

## **Appendix: 9**

### **Osteological and Funerary Analysis of the Human Skeletal Assemblage from St Catherines, Lincoln.**

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#### **1.0 Introduction**

The excavation at land at 45-47 St Catherines uncovered 47 discrete inhumations and a disarticulated assemblage of over 163 bones from more than 15 different contexts, producing a minimum number of an additional 9 individuals. There were multiple phases of burial within this small area both pre and post dating the structures uncovered on site.

This assemblage is relatively small. However, it is evident from additional finds, both structural and skeletal, that the cemetery uncovered here is situated within a much larger cemetery or cluster of distinct cemeteries forming part of *St Katherine's* monastic landscape. From finds recovered on the site this cemetery would appear to have been in use from the 12<sup>th</sup> century up until the dissolution of the monasteries.

The cemetery was excavated to a high standard with an osteologist on site at all times. Recovery of the remains was hampered by poor weather conditions, the waterlogged nature of the site and the poor preservation of some of the most deeply stratified remains. The osteological analysis was carried out in spring 2008.

Osteological data can assist with determining the social status of individuals. It can be evaluated in relation to physical stature, degree of dental decay and other pathological conditions. It is hoped that combining this information with the archaeological evidence will help to inform on the true nature of this assemblage. In particular it is hoped to inform on which part of the monastic precinct it belonged. Is the cemetery uncovered here part of the Holy sepulchre hospital, the canons or the lay cemetery?

The analysis resulted in an in-depth paper record of all scientific data available, digital databases of the results and a digital photographic record of each skeleton and the significant pathologies visible on them. This report contains a full account of the funerary and scientific information and the inferences that can be made. The remains were analysed according to the standards laid out in the guidelines recommended by the British Association of Biological Anthropologists and Osteologists in conjunction with the IFA (Guidelines to the Standards of Recording Human Remains, Brickley and McKinley (eds) 2004) as well as by English Heritage (Human Bones From Archaeological Sites: Guidelines for producing assessment documents and analytical reports, Centre for Archaeology Guidelines 2004).

#### **2.0 The Assemblage**

The excavation yielded 47 discrete inhumations and the disarticulated remains of a minimum further 9 individuals, giving a minimum total of 56 individuals buried within this cemetery area. This number is an underestimation of the true total as a number of burials were visible within the unexcavated bulk and a number of burials

are known to have been removed by the construction of Victorian buildings present on the site.

Burial activity on site was undertaken in three phases. The first yielded 7 inhumations, the second yielded 22 and the final yielded 23. Not all of these were excavated and not all yielded human remains. Disarticulated remains were recovered from Phase 4 onwards.

### **3.0 The Burial Practices**

#### **3.1 The Grave Cuts**

There were three types of grave cut identified at the St Catherines excavation. The first and most common of the grave cuts, were simple in shape, being sub-rectangular in plan and shallow U-shape in profile. Apart from the occasional grave the majority were cut to a size just large enough to accommodate the body. The second form, of which there were only five, were anthropomorphic in shape (termed this after requiem). At the top of the cut the grave was sub-rectangular in plan. However, at the base the grave was excavated with a niche for the head. The third form was a more angular version of the first form, with straight edges and a square profile. The first two grave cuts were associated with simple shroud burials, whilst the majority of the third contained cist or coffin burials.

The construction of forms one and three are a result of functionality. The simple form was constructed to receive a shrouded body whilst the angular form was constructed to accommodate a body within a wooden coffin or to aid the construction of the cist. The second form, however, required more effort than was necessary and probably had an inherent symbolism. These anthropomorphic cuts are reminiscent of the cist burials on site, with their head niche, and were maybe a simpler and so cheaper version of the same ideal. It has been suggested that the niche maybe symbolic of the nimbus around the head and may convey a holy sanctified quality to the body (requiem).

Examples of the anthropomorphic grave have been found at a number of religious houses and hospitals at various sites around the country. They appear to post-date the Norman Conquest and are mainly superseded by the 14<sup>th</sup> Century (requiem). This grave form has been shown to have been important to the monastic community, although it has been found in lay cemeteries.

#### **3.2 Containers for the Body**

The majority of the individuals recovered from the site were inhumed within simple earthen graves, probably adorned in a shroud, although no evidence of such was recovered from the site. This was common practice in the medieval period when most individuals were transported from church or chapel to burial ground in a communal and re-useable wooden coffin which they would be removed from at the grave side (requiem).

