P	P	P	P	P	P	P	PE				

Calculus: No calculus was identified

Caries: No caries or abscesses were identified

Hypoplasia: No Hypoplasia was identified

Description of Grave

Grave Number: Grave 2A

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, right side, head to the South

Associated Material: Fragment of flint artifact (possibly blade), shells (of snails, possibly fortuitous); reported to have a juvenile left femur (intrusive) possibly linked to the individual in grave 1

Dating Information: N/A

Comments: The initial report (Pendergast, 1945) reports two cists, the second of which contained a child of roughly 14. In Waddell (1990) grave 2 is also reported to contain a child of roughly 14. In Hartnett and Prendergast (2011) this child is reported as being mis-identified as an adult female (see below). The remains reported for this grave were did not have a habitat recorded in the NMI database when I first came across them.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1945:24

This individual is moderately to well preserved, with all skeletal regions represented. The skull was represented by a partial frontal, complete right parietal, complete right temporal, poor occipital, partial sphenoid, complete right zygomatic, fragmentary left maxilla, complete right maxilla, partial left palatine, complete right palatine, partial left mandible, and a complete right mandible. The shoulder girdle was complete except for the right scapula, which was absent. The thorax consisted of a partial manubrium, partial sternal body, 11 left rib fragments, 10 right rib fragments, seven complete cervical vertebrae, three partial and 8 complete thoracic vertebrae, and three complete lumbar vertebrae. The pelvic girdle was represented by a complete left ilium, complete right ischium, partial left pubis, complete right ilium, complete right ischium, and a partial right pubis. Both acetabula were partial, S1-S4 were identified. The left upper limb was complete, with the right consisting of a complete humerus, the shaft and proximal portion of the right ulna, and the shaft and distal portion of the right radium. The lower limbs were represented but a complete left femur, complete left patella, poor left tibia, fragmentary left fibula, complete right femur, complete right tibia, and complete right fibula. The epiphyses for both radii, both distal ulnas, right proximal femur, right proximal tibia, left distal tibia, and for both fibulae were missing. The hand was represented by the left poor capitate, complete MC1-MC2, complete MC5, and two proximal phalanges; the right complete hamate, proximal and shaft portion of MC2 and MC3, complete MC5, four proximal phalanges, two intermediate phalanges, and one distal phalanx. Three additional carpals were identifiable. The feet were represented by the left poor talus, partial calcaneus, complete navicular, and the complete MT1; the right poor talus, complete calcaneus, partial lateral cuneiform, and the proximal and shaft portion of MT2-MT3, and MT5. One tarsal, one metatarsal, and two phalanges were identified.

Age and Sex

Multiple unfused epiphyses identify this individual as an adolescent, with the level of fusion and tooth eruption estimating a refined age-at-death of 13-16 years. As this individual was an adolescent, no sex estimation occurred.

Skeletal Pathology

No cribra orbitalia, porotic hyperostosis, or periostitis was identified.

Dentition

				P				MP	MP	MP	P	P	P	P	PU
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	~~37~~	~~38~~
PU	P	P	P	P	P	P	P	P	P	P	P	P	P		

Calculus: Mild calculus was identified on two of the lower premolars

Caries: A labial surface caries was identified on the lower right first incisor, there was no associated abscess

Hypoplasia: Hypoplasia was identified on the right upper second premolar and first molar; and on the left lower canine, second premolar, and fist molar. All enamel defects vertical single linear defects.

Description of Grave

Grave Number: Grave 2B
Grave Type: N/A
Orientation of the Grave: N/A
Body Position: N/A
Associated Material: N/A
Dating Information: N/A
Comments: As mentioned, this individual is only reported in Hartnett and Prendergast (2011) volume. This individual also has the same NMI registration number as the individual in grave 3. My conclusion is that this individual was wrongly registered under the same number as another individual from Ballybrennan (1946:13), and when the child of roughly 14 (1945:24) could not be located it was assumed that this individual had come from grave 2 and was mis-identified earlier.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1946:13/1945:24

The preservation of this individual is moderate to poor, however there was significant decay to the outer table. The skull was represented by a partial frontal bone, complete left parietal, partial right parietal, partial right temporal, partial occipital, and a fragmentary sphenoid. The shoulder girdle was represented by partial left and right scapulae. The thorax consisted of six rib fragments. there was no preservation of the vertebrae. The pelvic girdle was represented by a partial left ilium, ischium, and pubis. The left acetabulum was poorly preserved. The upper limbs consisted of complete humeri, the shaft and distal portions of both ulnae, and the shaft of the right radius. The lower limbs were represented by the shaft of the left femur, the shaft of the left tibia, fragmentary left fibula, complete right femur, the shaft and distal portion of the right tibia, and the fragmentary right fibula. There was no preservation of the hands or feet.

Age and Sex
The completed fusion of the skeleton indicated that this individual was an adult, with analysis of suture closer, suggest the estimation of age-at-death of Middle Adult. The morphology of the supraorbital ridges and the sciatic notch suggest the estimation of female for this individual.

Stature
A stature estimation of 155cm was made using the humerus. While this is not the preferred bone for stature estimation, it does provide an indication of stature.

Non-metric Traits
Wormian bones identified.

Skeletal Pathology
A perfectly circular and smooth aperture in the right parietal, near the bregma. The cause of this is unknown. Bony changes to the proximal right femur, around the gluteal tuberosity is consistent with an enthesophyte or myositis ossificans. Due to the surface degradation, it is impossible to identify the original extent of the bony change. This is indicative of a soft tissue, muscle or ligament, injury to the back of the leg at one point during this individuals' life. This site is a common site for the development of myositis ossificans associated with hip injures. While painful at time of injury, this would not have resulted in any long-term difficulties.

Dentition
No dentition was identified.

Description of Grave

Grave Number: Grave 3
Grave Type: Cist
Orientation of the Grave: Northwest/Southeast
Body Position: Crouched, left side, head in Northeast corner
Associated Material: Tripartite Bowl in front of face, cremation over knees
Dating Information: Inhumation dated to 3650 ± 40 BP (GrA-24139; human bone [collagen]; $\delta^{13}C$ = –21.51‰), calibrated to 2140-1914 cal BC (calibrated at 2σ); Cremation dated to 3660 ± 40 BP (GrA-24179; human bone [carbonate]), calibrated to 2190-1914 cal BC (calibrated at 2σ); these dates suggest that the burials are toughly contemporaneous; Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1946:13

This individual had noticeable bone surface decay, but good representation of skeletal elements. The skull was represented by the complete frontal, complete left parietal, complete right parietal, complete left temporal, partial right temporal, complete occipital, fragmentary sphenoid, poorly preserved but mostly complete mandible. The shoulder girdle consisted of the shafts of both clavicles, the fragmentary left scapula, and the partial right scapula. The thorax consisted of 9 mostly complete left ribs and fragments of 3 further left ribs, no cervical vertebrae, fragments of ten thoracic vertebrae, and the left neural arches of all five lumbar vertebrae. The pelvic girdle consisted of the complete left ilium and the partial left ischium. The left acetabulum was partial. The upper limb was represented by poorly preserved humeri, the shaft and distal potion of the left ulna and radius, and the complete right ulna and radius. The lower limb was represented by the shaft and proximal portion of the left femur, complete left patella, poor tibia, shaft and proximal portion of the left fibula, the shaft and distal portion of the right femur, complete right patella, poor right tibia, and the shaft of the right fibula. The hands consisted of the left lunate, pisiform, trapezium, trapezoid, MC1-MC4, and five phalanges; right scaphoid, trapezium, capitate, hamate, M1-M5, and four phalanges. The feet were complete except for the phalanges, of which eight left and five right were identified.

Age and Sex

Completed fusion, dental attrition, and the morphology of the left auricular surface suggest an age-at-death estimate of Middle Adult, with a refined age-at-death estimated of 35-44. The morphology of the supraorbital ridges, mastoid processes, nuchal crest, and the sciatic notch all point to an estimation of male for this individual.

Stature

Buckley reported a stature estimate of 161cm.

Skeletal Pathology

Diffuse DJD was identified in this individual. Mild lipping was identified on the left glenoid fossa, left acetabulum, left proximal and distal femur, left patella, left proximal tibia, right distal femur, right patella, left distal MT5 and one foot phalanx. DJD changes were also observed in the spinal column, including mild lipping on the left superior T5 facet, right inferior T5 facet, right superior T6 facet, left inferior T7 facet, left inferior T8 facet, right inferior T9 facet, left inferior T10 facet, right inferior T11 facet, right superior T12 facet, left superior L1 facet, left superior L2 facet, left inferior L2 facet, and on the T8 centrum. L3 showed moderate lipping to the left facets, with L4 and L5 showing severe lipping. New bone formation on L4 and L5 was significant, with areas of new bone between the superior and inferior facets. L4 had also begun to develop porosity. *Buckley suggests that these*

significant changes, particularly to L4 might have resulted from a crush fracture that compressed L4, resulting in the new bone formation to create a 'buttress' for the reduced join space. However as only a portion of the vertebrae is preserved it is hard to be sure. There was also ossification of the ligmenta flava, with are important for stabilising the spine, indicating that there had been damage.

Alongside this DJD, there was also an area of severe DJD around the right elbow. Severe lipping was identified on all joint surfaces of the right elbow, including a large area of eburnation on the capitulum and a corresponding area on the radial head. There was possibly a healed break of the proximal joint surface of the ulna, but there was such extensive lipping and bone build-up that it was impossible to be sure. Mild lipping in the right proximal humerus is likely associated with the injury that led to this area of joint destruction.

Dentition

			P	P			P	P	P	P	P	P				
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	MP	P	P	P	P	P	P	P

Attrition: There was moderate attrition on the lower incisors and canines, with milder attrition on the premolars and molars.

Calculus: There was mild to moderate deposits of calculus on the mandibular premolars and molars.

Caries: No caries identified.

Hypoplasia: While surface damage to the dentition obscured many of the teeth, hypoplasia was identified of the lower right canine.

Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.66)

Prendergast E. 1945. Bronze Age burials in Co. Westmeath. Journal of the Royal Society of Antiquaries of Ireland 75(2):107-111

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.146)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Reg Number: 1958:132 **SMR Number:** WM032-082----

Physical Setting

Townland: Benalbit and Derryroe

County: Westmeath **Province:** Leinster

Year of Excavation: 1969

Monument Type: Cist Burial

Conditions of Discovery: Capstone uncovered by a tractor

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Waddell, J. 2011. Benalbit and Derryroe, Co. Westmeath, E1163. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 501–503.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Roughly North/South

Body Position: Disturbed

Associated Material: Shell fragment

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1969:76

This individual is poorly preserved and highly fragmentary, most likely because of disturbance. The skull is represented by fragments of the frontal, both parietals, the occipital, and a partial left mandible and maxilla. The shoulder girdle is represented by the shaft and lateral portion of the left clavicle and a fragmentary left scapula. The thorax is represented by a partial sternal manubrium and body, 17 rib fragments, three cervical vertebrae fragments, four thoracic vertebrae fragments, five lumbar vertebrae fragments, and the fragmented remains of the sacrum. The pelvic girdle is represented by the poorly preserved left ilium, partial left ischium, partial right ilium, and complete right ischium and pubis. The upper limbs consist of a poorly preserved left humerus, the shaft and proximal portion of the left radius and ulna, and the fragmentary remains of the right humerus. The lower limb consisted of the shaft and proximal portion of the left femur, left tibial shaft, fragmentary left fibula, fragmentary right femur, right tibial shaft, and the proximal portion of the right fibula. The hands consist of the left triquetrum, trapezium, MC2, MC3, MC4, and MC5; right pisiform, trapezoid, capitate, MC2, MC4, and MC5. There was one unidentified

metacarpal and seven hand phalanges. The foot was represented by five unidentified metatarsals and three phalanges.

Age and Sex
Third molars in occlusion and the presence of a fusion line at the ischial border suggest that this is a young adult, with an estimated refined age-at-death of 18-25. Based on the morphology of the sciatic notch, this individual was estimated to be a possible female.

Stature
A stature estimate of 157.09 ± 4.45 cm was obtained from the measurement of the length of the left humerus, 29.5cm. While this measurement isn't preferred for stature estimation, it does provide a ballpark.

Skeletal Pathology
This individual was not scorable for cribra orbitalia, porotic hyperostosis. No periostitis identified.

Dentition

								MP	MP	MP	MP	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	35	36	37	38
								MP	P	P	P	P	P	P	P

Attrition: Low levels of attrition identified

Calculus: Mild calculus identified on all molars present and both second premolars.

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Additional References

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.148)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Reg Number: 1958:132 **SMR Number:** WM013-064----

Physical Setting

Townland: Cartenstown

County: Westmeath **Province:** Leinster

Year of Excavation: 1957

Monument Type: Flat Cemetery

Conditions of Discovery:

Total Burials: 2 **Total Inhumations:** 2

Excavation Report: Published

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (148-149)

Description of Grave

Grave Number: Cist B

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, right side

Associated Material: N/A

Dating Information: N/A

Comments: Location of remains not identified within in NMI storage

Description of Grave

Grave Number: Cist C

Grave Type: Cist

Orientation of the Grave: Northwest/Southeast

Body Position: N/A

Associated Material: N/A

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1958:132

The remains of this individual were moderately well preserved, with moderate skeletal representation. The skull consisted of a partial left frontal, complete right frontal, fragmentary parietals, poor temporals, partial left occipital, fragmentary sphenoid, fragmentary left zygomatic, complete right zygomatic, poor maxillae, poor palatines, and poor mandible. The shoulder girdle consisted of the complete left clavicle, partial left

scapula, lateral and shaft portion of the right clavicle, and partial right scapula. The thorax was represented by a partial manubrium, 6 left rib fragments, 7 right rib fragments, 23 unsided rib fragments, 7 fragmentary cervical vertebrae, fragmentary thoracic vertebrae, 4 fragmentary lumbar vertebrae. The pelvic girdle consisted of partial left ilium, partial left ischium, partial right ilium, fragmentary right ischium, fragmentary right pubis, and S1. The left acetabulum was partial. The upper limb was represented by a poor left humerus, shaft of the left ulna and radius, proximal and shaft portions of the right humerus and ulna, and a poor right radius. The lower limb consisted of fragmentary femora, fragmentary tibiae, proximal and shaft portion of the left fibula, and the shaft of the right fibula. The hands and the feet were not represented.

Age and Sex

Based on dental formation and eruption, this individual was estimated to have been a child, with a refined age-at-death estimate of 7-9 years. As this individual was a child, no sex estimation was attempted.

Skeletal Pathology

Mild, unhealed, cribra orbitalia was identified in the left orbit, with moderate, unhealed, cribra orbitalia in the right orbit. Porotic hyperostosis was not scorable, periostitis was absent.

Dentition

	PU	P		PU	PU					PU	PU		P	PU	
18	17	16	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	26	27	28
48	47	46	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	36	37	38
	PU	P			PU					PU	PU		P	PU	
			P	P							P	P			
			55	54	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65			
			85	84	83	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	74	75			
			P	P	P						P	P			

Attrition: Mild attrition identified

Calculus: No calculus identified

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Additional References

Ó Ríordáin, B. 1959. Prehistoric burial at Cartenstown, Co. Westmeath. *Riocht na Midhe*, 2(1), 49-50.

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum*, 3(2), 7-20.

Rynne, E. 1962. Two Bronze Age burials. *Riocht na Midhe,* 2(4), 33-36.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Reg Number: 1980:43 **SMR Number:** WM020-137----

Physical Setting

Townland: Clonickilvant

County: Westmeath **Province:** Leinster

Year of Excavation: 1980

Monument Type: Cist

Conditions of Discovery: Bulldozing on a Farm

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Cahill, M. 2011. Clonickilvant, Co. Westmeath, E1165. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 503–506.

Description of Grave

Grave Number: Grave 1

Grave Type: Trapezoidal Cist

Orientation of the Grave: North/South

Body Position: Crouched, right side, facing East

Associated Material: Anomalous vase immediately East of skull, mussel shell between skull and vessel

Dating Information: 3660 ± 30 BP (GrN-11898; human bone [collagen]; $\delta^{13}C$ = –21.37‰), calibrated to 2137-1948 cal BC (95.4%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020])

Comments: At least three other burials had recorded from this townland

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1980:43

The remains of this individual were well preserved, with very representation of skeletal regions. The skull was represented by a poor left frontal, complete right frontal, partial left parietal, poor right parietal, partial left temporal, poor right temporal, fragmentary occipital, poor sphenoid, poor left zygomatic, complete right zygomatic, complete maxillae, complete palatines, poor nasals, partial right lacirmal, poor internal nasal concha, poor ethmoid, complete vomer, and a complete hypoid. There was some significant damage to the bottom and left side of the skull. The shoulder girdle consisted of a complete left clavicle, poor right clavicle, complete left scapula, and poor right scapula. The thorax was represented by a complete manubrium, fragmentary sternal body, twelve almost complete right ribs, nine of which were complete, ten partial to complete left ribs, complete C1, partial C2 and C3,

complete C4-C7, complete T1-T9, partial T10 and T12, complete T12, complete L1 and L2, and partial L3-L5. The pelvic girdle consisted of a partial left ilium, complete left ischium, partial left pubis, complete right ilium, partial right ischium, and a partial right pubis. The left acetabulum was complete, the right poor; S1-S3 and the coccyx were present. The upper limb was represented by a complete left humerus, poor left ulna, complete left radius, poor right humerus, complete right ulna, and a complete right radius. The lower limb consisted of complete patellae, poor left tibia, shaft of the left fibula, complete right femur, poor right tibia, and complete right fibula. The left femur had been taken for radiocarbon analysis. The hands were complete. The feet consisted of left poor talus, poor calcaneus, partial cuboid, complete navicular, complete cuneiforms, poor MT1, distal and shaft portion of MT2, poor MT3, distal and shaft portion of MT4, fragmentary MT5, four proximal phalanges, two middle phalanges, and one distal phalanx; complete right tarsals, complete MT1, distal and shaft portion of MT2-4, complete MT5, four proximal phalanges, and one distal phalanx.

Age and Sex

The level of fusion, dental development, and the morphology of the pubic symphyses, this individual was estimated to be a young adult; with a refined age-at-death estimate of 25 to 30. Based on the morphology of the supraorbital ridges, mental protuberance, gonial flare, ventral arch, and sciatic notch this individual was estimated to be male.

Stature

An attained stature estimate of 169.94 ± 3.94 cm was obtained from a right femur maximum length of 45.6 cm. A right measurement of 36.2 cm and a left measurement of 36.3cm for the tibiae resulted in an attained stature estimate of 170.10 ± 4.00 cm.

Skeletal Pathology

C3 seems unreasonably small, such that initially I thought it was an intrusive bone and that C3 was missing. However, it articulated well with C2, and the centrum articulated well with the C4 centrum.

Some likely developing mild DJD was identified on the right distal femur and distal tibia; this would not have been symptomatic. There was mild lipping identified on the C1 dens articulation. Schmorls nodes were identified on the inferior T7 centrum, superior T8 centrum, inferior T9 centrum, inferior T10 centrum, superior T11 centrum, and both surfaces of the T12-L3 centrums.

Bony changes to the sacrum were identified, with it developing asymmetrically – ‘leaning’ to the left. This would have likely resulted in the left hip sitting higher than the right during life. It is possible that this developmental asymmetry could have interfered with how this individual walked or resulted in pain. However, it would have been unlikely that this was a

debilitating pathology. When reconstructed, the lumbar vertebrae show some slight asymmetry in disc space, particularly L4/L5, which would have likely been secondary to adjust to the asymmetry.

Periostitis and cribra orbitalia were absent in this individual, with porotic hyperostosis not scorable due to surface damage.

Trauma
A well healed crush fracture to the left first distal phalanx is suggestive of a broken big toe during life.

Dentition

P	P	MP	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

The upper right 3rd molar erupted on a slight but noticeable angle towards the other teeth. However, there was no impaction or resulting infection.

