relates :

NYCC HER	
SNY	8563
ENY	498
CNY	1908
Parish	6031
Rec'd	24/09/03

The Old Deanery
Minster Close
Ripon
North Yorkshire
SAM NY 1282

The Human Remains

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Non - technical summary

A total of eight inhumations as well as a quantity of disarticulated human remains were examined. The inhumations consisted exclusively of immature remains, ranging from newborn babies to children of about five to six years of age. The disarticulated material represented a total of six individuals, and included both adults and children. Pathological conditions observed in the inhumed material included non-specific infection and iron-deficiency anaemia.

1.0 Introduction

1.1 During excavations at The Old Deanery, Ripon, North Yorkshire, in July 2001, a total of eight well-preserved immature skeletons were exhumed. In addition, a small amount of disarticulated human bone was recovered from other deposits in the evaluation area, which had apparently been disturbed and re-deposited during previous ground works.

1.2 Although there was no datable artefactual evidence associated with the inhumations, documentary evidence indicates these individuals could have been interred at any time during the Anglo-Scandinavian or Post-Conquest period, up until the early fifteenth century when a College of the Vicars Choral was constructed on the site (Moody, pers. comm.).

2.0 Methodology

2.1 *Inventory*

A detailed inventory of all skeletal elements present was made for each inhumation. The level of preservation for each skeleton was recorded as either good, fair or poor, depending on the condition of the bone tissue. The relative completeness of each individual was recorded as a percentage of the total number of bones present in a normal human skeleton. Disarticulated human bone from additional contexts was also recorded, and an estimate made of the

minimum number of individual represented, based on the number of repeated elements from each age group.

2.2 *Estimation of sex*

No attempt was made to estimate the sex of immature individuals, as definitive sexually dimorphic traits do not develop in the skeleton until puberty (Krogman, 1962). Estimation of sex in the single adult cranium encountered was made by analysis of sexually dimorphic features of the skull, according to methods described in Buikstra and Ubelaker (1994).

2.3 *Estimation of age at death*

Age at death of immature individuals was estimated using long bone diaphyseal length (Scheuer et al. 1980 ; Hoppa, 1992), an assessment of dental development using schemes devised by Moorrees et al. (1963), and by Smith (1991), and consideration of the stage of fusion between a range of ossification centres with reference to published values of the average age of attainment (Schwartz, 1995).

Each individual was subsequently assigned to one of the age categories defined below (Table 1).

Age Group	Age Range
foetus	less than 38 weeks post conception
neonate	38 wks post conception to one month after birth
infant	1 month to one year
young child	1 to 5 years
older child	6 to 11 years
adolescent	12 to17 years
young adult	18 to 29 years
young/middle adult	30 to 39 years
middle adult	40 to 49 years
mature adult	50 to 59 years
old adult	over 60 years
adult	mature, but otherwise indeterminate

Table 1. Age categories

2.4 *Metric analysis*

Measurements of immature remains from articulated burials were made according to the standards detailed in Buikstra and Ubelaker (1994). No measurements were taken for disarticulated material.

2.5 *Health and disease*

All skeletal elements were examined for visible abnormalities, and any pathological changes were described and photographed where appropriate.

3.0 Results

3.1 *Preservation and completeness*

The inhumed remains comprised eight individual skeletons. Four of the skeletons were over 70% complete and of good to fair preservation. Two skeletons were 40 – 70% complete and of fair preservation. The remaining two skeletons were less than 40% complete and of fair or poor preservation. The preservation and completeness of each skeleton is detailed in Table 2.

Skeleton	Preservation	Completeness
2014	good	>70%
2026	good	>70%
2030	poor	<40%
2031	fair	40-70%
2032	fair	<40%
2039	fair	40-70%
2040	fair	>70%
2043	good	>70%

Table 2. Preservation and completeness

3.2 *Disarticulated remains : minimum number of individuals*

In addition to the eight articulated burials, disarticulated remains from a total of fourteen contexts contained the remains of a minimum of six individuals. The human remains from context 1016 were exclusively adult, and derived from the upper grave fill of skeleton 1018 which was left in situ. These remains probably belong to this skeleton. The additional remains were all of

sub-adults, and a minimum of two infants, one young child, one older child and one juvenile were represented.

