Marcham Excavations 2004–2005
Report on Human Skeletal Assemblage

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Introduction

During 2004 and 2005 the skeletal remains of a minimum of 25 individuals were recovered from Trench 1 during the course of excavations.

The largest assemblage comprised six adults from shallow graves in the eastern extent of the arena bank during 2004 (Lock, Gosden *et al.* 2005), and a further two during 2005 (Gosden, Lock *et al.*, 2006). The remains of at least 14 further individuals, including fragments of infant skull, have also been recovered from various deposits within Trench 1. Some plough damage had occurred and no skeleton was more than 75% complete, and in some cases comprised only fragments. Table 1 shows estimated completeness.

Table 1: Trench 1 Skeletal completeness

	>75-100%	>50-75%	>25-50%	0-25%	Total
N	0	3	2	17	22

In addition to those listed in Table 1, the remains of at least three other individuals were co-mingled when topsoil removal first revealed the cemetery in 2004. These were originally thought to be the remains of one individual and are listed in the excavation record as SK20. A summary of this material is shown in Table 5.

A small quantity of bone (SK5 and SK6) was also recovered from the soils around the graves, however this provides no osteological information and in accordance with current recommendations was not examined (Mays *et al.* 2002).

A large, late Roman and Anglo-Saxon cemetery lies to the northwest of the current excavation area (Akerman, 1865; Rolleston, 1869; 1880) and the discovery of the cemetery in Trench 1 was unexpected.

The skeletons lay in poorly defined shallow graves aligned east-west, with the heads to the west. In common with a number of the burials in the Frilford cemetery they lacked evidence for coffins or grave goods and appear to have been placed directly into the ground. It was possible to determine the body position of seven of the inhumations; All were extended, five were supine, although one lay with its lower body twisted to one side, and one had been buried in a prone position. A full description is given in Table 2.

Animal bone, unworked flint and abraded fragments of pot were recovered from the soil around the skeletons, but these most probably entered the grave fill from the surrounding soil, or in the case of the rodent bones, as later intrusions.

Table 2. Burial Position

SK	Position
3	Upper body badly damaged. Right arm folded across body with hand resting on stomach, left arm bent at elbow towards shoulder. Lower body twisted to right, feet apart.
4	Right arm folded across body to rest on left hip. Left arm bent at elbow and resting on stomach. Feet together
8	Right arm bent at elbow, with hand resting on throat. Left arm lying straight alongside body, hand turning inwards. Feet apart
13	Body in prone position. Left arm lying alongside body (right arm missing). Feet together. Upper body and skull missing (probably plough damage)
14	Very decayed. Body appears to have been extended with stones around head and at estimated position of feet (now missing).
16	Central part of body missing. Head misaligned with lower body. Feet together.
17	Very disturbed. Head to west, hand over pelvis

Methodology

The skeletal remains were examined in accordance with the guidelines laid down in Brickley and McKinley, 2004; Mays *et al.* 2002. The minimum number of individuals was calculated and each skeleton was analysed to assess its preservation and completenes, and to determine where possible, age, sex, and stature. Due to the incomplete nature of the assemblage only a limited assessment could be made.

Age at death of mature adults was based on the degree of degeneration of the pubic symphyseal face (Brooks and Suchey 1990; Todd, 1920), and changes to the pelvic auricular surface (Lovejoy *et al*.1985). Where dentition survived, dental attrition rates were used to assess biological age. Dentition survived for three individuals and dental notation was based on Brothwell (1981: fig 3.9)

Where available, determination of sex was based on the sexually dimorphic characteristics of the pelvis (Phenice, 1969), and the skull (Buikstra and Ubelaker 1994). The pelvis is considered the more reliable indicator, as skull morphology in females can become increasingly masculine with age. Sacral anterior curvature and robusticity of the long bones was also recorded where available (Bass, 1995). In all cases the pelvic bones were damaged or missing and assesment from the sub-pubic concavity, considered to be the most accurate method, was not possible. Sex was determined from secondary sexual characteristics only and was possible for six individuals.