Only five graves contained evidence of wooden coffins in the form of nails, wood remnants or staining and only three of these were truly convincing of coffin burials

[116], [305] and [313]. However, that number may be increased if the association with angular grave cuts and coffins is reliable.

A further 16 graves were fully or partially lined with stone. Two of these, however, no longer contained a skeleton as they had been incorporated into a wall and a further one was unexcavated due to its location under the bulk.

Stone lined coffins were introduced from south-east France in c1000 and spread rapidly as a concept, being found in Lincolnshire and Newark by the later 10<sup>th</sup> and 11<sup>th</sup> centuries (requiem).

The cist burials uncovered on site were lined with angular limestone blocks and slabs. Those that were still complete, all had niches for the head incorporated. Some were found to have covers as well, and one had a stone base. All but one of the cist burials followed the same construction pattern, with the blocks standing on edge lining the grave cut. Structure (311) sides, however, were constructed from three courses of angular limestone blocks with a large limestone slab at the head and foot of the grave (See Fig.5 and Plate 7).

Cist burials were expensive to construct, costing up to 20s for large stones, lime and sand. Structure (311) was an extravagance in that it created a larger than necessary grave cut and used more stone than was required to line the grave. Not all of the cist burials were constructed to the same standard or with the same quality material. A general decrease in size and material quality is evident with the development of the site.

The majority of individuals inhumed in these cist burials were adult males, only one contained an adult female and one contained an unsexed juvenile.

### **3.3 Body Position and Multiple Burials**

All the individuals at *St Katherine's* were supine and extended, only the position of the arms and hands varied from grave to grave. Five different positions were evident but there were no patterns evident between position and sex, age, burial location, type or phase. There was only one possible double burial. The skeletons of a prime adult male and an infant, skeletons 8 and 9 were located together in the very east of the cemetery in the latest phase of burial. The position of the grave and the limit of excavation prevented the complete excavation of the individuals so a true relationship could not be concluded. Due to the location and depth of the infant, low down by the knees of the adult, it is possible that the infant was buried alone and the adult grave cut through the surface and was located on top.

## **4.0 Methodology of Osteological Analysis**

### **4.1 Preservation and Completeness**

An inventory for each inhumation was carried out recording percentage of each bone present or for long bones which segment and joint surfaces were present. This allowed a better understanding of what the skeleton consisted of and allowed a proper analysis

to take place. A dental inventory, recording whether teeth were present or absent was carried out. This inventory noted whether those present still maintained their crown or whether just the root remained, whether those lost were lost ante or post mortem and whether any teeth were still erupting. The overall degree of completeness was then recorded.

For this six stages were devised, ranging from 1, the most complete to 6, the least complete. The following stages were used:

- Stage1= >95%
- Stage 2= 75<95%
- Stage 3= 50<75%
- Stage4= 25<50%
- Stage5= 5<25%
- Stage6= <5%

Each skeleton was then assessed for its state of preservation in order to record its level of bone surface erosion and fragmentation. Again six stages of preservation (after IFA, 2004) were devised, ranging from 0, where the bone is still strong with no modifications of the surface or fragmentation to 5, where the bone is very fragile with a highly eroded surface and is highly fragmented.

#### **4.2 Metric Data**

Twenty-Five post cranial metrics were recorded bilaterally, where possible, for each skeleton and a further twenty-one bilateral and unilateral cranial measurement were also recorded following Bass, 1978. These metrics help to analysis stature and sex and to highlight pathological and cultural processes that have acted on the bones.

#### **4.3 Non-Metrics**

Non- metric variants were recorded for the post cranial, cranial and dental elements, where possible, for each skeleton. The presence, absence or instances when the observable trait could not be assessed were recorded for each unilateral and bilateral trait. For the skull the non-metric variants of Berry and Berry (1967) were recorded. For the post cranial skeleton the variants of Finnegan (1978) were recorded and for the dental elements the variants of Turner, Nichol and Scott (1991) were recorded. The non metrics for this assemblage were recorded so as to provide a full catalogue of information gleaned form this source so that it is available to future studies.

