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## Noeleen Keavey

**Subject:** FW: GCHL WO 298 -01
**Attachments:** Mara Tesorieri - 'Journal of County Kildare Archaelogical Society (2013)'.pdf

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**From:** Broadford Residents Association <broadfordresidentsassociation@gmail.com>
**Sent:** Sunday, September 8, 2024 21:19
**To:** Wexford Receptionist <REC_WEX@epa.ie>
**Subject:** GCHL WO 298 -01

Hi Could you please include the following important archaeology information as a submission regarding the waste licence application Could you please acknowledge receipt of this information . Regards [redacted] [redacted] Chairman BARA .

Sent from my iPhone


*St. Laurence O'Toole Stone placed in Church Grounds, Castledermot, 2000*

*St. Laurence O'Toole*

# Health in Late Medieval Ireland: the Osteoarchaeology from Ballinderry, Co Kildare

MARA TESORIERI

## Introduction

Human remains provide a unique opportunity for the archaeologist. They are the actual physical remains of the people we study, offering a rare glimpse into the life of an individual, population, and region. Although many ailments do not leave evidence on the skeleton, analysis of skeletal remains still contributes information on disease, diet, living conditions, habitual activities, care within the community, and life expectancy. During the Middle Ages, people lived in close proximity with livestock, and by modern standards, personal hygiene was poor, creating a natural breeding ground for infections, easily transmitted by the ever constant fleas and lice plaguing the young and old alike. Urban centres were particularly vulnerable, as the streets became the natural dumping ground for unwanted waste, eventually polluting the water supply (Power 1997). Rural life was not untainted by the problems affecting the urban centres, and would have been vulnerable to the frequent crop failures, bad weather, livestock sickness, and plagues regularly mentioned in contemporary records. This paper seeks to contribute to our knowledge of rural life in late medieval/early modern Ireland by discussing the human remains from the rescue excavation at Ballinderry, Co Kildare.

## The Excavation

Archaeological excavation took place in the summer of 2005 and 2006 at the site of Ballinderry, Carbury, Co Kildare in advance of quarrying by National Archaeological Services under the direction of Brian Halpin. The site was located at the top of a low hill overlooking the Bradford road and included a burial ground surrounded by a ditch and an area of associated domestic disturbance, with the site encompassing a total area of 70 metres north to south and 40 metres east to west. This paper will focus on the cemetery, surrounded by a 45 metre radius ditch on the northern and western margins, while the sharp drop off of the hill on the eastern and southern sides provided a natural border for the burial ground. A total of 240 graves were excavated, three of which were recovered from the ditch fill (Sk 69, Sk 247, Sk 248), with the remaining 237 recovered from within the enclosure. The natural sand and gravel mixture at the site undoubtedly aided in the overall good preservation of the human skeletal

remains, and although some remains were quite fragmentary, the quality of the preservation was quite high, assisting in the identification and analysis of pathological conditions.

## Burial Practices

Burial practices can provide valuable insights into earlier communities. Differences in grave types and positioning of the skeleton can vary temporally, while also suggestive of the life history of an individual, as often times criminals, unbaptised children, women who died at childbirth, suicides, people with physical/mental disabilities or diseases, those with congenital conditions or other aspects of life that were evaluated in a negative way, could affect the treatment of the body after death (Murphy 2008; Tsaliki 2008). As previously mentioned three burials were found outside of the main concentration of burials, within or cut into the ditch fill. One of these individuals, a child between the ages of 4-7years (Sk 247) was found to have an unidentified infection afflicting the left side of the face; causing the child to most likely be blind and deaf on the one side. The lesions themselves would have been quite outwardly apparent, with pustules particularly noticeable just behind the left ear and right temple. This ailment could possibly be the reason for the child's interment outside of the main burial area. Interestingly, the other two individuals were also children: a foetus and a 1-5 year old. The reasons behind this segregation are unknown but it is possible these two represent unbaptised children, buried much later near what was known to be a disused burial ground. Radiocarbon dating of these individuals would perhaps help determine their origins.

The rest of the burials were found within the surrounding ditch. Burials were predominately in an east-west alignment, with the head at the western end of the grave. This is typical of Christian communities where individuals were buried in this particular alignment in advance of the apocalypse, as they would rise facing east, where God would appear. Priests would be buried in the opposite direction, thus rising facing their congregation (Parker Pearson 2005). A total of three individuals were found to be buried with the head to the east; a child between the ages of 4 to 6 years (Sk 112), a young adult female (Sk 237), and a mature adult male (Sk 151). The female and child skeletons were buried at the perimeter of the main burial area, while the male skeleton was found inside the focal point of burials.

| Supine extended | Prone extended | Flexed | Crouched |
|---|---|---|---|
| 202 | 2 | 32 | 4 |

*Table 1: Burial positions present within the Ballinderry assemblage*

All of the graves were simple, rectangular shaped cuts with rounded edges, anywhere between 10 to 35 centimetres in depth. No evidence of wooden coffins or stone-lined graves was detected, suggesting the graves belonged to a poor



community. Table 1 summarises burial positions, and as can be seen, most individuals were found in the supine extended position, however two individuals were found in the prone (face down) position. Skeleton 53 was a middle adult female (Plate 1), who was found face down with the left hand extended along the torso, the hand facing down against the base of the grave, while the right hand was extended underneath the torso. The second individual was a second trimester foetus (Sk 58) found in a semi-prone/flexed position. The remaining skeletons were found in the flexed position (supine with the lower limbs flexed) (Plate 2) or in the crouched position (found positioned on one side with both legs and arms flexed) (Pate 3). One individual (Sk 161), a young adult male was buried with the hands placed behind the back, although no evidence of string was found, it is most likely the individual's hands had been tied behind his back. Most of the graves were found to be intercutting one another, with a total of three layers discovered. The mix of burial types, positions, and numerous levels would suggest the burial ground was used over different periods.

