THE BRIGHTON AND HOVE PREHISTORIC PEOPLES RESEARCH PROJECT

An assessment of the human remains

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AN ASSESSMENT OF THE HUMAN REMAINS

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INTRODUCTION

The human skeletal remains of a total of 28 individuals were studied during April-September 2016. These were housed at the Royal Pavilion and Museums, Brighton and Hove. The human remains resulted from excavations and incidental finds recovered from the Brighton and Hove area between the 1920s and 1990s.

A number of the human remains in the collection were found during local excavations, such as those at Shoreham Camp in 1916, Ditchling Road in 1921 and Slonk Hill in 1969. Human remains resulting from incidental findings include a number found during the course of council building work in Brighton and Hove between the 1920s and 1930s, such as those from East Brighton Golf Club, Roedean Crescent and the Blackrock coastguard's station. Other human remains were donated following their discovery during private building work, for example the skeleton from a property in Surrenden Road, found in 1928 during building works for a tennis lawn, and that from Woodingdean which was found by a home owner during the construction of a sun terrace to the side of his house. Additionally, human remains had been donated by the police in the 1950s, such as those from Eldred Avenue, and a small proportion of further human remains were of uncertain provenance.

The dating of the majority of these human remains was uncertain apart from two of the skeletons. The skeleton recovered from the Mile Oak Farm excavations in Portslade between 1989-1990 was carbon dated originally to the middle-to-late Iron Age but subsequently, on further sampling, to the late Bronze Age; and the skeleton from the Varley Halls excavation in 1992 was carbon dated to the middle-to-late Bronze Age. In the remainder of the cases the information about dating was originally derived from the burial position of the skeleton, its orientation within the grave, any grave goods found in association with the burials and, in a number of cases, physical features of the skull had been used to ascribe individuals to a particular prehistoric era using methods prevalent in the early 20th century. A summary of the dates previously assigned is shown in Table1.

	Neolithic	**Neolithic/ Bronze Age**	**Bronze Age**	**Iron Age**	**No date assigned**
n	2	3	11	2	10
Table 1: showing the composition of the population					

The amount of information available for relative dating was variable. For instance, skeleton I from the Slonk Hill excavations had been found in an oval pit, its skull to the north, facing east and the body laid on its left side, the right hand in front of its face, knees flexed; there were potsherds and a fossilised sea urchin associated with the burial which was relatively dated to the Iron Age. Conversely, the skeleton from the Patcham-Pyecombe boundary had not been examined *in situ* but was recorded as having been in a contracted position and was described as having a 'long barrow type' skull, resulting in a Neolithic date having been allocated; no grave goods were recorded.

As a first step towards addressing the ambiguity of the dating evidence for the collection, a programme of radiocarbon dating, funded by the University of Winchester, is underway and dating has been undertaken for the skeletons from the following sites: R2430 London Road, Patcham, R3016 Surrenden Road, HATMP100001 Slonk Hill, R3027 Moulsecoomb, R2574 East Brighton Golf Club and R3330 Blackrock, the results of which are shown in Table 7. Dating of further individuals from the collection and analysis of the results is planned for 2017.

To summarise, the 28 human remains analysed in the present study ranged in assigned date from Neolithic to Iron Age.

MATERIALS AND METHODS

The assessment of these 28 skeletons was carried out by Dawn Cansfield with the assistance of Andy Maxted and the supervision of Dr Paola Ponce. The assessment consisted of estimating sex and age along with carrying out standard osteometric analysis for the purpose of calculating stature and assisting with the sex assessment. Finally, the presence of pathologies was noted and recorded. All this biographical data gathered on each skeleton was comprehensibly documented in a paper-based record along with digital photographs.

Sex Estimation

An assessment of the biological sex of the adult skeletons was made using multifactorial methods. Thus, a combination of osteometric and dimorphic traits of the pelvis and skull were employed. The osteometric analysis was based on measurements taken on the humeral, radial and femoral heads, the bicondilar width, the maximum length of the clavicle and the width of the glenoid cavity of the scapula. These were estimated following Stewart (1979).

The dimorphic bones analysed were the pelvis and the skull but these were used whenever available, in other words depending on the degree of preservation and completeness. In the former, the ventral arc, the sub-pubic concavity, the ischiopubic ramus ridge, the greater sciatic notch and the pre-auricular sulcus were used according to Buikstra and Ubelaker (1994) and Bass (2005). In the skull, the nuchal crest, the supraorbital ridges, the mastoid process, the glabellar profile and the mental eminence were used according to Buikstra and Ubelaker (1994) and Bass (2005).