#### **4.4 Pathologies**

Skeletal and dental pathologies and evidence for trauma form an integral part of understanding the lifestyles of individuals and the population under study as a whole. They can provide valuable insights into the dynamics of the working populations, especially when related to demographic information.

Each skeleton from the assemblage was visually assessed for evidence of skeletal and dental congenital and acquired abnormalities. Detailed descriptions including location

and degree of severity were then recorded for those abnormalities noted. This information was then used to provide tentative diagnoses, using Aufderheide and Rodriguez-Martin 1998; Ortner and Putcshar, 1985.

#### **4.5 Sex Estimation**

As males and females differ in both size and shape, sex was determined in adults using both measurements of dimorphic dimensions and visual assessment of dimorphic aspects of the pelvis and skull (Measurements following Bass 1976) (Aspects following Schwartz, 1995; Ferembach et al, 1980; Krogman and Iscan, 1986; Phenice, 1969; Loth and Henneberg, 1996).

#### **4.6 Age Estimation**

In adults, age was estimated based on the ephyseal fusion of late fusing skeletal elements such as the clavicles and the sacrum (Schwartz, 1995), dental wear (Brothwell, 1981., Miles, 1962), ectocranial suture closure (Meindl and Lovejoy, 1985), age related change to the sternal end of the upper ribs (Iscan and Loth, 1986), pubic symphysis (Brooks and Suchey, 1990) and the auricular surface (Lovejoy et al 1985; Buckberry and Chamberlain, 2002).

In sub-adults, age was estimated based on ephyseal fusion of the available bones (Scheuer and Black, 2001) and dental development and eruption (Ubelaker 1978). Where possible multivariant analysis was utilised for both the adult and sub-adult remains, however, due to preservation or completeness this was not always possible.

The separate age estimates from different aspects of a single skeleton were combined to produce a summary age estimate, which is defined as an average of the separate estimates. This produced an age in years, however, due to the inherent risk of under or over aging the individuals age brackets for life stages were also recorded.

These age brackets were defined as:

- FE (fetus)
- NE (neonate-11 months)
- I (infant/young child: 1-5years)
- C (child: 6-11 years)
- JU (juvenile: 12-17 years)
- YA (young adult: 18-29 years)
- PA (prime adult: 30-44 years)
- MA (mature adult: 45-)
- AA (adult: age unspecified)

#### **4.7 Stature**

Stature was estimated for the all the adults of the assemblage where a least one long bone had survived complete. The estimation was carried out using Trotter (1970). Where possible stature was estimated using the median of lower limb bones only as

the margin for error is less for these bones, however, upper limb bones were occasionally used to produce stature.

#### **4.8 The disarticulated Material**

An inventory of all disarticulated material was recorded, noting skeletal element, side, preservation scale, age bracket, sex, and pathology. Once this data was recorded an estimation of minimum numbers of individuals (MNI) was produced.

#### **5.0 Results**

Due to the wealth of data derived from this analysis and the limitation on space here for an in-depth record of the results for each skeleton, the reader is directed to the primary record. Appendix 1 should be consulted for skeleton specific summaries. Below, the data for the assemblage has been collated and will be discussed as a whole. The results are expressed by phase and for the total assemblage. For ease of comparison with the archaeological report these phases are recorded as Phase 2, 3 and 6.

The details below relate to the discrete inhumations only. A record of the disarticulated remains is contained within the primary record. The disarticulated material represented the bones of an additional nine people, 7 of which were adults and two were infants. The adults included the remains of at least 3 females and 2 men.

#### **5.1 Preservation and completeness**

Below, Table 1 summarises the number of individuals in the different stages of completeness.

**Table 1 Summary of Skeletal completeness**

Stage of Completeness	1	2	3	4	5	6
Counts	11	17	7	5	4	3

Table 1 shows, therefore, that 59% of the individuals were more than 75% complete.

**Table 2 Summary of bone preservation**

Stage of preservation	0	1	2	3	4	5
Counts	0	10	14	14	9	0

Table 2 shows, therefore, that none of the individuals from the assemblage were in the best or worst possible stages of preservation. 60% of the assemblage fell within stages 2 and 3, where the general morphology of the bones is maintained but where erosion has masked some of the detail and fragmentation of the bones is becoming more common.