Assessment of the skeletons for joint disease and other pathological conditions followed the recommendations of Rogers & Waldron (1989, 1995). Aufderheide & Rodriguez-Martin (1998), Scheuer & Black (2000), and Scheuer (2002) were also referred to. Non-metric traits were scored from those listed in Buikstra & Ubelaker (1994), and Brothwell (1981). A complete record of the data including scoring sheets is held in the excavation archive.

Surface Preservation

Soils, and subsequently soil chemistry, varies across the site and is best demonstrated in the large number of animal bones recovered during excavations, with those from trenches in the east more poorly preserved. The remains were recovered from the eastern part of the site where the soils are more acidic, and consequently preservation was often poor. Each bone was examined for its state of preservation and erosion, and follows the grading system given in Brickley & McKinley (2004; p.16).

Table 3: Surface preservation and erosion

Grade	0	1	2	3	4	5	5+
		4	5	6		7	

0 = no modification; 1=slight, patchy surface erosion; 2=deeper surface penetration; 3=most of bone surface affected; 4=all bone surface affected; 5=heavy erosion; 5+=Extensive penetrating erosion

Sex and Biological Age

The majority of the articulated skeletons and the disarticulated remains from Trench 1 were of mature adults. Fragments of occipital, temporal, and parietal bones were recovered, which were relatively smaller and thinner than usual for adult bone (SK 9). Where fragments with sutures survived they were unfused and these were probably from a juvenile. Fragments of infant frontal bone SK12 were also recovered. The fragmentary nature of these remains allowed for no further analysis.

An estimation of age and/or sex was possible for seven individuals as shown in Table 4. In all cases the level of preservation prevented the determination of a precise age. However, the presence of degenerative changes, and heavy attrition on the teeth suggests that the individuals were old at the time of death.

Table 4: Demographic Analysis

	Sex	Age	Notes
SK3/1205	Male. 75% complete	Adult - no further data	**Sex:** Robust skeleton. Pelvis: left and right sciatic notch damaged but appear narrow. Skull: fragment of occipital bone with pronounced nuchal crest; large mastoid process; femoral bicondylar width, sacral curvature ♂
SK4/1225	Undetermined, ?female - based on pathology (see text) ~25% complete	23-57	**Sex:** Gracile. Broad ischiopubic ramus ♂ **Age**: Scored from pubic symphysis only, 23-57. Skull: sagittal and right lambdoid sutures obliterated endocranially.
SK8/1205	Undetermined. 75% complete	45+	**Sex:** Supra-orbital ridge and margin and nuchal crest ♀; diameter of femoral head and femoral bicondylar width ♂. Mental eminence, sciatic notch undetermined. **Age:** Based on dental attrition only.
SK13/1205	Male. 70% complete	27-66	**Sex:** Robust skeleton; assessment of post-cranial markers including sacrum ♂ **Age**: Scored from pubic symphysis only.
SK14/1221	Undetermined - possibly female ~10% complete	Old	**Sex: G**racile; nuchal crest ♀. **Age:** pacchionian depressions; cranial sutures obliterated endocranially. Dentition: two tooth fragments only – very worn.
SK16/1233	Female. ~40% complete	45+	**Sex:** Very gracile. Wide sciatic notch. Mental eminence and mastoid process ♀. **Age:** Based on dental attrition only.

SK17/1288	Probably male ~10% complete	Adult - no further data	**Sex:** mental eminence, sciatic notch, nuchal crest, femoral head diameter ♂. Supraorbital margin, supra-orbital ridge undetermined.