*Left. Plate 1: Prone burial of Sk 53. Centre. Plate 2: Flexed burial of Sk 81. Right. Plate 3: Crouched burial of Sk 87*

## Associated Finds

Very few finds were found at the site, with most consisting of remnants of the clothing the individuals would have been wearing at the time of burial. Shroud pins were recovered from two of the burials (Sk 91 and Sk 81), although only two of the graves contained shroud pins, the positioning of the skeletons with the shoulders shrugged upwards, the arms closely positioned against the torso, and the feet often placed together if not crossed, suggests that most of the individuals had been wrapped in a shroud before burial. Other items included two toggle-like metal rings found with a child between the ages of five to eight years

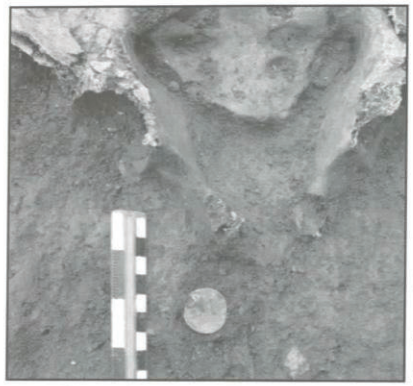


*Plate 4: Coin and unknown material underneath, possibly the remains of a pocket or purse (found with Sk 79)*

(Sk 166), while a coin and remnants of cloth was found on a mature adult male, most likely part of a pocket or coin purse as it was found just below the pelvis (Plate 4). More common finds such as a glass bead (Sk 119), an unidentified piece of metal (Sk 155), and a small piece of flint (Sk 87) were also retrieved.

## Dating

The dating of cemetery sites yields numerous problems for the archaeologist. Individuals unaccompanied by dateable grave goods can only be placed within a time frame by radiocarbon dating, an expensive method only employable in well-preserved remains. Furthermore, many burial grounds are used over long periods of time and the dating of one individual does not provide a date for the entire cemetery. However, even several dates can help yield valuable information regarding the population and surrounding area in question. As part of the research reported on here, a series of three radiocarbon dates were funded by the Kildare Archaeological Society for the cemetery at Ballinderry. Skeletons were chosen carefully, based on their position within the burial ground, the level at which they were buried, and unique pathological conditions.

As shown by Table 2, two of the dates range from 1439 to 1524, placing them securely in the fifteenth and sixteenth centuries while Sk 161 was dated to 1933-1951 (at only a 12 per cent accuracy). Although radiocarbon dating placed the use of the cemetery within the late medieval to early modern periods, the various burial positions, particularly the flexed burials, could possibly suggest dates as early as the early medieval or even transitional periods, as crouched burials are most often found within these time periods. It is suggested that further radiocarbon dates, particularly of skeletons which were found crouched or buried outside of the main burial area be carried out to provide a more accurate date range of use.

| Sk # | Weight | Cal Date 2 sigma ( per cent probability - total 95.4%) |
|---|---|---|
| **157** | 4g | AD 1439 - 1511 (0.929), AD 1602-1615 (0.071) |
| **161** | 3g | AD 1933 - 1951 (0.122) |
| **225** | 4g | AD 1451 - 1524 (0.594), AD 1558 - 1631 (0.406) |

*Table 2: List of radiocarbon dates*



## Demography

The minimum number of individuals within the Ballinderry collection was 240. This number includes all skeletons found in their original burial position. A large amount of disarticulated remains were recovered from the site, a common occurrence in cemeteries where intercutting of graves is present. The disarticulated remains were recovered and currated with the collection, however they do not form part of the current analysis. A total of 93 individuals were identified as adult and subsequently sexed based on morphological traits of the cranium, mandible and pelvis (Bass 1995; Cox and Scott 1992; Phenice 1969). and metrics of the long bones (Bass 1995; Berrizbeitia 1989; Krogman and Işcan 1986). Of the 93 adults, 34 individuals were identified as male and 41 as females, with 18 too poorly preserved to assign to a specific sex. In an average population the male and female ratio is usually 1:1 whereas in the Ballinderry population the ratio is 1:1.2. The high number of females found is most likely related to the high number of foetuses, perinates, and infants within the assemblage, as the dangers of childbirth and postpartum infection would have been high. Age-at-death estimates were generated for the adults using standard methods the resulting divisions by broad age categories summarised in Table 3.

| Sex | Young adult | Middle adult | Mature adult | Adult | Total |
|---|---|---|---|---|---|
| **Male** | 4 | 7 | 21 | 2 | 34 |
| **Female** | 3 | 18 | 18 | 2 | 41 |
| **Unknown** | 0 | 1 | 5 | 12 | 18 |
| **Total** | 7 | 26 | 44 | 16 | 93 |

*Table 3: Age distribution of the Ballinderry adults*

As can be seen, the mortality rate was at the highest in the mature adult category (45+ years) for both males and females. The young adult group (18-25 years) had the lowest mortality rate, which slowly increased with age. There was a higher mortality rate for middle adult females than males, likely associated with childbirth, a suggestion based on the fact that one female (Sk 72) was found with the remains of a third trimester foetus (Sk 74) in the pelvic area.