Preservation and completeness can often be affected by age and sex as juvenile and female bone is not as robust and strong as adult male bone. However, as can be seen in Appendix 1, the youngest individuals have a good state of preservation and there is

a normal distribution of males and females within the worst preserved bone. Appendix 1 also shows that stage of completeness within this assemblage is more correlated with truncation and excavation limits than taphonomic factors.

## 5.2 Sex

Table 3 shows the total number of males, females, unsexed and probable males and females for the separate phases and for the total assemblage.

**Table 3 Sex estimation**

Estimate	Male	Female	Unsexed	Female?	Male?	Total
Phase 2	4	0	1 (1)	0	0	5
Phase 3	14	4	2	0	0	20
Phase 6	14	3	2 (1)	2	1	22
Count	32	7	5 (2)	2	1	47

The number in brackets represents unsexed sub-adults

Including all those possible males and possible females, the male to female ratio for Phases 2, 3, 6 and the total assemblage are 1:0, 1:0.29, 1:0.33 and 1: 0.27 respectively. The assemblage appears to be dominated by adult males.

## 5.3 Age

Table 4 shows a summary of the total counts of individuals for each age group by phase, the different sexes are separate for ease of reference.

**Table 4 Demographic profile of the assemblage**

Age groups	Male			Female			Unknown			Group Total
	2	3	6	2	3	6	2	3	6	
<b>Phases</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>6</b>	
Fetus	0	0	0	0	0	0	0	0	0	0
Neonate	0	0	0	0	0	0	0	0	0	0
Infant/child	0	0	0	0	0	0	0	0	1	1
Child	0	0	0	0	0	0	0	0	0	0
Juvenile	0	0	0	0	0	0	1	0	0	1
<b>Total sub-adults</b>	0	0	0	0	0	0	1	0	1	2
Young Adults	1	2	1	0	1	1	0	0	0	6
Prime Adults	3	7	8	0	2	3	0	0	0	23
Mature Adults	0	5	5	0	1	1	0	0	0	12
Unspecified Adults	0	0	1	0	0	0	0	2	1	4
<b>Total adults</b>	4	14	15	0	4	5	0	2	1	45
<b>Total</b>		33			9			5		47

The assemblage appears to be dominated by prime age adults and there is a general increase in diversity of the demographic profile with each phase.

## 5.4 Stature

Only twenty-seven out of a total of 45 adults produced a stature. Table 5 shows the mean statures for both sexes from all phases and for the group as a whole. The mean male stature was approximately 5'7", while the mean female stature was approximately 5'3.5".

**Table 5 Summary statistics for stature**

	Males				Females			
	N	mean	Sd	Height	N	mean	Sd	Height
Phase 2	4	172.29	2.38	5'7.5"	0	-	-	-
Phase 3	8	171.69	5.57	5'7"	2	163.18	4.76	5'4.5"
Phase 6	9	169.78	6.20	5'6.5"	4	158.68	4.22	5'3"
Total	21	170.99	5.52	5'7"	6	160.31	4.31	5'3.5"

N= number of individuals Sd= standard deviation  
Height is to the nearest half inch.

## 5.5 Pathologies

Due to the small number of women within the assemblage and the inherent risk in misrepresenting the results, pathologies were not assessed with relation to sex.

### 5.5.1 Dental pathologies

Of the 47 individuals only 9 had dental pathologies that were completely none recordable and these were due to truncation and limit of excavation. All others showed at least one form of dental pathology (See Appendix 1).

Below, Table 6 summarises the dental pathologies recorded for this assemblage. The information shows number of individuals and teeth and frequencies in respect to total number of teeth, or with respect to horizontal periodontal disease, number of jaws.

**Table 6 Summary of Dental Pathologies**

Disease	N° of Individuals Expressing the Pathology				N° of teeth/Jaws Expressing the Pathology				% of diseased teeth/Jaws			
	2	3	6	T	2	3	6	T	2	3	6	T
Phases	2	3	6	T	2	3	6	T	2	3	6	T
Enamel Hypoplasia	1	5	2	8	4	31	14	49	3.5	10.3	4.2	6.4
Caries	2	9	11	22	6	25	27	58	5.2	8.3	8.1	7.8
Abscesses	0	7	4	11	0	10	11	21	0	3.3	3.3	5.6
Calculus	4	14	17	35	96	252	250	598	83.5	83.7	75.3	79.9
Periodontal Dis.	4	13	18	35	8	24	31	63	100	82.8	70.5	43.2

Total number of teeth for the assemblage = 748 Total number of jaws for the assemblage= 81  
T= Total for all phases



Table 6 therefore shows that the percentage of teeth expressing any one pathology increases from Phase 2 to 3(save for periodontal disease) but decreases from phase 3 to 6.