Disarticulated Remains
In addition to the articulated assemblage listed in Table 4, skeletal remains were recovered from other contexts within Trench 1. These are summarized in Table 5

Table 5 Trench 1 Disarticulated Remains

	Context	Notes
SK10	1205/MF04	Shaft of left and right femur; shaft of left and right tibia (fragment), condyles of right femur (fragment)
SK15	1212/MF04	Left femur (proximal end and 50% of shaft)
	Trench 1 Spoilheap/MF04 MNI=3	29 rib fragments; left and right femoral condyles; right humerus (fragments x 3); left ox coxae (fragment); manubrium; left and right calcaneus (gracile); left cuboid, left and right navicular; left 3rd cuniform; left talus (gracile); left 1st metatarsal; right 4th metatarsal; left 5th intermediate phalange; left 1st proximal phalange x 2; left 5th proximal phalange; right 2nd proximal phalange; left 2nd metacarpal; verterbra (fragment, ?thoraic); radius (fragment); right femur x 2 (fragments); left and right mastoid processes (large, ?male); left mastoid (small, ?female); right clavicle (fragment); left scapula (fragment); temporal (fragment x 2); right fibula (fragment); right mandible (fragment – coronoid process to 1st molar, L2-L3 lost ante-mortem); lower incisor (uneven wear); lower left canine, lower pre-molar.
SK22	1273/MF05	Fragment of sacrum. Sacralization of L5, extensive marginal osteophytes; intervertebral disk disease
SK23	1273/MF05	Left humerus, head missing, broken across anatomical neck. Enthesis on deltoid tuberosity
SK24	1293/MF05	Incomplete thoracic vertebrae (?T10). Ossified ligamentum flavum and Schmorl's node
SK25	1279/MF05	Fragments of right and left fibula. Right tibia, proximal and distal joint surfaes almost destroyed, but appear to show billowing consistent with a growth plate. Bones gracile. ?juvenile
SK26	1270/MF05	Fragment of right femur; gracile
SK27	1288/MF05	Fragment of right ulna
SK28	1273/MF05	Lower right 3rd molar, cusps worn.
SK29	1279/MF05	Lower right 2nd molar, chipped - probably post-mortem damage.
SK30	1298/MF05	Lower left first premolar; cusps worn, slight calculus

Stature
Estimation of living stature was possible for 6 individuals (Table 6). Adult stature was estimated from the maximum length of available long bones using the regression formula laid down in Brickley & McKinley (2004). Where possible complete femoral length was used as this is considered to have the smallest associated error (Waldron, 1998).

Estimation of stature is only possible where the sex of the individual is known. Where sex was undetermined, a height range has been calculated for both sexes. The mean heights of the Trench 1 people are 171.46cm (5'6") for males and 157.91cm (5'2") for females. These

heights accord well with the Romano-British mean derived from much larger samples (Roberts & Cox, 2004).

Table 6: Adult Stature

	Male	Female	Undetermined	Bone Used
SK3	5'8"			Femur
SK4			5'6"	Radius
SK8			5'3-5'4"	Femur
SK13	5'4"			Femur
SK16		5'2"		Femur
SK17	5'8"			Femur

Non Metric Traits
Non-metric traits are minor but normal anatomical variations in the bones or teeth. They are non-pathological, and environment, activity and genetics have all been cited for their presence. No post-cranial non-metric traits were present in the surviving bones and all traits noted are cranial. These are listed in Table 7.

Table 7 Non-metric traits

SK No.	Trait
4	2 infra-orbital foramen (right), 1 large infra-orbital foramen (left). 2 zygomatic foramen (right). Supra-orbital notch (right), supraorbital foramen (left)
8	Supra-orbital notch (left and right)
14	Parietal foramen
17	Supra-orbital notch (left and right)

Palaeopathological Analysis

Joint Disease

Osteoarthritis:
Osteoarthritis (OA) is the most common form of joint disease and is found throughout all periods of the archaeological record. A number of factors can be responsible for OA including genetics, trauma, occupation, body weight, nutrition, and most commonly age, with nearly all individuals over 60 affected (Rogers *et al*. 1987, Rogers & Waldron, 1989). It is a degenerative disease that results from destruction of the joint cartilage. Bone on bone contact creates a shiny, ivory-like appearance on the joint surface termed eburnation, which is the most significant expression of OA. Osteophytes (new bone) are formed around the joint margin, or on the surface of the joint as the bone attempts to repair itself. These, along with changes to the joint contour and joint surface porosity are also considered indicators of the disease.