| Age category | Age range | N | % |
|---|---|---|---|
| **Fetus** | 1st-3rd trimester | 10 | 6.80% |
| **Perinate** | -1 month – 1 month | 18 | 12.24% |
| **Infant** | 1 month - 1.9 years | 26 | 17.68% |
| **Young juvenile** | 2 years - 5 years | 48 | 32.65% |
| **Older juvenile** | 6 years -12 years | 40 | 27.21% |
| **Adolescent** | 13 years -17 years | 5 | 3.40% |

*Table 4: Age distribution of the Ballinderry subadults*

A total of 147 subadults (i.e. <18 years at time of death) were recovered from Ballinderry and placed within specific age categories based on dental eruption (Ubelaker 2008), epiphyseal fusion (Baker *et al*. 2005; Scheuer and Black 2004), and long bone lengths (Bass 1995). As shown in Table 4, 19 per cent of subadults died before or at birth, with 17.68 per cent dying between one to two years and 32.65 per cent dying between the ages of two to five years of age. The high percentage of subadults dying before the age of five is not surprising, as during these critical early years the child goes through a number of changes, the most significant being weaning. The child goes from a stable and nutritious food source that is mother's milk, to a less nutritious and most importantly less stable food source (solids). With the consumption of solid food, the immunities gained from breast milk are no longer available. These immunities are vital for the child's health, since the immune system is not fully developed until after the age of five (Larsen 2003). After the age of five years, the risk of death falls dramatically, suggesting that once a child survived the weaning stage, there was a good chance that they would survive to adulthood. When compared to other skeletal assemblages (Table 5), the high percentage of subadults within the population (61.25 per cent) is quite similar to the 60.30 per cent found at Johnstown 1, Co. Meath, a similar multi-period site.

| Site | Period | Percentage of Juveniles |
|---|---|---|
| Ninch, Laytown, Co Meath[1] | 1st millennium | 6% |
| Sarsfieldstown, Co Meath[2] | 8th century | 57% |
| Corbally, Co Kildare[3] | 3rd-10th century | 22.58% |
| Tintern Abbey, Co Wexford[4] | 14th-16th century | 31.13% |
| Dominican priory, Drogheda[5] | 13th-14th century | 18% |
| **Ballinderry, Co Kildare** | **15th-20th century** | **61.25%** |
| Johnstown 1, Co Meath[6] | 4th-19th century | 60.30% |
| St. Stephen's Hospital, Dublin[2] | 16th-17th century | 50% |
| Shandon, Cork, Co Cork[7] | 19th century | 15.7% |
| St. Luke's, The Coombe[2] | 18th-19th century | 24% |

***Table 5: List of subadult percentages from various archaeological sites. 1: Buckley et al. 2008, 2: Buckley 2010, 3: Coyne and Lynch 2010 4: O'Donnabhain 2010, 5: Halpin and Buckley 1995, 6: Clarke 2010, 7: Lynch 2004***

## Stature

It was possible to estimate the stature of 37 adults whose sex could be determined: 21 males and 16 females, based on regression formulae developed by Trotter (1970). Male height ranged from 155.65cm to 182.31cm with an average of 167.29cm, while females ranged from 144.74cm to 163.02cm with an average of 154.87cm. The statures of the Ballinderry adults are compared with adult stature rates from other assemblages dating to various periods in Table 6. When seen in the context of other samples from Ireland during the same time



period, Ballinderry males are quite short in comparison, with most male height averages around 171cm. Females also appear to be slightly shorter than average, with most populations having an average female high of around 158cm.

| Site | Period | Male cms | Female cms |
|---|---|---|---|
| Ninch, Laytown, Co Meath[1] | 1st millennium | 174 | 162 |
| Portmuck, Co Antrim[2] | Early medieval | 171.3 | 161.6 |
| Ballyhanna, Co Donegal[2] | 8th-9th century &13th-16th century | 167.1 | 154.8 |
| Ardreigh, Co Kildare[2] | Late medieval | 170.1 | 159 |
| Tintern Abbey, Co Wexford[3] | 14th-16th century | 171.1 | 159.8 |
| Dominican priory, Drogheda[4] | 13th-14th century | 171 | 155 |
| St. Thomas, Dublin[3] | 13th-14th century | 171.0 | 156.0 |
| Dublin, Temple Lane[3] | 13th-16th century | 169.0 | 159.2 |
| **Ballinderry, Co Kildare** | **15th-20th century** | **167.29** | **154.87** |
| Pooled British sample[5] | 11th-16th century | 171.0 | 159.0 |
| St Elizabeth's Church, Co Down[2] | 17th century | 171.5 | 158.4 |
| Shandon, Cork, Co Cork[6] | 19th century | 170.6 | 157.7 |
| Pooled Irish sample (Eastern region)[7] | 1930s | 171.1 | 160.32 |

***Table 6: List of stature averages from various archaeological sites. 1: Buckley et al. 2008, 2: McKenzie and Murphy 2011, 3: O'Donnabhain 2010, 4: Halpin and Buckley 1995, 5: Roberts and Cox 2003, 6: Lynch 2004, 7: Hooton and Dupertuis 1955***

Stature is a reflection of an individual's genetic make-up, every person has a maximum growth potential. Whether they reach their growth potential however, is a reflection of their environment, nutritional intake and exposure to other diseases. The low stature rates, particularly of the males, would suggest the Ballinderry population was under nutritional stress.