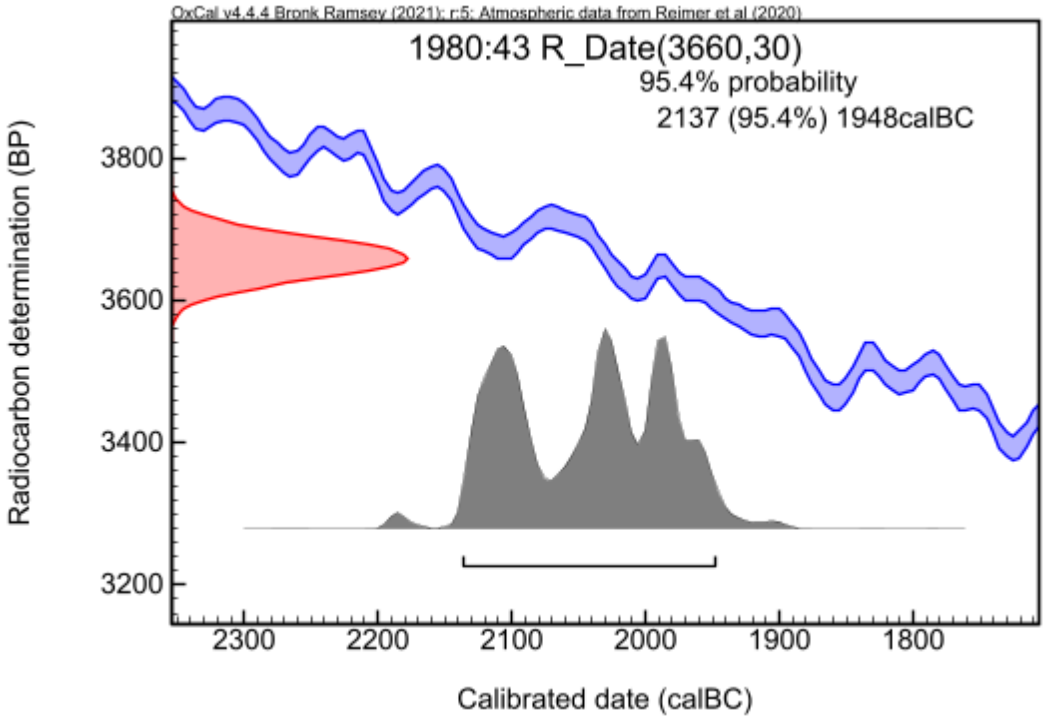
Attrition: Mild levels of attrition are consistent with the estimated age-at-death

Calculus: Mild calculus was identified throughout the dentition, however there was some surface damage to the upper left quadrant which made calculus identification harder

Caries: No caries identified

Hypoplasia: Surface damage to the left side resulted in those teeth not being scorable for hypoplasia. However, hypoplasia was identified on the upper right incisors and canine; as well as the lower canine and first premolar

Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.93)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.149)

Excavations.ie 1980-84:0198

Reg Number: 1947:37 **SMR Number:** WM025-093----

Physical Setting

Townland: Conranstown

County: Westmeath **Province:** Leinster
Year of Excavation: 1946
Monument Type: Cist Burial
Conditions of Discovery: Construction
Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: Raftery, J. 2011. Conranstown, Co. Westmeath, E1166. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 506–510

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: East/West
Body Position: Disturbed
Associated Material: Single fragment of cremated bone (frontal of an adult, probably male) with green staining
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1947:37

The remains of this individual were poorly preserved, with poor skeletal region representation. There was noticeable surface erosion. Age-at-death was estimated to be young adult, based on dental attrition. Sex was estimated to be make, based on the morphology of the pelvis. Attained stature was estimated to be 176cm, calculated from the length of the tibia.

Skeletal Pathology
Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	41	31	32	33	34	35	36	37	38
							MP	MP	MP	MP	P	P	P	P	P

Mild to moderate attrition was identified. Mild calculus was identified. Enamel hypoplasia was absent.

Reg Number: 02E0479 **SMR Number:** WM032-121----

Physical Setting

Townland: Gneveebeg

County: Westmeath **Province:** Leinster

Year of Excavation: 2002

Monument Type:

Conditions of Discovery: Gas Pipeline

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: Wallace, A. 2002. *Section 1b, Gas Pipeline to the West, Gneveebeg, Co. Westmeath, Licence no. 02E0479*.

Description of Grave

Grave Number: Burial 12

Grave Type: Pit

Orientation of the Grave: N/A

Body Position: Crouched, side not recorded

Associated Material: Sherds of a Vase vessel

Dating Information: Brindley stage 1 Vase

Human Remains

Curation Location: Unreported

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be adult. Due to poor preservation, no sex estimation was undertaken.

Periostitis, cribra orbitalia, porotic hyperostosis, enamel hypoplasia were not scorable.

Reg Number: 1979:110 **SMR Number:** WM020-104----

Physical Setting

Townland: Greatdown

County: Westmeath **Province:** Leinster
Year of Excavation: 1979
Monument Type: Cist Burial
Conditions of Discovery: Construction
Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published
Primary Reference: McCabe, J. and Ronayne, B. 2011. Greatdown, Co. Westmeath, E1170. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 510–513.

Description of Grave

Grave Number: Grave 1
Grave Type: Cist
Orientation of the Grave: North-northeast/South-southwest
Body Position: Crouched, side not recorded
Associated Material: Ribbed Bowl
Dating Information: Brindley stage 3 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1979:110

The remains of this individual were poorly preserved, with moderate to poor skeletal region representation. The skull was absent. Age-at-death was estimated to be older adult, based on the morphology of the auricular surface. Sex was estimated to be male, based on the morphology of the sciatic notch and metric analysis. Attained stature was estimated to be 177cm, calculated from the length of the femur.

Skeletal Pathology
Mild DJD was identified on the right glenoid, the right acromial articular facet, the right femoral head, and the distal ends of both tibiae. Moderate DJD was identified on the right acetabulum. Both knee joints were not scorable due to surface alteration.

Mild DJD was identified on the centrum of L1 and on multiple costo-vertebral joints. Moderate DJD was identified on most articular facets of the lower thoracic vertebrae and L1-L2. Eburnation was identified on the right superior articular facet of T5.

Periostitis was absent. Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Reg Number: 1956:211 **SMR Number:** WM037-010----

Physical Setting

Townland: Kilgaroan

County: Westmeath **Province:** Leinster

Year of Excavation: 1956

Monument Type: Cist Burial

Conditions of Discovery: Land reclamation work on a farm

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Prendergast, E.M. 2011. Kilgaroan, Co. Westmeath, E1171. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 513–516.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist, paved

Orientation of the Grave: East/West

Body Position: Disturbed, possibly crouched, head reported to have been in the Northeast corner

Associated Material: N/A

Dating Information: N/A

Comments: The report mentions that the remains could have contained a younger second individual, this could not be confirmed during analysis.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1956:211

The remains of this individual were moderately preserved. The skull was fragmentary, consisting of more than 50 vault fragments, including 18 large fragments. represented by a partial left frontal, fragmentary right frontal, fragmentary parietals, partial temporals, fragmentary occipitals, partial sphenoid, poor left zygomatic, partial maxillae, partial left palatine, partial vomer, and a partial mandible. The shoulder girdle consisted of complete clavicles. The thorax was represented by four left rib fragments, four right rib fragments, 19 unsided rib fragments, partial C1-C6, three lower thoracic or lumbar centrum, and four fragments of lumbar neural arch. The pelvic girdle was represented by partial left ilium, and poor right ilium. Both acetabula were absent, the sacrum was represented by partial S1 and S2. The upper limb consisted of the fragmentary left humerus, fragmentary left ulna, fragmentary left radius, poor right humerus, complete right ulna, and the complete right

radius. The lower limb consisted of the fragmentary left femur, fragmentary left tibia, fragmentary left fibula, fragmentary right femur, fragmentary right tibia, and fragmentary right fibula. The hands consisted of seven unidentified metacarpals including one unsided MC1, four proximal phalanges, and four middle phalanges.

Age and Sex
The lack of fusion and level of dental development identifies this individual as a child. A refined age-at-death estimate of 8 ± 2 years was made based on dental development. Due to the identification of this individual as a child, no sex estimation was undertaken. *Published anatomical analysis reported an age-at-death of 6.*

Skeletal Pathology
Periostitis was absent. Cribra orbitalia and porotic hyperostosis were both not scorable.

Dentition

	PU	P			PU	PE	MP	P	PE	PU	PU		P	PU		
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
48	47	46	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	33	34	35	36	37	38	
	PU	P			PU								P			
			P	P	P						P	P				
			55	54	53	52	51	61	62	63	64	65				
			85	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	74	75				
			P								P	PE				

The permanent teeth have not developed properly, resulting in a multiple misshapen teeth

Attrition: Mild attrition

Calculus: No identified calculus

Caries: No identified caries

Hypoplasia: Hypoplasia was identified on the upper left permanent first incisor and the lower right permanent canine

Additional References

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.150)

Reg Number: 1932:6684 **SMR Number:** WM031-015----

Physical Setting

Townland: Knockast, Coolatore

County: Westmeath **Province:** Leinster

Year of Excavation: 1932

Monument Type: Mound Cemetery

Conditions of Discovery: Excavation

Total Burials: 43 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: O'Neill Hencken, H., and Movius, H. 1932-1934. The cemetery-cairn of Knockast. *Proceedings of the Royal Irish Academy,* 41, 232-284.

Description of Grave

Grave Number: Skeletal Burial 1

Grave Type: Pit burial

Orientation of the Grave: N/A

Body Position: Extended, lying on his back, hands over pelvis

Associated Material: Parietal of a child over left elbow, other parietal of the child under the sternum. Disturbed burial cremation 5

Dating Information: N/A

Comments: Both the excavation publication and Waddell suggest that this individual is later – due to the body position, burial placement, and how it disturbed other burials. As such, it was not analysed.

Description of Grave

Grave Number: Skeletal Burial 2

Grave Type: Pit Burial

Orientation of the Grave: N/A

Body Position: Crouched, right side, head toward West, facing South

Associated Material: Pig tusk

Dating Information: N/A

Comments: Excavation report suggests that this was one of the first burials in the cemetery

Human Remains

Curation Location: Unknown

Male, 5 feet 8.5 inches tall, 35-40 years old at death. "This individual suffered from chronic arthritis, and in youth from an abscess of the inner ear which healed, but left his face severely distorted." (Hencken and Movius 1932, 235)

It is not known why, but the remains of skeletal burial 2 were not found to be curated with the remains of skeletal burial 3 and 4, which the recorded suggested they had been. The location of these remains is currently being investigated. As this individual has not been analysed by a recognised bioarchaeologist, it was not included within the assemblage for this study.

Description of Grave

Grave Number: Skeletal Burial 3
Grave Type: Pit?
Orientation of the Grave: N/A
Body Position: Disturbed, Crouched
Associated Material: N/A
Dating Information: N/A
Comments: Disturbed by cremation burial 21

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1932:6684.8

The remains of this individual were moderately preserved, with moderate skeletal region representation. The skull was partially reconstructed after excavation, with 20 addition fragments, and consisted of fragmentary frontal, fragmentary parietals, partial left temporal, complete right temporal, fragmentary occipital, fragmentary sphenoid, complete right zygomatic, poor maxillae, complete left mandible, and poor right mandible. The shoulder girdle was represented by the poor left clavicle, fragmentary left scapula, and the medial and shaft portion of the right clavicle. The thorax consisted of partial C1, partial T1-T3, partial T5-T9, and three lumbar centrums. The pelvic girdle consisted of the partial left ilium, partial left ischium, partial right ilium, partial right ischium, and the partial right pubis. The left acetabulum was partial, the right complete; S1 was identified. The upper limb was represented by the distal and shaft portion of the left humerus, distal and shaft portion of the left ulna, distal and shaft portion of the left radius, distal and shaft portion of the right humerus, proximal and shaft portion of the right ulna, and the fragmentary right radius. The lower limb was represented by the fragmentary left femur, poor left patella, fragmentary left tibia, fragmentary right femur, fragmentary right tibia, and the proximal portion of the right fibula. The hands were absent. The feed consisted of the partial left talus, poor left calcaneus, partial right calcaneus, one unidentified metatarsal, and one foot phalanx.

Age and Sex
Based on dental attrition, this individual was estimated to be a young adult. The morphology of the supraorbital ridges, mastoid process, gonial flare, and the sciatic notch resulted in a sex estimation of male.

Skeletal Pathology
Mild DJD was identified in the left acetabulum, left distal femur, C1 dens articulation, left inferior T1 facet, on the inferior centrum surface of L2 and the superior surface on the L3 centrum. Schmorl's nodes were identified on the T5 superior centrum and the T8 inferior centrum.

Periostitis and porotic hyperostosis were absent. Mild cribra orbitalia was observed in both orbits.

Dentition

P	P	P	P	P	P	P	MP	MP	MP	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	MP	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Mild attrition was identified across the dental arcade, with mild to moderate attrition on the first incisors

Calculus: Calculus was not scorable

Caries: No caries were identified

Hypoplasia: While 'dents' in the enamel of the lower canines were identified, these did not take any of the standard hypoplasia forms, suggesting that these did not represent hypoplasia

Description of Grave

Grave Number: Skeletal Burial 4
Grave Type: Cist Burial
Orientation of the Grave: Not reported
Body Position: Disturbed
Associated Material: Cremation burial 24a (young female)
Dating Information: N/A
Comments: Disturbed in antiquity

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1932:6684.9

The remains of this individual were moderate to poorly persevered, partially associated with the age-at-death of this individual. The skull was highly fragmented, 56 fragments of skull vault including 14 larger fragments. There were 6 fragments of the facial region. From this, parts of the frontal, parietals, temporals including both petrous bones, occipital, sphenoid, partial left zygomatic, martial maxillae, and partial mandible were identified. The shoulder girdle was represented by the partial left scapula. The thorax consisted of five left rib fragments, one right rib fragment, 20 unsided rib fragments, three thoracic neural arches, and one unidentified vertebral fragment. The pelvic girdle was absent. The upper limb was represented by the distal and shaft portion of the left humerus, the shaft of the left ulna, the shaft of the left radius, the shaft of the right humerus the proximal and shaft portion of the right ulna, and the shaft of the right radius. The lower limb was represented by the shaft of the left femur, the shaft of the left tibia, the fragmentary left fibula, poor right femur, the shaft of the right tibia, and the fragmentary right fibula. Six fragments of hands or feet were identified.

Age and Sex

Based on the size and dental development, this individual was estimated to be an infant with a refined age-at-death estimate of 3 ± 1 year.

Skeletal Pathology

No periostitis was identified. Both cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

		PU		PU							PU		PU		
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	24	25	26	27	28
48	47	46	45	44	~~43~~	~~42~~	~~41~~	31	32	33	34	35	36	37	38
						PU	PU	PU		PU	PU				
			P	P							P	P			
			~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	64	65			
			85	84	~~83~~	~~82~~	~~81~~	71	72	73	74	75			
			P	P			P	P	P	P	P	P			

Attrition: Mild attrition was identified

Calculus: No calculus was identified

Caries: No caries were identified

Hypoplasia: Hypoplasia was not scorable

Additional References

Kavanagh, R. 1973. The encrusted urn in Ireland. *Proceedings of the Royal Irish Academy,* 73, 507-617.

Martin, CP. 1935. *Prehistoric Man in Ireland*. London: Macmillan and Co., Ltd. (p.98)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.149)

Reg Number: 1971:906 **SMR Number:** WM025-049----

Physical Setting

Townland: Milltown

County: Westmeath **Province:** Leinster

Year of Excavation: 1971

Monument Type: Cist Burial

Conditions of Discovery: Ploughing

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Raftery, J. 2011. Milltown, Co. Westmeath, E1173. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 516–519.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Northeast/Southwest

Body Position: Crouched, right side, head to the Southwest. According to Raftery, the hands were on either side of the vessel

Associated Material: Tripartite bowl in southeast corner, in front of face

Dating Information: 3755 ± 35 BP (GrN-11903; human bone [collagen]; $\delta^{13}C = –21.20‰$), calibrated to 2287-2038 cal BC (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1971:906

The remains of this individual were well preserved, with good skeletal region representation. The skull consisted of a complete frontal, complete parietals, poor left temporal, complete right temporal, poor sphenoid, complete zygomatics, complete maxillae, poor palatines, partial nasal bones, complete hyoid, and complete mandible. The shoulder girdle was represented by a complete left clavicle, fragmentary left scapula, lateral and shaft portion of the right clavicle, and the fragmentary right scapula. The thorax consisted of a complete manubrium, partial sternal body, twelve left rib fragments, thirteen right rib fragments, 21 unsided rib fragments, complete C1-C4, partial C4-C6, complete C7, partial T1 and T2, complete T3, partial T4-T7, complete T8-T12, complete L1-L4, and partial L5. The pelvic girdle was represented by partial left ilium, partial left ischium, partial right ilium, and the partial right ischium, the left acetabulum was poor, the right partial; the sacrum was mostly complete. The upper limb was represented by a complete left humerus,

complete left ulna, complete left radius, distal and shaft of the right humerus, complete right ulna, and the complete right radius. The hands consisted of the left complete scaphoid, complete triquetrum, poor pisiform, poor trapezium, complete capitate, complete hamate, poor MC1, complete MC2-5, four proximal phalanges, and three middle phalanges; right complete scaphoid, poor lunate, complete triquetrum, complete trapezoid, complete capitate, complete hamate, poor MC1, complete MC2-MC5, three proximal phalanges, and two middle phalanges. The feet consisted of the left complete talus, complete calcaneus, partial cuboid, poor navicular, poor medial cuneiform, complete middle cuneiform, complete lateral cuneiform, poor MT1, complete MT2 and MT3, proximal and shaft of MT4, complete MT5, five proximal phalanges, and one distal phalanx; the right tarsals were complete except for the medial cuneiform which was damaged, MT1-MT5 was complete, there was five proximal phalanges, and one distal phalanx. Three sesamoid bones were identified.

Within the same curation box as these remains were a set of lower limbs labelled as either Newtownmacabe or Milltown. They were found unlabelled in a previous curation location with these sites, and as such it is unclear which they belong to. Based on the preservation of the remains from these sites, I believe it is most likely that they belong with Milltown, but this is not confirmed. These lower libs consist of a poor left femur, complete left patella, poor left tibia, poor left fibula, complete right femur, complete right patella, complete right tibia, and complete right fibula.

Age and Sex

Based on the fusion of S1, morphology of the auricular surfaces, and dental attrition, this individual was estimated to be a young adult, with a refined age-at-death estimate of 25 to 35. The morphology of the supraorbital ridges, mastoid process, nuchal crest, gonial flare, and the sciatic notch support the sex estimation of male for this individual.

Stature

While not a preferred bone to use for stature estimations, the maximum length of the left humerus (32.0 cm) resulted in a stature estimate of 170.58 ± 4.57 cm. This is consistent with a stature estimate taken from the femora outlined about (maximum lengths of 46.0 cm and 46.6 cm, left and right respectively) of 171.60 ± 3.94 cm. This supports, but does not confirm, the association of these lower limbs with this individual.

Non-metric Traits

This individual had a retained metopic suture. There is noticeable cranial asymmetry in this individual, with the right partial boss more anterior than the left parietal boss. No distinctive twisting was identified in the occipital or frontal. The posterior of the skull was noticeably flattened.

Skeletal Pathology

Mild DJD was identified in one left rib articular facet. DJD was also identified in the spinal column, although damage to many of the centrums restricted the identification of lipping. Mild lipping was identified on the inferior T3 centrum border, on both T8 centrum borders, on the superior T9 centrum border, on the superior L4 centum border, and on the inferior L5 centrum border. The superior L5 centrum border had moderate lipping. Schmorls notes were identified on the inferior T9 centrum, the inferior t11 centrum, both sides of the T12 centrum, both sides of the L1 centrum, both sides of the L2 centrum and on the superior L3 centrum. One rib articulation on T11 showed DJD.

Mild DJD was identified in the left proximal femur.

An area of woven bone was identified on the right supraorbital ridge, 23.48 mm by 10.71 mm at its widest. Sadly, the respective area on the other orbit was damaged so it could not be seen if this was symmetrical.

Periostitis and cribra orbitalia were absent. Mild porotic hyperostosis was identified on the frontal and both parietals.

Dentition

MP	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Moderate attrition was identified on the first incisors and the lower first molars, the rest of the dentition had mild attrition

Calculus: Due to surface damage, calculus could not be scored

Caries: No caries were identified

Hypoplasia: No enamel hypoplasia defects were identified

Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.67)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.151)

Reg Number: 1963:41 **SMR Number:** WM038-025001-

Physical Setting

Townland: Rahinashurock

County: Westmeath **Province:** Leinster

Year of Excavation: 1963

Monument Type: Cist Burial

Conditions of Discovery: Quarrying

Total Burials: 2 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (pp.151,153)

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, left side, head to North, facing East

Associated Material: N/A

Dating Information: N/A

Comments: Cremation with a bronze razor, a bone pin, and perforated bone object were apparently found in a pit about 60 cm east of the cist

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1963:41

The remains of this individual were very well preserved and mostly complete. The skull was complete, but with damage to the temporals, the internal nasal conchae, ethmoid, vomer, and the right mandible. The hyoid was complete. The shoulder girdle was represented by complete left clavicle, poor left scapula, complete right clavicle, and fragmentary right scapula. The thorax consisted of a poor manubrium, fragmentary sternal body, fragmented but mostly complete ribs, complete cervical vertebrae, complete thoracic vertebrae apart from T5 which was fragmentary, and complete lumbar vertebrae. The pelvic girdle was complete, but with damage to the right ilium. Both acetabula were complete, fragmentary sacrum. The upper limbs were complete. The lower limbs were complete, except for the left patella which was missing. The hands consisted of complete left carpals, complete left MC1-MC4, proximal and shaft portion of the left MC5, five left proximal phalanges, four left middle phalanges, three left distal phalanges; complete right scaphoid, lunate, trapezium, trapezoid, capitate, hamate, complete right MC1-MC4, proximal and shaft portion of the right MC5, five right proximal phalanges, four right middle phalanges, and four right distal

phalanges. The feet consist of complete left tarsals except for a damaged calcaneus, complete left metatarsals except for a damaged MT5, complete right tarsals, complete right metatarsals, ten proximal phalanges, and one distal phalanx.