All surviving synovial joint surfaces were checked for the presence of eburnation. Where eburnation was absent, diagnosis of OA was made if at least two of the other indicators listed above were present (Rogers and Waldron, 1995).

Extraspinal OA was identified in the left ankle and left 5th metatarsal of SK3; both ankles and left wrist and hand of SK13; the right ankle of SK16, and in multiple joints of the left hand of SK17. Probable OA of the hip was present in SK13 with marginal lipping around the left and right femoral head and surface osteophytes in the region of each fovea.

SK4, 8, and 13 had osteoarthritic changes to the spine, including porosity and marginal osteophytes on the vertebral bodies and articular facets. In SK16 and SK 17 OA was present in the neck, with slight eburnation on the 1st and 2nd cervical vertebrae including the articular surface of the odontoid process of SK16, and marginal osteophytes and eburnation on the odontoid process of SK17.

Other conditions of the Spine

Osteophytosis
Ostephytosis is characterized by the formation of numerus marginal bony growths (osteophytes) which project outwards from the vertebral body. They are benign and commonly occur in OA, but also as a normal accompaniment of the ageing process. Osteophytes were present on the thoracic vertebra T9-T12 and lumbar vertebra L1-L5 of SK13.

Degenerative Disk Disease
Degenerative disk disease is a common condition of the spine and is also a natural part of aging. It can be identified from course pitting and new bone growth on the superior or inferior joint surfaces of the vertebral body, caused by the gradual erosion of cartilage between the vertebrae. It was present on the thoracic vertebrae T2-T7 of SK4.

Schmorl's Nodes
Schmorl's nodes are indentations or pressure defects on the superior or anterior surfaces of the vertebra caused by the herniation of the intervertebral disc into the end plate of the vertebral body, and are caused by physical stress on the spine. They occur most often in the lower thoracic and lumbar regions and are commonly associated with osteophytosis, although there is no evidence they are causally related (Rogers & Waldron, 1995). The condition was identified in SK4, 8, and 13, and in a disarticulated thoracic vertebra from Trench 1 (SK24).

Congenital Anomalies

Spina Bifida Occulta
Only two of the individuals recovered had complete sacra, SK3 and SK13. In both cases the congenital anomaly of spina bifida occulta (SBO) was present. SBO is characterized by the incomplete fusion of the posterior neural arch of the sacrum and can involve one or more sacral segments (Aufderheide and Rodriguez-Martin, 1998). In both SK3 and SK13 this was partial and involved the neural arches up to the 3rd sacral segment. This condition, unlike the more severe spina bifida cystica, is likely to have been asymptomatic, with the spinal canal bridged by cartilage or membrane, and may have gone undetected in life. Fragments of this tissue might have survived in SK13 where the median crest had not developed between S1-S3 and a thin ossified tissue bridged the neural arch. Studies of the condition in modern and recent historic populations from UK sites shows a prevalence of approximately 15% of the population for both periods (Saluja, 1988), however prevalence is known to vary between populations. Although the exact cause is unknown, it is considered to have a genetic predisposition.

Sacralization of the 5th Lumbar Vertebra
Sacralization of L5 is a congenital abnormality in which the fifth lumbar vertebra becomes partially or completely incorporated into the sacrum through fusion with the first sacral segment. In addition to SBO, partial sacrilization of L5 was present in SK13. A further fragment of disarticulated sacrum was recovered from Trench 1 (SK22). Only the anterior fragments of the 5th lumbar vertebrae (L5) and first sacral element (S1) had survived, but were sufficient to show that complete sacralization had occurred.

Sacralization of the coccyx
SK13 also had sacralization of the 1st coccygeal element. Sacrococcygeal fusion is more common in males and can be indicative of increasing age, but has been seen in individuals as young as 30 (Scheuer & Black, 2000, Aufderheide & Rodriguez-Martin1998).