## Dental Disease

The analysis of a population's dentition alone can provide important information in regards to health, diet, oral hygiene, and daily habits. High levels of attrition were found within both the adult and subadult dentitions, suggesting that the population had a highly abrasive diet, causing teeth to be rapidly worn down early in life. In some cases, abnormally high levels of wear were found on the anterior teeth, a trait found in individuals with bruxism (tooth grinding) (Aufderheide and Rodríguez-Martín 1998). The wearing down of the hard tooth enamel exposes the more sensitive pulp of the tooth, often causing pain and abscess formation. Carious lesions were found to be quite common in both the adult and subadult population (Plate 5). The molars were affected the most, as their natural pits and crevices easily trap food and bacteria. Females were much more affected than males, with the highest number of carious lesions found in the young adult category. Higher rates of carious lesions within females are quite

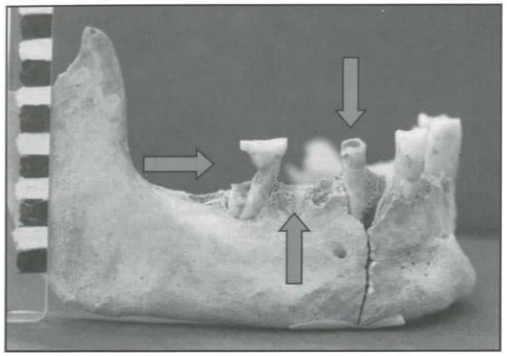


*Plate 5: Mature adult male (Sk 114) with arrows pointing to two carious lesions and ante-mortem tooth loss*

common, with several explanations being suggested. Dental eruption has been suggested as a possibility, as the female dentition erupts before the male dentition, exposing their teeth at an earlier age to infection (Larsen 2003). Pregnancy is also widely believed to increase dental disease, as calcium levels lower during pregnancy and breast-feeding, making females more susceptible to dental disease. Lastly, it is possible that there is a distinct difference between the sexes in what they consume (Larsen 1995).

**Pathology**

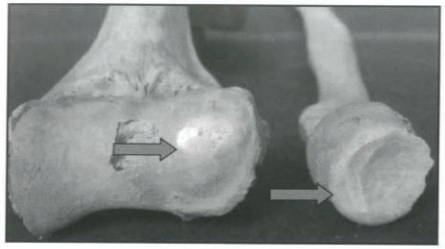
A number of interesting pathological conditions were noted in the remains from Ballinderry. As with most populations, congenital abnormalities (any physical condition which deviates from what is considered normal in the process of skeletal formation before or during birth) (Barnes 2008) such as osacromial, osmetastylodeum, and extra or missing bones were all represented in the population. Less common congenital abnormalities such as scoliosis and spina bifida occulta (an asymptomatic failure of closure of the posterior aspect of the sacral vertebrae) were also found. A total of three individuals had possible scoliosis (Plate 6), as well as three cases of spina bifida. Most interestingly was the case of skeleton 157, a mature adult male who suffered from possible cerebral palsy. Cerebral palsy is an umbrella term for a group of disorders involving the foetal brain (Andrew and Thompson 2012). Individuals affected by cerebral palsy would have had no apparent abnormalities at birth, with manifestations of the condition becoming apparent during childhood; such as scoliosis (Plate 6), dislocation of the hip and fixed contractures of the joints. The key feature of cerebral palsy is the lack of longitudinal growth of the skeletal muscles. Skeletally, this causes bones of the affected limbs to be smaller in overall size (Pate 7), with fixed contractures often found in the foot, resulting in permanent flexion (known as equinus deformity). Externally, the individual would have suffered from weakness, poor balance, and pain in the weight bearing joints such as the hips (Andrew and Thompson 2012). The individual from Ballinderry suffered from severe scoliosis, atrophy of the right upper (Plate 7) and lower limbs, and equinus deformity of the right foot. An alternative diagnosis of poliomyelitis is suggested, however poliomyelitis most often affects the lower limbs rather than the upper limbs, and most often both sides, unlike the case of skeleton 157, where only one side of the torso is affected, with the upper limb being more severely affected than the lower limb.



*Above Left: Plate 6. Severe scoliosis found in a mature adult male (Sk 157). Above Rigth: Plate 7. Upper limbs of skeleton 157, notice the general difference in size with the right much smaller than the left*

Perhaps one of the most common ailments affecting people worldwide is degenerative joint disease (DJD). Everyday wear and tear of the body affects the skeleton, causing natural deterioration of the joints as age increases. This, along with obesity, trauma, congenital hip dislocation, and activity/lifestyle can all produce DJD (Roberts and Manchester 2005). Once the surrounding cartilage is destroyed, and the joints are exposed to one another, eburnation (Plate 8) occurs. This is seen as a polished surface on the joint and indicates the joint has now become arthritic (OA) (Rogers and Waldron 1995). A total of 32 individuals had varying degrees of DJD and OA, of these it was possible to identify 17 as male and 11 as female. Overall the wrists, hands and elbows were the joints affected the most in both sexes, suggesting a community that particularly used the upper limbs in strenuous daily activity. Differences between the sexes could be seen when specifically looking at the vertebral column; females were much more affected by DJD and OA in the cervical vertebrae (the neck), while males were predominately affected within the thoracic and lumbar vertebrae (mid and lower back) with the neck region affected the most overall. This division between the

sexes of the areas of the back affected could suggest a division of labour between the sexes, with males focusing on work which required using the lower back, while females focused on work which caused neck pains. This is supported by the higher frequency rates of Schmorl's nodes (depressions in the vertebral bodies caused by herniations of the intervertebral disc due to mechanical stress) (Faccia and Williams 2008) found in the lower backs of the Ballinderry males. Other signs of stress in the vertebral column included two males with intervertebral osteochondritis; a condition caused by the degeneration of the joint capsule due to overloading, causing back pain and spasms (Kelley 1982), and four individuals with spondylolysis, the separation of the neural arch from the vertebral body due to excess loading of the lower back.