In addition to these pathologies was ante-mortem tooth loss. Thirty of the individuals had suffered ante-mortem loss of at least one tooth and a total of 124 teeth were recorded as such. Although loss of teeth during life can be due to occupational or cultural processes it can also be an additional sign of tooth decay. Appendix 1 lists skeleton specific records of ante-mortem tooth loss. Prevalence rates are not recorded here, due to preservation and truncation affecting accurate counts.

### 5.5.2 Skeletal Pathologies

As the assemblage is not complete, due to preservation and truncation, the expression of pathologies can be greatly underestimated. Therefore, to understand prevalence rates of pathologies and trauma within this assemblage the information is expressed in three ways. Firstly, the number of individuals that show attributes of the pathology or trauma, secondly, the number of individuals expressing the attributes as a percentage of the total number that the attribute could possibly be recorded for and thirdly, the number of bones expressing the attribute as a percentage of the total number of those bones.

### 5.5.3 Trauma

Of the 47 individuals, evidence of trauma is only evident on five. These traumas include broken bones, dislocation and soft tissue trauma, all relating to the upper body. Below, Table 7 summarises the evidence for the different types of trauma, recording both the number of individuals showing the trauma and the prevalence rates for each trauma for the phases and the assemblage as a whole.

**Table 7 Summary of Skeletal Trauma**

Trauma	Number of individuals expressing the trauma				Prevalence of individuals expressing trauma %				Frequencies with respect to total bones %			
	2	3	6	T	2	3	6	T	2	3	6	T
Phases	2	3	6	T	2	3	6	T	2	3	6	T
Broken Clavicle	0	0	2	2	0	0	5.1	5.1	0	0	5.6	2.6
Broken Rib	0	0	2	2	0	0	4.9	4.9	0	0	0.5	0.4
Dislocated Shoulder	0	1	0	1	0	3.6	0	3.6	0	5.6	0	2.0
Traumatic Myositis Ossificans (of the humeral head)	0	0	1	1	0	0	3.6	3.6	0	0	4.2	2.0

Table 7 therefore shows that trauma rates generally increase through the phases.

### 5.5.4 Congenital Pathologies

A number of congenital pathologies were evident within the group, throughout the phases (see Appendix 1). Table 8 shows the number of individuals with the pathology and the prevalence rates for the pathologies.

**Table 8 Summary of Congenital Pathologies**

Pathology	Number of individuals expressing the pathology				Prevalence of individuals expressing the pathology %				Frequencies with respect to total bones %			
	2	3	6	T	2	3	6	T	2	3	6	T
Phases	2	3	6	T	2	3	6	T	2	3	6	T
Spina bifida occulta	1	1	0	2	25	10	0	8	25	10	0	8
Spondylolysis (L5)	0	0	1	1	0	0	5.9	2.9	0	0	5.9	2.9
Deformity of Cuneiform 1	0	0	1	1	0	0	12.5	4.2	0	0	6.3	2.7
Craniosynostoses	0	1	0	1	0	6.25	0	2.6	0	1.6	0	2.6

T= total for all phases

All congenital pathologies present are developmental anomalies and are uninformative in relation to status of the individuals. In addition, due to the small sample sizes it is difficult to draw accurate conclusions from the data.

### 5.5.5 Acquired Pathologies

The individuals of the group expressed a common range of acquired pathologies relating to infections, degenerative processes and stressful physiological events such as malnutrition (see Appendix 1).

Table 9 shows the number of individuals with the acquired pathologies and the prevalence rates for the pathologies.