Flared Metaphysis
SK4 had flared metaphysis of the distal left humerus (the right humerus is absent). During growth and maturation healthy bone grows through resorption of the external cortex near the metaphysis and deposition of tissue endosteally (Buikstra & Ubelaker, 1994). If external resorption fails unusually wide distal ends develop as seen in SK4

Manubriosternal fusion and Sternal Curvature
Post excavation photographs taken of SK4 prior to lifting appear to show a marked anterior curvature of the sternum. The complete sternum did not survive lifting, and only approximately one-third remained for examination. In addition, the sternum and manubrium were fused and slightly misaligned at the manubriosternal joint. This joint is important in respiratory function, allowing for a hinge-like movement during breathing, and its fusion may have led to respiratory difficulties. With advancing years sclerotic fusion does occur, and is seen predominantly in females (Scheuer, 2002), but might also occur as a development defect in the feotus (Scheuer & Black, 2000; 227-228). The right clavicle, which was also incomplete, would have articulated with the manubrium in life. This also appears distorted with no evidence of fracture.

Anterior curving of the sternum can occur as a result of *pectus carinatum* or pigeon chest, a clinical condition that results from sternal protrusion and occurs more commonly in males. The condition can occur as a solitary abnormality or with other conditions, and is thought to possibly occur due to the premature fusion of the segments of the sternum and overgrowth of the costal cartilages. It is also associated with scoliosis (lateral curvature of the spine). Only fragments of the ribs and vertebrae survived and it was not possible to reconstruct of the thoracic cavity to investigate this further. The condition can restrict air exchange and result in breathing difficulties.

Both *pectus carinatum* and flared metaphyses are also seen in rickets. All surviving long bones of SK4 were examined but show no sign of abnormal bowing.

Miscellaneous Pathology

Hyperostosis Frontalis Interna
Two small areas of abnormal bone, approximately 10-15mm in diameter and 1mm thick. were present on the endocranial surface of the frontal bone of SK4 This is possibly the onset of a condition known as *hyperostosis frontalis interna* which occurs in high-frequency among post-menopausal elderly women. This condition, along with the manubriosternal fusion, supports the possibility that SK4 was an elderly female, in which case the possible sternal curvature would be less likely to be the result of *pectus carinatum*.

Abnormal bone formation
The internal acoustic or auditory meatus (IAM), is a canal within the temporal bone of the skull. It is responsible for transmitting both the auditory and facial nerves. In SK8 abnormal bone formation had completely blocked the canal. This would have caused pressure on the nerves and would almost certainly have resulted in deafness and facial palsy.

Trauma

Cruciate ligament injury

Surface and intercondylar notch osteophytes were present on the right distal femur of SK17. Osteophyte growth in the femoral intercondylar notch is thought to correlate with the progression of medial compartment OA of the knee (Wada *et al*. 1999). Recent studies have shown that changes consistent with advanced OA, as a result of anterior cruciate ligament (ACL) injury were observed radiographically in 41% of the study group, compared to 4% in those who had not suffered any injury (von Porat et al. 2004). Wada *et al.* (1999) also speculate that intercondylar osteophyte formation increases within the intercondylar notch as the body attempts to restabilise the knee after an ACL injury. It is possible that the intercondylar notch osteophytes seen in SK17 resulted from this type of injury. The left femur had not survived and no comparison was possible.

Enthesophytes

Enthesophytes are outgrowths of bone or bony spurs at the site of tendon insertions. They are believed to be linked to muscular exertion and repeated trauma to the tendons. Six of the skeletons were sufficiently preserved for analysis and these are shown in Table 8.

Table 8: Sites with enthesophytes

Site affected	SK3		SK4		SK8		SK13		SK16		SK17	
	L	R	L	R	L	R	L	R	L	R	L	R
Patella	0	√	0	0	√	√	√	√	-	-	0	√
Radial tuberosity (biceps)	√	-	√	0	-	√	√	0	0	0	0	0
Greater trochanter	-	0	-	0	√	√	√	√	-	-	-	0
Calcaneus (Achilles heel)	√	√	0	0	-	-	√	√	-	-	0	0
Lesser trochanter	-	-	-	-	√	0	√	√	-	-	0	-
Linea aspera	-	-	-	-	√	√	√	√	-	-	0	√
Illiac crest	√	√	-	-	0	0	-	0	-	-	0	√
Olecranon process	-	√	0	-	-	-	-	0	0	0	0	0

√ Present - enthesophytes absent 0 = no data

Enthesophytes are also linked to other conditions, but none of these were observed and the most probable cause is repeated mechanical stress, with the males most affected.