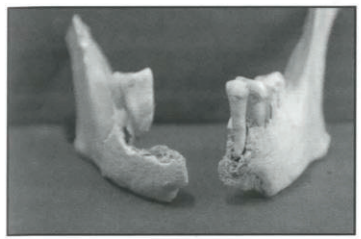


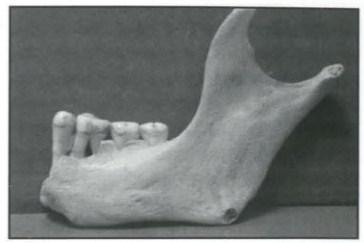
***Above Left: Plate 8. An adult female between the ages of 35-45 years with osteoarthritis in the left elbow (Sk 143).***
***Above Right: Plate 9. Intervertebral osteochondritis in a young adult male (Sk 33).***

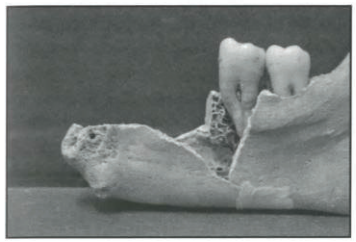
Other fractures included phalanges of the hands and feet; with fractures of the hands caused by stubbing, falling or punching and fractures to the feet most likely caused by heavy objects falling and crushing the toes. Os vesalianum, the separation of the lateral tubercle from the fifth metatarsal (little toe), is most likely caused by an avulsion fracture due to stress or a repetitive movement, and was seen in two males. Most of the long bone fractures consisted of Colles fractures to the distal radius, which is usually caused by a fall onto an outstretched hand. Several individuals had fractures of the fibulae, often caused by bad falls where the person lands on their side rather than on their back or front. Fractures of the clavicle were also seen and were most likely caused by forward falls. One of these individuals (Sk 80), a mature adult male, also had three broken ribs on the right side and two on the left side. Five other individuals displayed healed fractures of the ribs (Sk 93, Sk 117, Sk 156, Sk 203, Sk 212). These fractures could be caused by factors such as falling, interpersonal violence, work related trauma, and occasionally by an underlying pathological condition such as osteoporosis (Brickley, 2006).

One individual was found to have trauma of unknown origin. These were the remains of a young adult male (Sk 33) whose mental trigon (ie the chin)









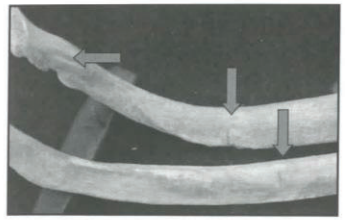
***Clockwise:***
***Plate 10. Frontal view of resorbed mandible from skeleton 33.***

***Plate 11. Left labial view of resorption area.***

***Plate 12. Right lingual view of resorption area.***

appeared to have been resorbed (Plate 10-12). The missing alveolus extends from tooth 35 to 43 (the tooth sockets from the left premolars to the right canine), with slight porosity and woven bone formation apparent on both the anterior and posterior surface of the mandible. No pathological or congenital condition known to the author would cause such a lesion, and therefore it is tentatively suggested that it is the result of the individual falling down at a young age with the full impact of the fall hitting the extended chin, crushing the bone. This type of fall would have undoubtedly affected the dentition, however, if the fall took place prior to the eruption of the permanent dentition, once erupted they would have shown no outward sign of damage.

One case of non-accidental injury was also observed within the population. A young adult male (sk 159) was found to have numerous sharp-force trauma wounds (ie cutting wounds) to the upper half of the body. These were perimortem injuries (ie they were incurred at the time of death). The right shoulder had several cut marks located on the clavicle, scapula and most notably the humeral head (Plate 13), which would have resulted in the disuse of the arm during the combat/assault. Within the thorax, multiple blade wounds were seen in the left ribs, particularly on the inferior and anterior surfaces (Plate 14), suggesting a right-handed opponent using upward thrusts into the thoracic area to stab the lung, heart, and gut areas. This is also evident with the multiple cut and stab wounds found on the anterior and sides of the vertebral column, with wounds found as high as thoracic vertebrae one (upper chest) running down lumbar vertebrae three (stomach area). The wounds found to the right shoulder would not have killed the individual, but were most likely done to disarm the



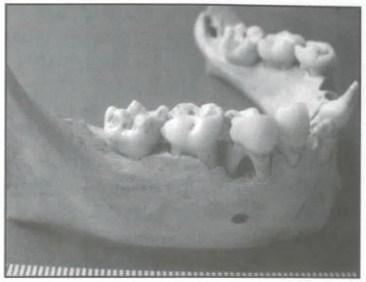
*Top: Plate 13. Right humerus showing wound which would have sliced the muscles and ligaments. Top left: Plate 14. Two left ribs showing multiple cut marks. Left: Plate 15. Left side of mandible showing multiple cut marks*

individual, whereas the multiple wounds found in the torso would have been killing blows. Unfortunately the attack did not end there, with multiple cuts seen on both sides of the ascending ramus of the mandible (Plate 15), and the entire dens sliced off from its vertebral body, suggesting the individual was decapitated by several blows delivered from the back.