**Table 9 summary of Acquired Pathologies**

Pathology	Number of individuals expressing the pathology				Prevalence of individuals expressing the pathology %				Frequencies with respect to total bones %			
	2	3	6	T	2	3	6	T	2	3	6	T
Phases	2	3	6	T	2	3	6	T	2	3	6	T
Osteoarthritis	3	11	18	32	75	55	81.8	69.6	/	/	/	/
Cranial Porotic Hyperostosis	1	3	2	6	25	18.8	12.5	16.7	6.3	4.8	5.6	1.9
Cribriform Orbitalia	1	3	0	4	25	11.8	0	12.5	25	15.6	0	6.7
Button Osteoma *	1	5	5	12	25	33.3	33.3	25	6.3	8.0	7.0	2.9
Non-specific Infection	0	1	3	4	0	5	13.6	8.7	/	/	/	/
Spondylolysis	0	10	12	33	0	62.5	60	84.6	0	29	38.8	3.9
Schmorl's nodes	2	13	11	26	75	65	55	66.7	1.8	20	21.2	3.1

\* Although button osteomas can be found on various skeletal elements, all those in this assemblage were located on the cranial vault and are therefore calculated in relation to cranial vault elements.

Again, it is difficult to draw any accurate conclusions from the data with respect to Phase 2 due to the small sample numbers. However, there does appear to be a big increase in the prevalence of individuals expressing osteoarthritis in Phase 6 compared to Phase 3 whilst cranial porotic hyperostosis and cribra orbitalia seem to be more prevalent in individuals in Phase 3 compared to Phase 6.

## **6.0 Analysis and Discussion**

The hospital of the holy sepulchre was known to care for the poor and sick. Orphans are also recorded to have been in residence at the hospital and the care of the inmates was maintained by lay sisters. At the time of the dissolution it is recorded that there were five lay sisters in residence (British History Online). If this were the cemetery for the hospital we would expect to find a wide demographic profile, covering the many inmates and the lay sisters who died at the hospital during its use. Congenital and acquired abnormalities, such as trauma, deficiencies and infections could be high along with small stature to reflect the general environmental factors inflicting such individuals. The construction of the burials for such individuals would be basic simple earthen shrouded burials.

If this were the canons cemetery associated with the priory church, based on historic sources we would expect to find exclusively adult male burials or for mixed orders a clear divide in cemetery locations for the different sexes (Harvey, 1993). Archaeological evidence, however, provides information to the contrary, with women and sub-adults recorded on a number of sites (Chilchrist and Sloane).

A canons cemetery could also contain a higher prevalence of mature males due to the increased high standard of living and protection from life's many occupational stresses and dangers. Grave goods of a religious nature such as chalices or papal seals are also a common feature. Some such artefacts were recovered from a late 19<sup>th</sup> century excavation on the lands of *St Katherine's* in association with burials, however, the exact location was not recorded and no analysis of the individuals was carried out.

Prevalence rates for acquired pathologies could be expected to be low due to the good diet and medical care they had access to. However, prevalence rates of certain 'occupational' diseases thought to be related to a monastic lifestyle such as diffuse idiopathic skeletal hyperostosis (DISH) and caries and abscesses which are known to be related to a rich diet could be increased.

The construction for the burials of the canons could expect to be of great substance and contain inherent symbolism or be simple earthen shroud burials.

A lay cemetery could differ in numerable ways depending on the sector of the lay community that was represented.

### **6.1 The overview**

The individuals of the assemblage had a good stage of completeness and a reasonable stage of preservation to allow a complete osteological analysis.

The assemblage appears to contain a high ratio of males to females and very few sub-adults are represented in the assemblage which is common in monastic and some hospital cemeteries (Gilchrist and Sloane, 2005, 205-206).

Most of the adults appear to have died in the prime of life, between the ages of 30 and 44. This correlates with the demographic profile of a number of monastic, lay and hospital cemeteries of the same period (*Ibid*).

The mean stature of all the males and females recovered from the excavation are higher than the known average for medieval English cemeteries at c5'6" for the males and c5'2" (Daniell, 1997, 134).

The pathologies for the assemblage represent commonly acquired ailments of the medieval period.

## **6.2 The phases**

To understand the osteology and through that the people of the St Katherine's cemetery, the burials have to be separated into their archaeological phases. Appendix 1 highlights the individuals from the different phases for easy comparison. It must be noted that these assemblages are only samples of the entire population for any one phase and as such patterns are only suggestive.