3.3 *Age at death*

Analysis of skeletal age indicators for each inhumation determined that all eight individuals were immature at the time of death. Two were neonatal, one was an infant of approximately 9 months, four were young children aged between 1 and 4 years, and one was an older child of about 6 years old. A mean age and age range for each skeleton is presented in Table 3.

Skeleton	Age (mean)	Age (range)	Age (group)
2014	2.5	2 - 3	young child
2026	3.6	3 - 5	young child
2030	6.3	5.4 - 6.9	older child
2031	3 weeks	3 weeks	neonate
2032	0.75 years (9 months)	0.7 - 0.9	infant
2039	37 weeks pc.	37-38wks pc	neonate
2040	1.2	0.9 - 1.7	young child
2043	1.5	1 - 2	young child

Table 3. Age at death. pc = post-conception

3.4 *Health and Disease*

Dental pathology

The dental health of the deciduous dentition in the population as a whole was very good, with only two cases of slight calculus (skeletons 2026 and 2030), and no instances of caries or dental abcess. There were also no cases of dental enamel hypoplasia, a condition associated with developmental arrest. Permanent teeth were observable in one individual (skeleton 2030 : n = 5), and no associated pathological conditions were noted. The frequencies of dental pathologies are presented in Table 4.

	n	% affected
no. of teeth	50	
no. of sockets	106	
calculus	10	20
caries	0	0
DEH	0	0
abcess	0	0

Table 4. Frequency of dental pathologies in deciduous dentition, expressed as percentage of total teeth or total sockets observable.

Non-specific infection

Skeleton 2030 has plaque-like lesions of compact bone located on the posterior aspect of the distal right femur and proximal right tibia. These bone lesion are the result of a condition known as periostitis, an inflammation of the membrane which surrounds the bone (periosteum). This is most likely to have been caused by localised soft tissue infection due to a leg injury. In this individual the lesions were healing at the time of death, as there is no evidence of new reactive (woven) bone formation.

Metabolic disorders

Skeleton 2043, an eighteen month old child, has several lesions of porous bone on the external surface of the cranium. One of the lesions located on the occipital bone appeared to be in the process of healing, whilst the others were still reactive at the time of death. Similar lesions were noted on the left and right orbit. The bone changes in the cranium are consistent with a diagnosis of porotic hyperostosis (Plate 1) Those in the orbit are known as cribra orbitalia (Plate 2). Both of these lesions occur as a result of iron-deficiency anaemia, most commonly caused by a lack of dietary iron, infection, or parasitic infestation.

Similar cranial lesions were observed on the exterior of the right side of the cranium of **skeleton 2032**, a nine-month old infant. Again, these lesions are

most likely the result of anaemia. Plaques of reactive(woven) new bone were also noted on the internal surface of the cranium, extending along the major blood vessel tract (sagittal sulcus), and along other blood vessel (meningeal) impressions. These latter lesions were most likely caused by an inflammatory and/or haemorrhagic reaction of the meninges (membrane protecting the brain) and is perhaps a case of bacterial meningitis.

Alternatively, the external and internal lesions may both be a result of the same haemorrhagic process, secondary to the weakening of blood vessels due to scurvy. However, post-depositional erosion and loss of some skeletal elements prevent a positive diagnosis of scurvy in this case.

Skeleton 2031, a three week old baby, had a number of bony changes which suggest nutritional deficiency. Four ribs with sternal ends present had distinct flaring in this region, accompanied by abnormal porosity extending laterally along the rib shaft. The left and right humerus, and the right ulna had porous and striated periosteal new bone over much of the shaft (diaphysis). The left and right tibia also had substantial periosteal deposits of porous bone over most of the diaphysis, excluding the lateral surface. These lesions are characteristic of some of the bone changes associated with rickets. Both femora were absent and therefore any changes in these bones were not observable. Bone changes associated with rickets are rarely observed in infants under four months as the disease does not ordinarily develop so soon after birth. However, a woman suffering from lack of vitamin D, either through a dietary deficiency or lack of exposure to sunlight, would pass that condition onto the child. There was no evidence of bending deformity in any of the upper limb bones present and no obvious flaring of long bone metaphyses, which are considered diagnostic features of infantile rickets (Ortner, 2003). However, these changes would not have had sufficient time to develop in such a young infant. A further complicating factor in this case may be that a delay in growth caused by rickets has resulted in an underestimation of the age of the individual.