Perhaps most uniquely to the Ballinderry collection were the high prevalences of metabolic (conditions which affect the processes of bone formation and remodelling) and infectious diseases afflicting the population. Possible osteoporosis was found in four individuals, with one specifically affected in the vertebral column and the other three affected in the long bones. Dental enamel hypoplasia (DEH) was found in 17 adults and 9 sub adults, with males slightly more affected than females (9 and 6 individuals respectively). Due to the nature of tooth formation, defects associated with the enamel cannot be remodelled, and therefore provide a permanent record of the first seven years of life. DEH is an indication of poor health and stress during the early years of life, and can be caused by anything from periods of malnutrition, starvation, congenital infections, lower birthweight, disease or fever (Ogden 2008). These incidents temporally stop the formation of the enamel, leaving horizontal lines, pits or grooves on the enamel crown (Plate 16). Based on the teeth affected within the Ballinderry collection, the individuals underwent a period of stress between the ages of one to about five years, suggesting an association with weaning practices. Within the deciduous dentition, the molars and canines were predominately affected (Plate 17), formed during the first year of life, the defects could possibly be an indication of a malnourished mother.

Cribra orbitalia and porotic hyperostosis, foramina found on the orbital roofs





*Left: Plate 16. An older child between the ages of 9-12 years (Sk 49) with linear hypoplasia on the incisors, canines, and premolars.*
*Right: Plate 17. A younger child between the ages of 4-6 years (Sk 162) with cuspal hypoplasia on the first permanent molars and second deciduous molars.*

and skull vault respectively, have been predominately associated with anaemia, particularly of the iron deficiency variety. A total of 53 individuals (including 34 subadults, 10 female, 8 males, and 1 adult) were affected by cribra orbitalia, porotic hyperostosis, or both. If taking into consideration only cribra orbitalia, 51 out of the 113 individuals who had at least one orbit available for observation had the lesion, providing a prevalence rate of 45.13 per cent. As shown in Table 7 prevalence rates of cribra orbitalia can vary, with most samples showing a 40 per cent involvement or less.

| Site | Period | n/N | % |
|---|---|---|---|
| Solar, Co Antrim[1] | 7th-13th century | 19/42 | 45.23% |
| Mt. Gamble, Swords, Co Dublin[1] | 6th-12th century | 17/51 | 33.33% |
| Ardfert, Co Kerry[1] | 5th-11th century | 26/65 | 40% |
| Tintern Abbey, Co Wexford[2] | 14th-16th century | 12/31 | 38.7% |
| Dominican priory, Drogheda[3] | 13th-14th century | 2/11 | 18% |
| **Ballinderry, Co Kildare** | **15th-20th century** | **51/113** | **45.13%** |
| Shandon, Cork, Co Cork[4] | 19th century | 13/94 | 13.83% |

*Table 7: Prevalence rates of cribra orbitalia from various archaeological sites. 1: Tesorieri forthcoming, 2: O'Donnabhain 2010, 3: Halpin and Buckley 1995, 4: Lynch 2004.*

More specific nutritional deficiencies included an individual with scurvy. A low intake of vitamin C is usually the result of a poor diet, with a low level of fresh fruits and vegetables . The main consequences of insufficient amounts of vitamin C are haemorrhaging, difficulty and slowness in the healing process, and a shortage of bone formation in juveniles. Individuals affected experience weakness and pain in the muscles as well as tiredness and lethargy. Skeleton 196 was an infant between the ages of one to two years, with advanced cranial and post-cranial lesions suggestive of haemorrhaging. A second infant (Sk 226) has

what appears to be extensive new bone formation on the cranial bones, possibly an indication of scurvy, however unlike skeleton 196, the main identifying criteria are not present. Infantile scurvy is considered to be quite rare, as breast milk contains a natural high level of Vitamin C, however when scurvy is present in infants, it could suggest a malnourished mother, or early weaning practices (Brickley and Ives, 2008).

With a high rate of metabolic diseases comes a higher rate of infections as a body low in vitamins and nutrients has a lower immune system, making the body more susceptible to infections. The assemblage from Ballinderry follows this pattern with a uniquely high level of infectious diseases. This includes tuberculosis, an infectious disease which can be transferred by a respiratory route where the bacteria is passed through coughing, sneezing, speaking and even singing. More commonly within the archaeological record, is the transferral of the bacteria by consumption of infected cows' milk, known as the gastrointestinal route (Roberts and Buikstra 2008). The spine is the most frequent area affected, particularly the lower vertebrae for the gastrointestinal route, followed by the ribs, knee, sternum, hip, shoulder, clavicle, femur, elbow and scapula. When the bacterium has been transmitted by the respiratory route, lesions will commonly occur in the upper thoracic vertebrae, including the sternum. Infection through the gastrointestinal route will usually display lesions in the lower thoracic vertebrae as they are adjacent to the stomach (Kelley and El-Najjar 1980). It has been suggested that the respiratory route is more prevalent in crowded, urban locations while the gastrointestinal route is more common in rural settings (Mays *et al*. 2001).

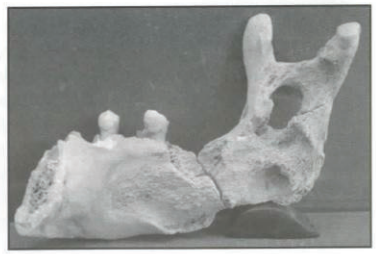
A total of three individuals were possibly infected by tuberculosis. The first case was in the remains of a young adult male (Sk 85), with lesions found within the vertebral column and ribs. The lumbar vertebrae (ie those of the lower back) were the most severely affected, with characteristic perforating lesions and irregular new bone formation. If the individual had continued to survive, it is highly likely the perforated lesions would have eventually caused the anterior portion of the vertebral bodies to collapse, with kyphosis (fusion of the vertebrae with an angular deformity) occurring as the body would try and stabilise the vertebral column (Ortner 2008). A total of five ribs from either side were also affected by the disease. The infection was focused on the vertebral angle of the rib, both anteriorly and posteriorly. The vertebral angle had become much more acute than normal, almost appearing fractured. Porosity and nodules of new bone formation were present on all affected ribs.