Age and Sex

While the third molars had erupted, the lack of fusion on many of the long bones suggests that this individual was a late adolescent or an early young adult, with a refined age-at-death estimate of 17-20. Based on the size of the individual, the late fusion of multiple bones, and the general morphology of the individual, it was estimated that they were a possible male.

Stature

While still not having completed growth, this individual had an attained stature estimated at 168.27 ± 3.94 cm, with a maximum femur length of 45 cm and 44.7 cm (left and right respectively).

Skeletal Pathology

No DJD was identified. Periostitis and cribra orbitalia were absent. Porotic hyperostosis was not scorable.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

It is likely that the left lower third molar had only recently erupted, as the space in the mandible to hold the crown was not fully closed around the neck of the tooth.

Attrition: Attrition was mild

Calculus: Mild calculus was identified on the upper incisors, canines, and premolars. Moderate calculus was developing on the upper first and second molars. Moderate calculus was developing on all of the lower dentition, except for the third molars

Caries: No caries was identified

Hypoplasia: No hypoplasia was identified

Additional References

Danaher, P. 1965. Bronze Age burials at Rahinashurock, Co. Westmeath. *Riocht na Midhe,* 3(3), 225-229.

Eogan, G. 1997. The earlier Bronze Age grave-group from Rahinashurock, Co. Westmeath, reviewed. *Riocht na Midhe,* 9(3), 28-45.

Lucas, A. 1966. National Museum of Ireland archaeological acquisitions in the year 1963. *Journal of the Royal Society of Antiquaries of Ireland,* 96(1), 7-27.

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Reg Number: 1956:209, 232, 233 **SMR Number:** WM025-090----

Physical Setting

Townland: Redmondstown

County: Westmeath **Province:** Leinster

Year of Excavation: 1956

Monument Type: Flat Cemetery

Conditions of Discovery: Ploughing

Total Burials: 3 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Prendergast, E.M. and Ó Ríordáin, B. 2011. Redmondstown, Co. Westmeath, E1177. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 540–547.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: North/South

Body Position: Crouched, left side, head to the North

Associated Material: None recorded

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1956:209

The remains of this individual were well preserved, with moderate skeletal region representation. The skull was absent. The shoulder girdle consisted of the lateral and shaft portion of the clavicles and complete scapulae. The thorax was represented by a fragmentary manubrium, 12 fragmented left ribs, 12 fragmented right ribs, 18 unsided rib fragments, complete C1, partial C2-C4, complete C5-C7, complete T1-T6, partial T7, complete T8, partial T9, complete T10-T12, complete L1-L2, partial L3-L5. The pelvic girdle consisted of poorly preserved left ilium, poor left ischium, poor right illum, complete right ischium, and complete right pubis. Both acetabula were complete, S1 and S2 were complete. The upper limb was represented by the poor left humerus, proximal and shaft portion of the left ulna, complete left radius, complete right humerus, proximal and shaft portion of the ulna and radius. The lower limb consisted of a complete left femur, complete left patella, poor left tibia, complete left fibula, poor right femur, complete right patella, fragmentary right tibia, and fragmentary right fibula. The hands were represented by the left complete scaphoid, trapezium, MC1, poor MC2-MC3, distal portion of MC4, proximal

portion of MC5, one proximal phalanx, and one distal phalanx; 4 right proximal phalanges, 2 middle phalanges, and 2 distal phalanges. The feet were represented by the left partial talus, complete calcaneus, fragmentary MT1, proximal and shaft portion of MT2, proximal portion of MT4, complete MT5; right complete talus, partial right calcaneus, complete medial cuneiform, intermediate cuneiform, complete MT1, and proximal portion of MT6. Two feet phalanges were identified.

Age and Sex
Based on the level of fusion and the morphology of the pubic symphysis, this individual was estimated to be a young adult, with a refined age-at-death of 18-25 years. The morphology of the ventral arc, subpubic concavity, and the ischiopubic ramus ridge suggest an estimated sex of male.

Stature
An attained stature estimate of 173.51 ± 3.94 cm was calculated based on the maximum femur measurement of 47.1 cm for the left and 45.9 cm. A maximum tibia measurement of 38.8 cm for the left and 39 cm resulted in an attained stature estimate of 176.4 ± 4.00 cm.

Skeletal Pathology
Mild DJD was identified on the right superior facet of L2, left inferior facet of L2, both left facets of L3, and the right inferior facet of L4. Schmorls nots were identified on the inferior surface of the T11 centrum, both surfaces of the T12 centrum, both surfaces of the L1 centrum, and the superior surface of the L2 centrum.

Exostosis on the lateral surface of the left calcaneus. Associated with the peroneal tubercle, the exostosis measured 13mm by 8.74mm, and 5.68mm proud of the bone surface. The peroneal tubercle is associated with the tendons of the *fibularis longus* and *brevis* muscles.

Cribra orbitalia and porotic hyperostosis were not scorable, periostitis was absent.

Description of Grave

Grave Number: Grave 2
Grave Type: Cist
Orientation of the Grave: Northwest/Southeast
Body Position: Crouched, right side
Associated Material: None recorded
Dating Information: N/A
Comments: Remains analysed by Laureen Buckley

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1956:233

The remains of this individual were moderately to well preserved, with moderate skeletal region representation. Age-at-death was estimated to be adolescent, with a refined age-at-death estimate of 15-20, based on the level of fusion. As this individual was a non-adult, sex estimation was not completed. Attained stature was estimated to be 156cm, calculated from the length of the femur and tibia.

Skeletal Pathology
A schmorl's node was identified on the inferior surface of the T11 centrum. Spondylolysis was identified at L5, with the neural arch detached just under superior articular facets. Possible congenital non-fusion of posterior right foramen on C4

Periostitis was absent. Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Description of Grave

Grave Number: Grave 3
Grave Type: Cist
Orientation of the Grave: Northwest/Southeast
Body Position: Unrecorded
Associated Material: Anomalous Bowl
Dating Information: N/A
Comments: Remains analysed by Laureen Buckley

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1956:232

The remains of this individual were poorly preserved, initially considered to be calcined bone. The skeletal material that was present was inhumed tooth crowns. Based on the teeth identified, this individual was estimated to be a child, with a refined age-at-death estimate of 4-7. Due to poor presentation and that this individual was identified to be a non-adult, sex estimation was not undertaken.

Dentition

	PU	?			PU	PU	PU	PU	PU	PU			?	PU	
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
	PU	?			PU	PU	PU	PU	PU	PU			?	PU	
			P	P							P	P			
			~~55~~	~~54~~	~~53~~	~~52~~	~~51~~	~~61~~	~~62~~	~~63~~	~~64~~	~~65~~			
			~~85~~	~~84~~	~~83~~	~~82~~	~~81~~	~~71~~	~~72~~	~~73~~	~~74~~	~~75~~			
			P	P							P	P			

Additional References

Brindley A. 2007. The Dating of Food Vessels and Urns in Ireland. Galway: Department of Archaeology, National University of Ireland (p.67)

Flanagan L. 1976. The composition of Irish Bronze Age cemeteries. Irish Archaeological Research Forum 3(2):7-20

Waddell J. 1970. Irish Bronze Age cists: A survey. Journal of the Royal Society of Antiquaries of Ireland 100(1):91-139

Waddell J. 1990. The Bronze Age Burials of Ireland. Galway: Galway University Press (p.154)

Waddell J. 1970. Irish Bronze Age cists: A survey. Journal of the Royal Society of Antiquaries of Ireland 100(1):91-139

Waddell J. 1990. The Bronze Age Burials of Ireland. Galway: Galway University Press. (p.154)

NMI Files.

Reg Number: 2011:6 **SMR Number:**

Physical Setting

Townland: Rickardstown

County: Westmeath **Province:** Leinster

Year of Excavation: 2011

Monument Type: Pit Burial

Conditions of Discovery: Unrecorded

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: NMI Files

Description of Grave

Grave Number: Grave 1

Grave Type: Pit, some stone lining

Orientation of the Grave: Northwest/Southeast

Body Position: Crouched, right side, hands near face, skull to the Southeast

Associated Material: Tripartite Bowl, near right elbow

Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 2011:6

The remains of this individual were moderately well preserved. The skull was represented by a partial frontal, fragmentary parietals, fragmentary temporals, fragmentary occipital, fragmentary sphenoid, complete left zygomatic, poor right zygomatic, complete left maxilla, partial right maxilla, partial left palatine, complete nasal bones, poor left mandible, and complete right mandible. The shoulder girdle consisted of the medial and shaft portion of the left clavicle, partial left scapula, lateral and shaft portion of the right clavicle, and a fragmentary right scapula. The thorax consisted of a partial sternal body, seven left rib fragments, ten right rib fragments, 60 unsided rib fragments, complete C1, partial C2, partial neural arch of C3-C7, partial neural arch of T1-T3, complete neural arch of T4-T6, partial neural arch of T7, complete neural arch of T8-T12, partial neural arch of L1, complete neural arch of L2, partial L3, complete neural arch of L4, partial neural arch of L5, and six lumbar centrum fragments. The pelvic girdle was represented by partial left ilium, poor left ischium, poor left pubis, poor right ilium, partial right ischium, partial right pubis. Both acetabula were partial, the sacrum was fragmentary. The upper limb consisted of the complete left humerus, proximal and shaft portion of the left ulna, fragmentary left radius, poor right humerus, poor right ulna, and the distal and shaft portion of the right radius. The lower limb was represented by the complete left femur, poor left tibia, proximal and shaft portion of

the left fibula, fragmentary right femur, fragmentary right tibia, and the fragmentary right fibula. The hands consisted of the left complete scaphoid, complete lunate, poor triquetrum, complete pisiform, poor trapezium, complete trapezoid, complete capitate, complete MC1-MC4, five proximal phalanges, four middle phalanges, and four distal phalanges; right complete scaphoid, lunate, pisiform, trapezium, trapezoid, capitate, hamate, poor MC1, complete MC2 and MC3, poor MC4, proximal and shaft portion of MC5, three distal phalanges, two middle phalanges, and three distal phalanges. The feet consisted of the left poor talus, partial calcaneus, poor cuboid, poor navicular, poor lateral cuneiform; right partial talus, partial calcaneus, partial cuboid. There were 5 unidentified metatarsals.

Age and Sex

The united, but not fused, medial clavicle and the morphology of the auricular surface and the pubic symphysis suggest that this individual was a young adult, with a refined age-at-death estimate of 25-35. Based on the morphology of the supraorbital ridges, mastoid process, gonial flare, ventral arc, subpubic concavity, and the sciatic notch, this individual was estimated to be female.

Stature

An attained stature estimate of 159.57 ± 3.72 cm was obtained from the left femur maximum length measurement of 42.7 cm. The left tibia maximum length measurement of 35.2 cm resulted in an attained stature estimate of 163.61 ± 3.66 cm.

Non-metric Traits

Multiple ossicles were identified along the sutures of this individual, however due to the fragmentation of the skull vault it could not be determined which suture(s).

Skeletal Pathology

Mild DJD was beginning to develop in the right distal femur. Mild DJD was also identified in the right superior facet of L2, the right inferior facet of L4, and the right superior facet of L5.

During development the styloid process on the left third metacarpal did not fuse to the rest of the metacarpal, but instead to the head of the capitate. As the primary function of the styloid process is in stabilisation, this may have resulted in a reduction of grip strength and some irritation. This would have likely increased this individual's predisposition to developing arthritis in this joint, however this did not happen during life.

Amongst the fragments of the left leg, there was a piece which had clear periostitis across the entire surface. No matching pieces, or any articulating pieces, could be identified. As it is unsure where this fragment originated from, this individual was not recorded as 'present' for periostitis. Cribra orbitalia was absent, porotic hyperostosis was not scorable

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Mild attrition was identified

Calculus: Moderate calculus was identified on the upper right first and second molars, the upper left first premolar, first and second molars, the lower left second premolar, and the first molar. All of the other dentition had mild calculus

Caries: A mild occlusal caries was identified on the lower right third molar

Hypoplasia: Hypoplasia was identified on the first incisors, the lower right second incisor, all canines except the upper right, the upper right first premolar, and the lower right first molar

Reg Number: 1969:672 **SMR Number:** WM027-018----

Physical Setting

Townland: Riverstown

County: Westmeath **Province:** Leinster

Year of Excavation: 1969

Monument Type: Cist Burial

Conditions of Discovery: Ploughing

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Waddell, J. 2011. Riverstown, Co. Westmeath, E1178. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 547–552.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Crouched, right side

Associated Material: Tripartite Bowl

Dating Information: 3645 ± 30 BP (GrN-9322; human bone [collagen]; $\delta^{13}C = -21.45‰$), calibrated to 2134-1926 cal BC (95.4%) (calibrated at 2σ); Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1969:672

The remains of this individual were well preserved but had poor skeletal region representation. Age-at-death was estimated to be old adult, based on the morphology of the costal cartilage. Sex was estimated to be male, based on metric analysis. Attained stature was estimated to be 171cm, calculated from the length of the femur and fibula.

Skeletal Pathology

Mild DJD was identified on trochlea and capitulum of the left humerus, the ulnar articulation area on the proximal left radius, the left distal radius, and the left distal ulna. Moderate DJD was identified on lateral end of the left clavicle, the proximal joint of the left ulna, the trochlea and capitulum of the right humerus, and the right proximal ulna. Severe DJD was identified on head of both humeri and the articular surfaces for the clavicles on the sternum.

Large exostosis identified on the Linear Aspera in distal half of left femur. Periostitis was absent, Cribra orbitalia, porotic hyperostosis, and enamel hypoplasia were not scorable.

Reg Number: P1948:101 **SMR Number:** WX002-025001-

Physical Setting

Townland: Annagh More

County: Wexford **Province:** Leinster

Year of Excavation: 1948/1923

Monument Type: Cist Burial

Conditions of Discovery: Accidental, associated with ploughing

Total Burials: 3 **Total Inhumations:** 2

Excavation Report: Yes

Primary Reference: Hartnett, P, and Prendergast E. 1953. Bronze Age burials, Co. Wexford. *Journal of the Royal Society of Antiquaries of Ireland,* 83(1), 46-57.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Crouched, left side, head at West end

Associated Material: Tripartite Bowl, upright at NW corner of the grave. Reported to have contained 'black ashes'; possible cremation

Dating Information: N/A

Comments: Reports to also contain the badly decayed bones and teeth of a child 2 to 3 years. It is reported that this child was the primary burial. Around 1923 another cist was found nearby, from which a skull is reported.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** P1948:101

The remains were moderately to poorly preserved, with the left side significantly more represented. The skull was represented by a complete frontal, complete left parietal, poor right parietal, complete left temporal, partial right temporal, poor occipital, partial sphenoid, complete left zygomatic, partial left maxilla, partial left palatine, partial left mandible, complete left nasal. Other internal facial bones were absent. Only the clavicle of right side of the post cranial skeleton was identified, alongside one vertebral centrum. Of the left post-cranial skeleton shoulder girdle was represented by the shaft and lateral portion of the clavicle and a poorly preserved scapula. The thorax consisted of eight left rib fragments, including the first rib, three cervical and two thoracic vertebrae fragments. The pelvic girdle was represented by a partial ilium and ischium. The acetabulum was not represented. The upper limb consisted of the shaft of all three bones, with the lower limb

represented by a poorly preserved femur, complete patella, and the proximal portion of the tibia. The hands and feet were not preserved.

Age and Sex
Based on the level of fusion identified, and completion of the root of the 2nd premolar, the eruption of the 2nd molar and the unerupted 3rd molar, this individual was identified to be an adolescent, with a refined age-at-death estimate of 14-18. As this individual was an adolescent, no sex estimation was undertaken.

Skeletal Pathology
Mild cribra orbitalia was identified in the left orbit, with none identified in the right. Mild porotic hyperostosis was identified on the frontal bone, with none of the other flat bones. No periostitis identified.

Dentition

												P	P	P	MP	MP
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	35	36	37	38
												P	MP	P	PU

Attrition: Mild attrition

Calculus: No calculus was identified on the present teeth

Caries: There was no evidence of either caries or dental abscesses in this individual

Hypoplasia: Hypoplasia was identified on the left upper 2nd premolar

The anatomical report included in the excavation report identifies two teeth not identified above with '*some calculus'.*

Seven teeth/teeth caps of a child aged 2-3 were identified, no other remains of this child were identified.

Additional References

Moore, M. 1996. *Archaeological Inventory of County Wexford*. Dublin: Stationery Office. (p.9)

Ó Ríordáin, B., and Waddell. J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age*. Galway: Galway University Press. (p.142)

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.154)

Reg Number: 1965:79.1 **SMR Number:** WX016-010----

Physical Setting

Townland: Bolinready

County: Wexford **Province:** Leinster

Year of Excavation: 1965

Monument Type: Cist Burial

Conditions of Discovery: Previously known in local area, reopened due to local interest; then investigated by NMI

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Prendergast, E. (1968). Cist Burial at Bolinready, Co. Wexford. *The Journal of the Royal Society of Antiquaries of Ireland*, 98(2), 161–162.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: East/West

Body Position: Disturbed

Associated Material: Tripartite Bowl in Northeast corner, fibula of a child

Dating Information: 3620 ± 60 BP (GrN-9321; human bone [collagen]; $\delta^{13}C$ = –21.99‰), calibrated to 2194-2176 cal BC (1.3 %), 2145-1873 cal BC (88.9%), 1846-1817 cal BC (3.0%), and 1802-1776 cal BC (2.2%) (calibrated at 2σ with the program OxCal 4.4.4 [Bronk Ramsey 2021] using the IntCal20 curve [Reimer et al 2020]); Brindley stage 2 Bowl

Comments: Excavation report strongly suggested that some of the bones had been removed between when first discovered and when investigated by NMI

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1965:79.1

The remains of this individual were in a poor condition, with many skeletal elements missing, likely due to earlier disturbance. The skull was represented by a fragmentary frontal, fragmentary left parietal, partial right parietal, partial temporals, partial occipital, and a partial right mandible. There was significant surface damage to the skull vault. The shoulder girdle was represented by a partial right scapula. The pelvic girdle consisted of the right fragmentary ilium, pubis, and acetabulum. All limb bones were represented and fragmentary except for the left ulna which was the proximal section only, the left fibula which was shaft only, and the patellae which were absent. The hands and feet were not represented.

Age and Sex

The proximal tibia and distal femora epiphyses are not fused, and the third molar is not erupted, identifying this individual as an adolescent. The refined age-at-death is between 15-18. As this individual is an adolescent, sex was not estimated, however they are reported as a young male in the excavation report.

Skeletal Pathology

Due to the surface damage to the skull, it was not scorable for porotic hyperostosis or cribra orbitalia. No periostitis identified.

Dentition

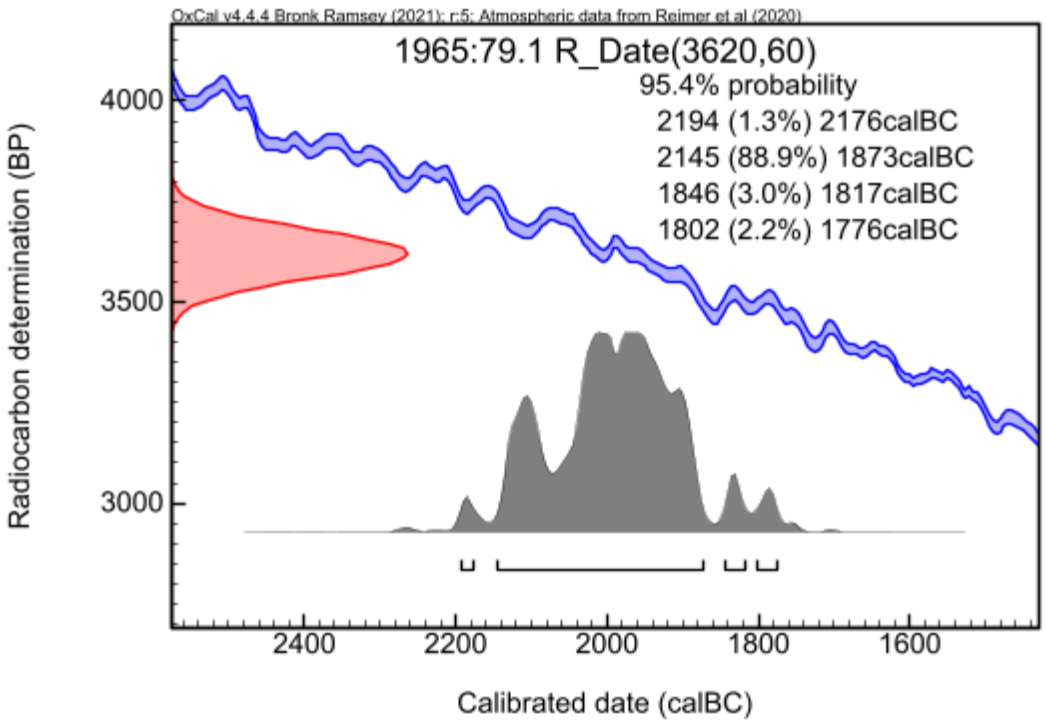
	P	P							P	P			P	P	PU	
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~	
~~48~~	47	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~	
	P	P										P				

Calculus: No calculus identified

Caries: No caries were identified, only one alveolar socket observable.