Reactive(woven) new bone deposits on the internal surface of the cranium, in both orbits and on the brow (glabella) region may be an indication of scurvy, a metabolic disturbance caused by lack of vitamin C. Again, some diagnostic elements are not present and occurrence of this disease in very young babies is rare. However, the condition could have been passed from mother to baby, and as rickets and scurvy are both nutritional deficiency diseases, they can occur in one individual simultaneously (Ortner, 2003). In this case, the presence of some lesions associated with these diseases is not sufficient to enable a positive diagnosis of either rickets or scurvy.

4.0 Discussion

This group of infants and children represent a small sub-sample of a larger medieval population, interred in this location some time between the eighth and fifteenth century. The absence of adult graves in the small area from which the child burials were recovered, along with the intercutting of graves, suggest this was an area of the burial ground that was at set aside for infants and children.

The presence of anaemia in one, perhaps two of the infants, as well as healed periostitic infection in another, suggests this population was physiologically 'stressed'. A stressed population will frequently have specific skeletal and dental abnormalities, which represent the individuals' adaptive response to physiological insults on the body during development. Infants and children are more susceptible to diet related metabolic disorders because of the energy and nutrients required for growth and development, and anaemia is commonly observed in archaeological populations. Susceptibility to infection is also greater due to an underdeveloped immune system.

The anaemia in this population may have been caused by dietary lack of certain nutrient rich foods such as vegetables or red meat, general under-nourishment or by a high prevalence of parasitic infestation or infectious disease. Anaemia is frequently found to be a side effect of infectious diseases, although the reason for this is not fully understood (Roberts and Manchester,

1995). The absence of dental enamel hypoplasia, an enamel defect also associated with stressed populations, may be due to the small number of teeth suitable for examination in this population as many were unerupted or absent. Alternatively, physiological stress may have occurred after the formation of deciduous tooth crowns.

Further investigation is required to establish a more accurate date for this population, and to determine the type of community from which they derived. This would enable an assessment of health and disease to be made within the context of the type of society in which they lived, and allow comparisons to be made with other British archaeological populations.

5.0 Conclusion

The assemblage of human bone from this site included the relatively complete skeletal remains of eight infants and children, and at least six additional individuals represented by the disarticulated material. Pathological conditions observed in the inhumed individuals suggest they may have derived from a stressed population, perhaps adversely affected by poverty, famine, or a prevalence of infectious disease. However, further work is required to determine the nature of the society in which these children lived.

6.0 References

Buikstra, J.E. and Ubelaker, D.H. 1994. (eds) *Standards for data collection from human skeletal remains.* Arkansas Archaeological Survey Research Series No.44 Fayetteville, Arkansas Archaeological Survey.

Hoppa, R. D. 1992. Evaluating human skeletal growth: an Anglo-Saxon example. *International Journal of Osteoarchaeology 2 : 257-288.*

Krogman, W.M. 1962. *The Human Skeleton in Forensic Medicine.* Springfield, Thomas.

Moorress, C.F.A., Fanning, E.A., and Hunt, E.E. 1963. Age variation of formation stages for ten permanent teeth. *Journal of Dental Research 42 : 1490 – 1502.*

Ortner, D. J. 2003. *Identification of Pathological Conditions in Human Skeletal Remains. Second Edition.* Academic Press, London.

Roberts, R. and Manchester, K. 1995. *The Archaeology of Disease. Second Edition.* Sutton Publishing, Stroud.

Scheuer, J.L., Musgrave, J.H. and Evans, S.P. 1980. The estimation of late fetal and perinatal age from limb bone length by linear and logarithmic regression. *Annals of Human Biology, 7 (3), 257-265.*

Scheuer, L. and Black, S. 2000. *Developmental Juvenile Osteology.* Academic Press, London.

Smith, B.H.1991. Standards of human tooth formation and dental age assessment. In Kelley, M.A. and Larsen, C.S. (eds) *Advances in Dental Anthropology.* Wiley – Liss, New York, pp.143 – 168.

Schwartz, J.H. 1995. *Skeleton Keys.* New York, Oxford University Press.