Skeleton 24 was middle adult female who displayed extensive periostitis on the fibulae, tibiae, femora and left ribs. Periostitis found on the shafts of the lower limbs are not normally diagnostic of tuberculosis, and will be discussed later on, as this is most likely a result of a separate condition. It is the patterning of the rib lesions which indicates the individual perhaps suffered from pulmonary tuberculosis. A total of eight ribs (rib numbers 3-10) were affected by woven bone formation on the visceral surface (i.e inside of the rib). The unilateral patterning of the lesions in the thorax is not uncommon in tuberculosis, with



several studies (Kelley and Micozzi 1984; Santos and Roberts 2006) showing higher rates of rib lesions on the left side than the right. Similar to skeleton 24, rib lesions rarely affect the first and twelfth rib (Santos and Roberts 2006). Other conditions such as pulmonary infections and pneumonia would also result in the rib lesions described above (Roberts *et al*. 2005).

The third individual, an adolescent (Sk 225), was a unique case of what has been tentatively diagnosed as tuberculous otitis media. Apart from extensive lesions on the left hip and right lower limb, the individual lacked any of the traditional lesions typically found in the vertebral column and ribs. Most apparent were the lesions affecting the skull and mandible. The right mastoid process has a circular groove surrounding the outer rim, while the remaining island of bone is highly porotic. An opening with rounded edges is present on the inferior side of the groove, suggesting there was continuous draining, with the infection active at time of death (Plate 18). Within the mandible, the entire periosteum on the posterior side of the right ascending ramus and mandibular body is missing due to taphonomic damage, however this has provided a unique opportunity to view the lesions affecting the bone. There appear to be three main focal points. The first is located at the crypt of the second molar; a second, perforating the entire bone, is located on the ascending ramus just below the mandibular notch; and a third just above the gonial angle (Plate 19). Thick woven bone formation can be seen surrounding the lesion on the mandibular body posteriorly, with a thick plate also located on the condylar neck, possibly suggesting the entire affected area was covered with new bone formation. On the anterior side, plaques of porotic compact bone are present throughout the mandibular body and ascending ramus, with a mixture of compact and woven along the gonial angle which appears to be partially resorbed and the mandibular notch around one of the three focal points and the condylar neck. Due to the extensive damage on the right side, the individual obviously favoured the left side of the mandible for chewing, as shown by slightly higher levels of tooth wear as well as the presence of calculus on the occlusal surfaces of the right dentition.



***Left: Plate 18. Right mastoid of Sk. 225 showing the draining lesion. Right: Plate 19. Right side of mandible showing the extensive destruction and focal lesions on Sk. 225.***

Several other individuals (Sk 46, Sk 159) had deep destructive lesions within one or more vertebral body, however without further bone involvement, it was not possible to diagnose the cause of the lesions, which could be due to infection, trauma, or physiological stress.

A total of two individuals suffered from osteomyelitis, an infection of the medullary cavity that is normally secondary to another disease or traumatic event (Ortner 2008). The left radius and right tibiae of an adult of unknown age and sex (Sk 55) were affected by the infection. The second individual, (Sk 95) a mature female, was affected on the right radius.

As previously mentioned, skeleton 247 was a young child between the ages of 4-7 years, who had been buried outside the main concentration of burials. Upon analysis, it was noticeable that the individual has suffered from a severe infection involving the left side of the head and face. The petrous bone (inner portion of the ear) appears to have been partially destroyed by an infection, with a draining lesion located just above the mastoid process (behind the ear). A second perforating lesion was also located on the frontal bone, just behind the left orbit. Endocranial (ie on the inner surface of the skull) bone formation was present both on the temporal, frontal and left parietal bone. It is unknown the exact cause of these lesions, perhaps an ear infection which never healed, however what can be concluded is that the infection would have been quite noticeable during life, with the individual most likely blind and deaf on the left side.

One individual, a mature adult female (Sk 153), was found to have suffered from chronic sinusitis. Sinusitis as a whole is not commonly found in the archaeological record; as most cases only last a few days, providing little time for the skeleton to be permanently affected. What does remain in the archaeological record is chronic sinusitis, caused by either a respiratory track infection or a bad tooth infection which travelled up into the sinus cavity (Boocock and Roberts 1995). Within a rural environment such as Ballinderry, individuals could have been exposed to pathogenic organisms within the local drinking water, smoke inhalation in poorly-ventilated thatched houses, as well as infections from farm animals (Lewis *et al*. 1995).

