Osteological Analysis
Fermoy 2
County Cork
Republic of Ireland

Site Code: 03E0979

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TABLE OF CONTENTS

Summary

An osteological assessment of an assemblage of cremated bone excavated in 2003 by Archaeological Consultancy Services was undertaken by York Osteoarchaeology Ltd on behalf of Palaeoecology Research Services Ltd in May 2005. The remains were excavated in advance of construction along the route of the proposed N8 Rathcormac to Fermoy Bypass, County Cork, in the Republic of Ireland.

The cremation burial derives from a prehistoric landscape, including burnt mounds and a corn drying kiln. The cremated bone was recovered from a pit located in Area 1, which is thought to date to the Bronze Age. Osteological analysis found that the burial contained the remains of a child, aged between ten and sixteen years old. Only cranial and long bone fragments were selected for burial. The bone was well-calcined and had been cremated thoroughly. No manifestations of disease were noted.

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1.0 INTRODUCTION

In May 2005 York Osteoarchaeology Ltd was commissioned by Palaeoecology Research Services Ltd to carry out an osteological assessment of an assemblage of cremated human bone recovered in 2003 by Archaeological Consultancy Services Ltd. The cremation burial had been excavated in advance of construction along the route of the proposed N8 Rathcormac to Fermoy Bypass, County Cork, in the Republic of Ireland.

The cremation burial was interred in a simple pit and is thought to date to the Bronze Age. It was found at the base of a steep slope, in the vicinity of three burnt mounds and a corn drying kiln.

1.1 AIMS AND OBJECTIVES

Initially, the assessment aimed to identify whether all cremated human bone recovered from the burial was human. The skeletal assessment then aimed to determine age and sex, as well as any manifestations of disease from which the individuals may have suffered. Additionally, information was sought regarding the cremation techniques.

1.2 METHODOLOGY

The cremated bone was first analysed to determine whether it was human or non-human. The human bone was subsequently sieved through a stack of sieves, with 10mm, 5mm and 2mm mesh sizes. The bone recovered from each sieve was weighed and sorted into identifiable and non-identifiable bone. The identifiable bone was divided into five categories: skull, axial (excluding the skull), upper limb, lower limb and long bone (unidentifiable as to the limb). All identifiable groups of bone were weighed and described in detail.

2.0 OSTEOLOGICAL ANSLYSIS

Osteological analysis is concerned with the determination of the demographic profile of the assemblage based on the assessment of sex, age and non-metric traits. This information is essential in order to determine the prevalence of disease types and age-related changes. It is also crucial for identifying gender dimorphism in occupation, lifestyle and diet, as well as the role of different age groups in society.

2.1 PRESERVATION

Skeletal preservation depends upon a number of factors, including the age and sex of the individual as well as the size, shape and robusticity of the bone. Burial environment, post-depositional disturbance and treatment following excavation can also have a considerable impact on bone condition. Preservation of human remains is assessed subjectively, depending on the severity of bone surface erosion and post-mortem breaks, but disregarding completeness.

Preservation was assessed using a grading system of five categories: very poor, poor, moderate, good and excellent. Excellent preservation implied no bone erosion and very few or no post-depositional breaks, whereas

very poor preservation indicated complete or almost complete loss of the bone surface due to erosion and severe fragmentation.

Preservation was good, with moderate fragmentation and no bone surface or edge erosion (Table 1). Little warping and bone cracking, which occurs commonly during the cremation process, was evident.

Table 1 Summary of the assemblage preservation

Burial No	Feature Type	Inclusions	Bone State	Preservation	Age	Sex	Weight (g)
16	Pit	-	white	Good	10-16	-	106.9g

The fragment size of cremated bone is frequently attributed to post-cremation processes. This is because skeletal elements retrieved from modern crematoria tend to be comparatively large before being ground down for scattering or deposition in the urn. Bone is also prone to fragmentation if it is moved while still hot (McKinley 1994, 340). However, it is believed that post-depositional, rather than post-burning disturbance of the bone caused the fragmentation of the human remains from this site.

The majority of bone was derived from the 5mm sieve (Table 2). A moderate proportion of bone fragments were larger than 10mm, and all of these could be identified. Almost a third of the cremated bone was in the 2mm category and it was largely impossible to identify bone from this category.

Table 2 Summary of cremated bone fragment size

Burial No	10mm (g)	10mm (%)	5mm (g)	5mm (%)	2mm (g)	2mm (%)	Residue	Weight (g)
16	19.6	18	49.5	46	36	34	1.8	106.9

The quantity of cremated bone recovered from the burial weighed 106.9g. This is considerably less than that produced by modern crematoria, which tends to range from 1000.5g to 2422.5g with an average of 1625.9g (McKinley 1993). Wahl (1982, 25) found that archaeologically recovered remains of cremated adults tend to weigh less (between 250g and 2500g), as a result of the commonly practised custom of selecting only some of the cremated bone from the pyre for inclusion in the burial, thereby representing a symbolic, or token, interment. The burial from Fermoy 2 produced less than 7% of the quantity of bone expected to remain following burning.