Hypoplasia: No hypoplasia identified

Calibration Curve



Additional References

Brindley, A.L. 2007. *The Dating of Food Vessels and Urns in Ireland*. Galway: National University of Ireland, Galway, Department of Archaeology. (p.68)

Hartnett, P., and Prendergast, E. 1953. Bronze Age burials, Co. Wexford. *Journal of the Royal Society of Antiquaries of Ireland,* 83(1), 46-57.

Moore, M. 1996. *Archaeological Inventory of County Wexford*. Dublin: Stationery Office

Ó Ríordáin B, and Waddell J. 1993. The Funerary Bowls and Vases of the Irish Bronze Age. Galway: Galway University Press. (p.143)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.155)

Reg Number: 1935:768; 1935:799; 1935:799.1; 1935:799.2b **SMR Number:** WI003-039----

Physical Setting

Townland: Ballybrew

County: Wicklow **Province:** Leinster

Year of Excavation: 1935

Monument Type: Flat Cemetery

Conditions of Discovery: Quarrying

Total Burials: 4 **Total Inhumations:** 4

Excavation Report: Published

Primary Reference: Martin, C., Price, L., and Mitchell, G. 1935-1937. On two short cist interments found at Ballybrew, Co. Wicklow. *Proceedings of the Royal Irish Academy,* 43, 255-270.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: West, Northwest/East, Southeast

Body Position: Crouched, right side, right hand under head, head East, facing roughly North

Associated Material: Tripartite Bowl in Northeast corner opposite face, broken lignite bead, small flint scraper

Dating Information: Brindley stage 2 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:768

The remains of this individual had good preservation with good skeletal region representation. The skull was mostly complete, with complete frontals, complete parietals, poor temporals, complete left occipital, poor right occipital, complete sphenoid, poor zygomatics, poor left maxilla, complete right maxilla, complete palatines, complete nasal bones, partial lacrimal bones, poor left internal nasal concha, partial right internal nasal concha, poor ethmoid, complete vomer, and complete mandible. The shoulder girdle was represented by complete clavicles and scapulae. The thorax consisted of a partial manubrium and sternal body, 11 left ribs fragments, 12 right ribs fragments, 7 unsided rib fragments. The vertebrae were consisted of partial C1-C4, complete C5-C7, complete T1-T9, partial T10, complete T11, complete T12, partial L1-L2, and partial L5. The pelvic girdle was represented by the partial left illum, poor left ischium, poor left pubis, complete right ilium, poor right ischium, and partial right pubis. The left acetabulum was poorly preserved, with the right acetabulum complete. The upper limb consisted of a complete left humerus, poor

left ulna, poor left radius, complete right humerus, complete right ulna, and complete right radius. The lower limb consisted of complete femora, complete patellae, complete tibiae, poor left fibula, and a complete right fibula. The hands were represented by complete left carpals, MC1-MC3, complete proximal phalanges, 3 middle phalanges, and 3 distal phalanges; complete right carpals, metacarpals, proximal phalanges, 4 middle phalanges, and 4 distal phalanges. The feet were represented by the left complete talus, complete calcaneus, partial cuboid, poor navicular, poor medial cuneiform, complete intermediate cuneiform, poor lateral cuneiform, complete MT1, poor MT2-MT5; the right complete talus, complete calcaneus, complete cuboid, poor navicular, poor medial cuneiform, complete intermediate cuneiform, complete lateral cuneiform, complete MT1-MT4, poor MT5. Eight phalanges were identified.

Age and Sex

Based on the tooth attrition this individual was identified as a young adult, with a refined age-at-death of 25-35 due to completed fusion. It was estimated that this individual was a female based on the morphology of the supraorbital ridge, mastoid process, nuchal crest, mandible, ventral arch, subpubic concavity, ischiopubic ramus ridge, and sciatic notch.

Stature

A stature estimate of 164.76 ± 3.72 cm was calculated from a measurement of the maximum left femur of 44.8 cm and a maximum measurement of 44.0 cm for the right femur. A maximum measurement of the left tibia at 36 cm and the right tibia 36.1 cm produced a stature estimate of 165.96 ± 3.66cm.

Non-metric Traits

Retained metopic suture.

Skeletal Pathology

Mild DJD was identified on the lateral facet of 2 left ribs and 1 right rib, right proximal humerus, right proximal ulna, left distal femur, and left distal tibia. Mild DJD was identified on the left inferior facet of T7, right inferior facet of T11, and the left inferior facet of L2. Schmorls nodes were identified on the inferior surface of the T10 centrum and the inferior surface of the L2 centrum.

No cribra orbitalia, porotic hyperostosis, or periostitis was identified.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Mild to Moderate attrition was identified on the incisors, with mild attrition identified on the remaining dentition

Calculus: Mild calculus was identified on the incisors, canines, and first premolars. Moderate calculus was identified on the second premolars and molars

Carries: No carries were identified

Hypoplasia: No hypoplasia was identified

Description of Grave

Grave Number: Grave 2
Grave Type: Cist
Orientation of the Grave: Northwest/Southeast
Body Position: Articulated individual (1935:799) was crouched on their back, skull against the Southeast stone, generally towards the Southwest side of the grave. Disarticulated individual (1935:799.1) was pushed aside, some bones placed into the ceramic.
Associated Material: Tripartite Bowl in the east corner, three flint fragments – one of which was similar to a thumb scraper.
Dating Information: Brindley stage 2 Bowl
Comments: It is likely that the disarticulated individual was the primary internment, which was then pushed aside when 1935:799 was placed in the grave. Due to the placement of a few bones of the disarticulated individual into the ceramic, it is likely that the tripartite bowl was associated with 1935:799.1

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:799

The remains of this individual were in excellent condition, with excellent skeletal region representation. The skull was practically complete, with complete frontals, parietals, temporals, occipitals, sphenoid, zygomatics, poor left maxilla, complete right maxilla, complete palatines, nasals, partial left lacrimal, poor right lacrimal, partial left internal nasal concha, poor right internal nasal concha, partial ethmoid, and partial vomer. The shoulder girdle consisted of complete clavicles and scapulae. The thorax was represented by a poor sternal body, fragments of 10 left ribs, fragments of 12 right ribs, and 1 unsided rib fragments. The pelvic girdle consisted of complete left ilium, poor right ilium, complete ischii, complete pubic bones, complete sacrum, and complete coccyx. Both acetabula were complete. The upper limb consisted of the complete humeri, proximal and shaft portion of the left ulna, complete right ulna, and complete radii. The lower limb was represented by

the complete left femur, complete left patella, complete left tibia, distal and shaft portion of the left fibula, poor right femur, complete right femur, complete right tibia, and complete right fibula. The hands consisted of left complete scaphoid, lunate, partial triquetrum, complete trapezoid, complete MC1-MC3, poor MC4-MC5, 5 proximal phalanges, 3 middle phalanges, and 1 distal phalanx; right complete scaphoid, lunate, triquetrum, pisiform, partial trapezium, partial trapezoid, complete capitate, complete hamate, complete MC1-MC5, 5 proximal phalanges, 4 middle phalanges, and 2 distal phalanges. The feet were represented by the left complete talus, complete calcaneus, complete cuboid, partial navicular, poor lateral cuneiform, distal and shaft portion of MT1, proximal and shaft portion of MT2-MT4, complete MT5; the right partial talus, complete calcaneus, poor cuboid, poor MT1, proximal portion and shaft of MT2, complete MT3, poor MT4, and complete MT5. Two damaged cuneiforms and four phalanges were identified.

Age and Sex
Based on the tooth attrition, morphology of the auricular surfaces and the public symphyses, this individual was identified as a young adult, with a refined age-at-death of 30-40. It was estimated that this individual was a male based on the morphology of the supraorbital ridge, supraorbital shape, nuchal crest, ventral arch, subpubic concavity, ischiopubic ramus ridge, and sciatic notch.

Stature
A stature estimate of 178.74 ± 3.94 cm was calculated from a measurement of the maximum left femur at 49.3 cm a. A maximum measurement of the left tibia at 41.1 cm produced a stature estimate of 182.19 ± 4.00cm.

Non-metric Traits
Extensive wormian bones identified. Sacralisation of L5.

Skeletal Pathology
Mild DJD were identified in the left acromioclavicular joint, left proximal humerus, both acetabula, both proximal femora, and the right proximal tibia. Moderate DJD were identified in the right distal femur, and severe DJD in the right patella. Mild degenerative changes were identified in the right inferior facet of C7, right inferior facet of T9, left inferior facet of L1, and the left inferior facet of L3. Schmorl's nodes were identified on T6-T12, L1-L4.

Multiple sided robusticity changes were identified in the skull of 1935:799. The right portion of the occipital is noticeably more robust, with a corresponding flattening of the left portion. The magnum foramen is asymmetrical, there is a noticeable twist in the spheno-occipital joint, and the right TMJ is more anteriorly placed and shows remodelling. The right mastoid process is noticeably larger, measuring 16.55mm by 30.45mm by 16.46mm, compared to

the left mastoid process at 14.51mm by 26.60mm by 12.26mm. The right mastoid also shows remodelling of the mastoid grove. The left parietal has flattened compared to the right, with the parietal boss sitting higher on the bone. As such, there is a more oblique angle between the sagittal crest and the temporal line on the right frontal, giving this portion of the skull a flatter appearance. The left zygomatic is somewhat regressed, which resulted in a differential orbital shape compared to the right. The supraorbital ridges are asymmetrical, with the right extending further towards the crown but not as far laterally as the left supraorbital ridge.

Trauma

An oblique fracture was identified on the right tibia and fibula, below the mid-shaft point. The fracture line travels anterio-posteriorly from front to back on a diagonal. The proximal tibia fracture surface measures 68.21mm in length, with the proximal fibula fracture surface measuring 16.43mm in length. While all surfaces show healing, the distal portions of the tibia and fibula did not unite with the proximal portions of the tibia and fibula; resulting in the formation of a non-union fracture. Significant remodelling occurred to the proximal portion, with the medullary cavities of both the tibia and fibula closing and these two segments fusing through the formation of new bone. In comparison, there is limited remodelling on the distal portions of the tibia and fibula, evidence of bone reabsorption and limited new bone formation across the fracture site. There is some indication of a habitual position for the proximal sections on the distal sections.

Dentition

P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

Attrition: Moderate attrition identified across all dentition

Calculus: Mild calculus was identified on the upper right canine, upper right premolars, upper left first molar, lower right premolars, and lower left premolars. Moderate calculus was identified on the upper right molars, upper left second and third molars, lower right incisors, lower right canine, lower right molars, lower left incisors, lower left canine, and lower left molars

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Photos











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Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:799.1

The remains of this individual had moderate to poor preservation, with significant bone surface loss. The skull was represented by a poor frontal, poor parietals, poor temporals, poor occipital, partial sphenoid, and a complete mandible. The shoulder girdle was represented by the shaft and medial portion of the left clavicle, partial left scapula, complete right clavicle, and partial right scapula. The thorax consisted of a partial manubrium, seven left rib fragments, ten right rib fragments, eight unsided rib fragments, mostly complete cervical vertebra, complete T1, partial T2-T7, complete T8, partial T9, complete T10, partial T11, complete L1, and partial L2-L5. The pelvic girdle was represented by the complete left ilium, poor right ilium, partial right ischium, complete right pubis. Both acetabula were absent, S1 and S2 were identified. The upper limbs was represented by the complete left humerus, poor left ulna, shaft of the right radius, poor right humerus, shaft and proximal portion of the right ulna, and the shaft of the right radius. The lower limbs were represented by the poor left femur, partial right patella, complete left tibia, poor left fibula, poor right femur, complete right tibia, poor right fibula. The hand consisted of four unidentified metacarpals and one phalanx. The feet consisted of both talai and calcanei, and the poorly preserved right MT1 to MT5.

Age and Sex

Based on tooth formation and fusion levels, this individual was identified as an adolescent; with an estimated refined age-at-death of 14 ± 2 years. Since this individual was an adolescent, no sex estimation was undertaken.

Non-metric Traits

Wormian bones were noted

Skeletal Pathology

Moderate cribra orbitalia was identified in the left orbit, with the right orbit un-scorable. This individual was not scorable for porotic hyperostosis. There was no periostitis identified.

Dentition

PU	P	P	MP	MP	P	MP	MP	P	P	P	MP	P	P	P	PU
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
	P	P	P	P	P	MP	P	P	P	P	P	P	P	P	PU

Calculus: Mild calculus was identified on the first molars and first incisors.

Carries: No caries identified

Hypoplasia: Hypoplasia was identified in multiple teeth. Multiple lines were identified on the upper right canine, upper left first incisor and canine; single line on the upper right first molar, upper left first molar, lower left fist incisor, lower left first molar, and the lower right first molar. Enamel pitting was identified on the lower left canine.

Description of Grave

Grave Number:
Grave Type:
Orientation of the Grave:
Body Position:
Associated Material:
Dating Information:
Comments: Label on this individual reads "disarticulated human adult found with 1935:768/99". However, this individual is not mentioned in either the top file or the published excavation report. The excavation report does mention a third cist; however, it is reported to have been empty. On the NMI system, this individual is described as "presumed to be from same site".

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1935:799.2b

The remains of this individual were moderately well preserved. The skull was represented by a complete frontal, poor parietals, complete temporals, complete occipitals, complete left zygomatic, fragmentary left maxilla, partial right maxilla, and a poorly preserved mandible. The shoulder girdle was represented by the complete left clavicle and the shaft of the right clavicle. The thorax consisted of C2, C5, C7, T1, partial T3, partial T7, mostly complete T9 and T10, partial T11, partial L2, and complete L3-L5. The pelvic girdle consisted of the fragmentary left ilium, partial left ischium, partial right ilium, partial right ischium, and the partial right pubis. The right acetabulum was poorly preserved, S1 was present. The upper limb was represented by the shaft and proximal portion of the left humerus, shaft of the right humerus, shaft of the right ulna, and the shaft and proximal portion of the right radius. The lower limb was represented by the distal portion of both femora. The hand consisted of one unsided metacarpal. There was no preservation of the feet.

Age and Sex
Based on the tooth attrition and presences of DJD, this individual was identified as an old adult. It was estimated that this individual was a male based on the morphology of the supraorbital ridge, mastoid process, nuchal crest, mandible, and sciatic notch.

Skeletal Pathology

Mild DJD was identified on the left proximal humerus, on the left distal femur, on the right acetabulum and proximal femur.

Moderate to severe DJD was identified within the spinal column. Severe lipping was identified left inferior facet of C2, moderate lipping on both superior C5 facets, mild lipping on the right inferior C5 facet, severe lipping and porosity on the left inferior C5, severe lipping and porosity on both inferior C7 facets, severe lipping and porosity on both superior T1 facets, moderate lipping on the left T1 inferior facet, severe lipping on the right inferior T1 facet, mild lipping on the left inferior T10 facet, mild lipping on the left inferior L2 facet, mild lipping on all L3 facets, moderate lipping on both superior L4 facets, mild lipping on both inferior L4 facets, moderate lipping on the left superior L5 facet, and mild lipping on the right superior L5 facet. Mild osteophyte growth was identified on the inferior C5 centrum, inferior T3 centrum, inferior T7 centrum, superior T9 centrum, superior T10 centrum, superior L4 centrum, and the superior L5 centrum. Moderate osteophyte growth was identified on the inferior T9 centrum, inferior T10 centrum, inferior L2 centrum, both sides of the L3 centrum; with severe osteophyte growth on the inferior T11 centrum and the inferior L4 centrum. Schmorls nodes were identified on both sided of the T7 centrum, both sided of the T9 centrum, the inferior T10 centrum, both sides of the T11 centrum, both sides of the L2 centrum, the superior L3 centrum, and the inferior L4 centrum.

Mild cribra orbitalia was identified in the left orbit, with the right showing no lesions. Mild porotic hyperostosis was identified on the frontal, and the left parietal; with the right parietal and occipital showing mild to moderate porotic hyperostosis. There was no identified periostitis.

Dentition

								MP	P	LA	LA	P	P	P	
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	21	22	~~23~~	~~24~~	25	26	27	~~28~~
48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
P	P	P	P	P	P	P	P	P	MP	P	P	P	P	P	P

Attrition: There was high levels of attrition on all of the teeth, particularly the lower molars, which had very high levels of attrition

Calculus: Due to the attrition it was hard to score some of teeth for calculus. On those scorable there was moderate levels, with gross calculus on the lower third left molar.

Caries: Occlusal caries was noted on the lower left first and second molars. The first molar had abscessed.

Hypoplasia: Due to the levels of attrition it was difficult to score the teeth for hypoplasia. Multiple lines of hypoplasia were identified on the lower left canine, and both lower first premolars.

Additional References

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum,* 3(2), 7-20.

Grogan, E., and Kilfeather, A. 1997. *Archaeological Inventory of County Wicklow*. Dublin: stationery Office (p.10)

Ó Ríordáin, B., and Waddell, J. 1993. *The Funerary Bowls and Vases of the Irish Bronze Age.* Galway: Galway University Press (p.144)

Waddell, J. 1970. Irish Bronze Age cists: A survey. *Journal of the Royal Society of Antiquaries of Ireland*, 100(1), 91-139.

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.159)

Reg Number: 1932:6578 **SMR Number:** WI005-025----

Physical Setting

Townland: Haylands

County: Wicklow **Province:** Leinster

Year of Excavation: 1932

Monument Type: Mound Cemetery

Conditions of Discovery: Excavation, encroaching quarrying

Total Burials: 5 **Total Inhumations:** 3

Excavation Report: Published

Primary Reference: Price, L., and Walshe, P. 1933. Stone and Bronze Age antiquities of the Barony of Lower Talbotstown, County Wicklow: with a description of the excavation of Haylands Mote, near Blessington. *Journal of the Royal Society of Antiquaries of Ireland,* 3(1), 46-67.

Description of Grave

Grave Number: Burial B

Grave Type: Pit burial, possible stone cap lying at some distance

Orientation of the Grave: N/A

Body Position: Crouched, right side

Associated Material: Two fragments of cremated bone, and two animal bone fragments

Dating Information: N/A

Comments: 1932:6578.6 is labelled as burial B. 1932:6578.8 is labelled as "other skeletal remains", and after consulting the material in the collection and the excavation report, identified as most likely also representing burial B. As pieces from both deposits articulate/reconstruct together, this strongly supports the identification of both as burial B. Both deposits will be reported below as belonging to burial B.

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1932:6578.6 & 1932:6578.8

The remains of this individual were poor to moderately preserved, with moderate skeletal region representation. The skull was represented by four skull vault fragments, including two orbitals, and a partial mandible. The shoulder girdle consisted of the shaft of the right clavicle, and the fragmentary remains of the right scapula. The thorax consisted of 37 unsided rib fragments, three thoracic vertebrae fragments, two fragments of lumbar centum, partial L3, and complete L4 and L5. The pelvic girdle consisted of the fragmentary left ilium, partial right ilium, partial right ischium, and three pelvic fragments. The right acetabulum was partial; the sacrum was represented by the complete S1, partial sacral vertebra, and fused sacral neural arches. The upper limb was represented by the distal

portion of the left humerus, fragmentary left ulna, poor left radius, fragmentary right humerus, poor right ulna, and poor right radius. The lower limb was represented by the shaft and fragmentary head of the left femur, fragmentary left tibia, fragmentary left fibula, and the proximal and shaft portion of the right femur. There were multiple long bone fragments, including one piece of fibula shaft that could not be sided. The hands consist of the partial left scaphoid, proximal and shaft portion of the left MC3, poor left MC4, proximal and shaft portion of the right MC2-MC4, one unidentified metacarpal, and three phalanges. The feet are absent.

Age and Sex

Fusion was ongoing in this individual. The proximal radius, distal humerus, and proximal ulna were fused. The proximal femur and the glenoid were partially fused or united. Unfused bones included the phalanges, medial clavicle, distal ulna, distal radius, the ischial tuberosity, and the sacroiliac joint plate. As such, this individual was identified to be an adolescent, with an estimated refined age-at-death of 16-21. While not an adult, the size, robustiously, and morphology of this individual suggest that they were possibly male.

Stature

Due to the lack of complete lower limb bones, stature could not be estimated. However, the general size of the bones present suggests that after full growth, this individual would have likely been above average in height.

Skeletal Pathology

Schmorls nodes were identified on the superior centrum on L4, with possible schmorls on both sides of the L3 centrum, however taphonomic damage prevented a positive identification.

Periostitis and cribra orbitalia were absent, porotic hyperostosis was not scorable.