Unfortunately not all skeletal lesions can be diagnosed to a specific disease or traumatic event. These cases are most often recorded under the term periostitis, referring to a new layer of bone deposited under the periosteum due to inflammation caused by trauma or infection (Fennell 1997; Lewis and Roberts 1997). New bone formation is quite common, as anything that tears, pulls, touches, or breaks the periosteum can start new bone formation. Within the adult population, a total of 16 individuals were affected by a non-specific infection, eight of whom were male, five female, and three adults of unknown sex. The higher rate of affected males could suggest perhaps some type of segregation between the two sexes, most likely in labour. If for example, the males were more likely to be working outdoors with livestock in dirty conditions, then it is highly possible that they would contract more infections than females of the population. The bones of the lower limbs were the most frequently affected, which again could possibly suggest strenuous outdoor activities. Periostitis found on the tibiae



could potentially be shin splints, also known as medial tibial stress syndrome, which is caused by walking, running, or any activity involving stress on the lower limbs. The stress is caused by an overload on the muscles and ligaments attached, such as the tibialis anterior. Within the subadults, a total of 15 individuals had one or more bone affected by periostitis caused by an unknown infection. Most of the bone formation was either found on the lower limbs or on the bones of the cranium. The individuals affected ranged from newborns to children of 12 years old. The new bone formation could be caused by a number of factors, but most likely by 'growing pains' which affect the long bones, and tooth eruption which affects the mandible and maxillae. A total of four individuals had new bone formation found endocranially, which could have been caused by either meningitis or perhaps a spread of toxins from a bacterial infection elsewhere in the body.

## Conclusion

The skeletal collection from Ballinderry, Co Kildare provides a unique opportunity to study life in a rural community in Kildare during the late medieval/early modern periods. Within the cemetery sample, over 60 per cent of individuals did not survive to adulthood, with most deaths occurring within the first five years of life. The high mortality rate in Ballinderry was most likely caused by infectious diseases, many of which do not leave any recognisable trace on the human skeleton. Close proximity with livestock, over-crowding in poorly ventilated houses, packed earth or clay floors, and infestations of rats, fleas, and other pests, provided a breeding ground and swift spread of transmissible disease. Within these conditions, by the fourteenth and fifteenth century the bubonic plague rapidly spread throughout Europe, killing up to a third of the population. This was closely followed by diseases such as measles, influenza, chicken pox, scarlet fever, whooping cough, tuberculosis, leprosy, and syphilis (Roberts and Cox 2003). The Ballinderry community would have been susceptible to all of these ailments, and although most of these diseases do not leave any known trace on the skeleton, three individuals were affected by tuberculosis, one with sinusitis, two with osteomyelitis, one individual with a severe infection of the left ear and face of unknown cause, and 35 individuals with periostitis. The Irish annals often mention famines due to crop failures, which would have been responsible for many deaths as well. An individual who is starved or undergoes continuous malnutrition would have found it increasingly difficult to fight off infections. The Ballinderry community was indeed often malnourished, as indicated by the case of scurvy and the high rates of cribra orbitalia and dental enamel hypoplasia affecting individuals of all ages.

The high levels of stress-induced trauma, arthritis and fractures would indicate a strenuous lifestyle, with work specifically focusing on the back and upper limbs prevalent in the community. Previous studies have shown the vertebral column the area most frequently affected, with males predisposed to arthritis in the mid and lower back as well as the hip, and females in the neck and hands (Power 1995). Ballinderry is no different, and follows the expected

pattern. The analysis of the Ballinderry dentitions indicate a community whose diet was heavy in carbohydrates and sugars, as caries, periodontal disease, high levels of attrition and abscesses were prevalent in both the adults and subadult remains.

Although the cause of death for many in the archaeological record cannot be ascertained, causes of death for two individuals within Ballinderry were possible to determine. The first was a female in her late twenties or early thirties with a second trimester foetus found in the pelvic cavity. The death of the individual could have been caused by complications in the pregnancy. A second individual, a young adult male, died of multiple weapon wounds.

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# The Talbots and Carton House in the Seventeenth Century

Joseph Byrne

Looked at retrospectively there appears to be an inevitability about the fate of the Old English Catholics of Ireland in the seventeenth century. Until the second half of the sixteenth century they had governed the country and staffed the colony's administration and courts. When they refused to conform to the Henrician religious reforms - specifically to swear the oath of supremacy – they lost the confidence of the monarch and entered a long gradual decline. By 1700 their political power was broken, all hope of civil and military office was extinguished and their landed wealth had been massively eroded. Compelled to observe their religious duties clandestinely in private houses, Old English Catholics were reduced to the status of deviants in their own land. Few Old English Catholics, however, regarded their eclipse as inevitable. On the contrary, throughout the seventeenth century they remained firmly committed to the task of wresting power in Ireland from the hands of the Tudor, Jacobean and Cromwellian Protestant interlopers who had supplanted them. Because they failed in that endeavour there is a tendency to overlook the impressive fight they made of it and how close they came to achieving their goal. That they came so close is largely attributable to Richard Talbot of Carton for no Old English Catholic proved as audacious or as single-minded in the campaign to restore Old English rule and none achieved as much. The irony is that this Richard Talbot who came to dominate politics in Ireland in the latter half of the seventeenth century sprang not from first-rank Old English nobility but from a family which began the century as a landless cadet line of the Talbots of Malahide who were themselves of modest rank.

Although indelibly associated with Carton, the Talbot family did not actually spend a very long time there. William Talbot, the progenitor of the Carton line, leased over 400 acres at Carton from June 1603 but work did not begin on the house until some time after 1611. It lay in ruin for the better part of two decades from 1642, underwent an impressive overhaul in the 1680s yet by 1691 the Talbots were gone. A lot is known about the family who inhabited this house, considerably less about its design, layout and size and that is, perhaps, only just. Carton's principal contribution to seventeenth-century Ireland was not architectural but rather a distinctive way of thinking about the world and how it should be ordered. To the Talbots of Carton that world should be Catholic in religion, kingly in politics, conservative in social and family issues and it should be governed by people like themselves, the Old English. That was how it had been and that was how they would attempt to make it anew. From William Talbot's