The sex categories assigned to all adult skeletons were male (M), probable male (?M), female (F), probable female (?F) or unknown (?) when the degree of incompleteness, poor preservation or ambiguous results prohibited definitive assignments to either sex. For the purpose of statistical analysis, “probable males” were grouped with males and “probable females” were grouped with females. The skeletons of newborn, infants and juvenile individuals were not assigned to any sex category.

Age Estimation

Age-at-death was established using standard osteological techniques. Multifactorial age-at-death assessments provide the most accurate results (Lovejoy 1985) and estimates of age were made using a combination of methods. These included the morphological changes observed in the pelvis such as the pubic symphysis (Brooks and Suchey 1990) and the auricular surface (Lovejoy et al 1985). Other methods included the development of the epiphyseal union of long bones (Scheuer and Black 2004), the eruption of teeth and dental development (Gustafson and Koch 1974 and Ubelaker 1989), and the measurements of long bone lengths (Maresh 1970, Scheuer et al 1980). The age categories employed are summarised in Table 2.

Age category	Description	Month/Years
0	Foetus and neonate	Before birth- 11 months
1	Infant 1	12 months – 6 years
2	Infant 2	7 – 12 years
3	Juvenile	13 – 17 years
4	Young Adult	18 – 30 years
5	Prime Adult	31 – 45 years
6	Mature Adult	45 + years
7	Adult	18 + years
8	Sub-adult	<18 years
Table 2: showing the age categories employed		

Stature estimation

Stature was calculated for adult individuals using the femur whenever possible. When this bone was broken, pathological or not present, the tibiae and fibulae were used instead. Alternatively when none of the lower limb bones were present, the humerus, radius or ulna was used. Left side bones were preferred over right side bones whenever possible in both upper and lower limb bones.

The maximum length of the bones was measured with an osteometric board following the standards proposed by Buikstra and Ubelaker (1994) and the maximum stature was calculated using the equations of Trotter (1970).

Stature was estimated on adult individuals only and individuals with undetermined sex were not included in the analysis.

Pathology quantification

All significant gross pathology was assessed following the diagnostic criteria by Aufderheide and Rodríguez-Martín (1998) and Ortner (2003) and by supplementary references as required.

RESULTS

Demography

The 28 skeletons were divided into 24 adults, 3 sub-adults and 1 neonate. The former group included individuals whose age categories fell between 4-7 and sub-adult individuals included those of age categories 0-3. As shown in Table 3 there were 11% (3/28) sub-adult individuals aged 0-17 years compared with 86% (24/28) adults aged 18+ years.

Age category	Description	n
0= before birth-11 months	Foetus and neonate	1
1= 12 months-6 years	Infant 1	0
2= 7-12 years	Infant 2	0
3= 13-17 years	Juvenile	2
4= 18-30 years	Young Adult	14
5= 30-45 years	Prime Adult	4
6= 45+ years	Mature Adult	2
7= 4-6 age categories	Adult	4
8 = <18 years	Sub-adult	1
Total	All groups	28
Table 3: showing the age categories found		

Observations between adult males and females showed that their presence in the sample was fairly equal (Table 4). Of those adults for whom sex could be estimated, as a proportion of the overall group, 46% (13/28) were males and 36% (10/28) were females.

Age category	M+M?	F+F?	?
4= 18-30 years	9	6	0
5= 30-45 years	2	3	0
6= 45 + years	1	0	1
7= 4-6 age categories	1	1	1
Total	13	10	2

Table 4: showing the composition of the adult population Note: M+M? are all males and probable males grouped, F+F? are all females and probable females grouped, ? are all adults that could not be sexed.

Stature

Stature estimation was possible in a fairly equal percentage of males and females. A total 67% (8/12) of adult males had at least one long bone well-preserved to estimate stature compared to 50% adult females (6/12).

The bone most commonly used for stature calculation in all adult individuals was the femur (n= 11) followed by the humerus (n=2), tibia (n=1).

As shown in Table 5, males were taller than the females. The average height for all men was 170.46 cm and that of the females was 155.16 cm although the former group showed more height variation.

Sex	n	Mean (cm)	Range (cm)	SD (cm)
M-M?	8	170.46	157-181	7.80
F-F?	6	155.16	147-164	7.25

Table 5: showing the adult stature

PALAEOPATHOLOGY

From the total skeletal population assessed, 75% (21/28) of the skeletons showed evidence of being affected by some palaeopathological condition compared with 25% (7/28) that did not show any evidence of disease.