### **6.2.1 Phase 2**

Phase 2 represents the earliest activity relating to the *St Katherine's Priory* on the site. From this phase 5 substantial and expensive stone cist burials were excavated yielding skeletons 4, 29, 45, 47 & 48. Four of the individuals were definitely male, the fifth being most probably a male (based on size and robustness) but due to its age and the skeletal elements present sex was not estimated. These males were all in the younger years of their lives, 3 being prime adults, 1 being a younger adult and the youngest being a juvenile.

Evidence of extensive or considerable pathological conditions was not apparent on these individuals as a whole. Dental hygiene was relatively good, ante-mortem tooth loss was minimal, no abscesses were recorded and carious lesions were minimal. Calculus and periodontal disease were the most prevalent ailments. These two conditions are common for this period and are highly correlated so this pattern is not unusual.

Only one non-fatal congenital pathology was evident within the group, while trauma was not evident and acquired pathologies were restricted to common ailments such as degenerative conditions of the back and other joints representative of a physically active life. These conditions were not extensive when evident but this possibly correlates to the young age of the group.

Only one individual Sk 47 showed signs of a non fatal assault on the body, possibly caused by an iron deficiency or bacterial infection at some point during his childhood. This is not necessarily an indicator of low status as the individual was sufficiently strong and cared for to survive the incident and the evidence relates to only one

stressful episode. The average height for the adult males was 5'7.5" placing them higher than the average medieval height. This reflects genetic and environmental influences that helped them achieve more of their growth potential.

The osteological, funerary and phasing evidence does suggest that these individuals were of an above average status, however there are no 'occupational' ailments suggestive of a monastic lifestyle. The group is very small though and with a larger sample the result could express a different image. The available evidence suggests the individuals were perhaps wealthy benefactors or family of benefactors of the priory who were buried close to an earlier wooden chapel.

### **6.2.2 Phase 3**

Phase 3 is represented by the construction of a chapel and its associated eastern cemetery. From this phase 20 inhumations yielding skeletons were excavated, namely skeleton numbers 2, 20-25, 27, 34-44 & 46. Five of the inhumations were partial or full cist burials, which interestingly were not as substantial or as good quality as the cists from Phase 2. All five anthropomorphic graves evident on site were recovered in this phase while the rest were simple earthen burials. 19 of the bodies were recovered to the east of the apse, a location highly sort for burial due to its proximity to the altar and the belief that the east was sacred. The final body was recovered from within the apse itself and if accurately phased could represent the body of any individual of important status due to being within the chapel and isolated there.

All of the individuals from this phase were adults. Only four of the individuals were definitely female, two could not be estimated and the further fourteen were males. The full range of adult ages are expressed within this sample, 3 being younger adults, 9 being prime adults and 6 being mature adults.

The dental hygiene of this group was poorer than the earlier phase with rates of ante-mortem tooth loss and all pathologies bar periodontal disease increased. Caries and abscesses have increased which is possibly related to the groups access to carbohydrate rich food, but is possibly linked to the greater number of mature individuals in the group. The prevalence of these ailments is not very high as would be expected for this period due to the restricted availability of sugar prior to the 17<sup>th</sup> century (Roberts and Manchester 1995, 49).

Evidence of trauma was visible for the first time in this phase but was only recorded on one individual. Developmental congenital pathologies were evident within this group but neither the prevalence nor the ailments are suggestive of overall status.

Acquired pathologies related to degenerative change were prevalent throughout the group and where more pronounced than in the earlier phase. This possibly relates to the individuals leading a more physical life but could simply relate to the higher ratio of older adults. A number of these individuals retained evidence that they had suffered from an iron deficiency or infection during their childhood, but again were strong enough to survive the insult. Evidence revealed that the majority of these individuals had again only suffered one insult. Non specific infections were also evident on one of the adults but which had healed by the time of death.

The average stature for the males was 5'6.5" putting them above average height for the period but somewhat smaller than the earlier phase. The groups average female stature was higher than expected at 5'4.5".

Interestingly sk 27 in the apse, the burial of interesting status does not yield the information one would expect. The individual is a young adult male, of below average stature, who had suffered from deficiency or infection during childhood, and was suffering from degenerative conditions had visible signs of musculoskeletal stress that his body was struggling to cope with and had evidence of a traumatic dislocation of the shoulder. The burial was a simple earthen construction and no grave goods were recovered. This individual had clearly not lived an easy life and had not had access to environmental factors that would help him achieve his full growth potential.