The cremated bone was very well burnt, causing the complete loss of the organic portion of the bone and producing a white colour throughout the assemblage. According to McKinley (1989), the body requires a minimum temperature of 500° Celsius over seven to eight hours to achieve complete calcination of the bone.

Despite the fragmentation of bone elements, it was possible to identify skeletal elements (Table 3). A total of 62.7% of the bone could be identified, the majority of which were long bone shaft fragments, followed by skull and tooth fragments.

Table 3 Summary of identifiable elements in the cremation burial

Burial No	Skull (g)	Skull (%)	Axial (g)	Axial (%)	UL (g)	UL (%)	LL (g)	LL (%)	UIL (g)	UIL (%)	Total ID (g)	Total ID (%)	Total UID (g)	Total UID (%)
16	11.1	10	0	0	0	0	14.1	13	41.8	39	67	63	39.9	37

2.2 MINIMUM NUMBER OF INDIVIDUALS

A count of the 'minimum number of individuals' (MNI) recovered from a cemetery is carried out as standard procedure during osteological assessments of inhumations in order to establish how many individuals were represented by the articulated and disarticulated human bones (without taking the archaeologically defined graves into account). The MNI is calculated by counting all long bone ends, as well as other larger skeletal elements, such as the hip joints and cranial elements. It is not possible to calculate the MNI for cremation burials, because only a token selection of bone from the pyre tends to be buried. Double burials can be identified only if skeletal elements are duplicated, or if skeletons of different ages are represented in one burial. In this instance, a double burial could not be identified.

2.3 ASSESSMENT OF AGE

Age was determined using standard ageing techniques, as specified in Scheuer and Black (2000a; 2000b) and Cox (2000). Age estimation relies on the presence of the pelvis and uses different stages of bone development and degeneration in order to calculate the age of an individual. Age is split into a number of categories, from foetus (up to 40 weeks in *utero*), neonate (around the time of birth), infant (newborn to one year), juvenile (1-12 years), adolescent (13-17 years), young adult (ya; 18-25 years), young middle adult (yma; 26-35 years), old middle adult (oma; 36-45 years), mature adult (ma; 46+) to adult (an individual whose age could not be determined more accurately as over the age of seventeen).

Age determination was based on the preservation of the tooth roots. The development of the roots suggested that this individual was older than ten years, but less than sixteen years old.

2.4 SEX DETERMINATION

Sex determination is usually carried out using standard osteological techniques, such as those described by Mays and Cox (2000). Assessment of sex in both males and females relies on the preservation of the skull and the pelvis and can only be carried out once sexual characteristics have developed, during late puberty and early adulthood. It was therefore not possible to determine sex in this child.

2.5 METRIC ANALYSIS

Cremated bone shrinks at an inconsistent rate (up to 15%) during the cremation process and it was therefore not possible to measure any of the bones from this burial.

2.6 NON-METRIC TRAITS

Non-metric traits are additional sutures, facets, bony processes, canals and foramina, which occur in a minority of skeletons and are believed to suggest hereditary affiliation between skeletons (Saunders 1989). The origins of non-metric traits have been extensively discussed in the osteological literature and it is now thought that while most non-metric traits have genetic origins, some can be produced by factors such as mechanical stress (Kennedy 1989) or environment (Trinkhaus 1978). Non-metric traits were not observed in any of the individuals.

Non-metric traits were not identified in the cremated individual.

3.0 PATHOLOGICAL AND DENTAL ANALYSIS

The analysis of skeletal and dental manifestations of disease can provide a vital insight into the health and diet of past populations, as well as their living conditions and occupations. In this case, manifestations of disease were not observed.

Analysis of the teeth from archaeological populations can provide vital clues about health, diet and oral hygiene, as well as information about environmental and congenital conditions. Eighteen tooth root fragments and eleven crown fragments were recovered, which had shattered into tiny pieces during the cremation process. Dental pathology could not be observed.

4.0 DISCUSSION AND SUMMARY

A single Bronze Age cremated bone assemblage was recovered during archaeological work at Fermoy 2. The burial was interred in a simple pit. No artefacts or animal bones were found with the bone.

Notably, the burial contained only 106.9g of cremated bone, which is 6.5% of the expected mean quantity of bone from a modern cremation burial. This suggests that the majority of bone from the burial was lost, probably as a result of truncation of the pit.

The bone recovered from the burial was well calcined, suggesting that the cremation temperature and length had been adequate to thoroughly cremate the body. The individual was a child, aged between ten and sixteen years. No evidence for disease was noted. The osteological evidence suggests that the individual was cremated thoroughly, followed by the selection of some of the bones from the skull and long bones from the pyre for burial. Considering the number of tiny tooth fragments found in the assemblage, selection of the remains from the pyre must have been undertaken with great care.

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