The conditions found within the skeletal sample were dental disease, trauma, congenital abnormalities, infectious diseases, joint disease, metabolic and neoplastic conditions.

The results obtained with the above-listed pathologies are presented and discussed in the order of prevalence as shown in Table 6.

Pathologies	Prevalence (n/N)
Dental disease	64% (18/28)
Trauma	39% (11/28)
Congenital anomalies	18% (5/28)
Infectious diseases	14% (4/28)
Joint disease	11% (3/28)
Metabolic conditions	4% (1/28)
Neoplastic conditions	4% (1/28)

Table 6: showing crude prevalence rates of all pathologies found within the population

Dental disease

Dental disease refers to any acquired or congenital pathology of the teeth. In the skeletal population those found within the first group included calculus, ante-mortem tooth loss, dental enamel hyperplasia, dental wear, caries and abscesses.

Congenital anomalies of the teeth included agenesis, retained teeth, fused teeth, rotated teeth and peg-shaped teeth. There were mandibular tori in skeletons R2315/3 Ditchling Road and HATMP100348 Slonk Hill II. These are bony outgrowths or bony excrescences arising along the midline of the mandible or palate. A number of factors have been postulated as causative of these tori including mechanical stress, diet, disease and congenital abnormality (Brothwell 1981).

Finally, skeleton HAMTP100399 was affected by an oroantral fistula (connection between the mouth and the maxillary sinus), which manifests as a small orifice that serves as a draining cloaca.

Trauma

Despite the many definitions, trauma can be defined as any extrinsic mechanism that causes injury to a living tissue of the body (Lovell 1997).

The evidence of trauma within the skeletal population consisted of several examples of Schmorl's nodes, musculoskeletal stress markers and spondylolysis along with two instances of myositis ossificans traumatica and a single case of osteochondritis dissecans.

Spondylolysis

Present day consensus supports the idea that spondylolysis is an acquired traumatic lesion and the consequence of a stress fracture, fatigue fracture or overuse injury occurring during growth. The combination of repeated extension and hyperflexion of the lumbar spine that exceeds the capacity of bone repair results in the separation of the vertebrae in two parts, the anterior vertebral body and posterior pars interarticularis (Aufderheide and Rodriguez-Martin 1998).

Two adult individuals were affected by spondylolysis. The condition was complete bilateral on the 5th lumbar vertebra of skeleton R3706 Woodingdean and skeleton R4267 Roedean.

Osteochondritis dissecans

This is a condition that results from repetitive stress and microtrauma (Ortner 2003) which in turn leads to the interruption to the normal blood supply and the death of cartilage and bone followed by their consequent separation from the normal position at the joint.

The condition was observed affecting the proximal articular facet of the right hallux (big toe) and the proximal phalanx of the right hallux of male skeleton HATMP100399.

Myositis ossificans traumatica

This is a type of soft tissue trauma that results from local trauma to muscle or tendon by an external force which in turn triggers an inflammatory response and the formation of new bone and connective tissue on the affected area (Saartje et al 2012).

It was observed in skeleton HAMPT100001 Slonk Hill I affecting the gastrocnemius muscle of the left fibula. Similarly, it was present in skeleton R3027 Moulsecoomb affecting the semimembranosus muscle of the right tibia.

Enthesopathies

These are another type of soft tissue trauma observed at the insertion of muscles and tendons into bone that can result from strenuous physical activity, occupation and mechanical factors such as differential strain and biomechanical changes in bone load, although they are highly correlated with age (Ponce 2010).

A number of bones and the entheses with muscle or ligament involvement were observed in skeleton R2315.3 Ditchling Road 3. In the upper limbs these were present in the right radius where the muscle biceps inserts and at the distal end of this bone where the muscle pronator quadratus inserts. The olecranon of the right ulna was also affected where the muscle triceps inserts. Finally, in the lower limbs the right tibia was affected at the soleus muscle insertion.

Schmorl's nodes

These nodes are depressions on the vertebral bodies that result from herniations of the nucleus pulposus material of the intervertebral discs (Aufderheide and Rodriguez-Martin 1998, Ortner 2003). These may result from repeated trauma due to exerting compression forces in the spine while bending, lifting weight or twisting motions (Roberts and Cox 2003).