There are known cases of individuals who service the priory gaining access to burial within its precinct. (Rogers 1999, 270).

The osteology, burial location and internment suggest that these individual were of middle ranking status within the community and do not represented brethren or hospital inmates. These individuals were members of the lay community who had paid for or earned the right to be buried in the prime eastern location at the ancillary chapel. It is possible that some of the women had family connections to the brethren of the order and had so earned burial rites through blood (requiem).

### **6.2.3 Phase 6**

Phase 6 represents the last phase of activity relating to the priory and appears to be the southern limits of an unknown sized cemetery. From this phase 21 inhumations yielding human remains were excavated, namely skeleton numbers 1, 3, 5-19, 26, 28, 30-32. The only coffin burials on site were recovered within this phase, along with three small cist burials of reduced quality and so expense. The rest were earthen burials. Twenty of the individuals were adults, 2 were young, 11 prime aged and 6 were mature. The sub-adult was an infant and was recovered from one of the latest burials recovered. Fifteen of the adults were male, 5 were female and 1 was unsexed.

Dental pathology for this group was on a par with the previous phase. Ante-mortem tooth loss was still high and caries and abscesses were of almost the same rate while calculus and periodontal disease was somewhat reduced.

The majority of trauma visible on site is recorded within this phase. These represent common conditions for this period and the prevalence rates are not unexpected. Congenital pathologies visible are thought to be developmental however traumatic events can also replicate the same conditions.

Ailments relating to deficiency or traumatic insult from childhood are increased from the first phase but reduced from the second. This suggests that the individuals were exposed to the ailments in childhood more than those of phase 2 but had less access to the environment and conditions to cure the ailments than phase 3 and did not survive into adulthood. The prevalence for non-specific infections was increased in this phase and there was evidence on some of the individuals that the infection was still active at the time of death.

Degenerative diseases were either on a par with the previous phase or in the case of osteoarthritis, much increased. Osteoarthritis was not only more prevalent within this phase but was also more severe when present. These conditions in many cases lead to ankylosis (fusion of the joints). For example Sk 31 one of the latest burials on site showed the most extensive and severest case of osteoarthritis. Osteoarthritis and degenerative disc disease was visible along the entire length of his spine, fusing two thoracic vertebrae and practically fusing a further two. Osteoarthritis was also visible in both hands, his left elbow, his right shoulder and on the left side of his jaw. The area where he was suffering worst was in his hips. Both femur heads and acetabulums (hip joint) were extremely enlarged, with extensive new bone formation in addition to erosion and polishing caused by the bone on bone movement. Extension of the leg forward would have been greatly restricted and the individual would have been in a great deal of pain.

The average stature for males and females within this phase are still above average for the period at 5'6.5" for males and 5'3" for females but are decreased again from the phase above.

The osteological and internment evidence suggest that these individuals possible represent lower middle ranking individuals, of sufficient economic status to gain burial within the precinct. There is evidence of monastic cemeteries become more socially permeable over time, especially in urban contexts where they are more closely linked to the community in life and death (Gilchrist and Sloane, 2005:65). It is also possible that in this time, post-14<sup>th</sup> century, that the priory much reduced by economic decline and the effects of plague would relax the regulations on who could be buried in the precinct in order to secure the monies required for the priory. These individuals may represent people of the lower city as they began to use this as their cemetery.

## **7.0 Conclusion**

The inhumations excavated at *St Katherine's* represent at least three phases of distinct burial activity. The burials excavated represent only a sample of each of these phases so trends represented can not be stated as being statistically significant, however they do provide insight into whom the individuals were in the cemetery and how the monastic cemetery grew and altered overtime.

There are no trends or significant findings that suggest that this area formed part of the canon's cemetery or the hospital of the Holy Sepulchre. The osteological findings suggest that this area of the priory landscape was used predominately by the lay community, possibly benefactors, family members, and in the later phase wider strands of the local community.

The observations begin to provide hitherto unknown knowledge of the *St Katherine's* cemetery and add to the base of knowledge of medieval cemeteries from this area and country. Access to the osteological analysis of the more recent excavations and comparisons with other local assemblages of the same period would help to build up a clearer picture of the priory and its people.

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