Dentition

								P	P		P					
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	47	46	45	44	43	42	41	31	~~32~~	33	34	35	36	37	38
	P	P	P	P	P	P	P	P		P	P	P	P	P	PE

The lower third left molar was mostly erupted

Attrition: Mild attrition was seen across the present dentition

Calculus: Mild calculus was identified

Caries: No caries were identified

Hypoplasia: Hypoplasia was identified on the upper left first incisor, lower left second incisor, lower left canine, lower left first molar, lower right second incisor, lower right first premolar, and the lower right first molar

Description of Grave

Grave Number: Burial D
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, left side, head to the Southwest
Associated Material: Tripartite Bowl (Ribbed bowl) behind the skull
Dating Information: Possible Brindley stage 3 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1932:6578.2

The remains of this individual were moderate to poorly preserved, with moderate skeletal region representation. The skull was represented predominantly by the left side, with a poor left frontal, partial right frontal, poor left parietal, poor left temporal, poor left sphenoid, complete left zygomatic, complete left maxilla, fragmentary right maxilla, complete left palatine, complete left mandible, fragmentary right mandible, and a partial hyoid. The shoulder girdle consisted of a poor left scapula and a fragmentary right scapula. The thorax consisted of five partial left ribs, three partial right ribs, nine unsided rib fragments, partial C1, partial cervical vertebra, three thoracic neural arch fragments, seven lower thoracic or lumbar arch fragments, partial L3, and partial L4. The pelvic girdle was represented by the fragmentary left ilium, poor left ischium, partial right ilium, and partial right ischium. The left acetabulum was complete, the right absent; the sacrum was mostly complete, and the coccyx was present. The upper limb was represented by a fragmentary left humerus, and the proximal and shaft portion of the left ulna. The lower limb was represented by poor left femur, poor left patella, distal portion of the left tibia, fragmentary left fibula, and the distal portion of the right femur. There is also a partial femoral or humeral head that could not be sided or positively identified. The hands consisted of the left trapezium, left poor MC2, one unidentified metacarpal, the complete phalanges of the first digit, four proximal phalanges, six middle phalanges, and three distal phalanges. The feet consisted of the left partial cuboid, proximal portion of MT2, poor MT4, proximal portion of the MT5; right poor talus, poor calcaneus, complete cuboid, complete navicular, complete medial cuneiform, poor middle cuneiform, poor lateral cuneiform, complete MT1, proximal portion go MT2, and complete MT4.

The lower two-thirds of the left femur is a replica, assumed to be associated with radiocarbon dating.

Age and Sex
Based on completed fusion and the eruption and attrition of the dentition, this individual was estimated to be a later young adult or early middle adult. Based on the morphology of the supraorbital ridges, gonial flare, and the sciatic notch, this individual was estimated to be male.

Skeletal Pathology
Mild DJD was identified in the left glenoid, left proximal humerus, left proximal ulna, and the right proximal humerus. Mild DJD was also identified in the left articular facets, the inferior right facet of both L3 and L4.

Periostitis was absent. Both cribra orbitalia and porotic hyperostosis were not scorable.

Dentition

P		P		P			P	P	P	P	P	P	P	P	P
~~18~~	~~17~~	~~16~~	~~15~~	14	~~13~~	~~12~~	~~11~~	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	45	44	43	42	41	31	32	33	34	35	36	37	38
			MP	P	P	P	P	P	P	P	P	P	P	P	MP

Attrition: Mild to moderate attrition was idented in the majority of the dentition, with the third molars showing mild attrition

Calculus: Moderate calculus was identified, particularly around the molars, with the upper left second and third molars showing moderate to severe calculus

Caries: No caries or abscesses were identified

Hypoplasia: Hypoplasia was not scorable

Description of Grave

Grave Number: Burial G
Grave Type: Cist
Orientation of the Grave: Northeast/Southwest
Body Position: Crouched, head to the Southwest
Associated Material: N/A
Dating Information: N/A

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1932:6578.7

The remains of this individual were moderate to poorly preserved, with moderate to poor skeletal region representation. The skull was represented by the partial right frontal, fragmentary parietals, partial left temporal, poor right temporal, fragmentary occipital, partial right sphenoid, partial right zygomatic, poor maxillae, partial left palatine, and fragmentary mandible. The shoulder girdle consisted of lateral portion of the right clavicle, and the fragmentary remains of both scapulae. The thorax consisted of six unsided rib fragments, partial C1 and C2, three thoracic articular facts, one thoracic neural arch fragment, three thoracic centrum fragments, and three lumbar articular facet fragments. the pelvic girdle was represented by a fragmentary right ilium and four unidentified fragments. Both acetabula were absent, along with the sacrum. The upper limb consisted of a poor right humerus and fragmentary right radius. The lower limb was represented by the distal potion of the left femur, the proximal and distal portions of the left tibia, fragmentary right femur, poor right patella, and the proximal and shaft portion of the right tibia. There were multiple bone fragments, including 60 long bone fragments. The hands consisted of five unidentified carpals, poor left MC1-MC3, six proximal phalanges, one middle phalanx, and one distal phalanx. The feet consisted on one unidentified tarsal, the right partial calcaneus, right partial medial cuneiform, and one unidentified metatarsal.

Age and Sex

Based on the completed fusion, dental eruption, and level of dental attrition, this individual was estimated to be a young adult. No refined age-at-death estimation was identified. The morphology of the mastoid process and the gonial flare of the mandible suggest a sex estimation of female. The humeral head diameter measurement of 44.15 mm supports this sex estimation, being less than 44.9 mm.

Non-metric Traits

The punished anatomy report mentions squatting facets, which could not be confidentially identified or rejected due to current levels of preservation.

Skeletal Pathology

Mild DJD was observed beginning to form in the right distal femur and the right patella. It would not have been symptomatic at this point.

Periostitis and cribra orbitalia were absent, porotic hyperostosis was not scorable.

Dentition

MP	P	P	P	P	P	P	P	P	MP	P	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	36	37	38
													P	P	P

Two small mandible fragments were identified that almost seem to represent another individual, not consistent with the fragment that housed the lower left molars. However, due to their fragmentary state this could not be confirmed. In this manner, a number of teeth also seemed inconsistent with the other dentition, however not different enough to positively identify another individual. This included two lower premolars, one canine, one incisor, and two tooth caps (one upper molar, one lower molar).

Attrition: Mild attrition was idented

Calculus: Mild to moderate calculus was identified on the molar teeth, where it had been protected from taphonomic damage

Caries: No carries were identified

Hypoplasia: No hypoplasia was identified

Additional References

Flanagan, L. 1976. The composition of Irish Bronze Age cemeteries. *Irish Archaeological Research Forum*, 3(2), 7-20.

Grogan, E., and Kilfeather, A. 1997. *Archaeological Inventory of County Wicklow*. Dublin: stationery Office (p.11)

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Price L. 1934/1935. The Ages of Stone and Bronze in County Wicklow. *Proceedings of the Royal Irish Academy,* 42, 31-64.

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Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.162)

Reg Number: 1982:15 **SMR Number:** WI037-001----

Physical Setting

Townland: Liscolman

County: Wicklow **Province:** Leinster

Year of Excavation: 1978

Monument Type: Cist Burial

Conditions of Discovery: Land Reclamation

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Published

Primary Reference: Raftery, J. 2011. Liscolman, Co. Wicklow, E1194. In Cahill, M. and Sikora, M. (eds). *Breaking Ground, Finding Graves - reports on the excavations of burials by the National Museum of Ireland, 1927-2006*. Dublin: Wordwell Ltd., in association with the National Museum of Ireland. 663–666.

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Not reported

Body Position: Not reported

Associated Material: Tripartite Bowl, animal bone

Dating Information: Brindley stage 2/3 Bowl

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1982:15

The remains of this individual were poorly preserved, with poor skeletal region representation. Age-at-death was estimated to be young adult, with a refined age-at-death of 17-21, based on dental development. Due to poor preservation, sex estimation was not undertaken.

Skeletal Pathology

Periostitis, cribra orbitalia, and porotic hyperostosis were not scorable.

Dentition

												P			P
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
			P			P				P	P	P			

Mild attrition was identified. Mild calculus was identified. Enamel hypoplasia was absent.

Reg Number: 1956:222 **SMR Number:** WI015-035001-

Physical Setting

Townland: Tornant Lower

County: Wicklow **Province:** Leinster

Year of Excavation: 1956?

Monument Type: Cist Burial

Conditions of Discovery: Unrecorded

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: No

Primary Reference: NMI Files

Description of Grave

Grave Number: Grave 1

Grave Type: Cist

Orientation of the Grave: Unrecorded

Body Position: Crouched, Left side

Associated Material: N/A

Dating Information: N/A

Comments: Food Vessel known from the town

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1956:222

This individual was moderately to poorly preserved, with moderate skeletal region representation. The skull consisted of partial frontal, complete right parietal, partial right parietal, and partial right temporal. The shoulder girdle consisted of a poorly preserved left clavicle and scapula. The thorax was represented by four left ribs, two right ribs, one upper thoracic vertebra, two mid-thoracic vertebrae, and one mid-lumbar vertebra. The pelvic girdle consisted of a complete left ilium, complete left ischium, partial right ilium, partial right ischium, and the partial right pubis. The left acetabulum was complete, the right acetabulum was fragmentary, and the sacrum was complete. The upper limb was represented by a complete left humerus, distal and shaft portion on the left ulna, complete left radium, complete right humerus, proximal and shaft portion of the right ulna, and a poorly preserved right radius. The lower limb consisted of a complete left femur, poor left tibia, shaft of the left fibula, fragmentary right femur, poor right tibia, and the distal and shaft portion of the right fibula. The hands were represented by a complete right metacarpal four. The feet were represented by a poor left talus and a poor right calcaneus.

Age and Sex

Based on the completed fusion of the medial clavicle, this individual was identified as an adult. This was further identified to a Middle Adult based on the morphology of the left auricular surface and right pubic symphysis; with a refined age-at-death of 30-45. While this individual was noticeably gracile, the morphology of the ventral arc, subpubic concavity, ischiopubic ramus ridge, and the sciatic notch support the estimation of male for this individual.

Stature

Stature was estimated at 166.83 ± 4cm based on the maximum left femur measurement of 44cm and the maximum right tibia measurement of 35cm.

Skeletal Pathology

This individual had extensive mild DJD, with almost all joints present for scoring showing bony changes. Mild DJD was identified on the left medial clavicle, left glenoid, left proximal humerus, left humeral trochlea, left distal ulna, left distal radius, right proximal humerus, right humeral trochlea, right humeral capitulum, right proximal ulna, right proximal radius, left proximal femur, left distal demur, left proximal tibia, left distal tibia, left distal fibula, right proximal femur, and right distal tibia.

In comparison, the vertebral column showed very limited degenerative change, but this may have been obscured by taphonomic processes. The upper thoracic vertebra showed mild osteophytic lipping on the inferior centrum surface. One of the mid-thoracic vertebrae mild osteophytic lipping on the inferior centrum surface showed, with the other showing mild osteophytic lipping on the superior centrum surface. The mid-lumbar vertebra showed mild DJD in the left inferior facet and mild osteophytic lipping on the superior centrum surface.

Slight, but noticeable, ossification of the right calcaneus was identified.

No periostitis was identified, cribra orbitalia was not scorable. Mild porotic hyperostosis was identified on the frontal and right parietal.

Dentition

	P										P	P		P		
~~18~~	~~17~~	~~16~~	~~15~~	~~14~~	~~13~~	~~12~~	~~11~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~
												P		P		

Attrition: Attrition was mild

Calculus: Due to taphonomic damage, calculus could not be scored

Caries: No caries identified

Hypoplasia: No hypoplasia identified

Additional References

Waddell, J. 1990. *The Bronze Age Burials of Ireland*. Galway: Galway University Press. (p.166)

Reg Number: 1939:988 **SMR Number:** WI010-038----

Physical Setting

Townland: Tulfarris

County: Wicklow **Province:** Leinster

Year of Excavation: 1930

Monument Type: Rabbit Burrow on the side of a Rath

Conditions of Discovery: Uncovered by dog

Total Burials: 1 **Total Inhumations:** 1

Excavation Report: Unpublished

Primary Reference: NMI File: 1939:988

Description of Grave

Grave Number: Grave 1

Grave Type: Unrecorded

Orientation of the Grave: Unrecorded

Body Position: Disturbed

Associated Material: N/A

Dating Information: N/A

Comments: Skull pulled from a rabbit borrow by a dog, on the side of a rath. Remains of an adult and a child reported from the redevelopment of a golf course in the area in 1988

Human Remains

Curation Location: National Museum of Ireland **NMI Reg:** 1939:988

Only the skull of this individual was identified. The skull was moderately preserved, but with noticeable surface damage. The skull consisted of a complete frontal, complete left parietal, poor right parietal, poor left temporal, partial occipital, poor left zygomatic, complete right zygomatic, poor left maxilla, complete right maxilla, partial palatines, complete nasal bones, and poor vomer.

Age and Sex

The level of dental attrition and suture closure suggest that this individual was an old adult, with no refined age-at-death.

Skeletal Pathology

Cribra orbitalia and porotic hyperostosis were absent.

Dentition

P	P	P	P	P	P	P	MP	MP	P	CA	P	P	P	P	P
18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
~~48~~	~~47~~	~~46~~	~~45~~	~~44~~	~~43~~	~~42~~	~~41~~	~~31~~	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	~~37~~	~~38~~

Unclear if 23 was congenitally absent or lost antemortem but very well healed. 22 has rotated to sit in the space so there is no gap in the occlusal surface, however there is some bony changes to the maxilla

Attrition: Moderate to high levels of attrition

Calculus: Not scorable for calculus due to taphonomic damage

Caries: No caries identified

Hypoplasia: Not scorable for hypoplasia due to taphonomic damage

Appendix 2: Summary table of Demographics and Burial Attributes in Assemblage

Analysis	ID	Site	Grave Number	Estimated AAD	Estimated Sex	Province	Grave Type	Grave Occupancy	Body Position	Phase	Associated Material
My Analysis	1938:9690	Aghfarrell	Burial 1	M. Adult (35-49 y)	Possible Male	Leinster	Cist	Single	Right	Phase B	Bowl placed mouth upwards in the top right corner of the cist, behind the head
My Analysis	P1948:101	Annagh More	Grave 1	Adolescent (12-18 y)	Undetermined	Leinster	Cist	Multiple	Left	Phase B	Tripartite Bowl, upright at NW corner of the grave. Reported to have contained 'black ashes'; possible cremation. Reports to also contain the badly decayed bones and teeth of a child 2 to 3 years.
My Analysis	1984:34	Annaghkeen	Grave 1	Adolescent (12-18 y)	Undetermined	Connacht	Cist	Single	Right	Phase B	Bipartite Vase below knees, small flint blade in western corner, mussel shells, unburnt proximal ulna, and radius of a juvenile pig (radius with multiple cut marks)
From Literature	1992:24	Ardra	Grave 1	Adult (18+ y)	Possible Male	Leinster	Cist	Multiple	Disturbed	N/A	Cremation
From Literature	1961:229	Ballickmoyler		M. Adult (35-49 y)	Female	Leinster	Cist	Multiple	Right	N/A	Cremation
My Analysis	1961:228	Ballicknahee	Grave 1	O. Adult (50+ y)	Female	Leinster	Cist	Multiple	Crouched, side not recorded	N/A	Cremation representing at least one adult in the region of the thorax
My Analysis	1928:459	Ballon		Adult (18+ y)	Undetermined	Leinster	N/A	Single	Not Recorded	N/A	None reported

My Analysis	1946:13.2	Ballybrennan	Cist 2B	M. Adult (35-49 y)	Female	Leinster	N/A	Single	Not Recorded	N/A	None reported
My Analysis	1940:87	Ballybrennan	Grave 1	Infant (B-2y)	Undetermined	Leinster	Cist	Single	Disturbed	N/A	Small bone pin, possibly peg pig femur pin
My Analysis	1945:24	Ballybrennan	Grave 2A	Child (3-12 y)	Undetermined	Leinster	Cist	Single	Right	N/A	Fragment of flint artifact (possibly blade), shells (of snails, possibly fortuitous); reported to have a juvenile left femur (intrusive) possibly linked to the individual in grave 1
My Analysis	1946:13.1	Ballybrennan	Grave 3	M. Adult (35-49 y)	Male	Leinster	Cist	Multiple	Left	Phase B	Tripartite Bowl in front of face, cremation over knees
My Analysis	1935:768	Ballybrew	Cist 1	Y. Adult (18-34 y)	Female	Leinster	Cist	Single	Right	Phase B	Tripartite Bowl in Northeast corner opposite face, broken lignite bead, small flint scraper
My Analysis	1935:799	Ballybrew	Grave 2	Y. Adult (18-34 y)	Male	Leinster	Cist	Multiple	Other	Phase B	Second burial in this cist, three flint flakes.
My Analysis	1935:799.1	Ballybrew	Grave 2	Adolescent (12-18 y)	Undetermined	Leinster	Cist	Multiple	Disturbed	Phase B	Tripartite Bowl in the east corner. Likely the primary burial in this cist as some bones were found in the pot. Three fragments of flint
My Analysis	1935:799.2b	Ballybrew		O. Adult (50+ y)	Male	Leinster	N/A	Single	Not Recorded	N/A	None reported
My Analysis	1934:429	Ballyhacket Upper		Y. Adult (18-34 y)	Possible Male	Leinster	Cist	Multiple	Disturbed	Phase B	Bipartite Vase at East end of grave, flint flake, Cremated Individual
From Literature	1996:230	Ballykine Upper	Grave 1	Child (3-12 y)	Undetermined	Connacht	Cist	Multiple	Not Recorded	Phase B	Cremation, five sherds of a Vase, Animal Bones (rabbit?), two Hazelnut shells
From Literature	E2873	Ballymount		M. Adult (35-49 y)	Undetermined	Leinster	Pit	Single	Right	Phase C	Four sherds of a Bipartite Vase, five lithics, Water-

											rolled stone appeared to be placed on top of the skull
My Analysis	2018:44	Ballynamona	Grave 1	Y. Adult (18-34 y)	Undetermined	Leinster	Pit	Single	Right	N/A	None reported
My Analysis	E111:11	Baunogenasraid	Burial 1	M. Adult (35-49 y)	Possible Male	Leinster	Semi-Cist	Multiple	Left	N/A	Necked bipartite bowl, lining of a dark organic substance with traces of a wood grain, Cremation
My Analysis	E111:15.1	Baunogenasraid	Burial 5	M. Adult (35-49 y)	Possible Male	Leinster	Pit	Multiple	Crouched, side not recorded	N/A	Inhumation of an adult male with a flint knife beside one of the long bones, inhumation of a child. Three pieces of cremated bone were found with the remains, likely belonging to grave 4
My Analysis	E111:15.2	Baunogenasraid	Burial 5	Child (3-12 y)	Undetermined	Leinster	Pit	Multiple	Crouched, side not recorded	N/A	Inhumation of an adult male with a flint knife beside one of the long bones, inhumation of a child. Three pieces of cremated bone were found with the remains, likely belonging to grave 4
My Analysis	E111:17	Baunogenasraid	Burial 7	Y. Adult (18-34 y)	Undetermined	Leinster	Pit	Single	Disturbed	N/A	None reported
My Analysis	E111:18	Baunogenasraid	Burial 8	Y. Adult (18-34 y)	Possible Male	Leinster	Pit	Single	Disturbed	N/A	None reported
My Analysis	E111:19	Baunogenasraid	Burial 9	M. Adult (35-49 y)	Possible Male	Leinster	Semi-Cist	Single	Left	N/A	None reported
My Analysis	1969:76	Benalbit and Derryroe	Grave 1	Y. Adult (18-34 y)	Possible Female	Leinster	Cist	Single	Disturbed	N/A	Shell fragment

My Analysis	1977:2330	Betaghstown	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Crouched, side not recorded	Phase A	Ribbed Bowl inverted at left shoulder, two flint flakes. Identified from the skeletal material three sheep bones, two tibia epiphyses, one astragalus, mollusc shells. Fragments from an adult female(?) found in soil around cist.
My Analysis	1956:11	Boherduff	Grave 1	Infant (B-2y)	Undetermined	Leinster	Cist	Single	Right	N/A	None reported
My Analysis	1965:79.1	Bolinready	Grave 1	Adolescent (12-18 y)	Undetermined	Leinster	Cist	Multiple	Disturbed	Phase B	Tripartite Bowl in Northeast corner, fibula of a child
My Analysis	2009:181	Brackloney	Grave 1	Child (3-12 y)	Undetermined	Ulster	Cist	Multiple	Left	N/A	Tripartite bowl, five fragments of cremated bone
From Literature	1935:447a	Brownstown		Y. Adult (18-34 y)	Female	Leinster	Pit				Co-mingling after excavation
From Literature	1935:447b	Brownstown		Y. Adult (18-34 y)	Female	Leinster	Pit				Co-mingling after excavation
From Literature	1935:447c	Brownstown		Adult (18+ y)	Male	Leinster	Pit				Co-mingling after excavation
From Literature	1935:447d	Brownstown		Child (3-12 y)	Undetermined	Leinster	Pit				Co-mingling after excavation
From Literature	1935:447e	Brownstown		Adolescent (12-18 y)	Undetermined	Leinster	Pit				Co-mingling after excavation
From Literature	C805	Cappydonnell Big	Burial 3	Y. Adult (18-34 y)	Possible Male	Leinster	Pit	Single	Disturbed	Phase C	None reported
From Literature	E3976	Carn More, Dundalk		Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Right	Phase B	Tripartite Bowl placed in front of face
My Analysis	1976:11	Carrickballydooey	Grave 1	M. Adult (35-49 y)	Male	Ulster	Cist	Single	Left	N/A	Plano-convex flint knife found under ribs
My Analysis	1933:970b	Carrownacon	1	O. Adult (50+ y)	Possible Female	Connacht	Cist	Multiple	Disturbed	N/A	Report mentions ‘two decayed pottery vessels’, cremation burial