This condition was observed affecting the spine of six skeletons. Skeleton 100402 Exeter Street and skeleton HA210862 Mile Oak showed Schmorl's nodes in the lumbar spine, skeleton HATMP100348 Slonk Hill II and skeleton R4267 Roedean were affected in the thoracic spine, and both thoracic and lumbar segments were affected in skeleton R3330 Blackrock, skeleton R3706 Woodingdean and skeleton R3428 Bevendean.

Congenital anomalies

Congenital anomalies refer to anomalies occurring during embryological development that affect the normal formation of organs and tissues (Ortner 2003).

A total of 18% (5/28) of the skeletons analysed had evidence of some form of congenital anomaly. Of these, two individuals (skeleton R3428 Bevendean and skeleton R3706 Woodingdean) exhibited persistent metopic sutures, a further two (skeleton R3027 Moulsecoomb and skeleton R3370 Blackrock) were found to have sacralisation of the L5 vertebra with the sacrum, and one individual (skeleton R2315/3 Ditchling Road) was affected by lateral deviation of the nasal septum.

Infectious diseases

These are a group of disorders that result from the invasion of agents into the body such as bacteria, viruses, fungi or parasites and produce an inflammatory response in the bone (Aufderheide and Rodríguez-Martín 1998, Ortner 2003).

Evidence for infectious disease was observed in 14% (4/28) of the skeletal population. One individual from Eldred Avenue (HATMP100046) was found to have pitting in the palate and also periosteal reactions in the long bones. The two individuals from Ditching Road had porosity in the glabellar region. Analysis of skeleton HAMPT100399, an adult male individual from the collection with unknown provenance, demonstrated a complex picture of infectious disease. There was porosity of the palate, secondary to dental infection, and hypervascularity evident in the calcaneus. In the ribs there was infection to the posterior aspect of a significant number of ribs bilaterally with cloaca observed in some instances. There was apophyseal joint fusion through thoracic vertebrae T5-8. Vertebrae T2-10 showed signs of infectious infection. Their pathological condition led to an abnormal anterior-posterior bending of the spine suggestive of tuberculosis although this would be difficult to confirm.

Joint disease

Joint disease refers to degenerative conditions of the joints. A total 11% (3/28) of the skeletal population suffered from joint disease in the form of osteoarthritis. This was observed in skeletons R3027 Moulsecoomb (to the sternoclavicular joints), HATMP100348 Slonk Hill II (to the lumbar vertebrae) and HATMP100046 Eldred Avenue (to the humeroulnar joints bilaterally, the right humeroradial joint and the glenohumeral joints).

Metabolic conditions

Metabolic disease in bone is characterised by disturbances in formation, mineralisation and remodelling (Brickley 2000, 183). There was one instance of a metabolic condition in the form of possible osteoporosis in the vertebrae and pelvis of skeleton R3027 Moulsecoomb, a mature adult male individual. Although osteoporosis is often associated with post-menopausal females, it can occur in both sexes and can result from poor diet or old age (Walker 2012,186).

Neoplastic conditions

The term neoplasm refers to 'new tissue' or 'mass of new tissue'. Neoplastic tissue can be benign or malignant depending on whether its proliferation is capable of destroying surrounding cells or not (Aufderheide & Rodríguez-Martín 1998).

Benign neoplastic conditions

Button osteoma

The most commonly found neoplasms in archaeological populations are button osteomas. These are raised areas of dense bone that resemble a small mound or dome (Mann and Hunt 2005). One example was found in this skeletal population, in skeleton HATMP100399 on the right frontal bone.

RADIOCARBON DATING

The results of the first group of radiocarbon dating samples are shown in Table 7.

Museum Ref No	**Site**	**Radiocarbon date (95% confidence)**
R2430	London Road, Patcham	1230-1031 cal BC
R3016	Surrenden Road	794-541 cal BC
HATMP100001	Slonk Hill	393-206 cal BC
R3027	Moulsecoomb	92-63 cal BC
R2574	East Brighton Golf Club	1891-1699 cal BC
R3330	Blackrock	784-519 cal BC
Table 7: showing the calibrated date ranges of the samples analysed to date		

FURTHER WORK

This has been a valuable exercise in identifying the extent and content of the human remains collection at Brighton's Royal Pavilion and Museums. It has generated information on the prehistoric people of Brighton and Hove as a discrete geographical area with data on demography, palaeopathology, dating and burial practice. It is now possible to build on this to further analyse the collection, particularly in relation to the radiocarbon dating evidence, to gain further understanding in the context of the wider picture of prehistory in the Brighton and Hove area, the region of southern England and further afield.

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