From Literature	1931:167.1-2	Carrowntober East		Adolescent (12-18 y)	Possible Female	Connacht	Cist	Multiple	Right	Phase A	Bipartite Vase, two flint scrappers, Cremation, animal bone
My Analysis	1958:132	Cartenstown	Cist C?	Child (3-12 y)	Undetermined	Leinster	Cist	Single	Not Recorded	N/A	None reported
My Analysis	1980:43	Clonickilvant	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Right	Phase B	Anomalous vase immediately East of skull, mussel shell between skull and vessel
From Literature	1995:88	Clooneen		Child (3-12 y)	Undetermined	Connacht	Cist	Single	Not Recorded	Phase B	Bipartite Vase
From Literature	1947:37	Conranatown		Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Disturbed	N/A	Single fragment of cremated bone (frontal of an adult, probably male) with green staining
From Literature	97E0204	Coolnatullagh		Adolescent (12-18 y)	Undetermined	Munster	Pit	Multiple	Right	Phase C	Two cremation deposits, cattle jaw, six pig teeth
From Literature	1985:15	Crossakeel		M. Adult (35-49 y)	Possible Male	Leinster	Cist	Single	Disturbed	N/A	None reported
From Literature	98E0615	Crumlin		Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Disturbed	N/A	None reported
My Analysis	1937:3704	Cuillare	Grave 1, Burial 2	M. Adult (35-49 y)	Undetermined	Connacht	Cist	Single	Disturbed	N/A	None reported
From Literature	2009:23	Culleens		M. Adult (35-49 y)	Possible Female	Connacht	Cist	Single	Left	Phase B	Tripartite Vase
From Literature	AE.06.19_1	Drumahoe	Cist 1	Child (3-12 y)	Undetermined	Ulster	Cist	Single	Right	Phase C	None reported
From Literature	AE.06.19_2	Drumahoe	Cist 2	Y. Adult (18-34 y)	Male	Ulster	Cist	Single	Right	Phase B	Bronze dagger, with remains of daggers bark and leather sheath (possibly decorated with embossed swirl and line pattern). Fragments of a pig left radius and ulna were found beneath the spinal column and the ribs of the

											inhumation. Body placed on a bed of quartzite pebbles
My Analysis	1961:231	Drung	Cist A	Y. Adult (18-34 y)	Possible Female	Ulster	Cist	Single	Right	N/A	Pygmy cup behind head, one small animal bone
My Analysis	1961:244	Drung	Cist B	Y. Adult (18-34 y)	Possible Female	Ulster	Cist	Single	Right	N/A	Piece of rock crystal near the left hand, a bronze awl near to the right elbow
My Analysis	1961:245	Drung	Cist C	Infant (B-2y)	Undetermined	Ulster	Cist	Single	Not Recorded	N/A	None reported
My Analysis	TYR028:021_1	Dungate	Grave 1	M. Adult (35-49 y)	Male	Ulster	Cist	Multiple	Other	Phase B	Necked Bipartite Bowl (Tripartite Bowl in McSparron 2017) placed such that the opening was resting against the skull of skeleton 1. A second skeleton of a child was identified, lying to the west of skeleton 1 with the fragmented remains of a second Necked Bipartite Bowl (Tripartite Bowl in McSparron 2017)
My Analysis	TYR028:021_2	Dungate	Grave 1	Child (3-12 y)	Undetermined	Ulster	Cist	Multiple	Disturbed	Phase B	Necked Bipartite Bowl (Tripartite Bowl in McSparron 2017) placed such that the opening was resting against the skull of skeleton 1. A second skeleton of a child was identified, lying to the west of skeleton 1 with the

											fragmented remains of a second Necked Bipartite Bowl (Tripartite Bowl in McSparron 2017)
From Literature	1952:29a	Edmondstown	Cist 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Right	Phase A	Tripartite Bowl placed in Northwest corner
From Literature	1951:30a	Edmondstown	Cist 2	Adolescent (12-18 y)	Undetermined	Leinster	Cist	Single	Left	Phase B	Tripartite Bowl placed in Southeast corner, in front of skull
My Analysis	E18:128	Fourknocks II	Cist 1	Adult (18+ y)	Undetermined	Leinster	Cist	Single	Not Recorded	N/A	Fragments of charcoal
My Analysis	E18:142.1	Fourknocks II	Cist 2	O. Adult (50+ y)	Female	Leinster	Cist	Multiple	Right	N/A	Fragments of cremated bone and charcoal, possible fragments of pottery, bronze awl, flint flake, plano-convex flint blade, hazelnut shell
My Analysis	E61:382	Freestone Hill, Coolgrange		Y. Adult (18-34 y)	Possible Female	Leinster					Co-mingling after excavation
My Analysis	E61:386	Freestone Hill, Coolgrange		M. Adult (35-49 y)	Undetermined	Leinster					Co-mingling after excavation
My Analysis	E61:389	Freestone Hill, Coolgrange		O. Adult (50+ y)	Undetermined	Leinster					Co-mingling after excavation
My Analysis	1978:343	Glassamucky	Grave 1	Y. Adult (18-34 y)	Possible Male	Leinster	Cist	Single	Left	Phase B	Bowl behind right shoulder
From Literature	02E0479	Gneveebeg	Burial 12	Adult (18+ y)	Undetermined	Leinster	Pit	Single	Crouched, side not recorded	Phase B	Sherds of a Vase vessel
From Literature	P1953:3a	Graney West	Grave 1	Adult (18+ y)	Male	Leinster	Cist	Multiple	Crouched, side not recorded	Phase B	Ribbed Bowl placed near the skull; a second inhumation with a Necked Bowl

From Literature	P1953:3b	Graney West	Grave 1	Adult (18+ y)	Male	Leinster	Cist	Multiple	Crouched, side not recorded	Phase B	Necked bowl placed near the skull, along with sheards of a shouldered Bowl; another inhumation with a Bowl in cist
From Literature	P1953:31	Graney West	Grave 3	M. Adult (35-49 y)	Male	Leinster	Pit	Single	Left	N/A	Sheards of a Bowl vessel
From Literature	E65:41.1	Grange	Grave 2	M. Adult (35-49 y)	Male	Ulster	Cist	Multiple	Left	Phase B	Grave contained a Bipartite Bowl and a Tripartite Bowl, along with two inhumation burials
From Literature	E65:41.2	Grange	Grave 2	Child (3-12 y)	Undetermined	Ulster	Cist	Multiple	Disturbed	Phase B	Grave contained a Bipartite Bowl and a Tripartite Bowl, along with two inhumation burials
From Literature	E65:10	Grange	Grave 3	Child (3-12 y)	Undetermined	Ulster	Cist	Single	Crouched, side not recorded	Phase A	Bowl vessel, hoof of a pig
From Literature	1979:110	Greatdown		O. Adult (50+ y)	Possible Male	Leinster	Cist	Single	Crouched, side not recorded	Phase B	Ribbed Bowl
My Analysis	1939:1142	Halverstown	Grave 5	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Crouched, side not recorded	N/A	Fragments of charcoal and parts of a right ox femur
My Analysis	1939:1143	Halverstown	Grave 6	M. Adult (35-49 y)	Possible Female	Leinster	Pit	Single	Crouched, side not recorded	Phase B	Bowl placed behind the head
From Literature	03E1526_1	Harlockstown	B519	Y. Adult (18-34 y)	Undetermined	Leinster	Cist	Single	Left	Phase B	Necked Bipartite Bowl placed behind the base of the skull
From Literature	03E1526_2	Harlockstown	B601	Y. Adult (18-34 y)	Possible Male	Leinster	Semi-Cist	Single	Left	N/A	Pillow Stone. Ribbed Bowl behind skull
My Analysis	1932:6578.8	Haylands	B	Y. Adult (18-34 y)	Possible Male	Leinster	Pit	Single	Right	N/A	Two fragments of cremated bone, and two animal bone fragments

My Analysis	1932:6578.2	Haylands	D	M. Adult (35-49 y)	Male	Leinster	Cist	Single	Left	Phase B	Tripartite Bowl (Ribbed bowl) behind the skull
My Analysis	1932:6578.7	Haylands	G	Y. Adult (18-34 y)	Possible Female	Leinster	Cist	Single	Crouched, side not recorded	N/A	None reported
From Literature	1937:2746	Hempstown Commons	Grave 1	Adult (18+ y)	Possible Female	Leinster	Cist	Single	Right	N/A	None reported
My Analysis	1949:84	Hempstown Commons	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Left	N/A	None reported
My Analysis	1908:158.1	Jamestown	Grave 3	Child (3-12 y)	Undetermined	Leinster	Cist	Single	Not Recorded	N/A	Bowl
My Analysis	1929:1290	Jamestown	Grave 4	O. Adult (50+ y)	Possible Female	Leinster	N/A	Single	Not Recorded	N/A	Bowl
From Literature	1929:14-15	Keenoge	Grave 03	Y. Adult (18-34 y)	Female	Leinster	Pit	Multiple	Left	Phase B	Cremation deposit beneath and behind the skull, Bipartite Bowl behind skull, small bronze dagger near skull, chipped flint and curved chert blade, Necked Bipartite Bowl behind spine. Mount suggests that the Bipartite Bowl and the bronze razor are associated with the cremation deposit
From Literature	1929:16	Keenoge	Grave 04	Y. Adult (18-34 y)	Male	Leinster	Pit	Multiple	Right	N/A	Cremation
From Literature	Kee_3	Keenoge	Grave 05	M. Adult (35-49 y)	Male	Leinster	Pit	Multiple	Right	N/A	Sheards of a Bowl in front of head, Cremation, Animal Tooth
From Literature	1929:23	Keenoge	Grave 06	Y. Adult (18-34 y)	Female	Leinster	Cist	Single	Left	Phase B	Tripartite Bowl near head. Two further Tripartite Bowls found near cist
From Literature	1929:24.1	Keenoge	Grave 07	Adult (18+ y)	Undetermined	Leinster	Cist	Multiple	Not Recorded	N/A	Grave contained remains of an adult and an infant

From Literature	1929:24.2	Keenoge	Grave 07	Infant (B-2y)	Undetermined	Leinster	Cist	Multiple	Not Recorded	N/A	Grave contained remains of an adult and an infant
From Literature	1929:28	Keenoge	Grave 09	Infant (B-2y)	Undetermined	Leinster	Cist	Single	Right	Phase B	Tripartite Bowl behind head, boar's tusk
From Literature	1929:30	Keenoge	Grave 11	Adult (18+ y)	Male	Leinster	Pit	Single	Left	Phase B	Tripartite Bowl in front of face
From Literature	Kee_7	Keenoge	Grave 12	Y. Adult (18-34 y)	Female	Leinster	Pit	Multiple	Not Recorded	N/A	Grave containing one adult female, one adult male, one child
From Literature	Kee_8	Keenoge	Grave 12	Y. Adult (18-34 y)	Male	Leinster	Pit	Multiple	Not Recorded	N/A	Grave containing one adult female, one adult male, one child
From Literature	Kee_9	Keenoge	Grave 12	Infant (B-2y)	Undetermined	Leinster	Pit	Multiple	Not Recorded	N/A	Grave containing one adult female, one adult male, one child
From Literature	1929:72a	Keenoge	Grave 13	Y. Adult (18-34 y)	Female	Leinster	Pit	Multiple	Right	N/A	Around the neck of the articulated inhumation, beneath the jaw, were 40 jet beads of varying sizes which formed a tight necklace or choker about 15cm in diameter. They range from 1.1cm to 2.25cm in length and all have a uniform perforation of 0.3cm. Most of the beads were perforated through their length but some have been perforated through the side. Grave also contained some bones from an adult male and three cremated bones

From Literature	Kee_11	Keenoge	Grave 13	M. Adult (35-49 y)	Male	Leinster	Pit	Multiple	Not Recorded	N/A	Around the neck of the articulated inhumation, beneath the jaw, were 40 jet beads of varying sizes which formed a tight necklace or choker about 15cm in diameter. They range from 1.1cm to 2.25cm in length and all have a uniform perforation of 0.3cm. Most of the beads were perforated through their length but some have been perforated through the side. Grave also contained some bones from an adult male and three cremated bones
From Literature	1929:72b	Keenoge	Grave 14	Adult (18+ y)	Male	Leinster	Pit	Multiple	Not Recorded	Phase B	Bowl Vessel near the head of the articulated inhumation. Grave contained two inhumations (adult male and adolescent), and the cremated remains of two individuals (adult male and infant)
From Literature	Kee_13	Keenoge	Grave 14	Adolescent (12-18 y)	Undetermined	Leinster	Pit	Multiple	Not Recorded	Phase B	Bowl Vessel near the head of the articulated inhumation. Grave contained two inhumations (adult male and adolescent), and the cremated remains of two individuals (adult male and infant)
My Analysis	2013:124.3	Kilcornan	Grave 1	Infant (B-2y)	Undetermined	Connacht	Cist	Single	Right	N/A	Bipartite Vase, placed at the back of the skull

My Analysis	1956:211	Kilgaroan	Grave 1	Child (3-12 y)	Undetermined	Leinster	Cist	Single	Disturbed	N/A	The report mentions that the remains could have contained a younger second individual, this could not be confirmed during analysis.
From Literature	03E1359	Kilshane	F5111	Y. Adult (18-34 y)	Possible Male	Leinster	Semi-Cist	Single	Right	N/A	None reported
From Literature	1935:11	Kinard	Grave 1	Y. Adult (18-34 y)	Possible Female	Connacht	Cist	Single	Left	Phase B	Bipartite Vase in Southwest corner, mussel shells
My Analysis	1932:6684.8	Knockast	Skeleton 3	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Disturbed	N/A	Disturbed by cremation burial 21
My Analysis	1932:6684.9	Knockast	Skeleton 4	Infant (B-2y)	Undetermined	Leinster	Cist	Multiple	Disturbed	N/A	Cremation burial 24a (young female)
My Analysis	1930:57	Knocknatubbrid	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Crouched, side not recorded	N/A	Animal bone was found with the remains during analysis
From Literature	1982:15	Liscolman	Grave 1	Y. Adult (18-34 y)	Undetermined	Leinster	Cist	Single	Not Recorded	Phase B	Tripartite Bowl, animal bone
From Literature	04E0505:2	Liscooly	Grave 1	Y. Adult (18-34 y)	Possible Male	Ulster	Cist	Single	Disturbed	Phase A	Bipartite Bowl
From Literature	04E0505:6	Liscooly	Grave 4	Child (3-12 y)	Undetermined	Ulster	Cist	Single	Right	Phase A	Bipartite Bowl placed near the elbow
From Literature	1989:46	Lisnamulligan	Grave 2	Adult (18+ y)	Undetermined	Ulster	Cist	Single	Left	Phase A	Bowl vessel in Northeast corner
My Analysis	1938:9729	Loughfad	Cist A	M. Adult (35-49 y)	Undetermined	Ulster	Cist	Multiple	Disturbed	N/A	One disarticulated skeleton found in each of the compartments. When it was opened, a certain amount of mixing took place
My Analysis	1938:9730	Loughfad	Cist B	M. Adult (35-49 y)	Male	Ulster	Cist	Multiple	Disturbed	N/A	One disarticulated skeleton found in each of the compartments. When it was opened, a certain amount of mixing took place

From Literature	E704:3	Lug	Grave 3	M. Adult (35-49 y)	Female	Leinster	Cist	Single	Right	Phase B	Small Ribbed Bowl near skull
From Literature	E704:5	Lug	Grave 4	Y. Adult (18-34 y)	Female	Leinster	Cist	Multiple	Right	N/A	Cremation
From Literature	E740:8	Lug	Grave 5	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Not Recorded	N/A	None reported
From Literature	E704:9	Lug	Grave 6	Infant (B-2y)	Undetermined	Leinster	Cist	Single	Not Recorded	N/A	Sherds of an anomalous vessel
From Literature	P1952:2	Martinstown	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Left	N/A	Sherds of an anomalous vessel, white stone pebble
From Literature	P1953:12.1	Martinstown	Grave 2	Adult (18+ y)	Male	Leinster	Pit	Multiple	Disturbed	N/A	Grave contained an adult male, an adolescent, and infant
From Literature	P1953:12.2	Martinstown	Grave 2	Adolescent (12-18 y)	Undetermined	Leinster	Pit	Multiple	Disturbed	N/A	Grave contained an adult male, an adolescent, and infant
From Literature	P1953:12.3	Martinstown	Grave 2	Infant (B-2y)	Undetermined	Leinster	Pit	Multiple	Disturbed	N/A	Grave contained an adult male, an adolescent, and infant
From Literature	P1953:18-19.1	Martinstown	Grave 3	O. Adult (50+ y)	Male	Leinster	Pit	Multiple	Disturbed	Phase B	Ribbed Bowl. Grave contained an adult male, an adult female, an adolescent (plus bones which could be associated with an additional adult)
From Literature	P1953:18-19.2	Martinstown	Grave 3	O. Adult (50+ y)	Female	Leinster	Pit	Multiple	Disturbed	Phase B	Ribbed Bowl. Grave contained an adult male, an adult female, an adolescent (plus bones which could be associated with an additional adult)
From Literature	P1953:18-19.3	Martinstown	Grave 3	Adolescent (12-18 y)	Undetermined	Leinster	Pit	Multiple	Disturbed	Phase B	Ribbed Bowl. Grave contained an adult male, an adult female, an adolescent (plus bones which could be

											associated with an additional adult)
From Literature	P1953:18-19.4	Martinstown	Grave 3	Adult (18+ y)	Undetermined	Leinster	Pit	Multiple	Not Recorded	N/A	Sherds of an anomalous vessel
From Literature	P1953:14	Martinstown	Grave 4	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Not Recorded	Phase B	Tripartite Bowl
From Literature	P1953:16	Martinstown	Grave 5	Child (3-12 y)	Undetermined	Leinster	Pit	Single	Right	Phase B	Ribbed Bowl
My Analysis	1971:906	Milltown	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Right	Phase A	Tripartite bowl in southeast corner, in front of face
From Literature	E2980_10	Moone	Grave 01	Infant (B-2y)	Undetermined	Leinster	Pit	Single	Left	Phase A	Unworked quartz. Grave fill contained cattle ulna, pig metacarpal, two unidentified animal bone fragments
From Literature	E2980_3	Moone	Grave 02	Y. Adult (18-34 y)	Female	Leinster	Pit	Single	Left	Phase A	Sheards of a Tripartite Bowl found by head; grave fill contained cattle, large mammal, red deer, and unidentified animal bone fragments
From Literature	E2980_1	Moone	Grave 03	Y. Adult (18-34 y)	Female	Leinster	Pit	Multiple	Left	Phase A	Grave contained the remains of a child in the arms of an adult; metacarpal of a pig in grave fill
From Literature	E2980_12	Moone	Grave 03	Child (3-12 y)	Undetermined	Leinster	Pit	Multiple	Crouched, side not recorded	Phase A	Grave contained the remains of a child in the arms of an adult; metacarpal of a pig in grave fill

From Literature	E2980_5	Moone	Grave 04	M. Adult (35-49 y)	Female	Leinster	Pit	Single	Left	Phase A	Ribbed Tripartite Bowl behind skull, bronze awl found in two pieces (one half at the head the other at the wrist of the right hand), fragment of a flint core, overshot flint flake, chert core, red flint flake blank, flint core, quartz hammerstone, piece of haematite or limonite, sandstone polisher with staining placed under the right knee, shale honestone placed under the right ankle
From Literature	E2980_7	Moone	Grave 05	Adolescent (12-18 y)	Undetermined	Leinster	Pit	Single	Left	Phase A	Ribbed Tripartite Bowl in front of skull, leaf-shaped thin projectile rough out (possibly an unfinished or apprentice piece), minimally retouched inner flint flake (thought to be an apprentice's piece), the distal fragment of a finely retouched plano-convex knife blade or elongated projectile point, a unifacially retouched chert artefact fragment, two debitage flakes, Cattle skull fragment and teeth
From Literature	E2980_8	Moone	Grave 06	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Right	Phase A	Ribbed Tripartite Bowl behind skull
From Literature	E2980_9	Moone	Grave 07	Child (3-12 y)	Undetermined	Leinster	Semi-Cist	Single	Left	Phase B	Fragments of Ribbed Tripartite Bowl, five sherds

											of a Bowl vessel, marine shell with perforation
From Literature	E2980_15	Moone	Grave 08	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Left	Phase B	Ribbed Bipartite Bowl in hands of individual (may have been near head originally), chert core fragment
From Literature	E2980_11	Moone	Grave 09	Child (3-12 y)	Undetermined	Leinster	Pit	Multiple	Right	Phase B	Grave contained the remains of a child in the arms of an adult
From Literature	E2980_6	Moone	Grave 09	Y. Adult (18-34 y)	Female	Leinster	Pit	Multiple	Left	Phase B	Grave contained the remains of a child in the arms of an adult
From Literature	E2980_13	Moone	Grave 10	Infant (B-2y)	Undetermined	Leinster	Semi-Cist	Single	Left	Phase B	Grave fill contained an unidentified animal tooth fragment and a fossil shell
From Literature	E2980_14	Moone	Grave 11	Infant (B-2y)	Undetermined	Leinster	Semi-Cist	Multiple	Not Recorded	Phase B	Grave contained the remains of a child, a pair of fleshed adult feet, and other adult bones
From Literature	E2980_16	Moone	Grave 11	Adult (18+ y)	Possible Male	Leinster	Semi-Cist	Multiple	Not Recorded	Phase B	Grave contained the remains of a child, a pair of fleshed adult feet, and other adult bones
From Literature	E2980_2	Moone	Grave 12	Child (3-12 y)	Undetermined	Leinster	Cist	Single	Right	Phase B	None reported
From Literature	E2980_4	Moone	Grave 13	Child (3-12 y)	Undetermined	Leinster	Pit	Multiple	Right	Phase B	Cremation in chest area, small plain intact tub-shaped vessel at the back of skull
From Literature	Mor_01	Morenane	Grave 1	Y. Adult (18-34 y)	Male	Munster	Cist	Single	Crouched, side not recorded	N/A	None reported

My Analysis	P1952:18	Mosney	Grave 1	O. Adult (50+ y)	Male	Leinster	Pit	Single	Crouched, side not recorded	N/A	None reported
My Analysis	1928:381.1	Moyveela	Grave 1	Adolescent (12-18 y)	Undetermined	Connacht	Cist	Multiple	Not Recorded	Phase A	Bipartite Vase, 123 pieces of cremated bone (possible infant), 50 animal bones (possible juvenile pig)
My Analysis	08E0100.1	Mullamast	Grave 1	Y. Adult (18-34 y)	Undetermined	Leinster	Pit	Single	Crouched, side not recorded	Phase C	Grave fill contained hazel charcoal, stones, and burnt bone
My Analysis	1971:903	Newtownmacabe	Grave 1	Adult (18+ y)	Undetermined	Leinster	Cist	Multiple	Not Recorded	N/A	Bowl; two skulls found in cist
From Literature	1955:83	Oldtown	Burial 1	Y. Adult (18-34 y)	Female	Leinster	Pit	Single	Crouched, side not recorded	Phase B	Sherds of a Ribbed Bowl
From Literature	1955:84	Oldtown	Burial 2	M. Adult (35-49 y)	Female	Leinster	Pit	Single	Disturbed	Phase B	Sheards of a Bipartite Vase and a small Vase Urn
From Literature	1955:88	Oldtown	Burial 3	M. Adult (35-49 y)	Female	Leinster	Semi-Cist	Multiple	Left	Phase B	Cremation placed on and around the lower limbs, Tripartite Bowl in front of face
From Literature	1935:546	Ploopluck	Grave 3	Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Crouched, side not recorded	Phase A	Ribbed Bowl behind head
From Literature	1935:548	Ploopluck	Grave 5	Adolescent (12-18 y)	Undetermined	Leinster	Pit	Single	Not Recorded	Phase B	None reported
From Literature	1935:3-5	Ploopluck		Y. Adult (18-34 y)	Male	Leinster	Pit	Single	Not Recorded	Phase B	None reported
From Literature	1935:6	Ploopluck		Adult (18+ y)	Male	Leinster	Pit	Single	Not Recorded	Phase B	None reported
My Analysis	1982:355	Punchestown Great	Skeleton 1	Y. Adult (18-34 y)	Possible Female	Leinster	Cist	Multiple	Left	N/A	Two inhumations and two cremations found in cist
My Analysis	1982:356	Punchestown Great	Skeleton 2	Y. Adult (18-34 y)	Possible Male	Leinster	Cist	Multiple	Right	N/A	Two inhumations and two cremations found in cist

My Analysis	1963:41	Rahinashurock	Burial 1	Adolescent (12-18 y)	Possible Male	Leinster	Cist	Single	Left	N/A	None reported
My Analysis	RATH_a	Rathlin Island	a	Adolescent (12-18 y)	Undetermined	Ulster	N/A	Single	Not Recorded	N/A	None reported
My Analysis	RATH_SK1	Rathlin Island	Grave 1	Y. Adult (18-34 y)	Female	Ulster	Cist	Single	Right	N/A	None reported
My Analysis	RATH_SK2	Rathlin Island	Grave 2	Y. Adult (18-34 y)	Possible Male	Ulster	Cist	Multiple	Disturbed	N/A	Vase Urn, inhumed remains of 5 individuals
From Literature	RATH_SK3	Rathlin Island	Grave 2	Y. Adult (18-34 y)	Male	Ulster	Cist	Multiple	Crouched, side not recorded	N/A	Vase Urn, inhumed remains of 5 individuals
From Literature	RATH_SK4	Rathlin Island	Grave 2	Y. Adult (18-34 y)	Undetermined	Ulster	Cist	Multiple	Disturbed	N/A	Vase Urn, inhumed remains of 5 individuals
My Analysis	RATH_SK5	Rathlin Island	Grave 2	Child (3-12 y)	Undetermined	Ulster	Cist	Multiple	Disturbed	N/A	Vase Urn, inhumed remains of 5 individuals
From Literature	RATH_SK6	Rathlin Island	Grave 2	Adult (18+ y)	Undetermined	Ulster	Cist	Multiple	Disturbed	N/A	Vase Urn, inhumed remains of 5 individuals
My Analysis	RATH_SK7	Rathlin Island	Grave 3	Child (3-12 y)	Undetermined	Ulster	Cist	Single	Disturbed	N/A	Pygmy Cup, animal bone
My Analysis	RATH_SK8	Rathlin Island	Grave 4	Adult (18+ y)	Undetermined	Ulster	Cist	Single	Disturbed	N/A	None reported
My Analysis	RATH_SK9	Rathlin Island	Grave 6	Adolescent (12-18 y)	Undetermined	Ulster	Cist	Single	Right	Phase A	Tripartite Bowl among the feet, possible animal bones
My Analysis	RATH_SK10	Rathlin Island	Grave 7	Y. Adult (18-34 y)	Male	Ulster	Cist	Single	Other	Phase A	Comb-decorated bowl, upright on the ribs
From Literature	RathG_C105	Rathlin Island, Glebe	C112	Y. Adult (18-34 y)	Male	Ulster	Cist	Multiple	Disturbed	N/A	Disarticulated remains of 3 individuals
From Literature	RathG_C122	Rathlin Island, Glebe	C112	Y. Adult (18-34 y)	Male	Ulster	Cist	Multiple	Disturbed	N/A	Disarticulated remains of 3 individuals
From Literature	RathG_Dis	Rathlin Island, Glebe	C112	Y. Adult (18-34 y)	Female	Ulster	Cist	Multiple	Disturbed	N/A	Disarticulated remains of 3 individuals
From Literature	RathG_C127	Rathlin Island, Glebe	C124	M. Adult (35-49 y)	Male	Ulster	Cist	Single	Left	Phase B	Tripartite Bowl near the South-East corner of Cist

My Analysis	1956:209	Redmondstown	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Left	N/A	None reported
From Literature	1956:223	Redmondstown	Grave 2	Adolescent (12-18 y)	Undetermined	Leinster	Cist	Single	Right	N/A	None reported
From Literature	1956:232	Redmondstown	Grave 3	Child (3-12 y)	Undetermined	Leinster	Cist	Single	Not Recorded	N/A	Anomalous Bowl
My Analysis	2011:6	Rickardstown	Grave 1	Y. Adult (18-34 y)	Female	Leinster	Semi-Cist	Single	Right	N/A	Tripartite Bowl, near right elbow
From Literature	1969:672	Riverstown	Grave 1	O. Adult (50+ y)	Male	Leinster	Cist	Single	Right	Phase B	Tripartite Bowl
From Literature	1934:433	Rush	Grave 1	Y. Adult (18-34 y)	Undetermined	Leinster	Cist	Single	Not Recorded	Phase B	Necked Bipartite Bowl
My Analysis	1974:27	Sliguff	Grave 1	Y. Adult (18-34 y)	Male	Leinster	Cist	Single	Left	Phase B	Tripartite Bowl, placed in front of the face
My Analysis	1955:42	Stillorgan Park	Grave 1	Y. Adult (18-34 y)	Possible Male	Leinster	Cist	Single	Disturbed	N/A	Flint Flake, tibial epiphysis of a juvenile cow
My Analysis	1933:3409	Stonepark	Grave 1	Adult (18+ y)	Possible Male	Connacht	Cist	Single	Disturbed	Phase B	Bipartite vase found in the Western half of the cist, 'curiously shaped fossil coral'
My Analysis	STRD_1	Straid	Grave 1	Y. Adult (18-34 y)	Male	Ulster	Cist	Single	Right	Phase A	Tripartite Bowl found next to skull in North-East corner of the cist
From Literature	STRD_2	Straid	Grave 3	M. Adult (35-49 y)	Male	Ulster	Cist	Multiple	Left	Phase A	Simple Bowl in North-East corner. Below left elbow of the inhumation, against the East face of the cist was a cremation. A second cremation lay below the right leg, against the South face of the cist. Both cremations, both mature females, seem to predate the inhumation.

My Analysis	STRD_3	Straid	Grave 4	Y. Adult (18-34 y)	Male	Ulster	Cist	Single	Right	Phase A	Constricted bowl, South-East corner of the cist
My Analysis	99E0203.6	Timolin	Feature 6	Child (3-12 y)	Undetermined	Leinster	Pit	Single	Disturbed	N/A	None reported
My Analysis	99E0203.7	Timolin	Feature 7	M. Adult (35-49 y)	Female	Leinster	Cist	Single	Right	N/A	None reported
My Analysis	1981:360.2	Timolin	Grave 1	Y. Adult (18-34 y)	Possible Male	Leinster	Cist	Single	Disturbed	Phase B	Complete Tripartite Bowl in Northeast corner of the grave near the skull, sherds of Bipartite Bowl likely broken in antiquity
My Analysis	1982:121	Timolin	Grave 2	O. Adult (50+ y)	Undetermined	Leinster	Cist	Single	Disturbed	N/A	None reported
My Analysis	FER194:040_1	Tonyglaskan	Cist A	Y. Adult (18-34 y)	Possible Male	Ulster	Cist	Single	Left	Phase B	Bipartite bowl, fragment of a possibly perforated stone object
My Analysis	FER194:040_2	Tonyglaskan	Cist B	Child (3-12 y)	Undetermined	Ulster	Cist	Single	Left	Phase B	Flint Flake
My Analysis	FER194:040_3	Tonyglaskan	Cist C	Y. Adult (18-34 y)	Male	Ulster	Cist	Single	Other	Phase B	Sherds of highly decorated simple bowl
My Analysis	1956:222	Tornant Lower	Grave 1	M. Adult (35-49 y)	Male	Leinster	Cist	Single	Left	N/A	None reported
My Analysis	1966:116.1	Treanmacmurtagh	Grave 1	Adolescent (12-18 y)	Undetermined	Connacht	Cist	Single	Left	Phase B	Small Vase in front of face, cremated bones of an adult, shards of a possible Bowl vessel
My Analysis	1966:116.2	Treanmacmurtagh	Grave 2?	Y. Adult (18-34 y)	Possible Female	Connacht	Cist	Single	Disturbed	N/A	None reported
My Analysis	1939:988	Tulfarris		O. Adult (50+ y)	Male	Leinster	N/A	Single	Disturbed	N/A	None reported
My Analysis	1932:5614b	Whitestown	Grave 1	M. Adult (35-49 y)	Male	Leinster	Cist	Single	Other	Phase B	Necked Bowl South of skull, some animal bone. The NMI File references a band of ornamented substance around the skull, which

											disintegrated upon disturbance. Small amount of cremated bone
My Analysis	1989:53.1	Whitestown	Grave 1	Y. Adult (18-34 y)	Possible Male	Leinster	Pit	Single	Not Recorded	N/A	None reported

Appendix 3: Summary table of Population Health Data

Analysis	ID	Site	Estimated AAD	Sex	Stature	Body Mass	EH	CO	PH	Periostitis	DJD	Spinal DJD	Trauma	BIF	BIF Category
My Analysis	1938:9690	Aghfarrell	M. Adult (35-49 y)	Possible Male			N/S	Absent	Absent	Absent	Present	Present	N/S	20.00	Low
My Analysis	P1948:101	Annagh More	Adolescent (12-18 y)	Undetermined	162.00		Present	Present	Present	N/S	Absent	Absent	N/S	73.33	High
My Analysis	1984:34	Annaghkeen	Adolescent (12-18 y)	Undetermined			Present	N/S	Absent	N/S	N/S	N/S	N/S		N/S
From Literature	1992:24	Ardra	Adult (18+ y)	Possible Male			Absent	N/S	N/S	Present	Present	N/S	Absent	37.50	Medium
From Literature	1961:229	Ballickmoyler	M. Adult (35-49 y)	Female	152.00		N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	1961:228	Ballicknahee	O. Adult (50+ y)	Female	158.33	39.27	N/S	Absent	Absent	Absent	Present	Present	Absent	37.50	Medium
My Analysis	1928:459	Ballon	Adult (18+ y)	Undetermined			N/S	N/S	N/S	N/S	N/S	Present	N/S		N/S
My Analysis	1946:13.2	Ballybrennan	M. Adult (35-49 y)	Female	159.08	37.24	N/S	Absent	Absent	Absent	Absent	N/S	Present	33.33	Medium
My Analysis	1940:87	Ballybrennan	Infant (B-2 y)	Undetermined			N/S	N/S	Absent	Absent	Absent	Absent	Absent	0.00	Low
My Analysis	1945:24	Ballybrennan	Child (3-12 y)	Undetermined			Present	Absent	Absent	Absent	Absent	Absent	Absent	20.00	Low

My Analysis	1946:13.1	Ballybrennan	M. Adult (35-49 y)	Male			Present	Absent	Absent	N/S	Present	Present	Present	57.14	High
My Analysis	1935:768	Ballybrew	Y. Adult (18-34 y)	Female	164.76	40.24	Absent	Absent	Absent	Absent	Present	Present	Absent	10.53	Low
My Analysis	1935:799	Ballybrew	Y. Adult (18-34 y)	Male	178.74	48.64	Absent	Absent	Absent	Absent	Present	Present	Present	21.05	Medium
My Analysis	1935:799.1	Ballybrew	Adolescent (12-18 y)	Undetermined			Present	Present	N/S	Absent	N/S	Absent	Absent	54.55	High
My Analysis	1935:799.2b	Ballybrew	O. Adult (50+ y)	Male			Present	Present	Present	N/S	Present	Present	Absent	77.78	High
My Analysis	1934:429	Ballyhacket Upper	Y. Adult (18-34 y)	Possible Male			N/S	Present	Absent	Absent	Absent	Present	Absent	15.79	Low
From Literature	1996:230	Ballykine Upper	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	E2873	Ballymount	M. Adult (35-49 y)	Undetermined			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	2018:44	Ballynamona	Y. Adult (18-34 y)	Undetermined	173.37		Present	N/S	Present	Absent	Absent	N/S	Absent	50.00	Medium
My Analysis	E111:11	Baunogenasraid	M. Adult (35-49 y)	Possible Male			N/S	N/S	N/S	N/S	N/S	N/S	Absent		N/S
My Analysis	E111:15.1	Baunogenasraid	M. Adult (35-49 y)	Possible Male			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	E111:15.2	Baunogenasraid	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S

My Analysis	E111:17	Baunogenasraid	Y. Adult (18-34 y)	Undetermined			Present	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	E111:18	Baunogenasraid	Y. Adult (18-34 y)	Possible Male			Present	N/S	Present	N/S	N/S	N/S	N/S		N/S
My Analysis	E111:19	Baunogenasraid	M. Adult (35-49 y)	Possible Male			N/S	N/S	N/S	N/S	N/S	Present	Absent		N/S
My Analysis	1969:76	Benalbit and Derryroe	Y. Adult (18-34 y)	Possible Female		39.03	Absent	N/S	N/S	N/S	Absent	Absent	N/S	37.50	Medium
My Analysis	1977:2330	Betaghstown	Y. Adult (18-34 y)	Male	163.04	42.63	Present	Absent	Present	Absent	Absent	Present	Present	63.64	High
My Analysis	1956:11	Boherduff	Infant (B-2 y)	Undetermined			Absent	N/S	Absent	Absent	Absent	Absent	Absent	0.00	Low
My Analysis	1965:79.1	Bolinready	Adolescent (12-18 y)	Undetermined			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	2009:181	Brackloney	Child (3-12 y)	Undetermined			Present	Present	Absent	Present	Absent	Absent	Absent	53.33	High
From Literature	1935:447a	Brownstown	Y. Adult (18-34 y)	Female			Absent	Present	Absent	N/S	N/S	N/S	N/S	20.00	Low
From Literature	1935:447b	Brownstown	Y. Adult (18-34 y)	Female			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	1935:447c	Brownstown	Adult (18+ y)	Male			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	1935:447d	Brownstown	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S

From Literature	1935:447e	Brownstown	Adolescent (12-18 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	E2653	Cappydonnell Big	Y. Adult (18-34 y)	Possible Male			Present	N/S	N/S	N/S	Present	N/S	Absent	66.67	High
From Literature	E3976	Carn More, Dundalk	Y. Adult (18-34 y)	Male			Present	N/S	Absent	N/S	N/S	N/S	Absent	37.50	Medium
My Analysis	1976:11	Carrickballydooey	M. Adult (35-49 y)	Male	178.91	49.42	N/S	Absent	Absent	Absent	Present	Present	Absent	12.50	Low
My Analysis	1933:970b	Carrownacon	O. Adult (50+ y)	Possible Female			Present	Present	Absent	N/S	N/S	N/S	Absent	47.37	Medium
From Literature	1931:167.1-2	Carrowntober East	Adolescent (12-18 y)	Possible Female			Absent	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
My Analysis	1958:132	Cartenstown	Child (3-12 y)	Undetermined			Absent	Present	N/S	Absent	N/S	N/S	Absent	30.00	Medium
My Analysis	1980:43	Clonickilvant	Y. Adult (18-34 y)	Male	169.94	48.91	Present	Absent	N/S	Absent	N/S	Present	Present	40.00	Medium
From Literature	1995:88	Clooneen	Child (3-12 y)	Undetermined			Absent	Present	Absent	Absent	N/S	N/S	Absent	4.76	Low
From Literature	1947:37	Conranatown	Y. Adult (18-34 y)	Male	176.00		Absent	N/S	N/S	N/S	N/S	N/S	Absent	0.00	Low
From Literature	97E0204	Coolnatullagh	Adolescent (12-18 y)	Undetermined			Present	N/S	N/S	Absent	N/S	N/S	N/S		N/S
From Literature	1985:15	Crossakeel	M. Adult (35-49 y)	Possible Male	176.00		N/S	N/S	Absent	Absent	Present	Present	Absent	20.00	Low

From Literature	98E0615	Crumlin	Y. Adult (18-34 y)	Male			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	1937:3704	Cuillare	M. Adult (35-49 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	Absent		N/S
From Literature	2009:23	Culleens	M. Adult (35-49 y)	Possible Female	169.00		Absent	N/S	Absent	Absent	N/S	Present	Absent	8.33	Low
From Literature	AE.06.19_1	Drumahoe	Child (3-12 y)	Undetermined			Absent	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
From Literature	AE.06.19_2	Drumahoe	Y. Adult (18-34 y)	Male	177.00		Absent	Absent	Absent	Absent	N/S	Present	Absent	6.67	Low
My Analysis	1961:231	Drung	Y. Adult (18-34 y)	Possible Female	160.80	42.70	Present	Present	N/S	Absent	Absent	Present	Absent	43.75	Medium
My Analysis	1961:244	Drung	Y. Adult (18-34 y)	Possible Female	159.57	39.61	Present	Absent	N/S	Absent	Absent	Absent	Absent	18.75	Low
My Analysis	1961:245	Drung	Infant (B-2 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	TYR028:021_1	Dungate	M. Adult (35-49 y)	Male	175.94	47.77	N/S	N/S	N/S	Present	Present	Present	N/S	50.00	Medium
My Analysis	TYR028:021_2	Dungate	Child (3-12 y)	Undetermined			Present	Present	Present	N/S	Absent	Absent	Absent	55.56	High
From Literature	1952:29a	Edmondstown	Y. Adult (18-34 y)	Male	182.00		Absent	Absent	Absent	Absent	Absent	Present	Present	18.75	Low
From Literature	1951:30a	Edmondstown	Adolescent (12-18 y)	Undetermined			Present	Absent	Absent	Present	N/S	N/S	Absent	38.46	Medium

My Analysis	E18:128	Fourknocks II	Adult (18+ y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	E18:142.1	Fourknocks II	O. Adult (50+ y)	Female	169.99	43.32	Absent	Absent	N/S	N/S	Present	Present	Present	28.57	Medium
My Analysis	E61:382	Freestone Hill, Coolgrange	Y. Adult (18-34 y)	Possible Female			N/S	Absent	Absent	N/S	N/S	N/S	N/S		N/S
My Analysis	E61:386	Freestone Hill, Coolgrange	M. Adult (35-49 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	E61:389	Freestone Hill, Coolgrange	O. Adult (50+ y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	1978:343	Glassamucky	Y. Adult (18-34 y)	Possible Male	166.61	42.89	N/S	N/S	N/S	Absent	Absent	N/S	N/S	57.14	High
From Literature	02E0479	Gneveebeg	Adult (18+ y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	P1953:3a	Graney West	Adult (18+ y)	Male	165.00		Present	Absent	N/S	Absent	Present	Present	Absent	46.15	Medium
From Literature	P1953:3b	Graney West	Adult (18+ y)	Male	172.00		N/S	Present	Present	Absent	Present	Present	Absent	47.37	Medium
From Literature	P1953:31	Graney West	M. Adult (35-49 y)	Male			Present	N/S	N/S	Absent	Present	Present	Absent	55.56	High
From Literature	E65:41.1	Grange	M. Adult (35-49 y)	Male			N/S	N/S	N/S	Absent	Present	Present	Absent	33.33	Medium
From Literature	E65:41.2	Grange	Child (3-12 y)	Undetermined			Absent	N/S	N/S	Absent	N/S	N/S	Absent	0.00	Low

From Literature	E65:10	Grange	Child (3-12 y)	Undetermined			Present	Absent	Absent	Absent	N/S	N/S	Absent	23.08	Medium
From Literature	1979:110	Greatdown	O. Adult (50+ y)	Possible Male	177.00		N/S	N/S	N/S	Absent	Present	Present	Absent	28.57	Medium
My Analysis	1939:1142	Halverstown	Y. Adult (18-34 y)	Male	175.17	42.93	N/S	Absent	N/S	Absent	Present	Present	Present	53.85	High
My Analysis	1939:1143	Halverstown	M. Adult (35-49 y)	Possible Female		47.41	N/S	Present	N/S	N/S	N/S	Absent	N/S	42.86	Medium
From Literature	03E1526_1	Harlockstown	Y. Adult (18-34 y)	Undetermined			Absent	N/S	Absent	Absent	N/S	N/S	Absent	0.00	Low
From Literature	03E1526_2	Harlockstown	Y. Adult (18-34 y)	Possible Male			Absent	N/S	Absent	Absent	Absent	Present	Absent	8.33	Low
My Analysis	1932:6578.8	Haylands	Y. Adult (18-34 y)	Possible Male			Present	Absent	N/S	Absent	N/S	Absent	Absent	27.27	Medium
My Analysis	1932:6578.2	Haylands	M. Adult (35-49 y)	Male			N/S	N/S	N/S	Absent	Present	Present	Absent	33.33	Medium
My Analysis	1932:6578.7	Haylands	Y. Adult (18-34 y)	Possible Female			Absent	Absent	N/S	Absent	N/S	N/S	Absent	0.00	Low
From Literature	1937:2746	Hempstown Commons	Adult (18+ y)	Possible Female			N/S	N/S	N/S	Absent	N/S	Present	Absent	20.00	Low
My Analysis	1949:84	Hempstown Commons	Y. Adult (18-34 y)	Male	171.13	45.56	Absent	Absent	Present	Absent	N/S	Present	N/S	14.29	Low
My Analysis	1908:158.1	Jamestown	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S

My Analysis	1929:1290	Jamestown	O. Adult (50+ y)	Possible Female	159.32	43.21	N/S	Absent	Absent	N/S	Present	N/S	N/S	9.09	Low
From Literature	1929:14-15	Keenoge	Y. Adult (18-34 y)	Female	167.00		Absent	N/S	N/S	Absent	Absent	Absent	Absent	0.00	Low
From Literature	1929:16	Keenoge	Y. Adult (18-34 y)	Male	162.00		Absent	N/S	Absent	Absent	Present	Present	Absent	23.08	Medium
From Literature	Kee_3	Keenoge	M. Adult (35-49 y)	Male			Absent	N/S	Absent	Absent	N/S	N/S	Absent	0.00	Low
From Literature	1929:23	Keenoge	Y. Adult (18-34 y)	Female	169.00		Present	Absent	N/S	Absent	Absent	Present	Absent	30.77	Medium
From Literature	1929:24	Keenoge	Infant (B-2 y)	Undetermined			N/S	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
From Literature	1929:24.1	Keenoge	Adult (18+ y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	1929:28	Keenoge	Infant (B-2 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	1929:30	Keenoge	Adult (18+ y)	Male	175.00		N/S	N/S	N/S	Absent	Absent	Absent	Absent	0.00	Low
From Literature	Kee_7	Keenoge	Y. Adult (18-34 y)	Female			Present	N/S	N/S	Absent	Absent	N/S	Absent	37.50	Medium
From Literature	Kee_8	Keenoge	Y. Adult (18-34 y)	Male			Absent	N/S	Absent	Absent	Absent	N/S	Absent	0.00	Low
From Literature	Kee_9	Keenoge	Infant (B-2 y)	Undetermined			N/S	N/S	N/S	Absent	N/S	N/S	Absent		N/S

From Literature	1929:72a	Keenoge	Y. Adult (18-34 y)	Female	153.00		Absent	N/S	N/S	Absent	Absent	Absent	Absent	10.00	Low
From Literature	Kee_11	Keenoge	M. Adult (35-49 y)	Male			N/S	Absent	Present	N/S	N/S	N/S	Absent	16.67	Low
From Literature	1929:72b	Keenoge	Adult (18+ y)	Male			Absent	N/S	Absent	Absent	Absent	N/S	Absent	0.00	Low
From Literature	Kee_13	Keenoge	Adolescent (12-18 y)	Undetermined			N/S	Absent	Absent	N/S	N/S	N/S	Absent	0.00	Low
My Analysis	2013:124.3	Kilcornan	Infant (B-2 y)	Undetermined			Absent	Present	Present	Present	N/S	N/S	Absent	61.54	High
My Analysis	1956:211	Kilgaroan	Child (3-12 y)	Undetermined			Present	N/S	N/S	Absent	N/S	N/S	Absent	42.86	Medium
From Literature	03E1359	Kilshane	Y. Adult (18-34 y)	Possible Male			Present	N/S	Absent	Present	Absent	Absent	Absent	41.67	Medium
From Literature	1935:11	Kinard	Y. Adult (18-34 y)	Possible Female			N/S	N/S	N/S	Absent	Absent	N/S	Absent	0.00	Low
My Analysis	1932:6684.8	Knockast	Y. Adult (18-34 y)	Male		52.96	N/S	Present	Absent	Absent	Present	Present	Absent	23.08	Medium
My Analysis	1932:6684.9	Knockast	Infant (B-2 y)	Undetermined			N/S	N/S	N/S	Absent	N/S	N/S	Absent		N/S
My Analysis	1930:57	Knocknatubbrid	Y. Adult (18-34 y)	Male	169.94	47.69	Present	N/S	N/S	Absent	Present	Present	Absent	38.46	Medium
From Literature	1982:15	Liscolman	Y. Adult (18-34 y)	Undetermined			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S

From Literature	04E0505:2	Liscooly	Y. Adult (18-34 y)	Possible Male	171.00		Present	N/S	N/S	Absent	Absent	N/S	Absent	33.33	Medium
From Literature	04E0505:6	Liscooly	Child (3-12 y)	Undetermined			Absent	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
From Literature	1989:46	Lisnamulligan	Adult (18+ y)	Undetermined			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	1938:9729	Loughfad	M. Adult (35-49 y)	Undetermined	166.13	45.56	Present	Present	Absent	N/S	Present	Present	N/S	55.56	High
My Analysis	1938:9730	Loughfad	M. Adult (35-49 y)	Male	176.60	47.71	Absent	Present	Absent	Absent	Present	Present	N/S	20.00	Low
From Literature	E704:5	Lug	M. Adult (35-49 y)	Female			Absent	Absent	Present	Present	Present	Present	N/S	53.85	High
From Literature	E704:5	Lug	Y. Adult (18-34 y)	Female		43.15	Present	N/S	N/S	Absent	N/S	Absent	Absent	27.27	Medium
From Literature	E740:8	Lug	Y. Adult (18-34 y)	Male			Present	Absent	Absent	Absent	Absent	N/S	Absent	21.43	Medium
From Literature	E704:9	Lug	Infant (B-2 y)	Undetermined			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	P1952:2	Martinstown	Y. Adult (18-34 y)	Male	169.00		Present	Absent	Absent	Absent	Absent	Present	Absent	25.00	Medium
From Literature	P1953:12.1	Martinstown	Adult (18+ y)	Male			N/S	N/S	Absent	N/S	N/S	Present	N/S		N/S
From Literature	P1953:12.2	Martinstown	Adolescent (12-18 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S

From Literature	P1953:12.3	Martinstown	Infant (B-2 y)	Undetermined			N/S	Present	Absent	N/S	N/S	N/S	Absent	37.50	Medium
From Literature	P1953:18-19.1	Martinstown	O. Adult (50+ y)	Male			Present	Absent	Absent	N/S	N/S	N/S	Absent	27.27	Medium
From Literature	P1953:18-19.2	Martinstown	O. Adult (50+ y)	Female			N/S	Present	Absent	N/S	N/S	N/S	N/S		N/S
From Literature	P1953:18-19.3	Martinstown	Adolescent (12-18 y)	Undetermined			Present	Absent	Absent	Absent	N/S	N/S	Absent	23.08	Medium
From Literature	P1953:18-19.4	Martinstown	Adult (18+ y)	Undetermined			N/S	N/S	N/S	Absent	Absent	Absent	Absent	0.00	Low
From Literature	P1953:14	Martinstown	Y. Adult (18-34 y)	Male	164.00		Absent	Absent	Absent	Absent	Absent	Present	Absent	12.50	Low
From Literature	P1953:16	Martinstown	Child (3-12 y)	Undetermined			N/S	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
My Analysis	1971:906	Milltown	Y. Adult (18-34 y)	Male	170.89	47.37	N/S	Absent	Present	Absent	N/S	Present	Absent	15.38	Low
From Literature	E2980_10	Moone	Infant (B-2 y)	Undetermined			Absent	N/S	Absent	Present	N/S	N/S	Absent	20.00	Low
From Literature	E2980_3	Moone	Y. Adult (18-34 y)	Female			Absent	N/S	Absent	Absent	Present	Present	Absent	16.67	Low
From Literature	E2980_1	Moone	Y. Adult (18-34 y)	Female	165.74		Present	Present	Present	Absent	Present	Present	Absent	58.33	High
From Literature	E2980_12	Moone	Child (3-12 y)	Undetermined			Present	Absent	Absent	N/S	N/S	N/S	Absent	27.27	Medium

From Literature	E2980_5	Moone	M. Adult (35-49 y)	Female	165.74		Absent	Absent	Present	Absent	Present	Present	Present	37.93	Medium
From Literature	E2980_7	Moone	Adolescent (12-18 y)	Undetermined			N/S	Present	Present	Absent	N/S	N/S	Absent	38.46	Medium
From Literature	E2980_8	Moone	Y. Adult (18-34 y)	Male	189.00		Absent	Absent	Absent	Absent	Absent	Present	Absent	6.25	Low
From Literature	E2980_9	Moone	Child (3-12 y)	Undetermined			Absent	N/S	N/S	Absent	N/S	N/S	Absent	0.00	Low
From Literature	E2980_15	Moone	Y. Adult (18-34 y)	Male	184.00		Absent	Absent	Absent	Absent	Absent	Present	Absent	6.25	Low
From Literature	E2980_11	Moone	Child (3-12 y)	Undetermined			Present	Absent	Absent	N/S	N/S	N/S	Absent	27.27	Medium
From Literature	E2980_6	Moone	Y. Adult (18-34 y)	Female	163.00		Absent	Absent	Absent	Absent	Absent	Present	Absent	6.25	Low
From Literature	E2980_13	Moone	Infant (B-2 y)	Undetermined			Absent	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
From Literature	E2980_14	Moone	Infant (B-2 y)	Undetermined			Absent	N/S	Absent	Present	N/S	N/S	Absent	20.00	Low
From Literature	E2980_16	Moone	Adult (18+ y)	Possible Male			N/S	N/S	N/S	N/S	Present	N/S	N/S		N/S
From Literature	E2980_2	Moone	Child (3-12 y)	Undetermined			Present	Present	Present	Absent	N/S	N/S	Absent	50.00	Medium
From Literature	E2980_4	Moone	Child (3-12 y)	Undetermined			Present	Present	Present	Absent	N/S	N/S	Present	77.78	High

From Literature	Mor_01	Morenane	Y. Adult (18-34 y)	Male	165.00		Absent	Absent	Absent	Absent	Absent	Absent	Absent	6.25	Low
My Analysis	P1952:18	Mosney	O. Adult (50+ y)	Male	167.32		N/S	Absent	N/S	Absent	N/S	Present	Absent	22.22	Medium
My Analysis	1928:381.1	Moyveela	Adolescent (12-18 y)	Undetermined			Absent	Absent	Absent	Absent	Absent	Absent	Absent	0.00	Low
My Analysis	08E0110_1	Mullamast	Y. Adult (18-34 y)	Undetermined			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	1971:903	Newtownmacabe	Adult (18+ y)	Undetermined	167.56	47.72	N/S	N/S	N/S	Absent	Present	Present	N/S	25.00	Medium
From Literature	1955:83	Oldtown	Y. Adult (18-34 y)	Female	162.00		Present	Absent	N/S	Absent	Absent	N/S	Absent	25.00	Medium
From Literature	1955:84	Oldtown	M. Adult (35-49 y)	Female			Absent	N/S	Absent	N/S	Absent	Present	Absent	10.00	Low
From Literature	1955:88	Oldtown	M. Adult (35-49 y)	Female			Present	Absent	Absent	Absent	Present	N/S	Absent	28.57	Medium
From Literature	1935:546	Ploopluck	Y. Adult (18-34 y)	Male	180.00		Present	Present	Absent	Absent	Absent	Absent	Absent	31.03	Medium
From Literature	1935:548	Ploopluck	Adolescent (12-18 y)	Undetermined			N/S	N/S	N/S	Absent	N/S	N/S	N/S		N/S
From Literature	1935:3-5	Ploopluck	Y. Adult (18-34 y)	Male	172.00		N/S	Absent	Absent	Absent	Absent	Present	Absent	7.69	Low
From Literature	1935:6	Ploopluck	Adult (18+ y)	Male			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S

My Analysis	1982:355	Punchestown Great	Y. Adult (18-34 y)	Possible Female	169.94	47.12	Present	Present	Absent	Absent	Present	Present	Absent	10.53	Low
My Analysis	1982:356	Punchestown Great	Y. Adult (18-34 y)	Possible Male	167.08	42.78	Absent	Absent	Absent	Absent	Absent	Absent	Absent	52.63	Medium
My Analysis	1963:41	Rahinashurock	Adolescent (12-18 y)	Possible Male	168.27	45.59	Absent	Absent	N/S	Absent	Absent	Absent	Absent	0.00	Low
My Analysis	RATH_a	Rathlin Island	Adolescent (12-18 y)	Undetermined			N/S	N/S	N/S	Absent	Absent	N/S	Absent	0.00	Low
My Analysis	RATH_SK1	Rathlin Island	Y. Adult (18-34 y)	Female	145.27	40.16	Present	Absent	N/S	Absent	Absent	Absent	Absent	25.00	Medium
My Analysis	RATH_SK2	Rathlin Island	Y. Adult (18-34 y)	Possible Male			Absent	N/S	N/S	Absent	Absent	Present	Absent	11.11	Low
From Literature	RATH_SK3	Rathlin Island	Y. Adult (18-34 y)	Male			Absent	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	RATH_SK4	Rathlin Island	Y. Adult (18-34 y)	Undetermined			Present	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	RATH_SK5	Rathlin Island	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	RATH_SK6	Rathlin Island	Adult (18+ y)	Undetermined			Present	N/S	N/S	N/S	N/S	N/S	N/S		N/S
My Analysis	RATH_SK7	Rathlin Island	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	Absent	N/S		N/S
My Analysis	RATH_SK8	Rathlin Island	Adult (18+ y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S

My Analysis	RATH_SK9	Rathlin Island	Adolescent (12-18 y)	Undetermined			Present	Present	N/S	N/S	Absent	Absent	N/S	66.67	High
My Analysis	RATH_SK10	Rathlin Island	Y. Adult (18-34 y)	Male		47.02	Present	N/S	N/S	Absent	Absent	Absent	N/S	30.00	Medium
From Literature	RathG_C105	Rathlin Island, Glebe	Y. Adult (18-34 y)	Male	173.30		Absent	N/S	N/S	Present	Absent	Absent	Absent	20.00	Low
From Literature	RathG_C122	Rathlin Island, Glebe	Y. Adult (18-34 y)	Male	175.30		Absent	N/S	N/S	Present	Absent	Absent	Absent	20.00	Low
From Literature	RathG_Dis	Rathlin Island, Glebe	Y. Adult (18-34 y)	Female			N/S	N/S	N/S	N/S	N/S	N/S	N/S		N/S
From Literature	RathG_C127	Rathlin Island, Glebe	M. Adult (35-49 y)	Male	181.30		Absent	N/S	N/S	Absent	Present	Present	Present	40.00	Medium
My Analysis	1956:209	Redmondstown	Y. Adult (18-34 y)	Male	173.51	48.71	N/S	N/S	N/S	Absent	Absent	Present	Absent	10.00	Low
From Literature	1956:223	Redmondstown	Adolescent (12-18 y)	Undetermined	156.00		N/S	N/S	N/S	Absent	Absent	Present	Absent	28.57	Medium
From Literature	1956:232	Redmondstown	Child (3-12 y)	Undetermined			N/S	N/S	N/S	N/S	N/S	N/S	N/S		Medium
My Analysis	2011:6	Rickardstown	Y. Adult (18-34 y)	Female	159.57	39.39	Present	Absent	N/S	Absent	Present	Absent	Absent	43.75	Medium
From Literature	1969:672	Riverstown	O. Adult (50+ y)	Male	171.00		N/S	N/S	N/S	Absent	Present	N/S	Absent	16.67	Low
From Literature	1934:433	Rush	Y. Adult (18-34 y)	Undetermined			Present	N/S	N/S	N/S	N/S	N/S	N/S		N/S

My Analysis	1974:27	Sliguff	Y. Adult (18-34 y)	Male	178.03	51.19	Present	Absent	Present	Absent	Present	Present	Absent	35.29	Medium
My Analysis	1955:42	Stillorgan Park	Y. Adult (18-34 y)	Possible Male	157.80	41.44	Absent	Absent	N/S	Absent	Absent	Present	Absent	31.25	Medium
My Analysis	1933:3409	Stonepark	Adult (18+ y)	Possible Male			N/S	N/S	N/S	N/S	Present	Present	Absent	50.00	Medium
My Analysis	STRD_1	Straid	Y. Adult (18-34 y)	Male	189.69	48.93	Absent	Absent	Absent	Absent	Absent	N/S	Absent	0.00	Low
From Literature	STRD_2	Straid	M. Adult (35-49 y)	Male	180.00		Absent	Absent	Absent	Absent	Present	Present	Absent	12.50	Low
My Analysis	STRD_3	Straid	Y. Adult (18-34 y)	Male	160.00		N/S	N/S	N/S	N/S	Absent	N/S	Absent	25.00	Medium
My Analysis	99E0203.6	Timolin	Child (3-12 y)	Undetermined			Absent	N/S	Absent	Absent	N/S	N/S	Absent	0.00	Low
My Analysis	99E0203.7	Timolin	M. Adult (35-49 y)	Female	168.23	42.86	N/S	Absent	N/S	N/S	Present	N/S	Absent	10.00	Low
My Analysis	1981:360.2	Timolin	Y. Adult (18-34 y)	Possible Male	173.27	50.10	N/S	N/S	Present	Absent	Present	Present	Absent	27.27	Medium
My Analysis	1982:121	Timolin	O. Adult (50+ y)	Undetermined			N/S	N/S	N/S	Absent	Present	Present	Present	66.67	High
My Analysis	FER194:040_1	Tonyglaskan	Y. Adult (18-34 y)	Possible Male	172.18		Present	N/S	Present	N/S	N/S	N/S	Absent	57.14	High
My Analysis	FER194:040_2	Tonyglaskan	Child (3-12 y)	Undetermined			Absent	Present	Absent	Absent	Absent	Absent	N/S	9.09	Low

My Analysis	FER194:040_3	Tonyglaskan	Y. Adult (18-34 y)	Male	170.65	49.36	N/S	Absent	Present	N/S	N/S	Absent	Absent	13.04	Low
My Analysis	1956:222	Tornant Lower	M. Adult (35-49 y)	Male	166.13	45.38	Absent	N/S	Present	Absent	Present	Present	N/S	33.33	Medium
My Analysis	1966:116.1	Treanmacmurtagh	Adolescent (12-18 y)	Undetermined			N/S	Absent	Absent	Absent	N/S	N/S	Absent	0.00	Low
My Analysis	1966:116.2	Treanmacmurtagh	Y. Adult (18-34 y)	Possible Female			Present	Present	Absent	N/S	N/S	N/S	N/S	53.85	High
My Analysis	1939:988	Tulfarris	O. Adult (50+ y)	Male			N/S	Absent	Absent	N/S	N/S	N/S	N/S		N/S
My Analysis	1932:5614b	Whitestown	M. Adult (35-49 y)	Male	174.94	43.82	Present	Absent	N/S	Absent	Present	Present	Absent	50.00	Medium
My Analysis	1989:53.1	Whitestown	Y. Adult (18-34 y)	Possible Male			Absent	Present	Absent	N/S	N/S	N/S	N/S	14.29	Low