Dentition

Dentition survived for three individuals: SK4, SK8 and SK16.

The average adult has 32 permanent teeth. Ante-mortem tooth loss was diagnosed where evidence for remodelling was visible within the tooth sockets. Factors influencing tooth loss include dental caries (cavities) complicated by abscess, severe attrition (dental wear), most commonly caused by grit in the diet, and peridontal disease (pyorrhoea), which is an infection of the soft tissues and alveolar bone around the teeth. This causes the bone to recede and results in tooth loss. Dental caries in the three individuals was low (9.2%) however the majority of the teeth were considerably worn and attrition can wear the surface of the tooth before caries develops. The dentition was recorded using the following notation.

/ lost post mortem	C caries	NP not present	X lost ante mortem
A abscess	B broken	PU pulp exposed	R root only

- alveolus & tooth absent

SK4
The worse affected was SK4 with 10 teeth lost ante-mortem. A further four had been lost peri- or post-mortem, and two for which no data was available due to post-mortem damage to the maxilla. The loss of an occlusal partner prevents further wear on the opposing teeth, creating complications when attempting to estimate age at death from wear patterns. In the case of SK4 the surviving teeth show considerable wear, which must have occurred prior to the loss of the occlusal partner. The ante-mortem loss of at least six of the nine molars, and an impacted upper right 2nd molar, would have resulted in considerable wear on the remaining teeth, and three upper incisors had been lost ante-mortem, possibly through attrition, whilst three lower incisors were worn down to the roots and the canines and premolars had dentine exposed. An abscess cavity was present below the lower 2nd right incisor. Two teeth had carious lesions: The impacted molar had interproximal neck caries on the distal surface. This surface would have occluded with the upper molar, possibly weakening the tooth enamel and contributing to the lesion. Interproximal neck caries (mesial) had also occurred in the upper left 1st premolar. Slight deposits of calculus was present on the remaining molars, and medium–considerable alveolar resorption had occurred.

L - - 6 5 C X X X |X / / R 5 X C X R
———————————————————————
L 8 X X 5 4 / R R |/ A 3 4 5 X X 8 R

SK8
Four teeth had been lost peri- or post-mortem, one ante-mortem, and three for which no data survived. All teeth showed considerable wear with the pulp cavity exposed on the majority of the molars. Interproximal caries had occurred between the lower right 1st and 2nd premolars. A further carious lesion was present on the buckle surface of the upper right 3rd molar. Slight alveolar resorption had occurred on the upper and lower jaws.

L PU PU - 5 4 3 R -| 1 2 3 - 5 PU 7 C R
———————————————————————
L 8 7 R 5 4 3 2 / | / R 3 C C X 7 8 R

Dental Enamel Hypoplasia
Two horizontal linear enamel hypoplastic defects were observed in the middle section of the crowns of the lower canines of SK8, with less pronounced lines on the upper canines and left 1st premolar (right missing). Enamel hypoplasia takes the form of depressed lines, grooves or pits on the crown surfaces of teeth. The defects are caused by deficiencies in enamel matrix composition, when nutritional deficiency or serious childhood illness results in a cessation of the tooth's development whilst the body diverts its energy to survival (Aufderheide and Rodríguez-Martín 1998, 405). As the timing of dental development is relatively well understood, hypoplastic events can provide information on the period of life when the event took place.

The formation of the permanent dentition occurs between the ages of 1-7. Based on the position of the hypoplastic lines, these events would have occurred in the latter of these years, between approximately the ages of 3 to 6 (Reid & Dean, 2000), however, all the teeth of SK8 are considerably worn and it is possible that evidence for earlier hypoplastic events has been lost

SK16
Six teeth had been lost ante-mortem, three post-mortem, and two for which no data had survived. Extensive attrition had occurred across the incisal surfaces of the front teeth, which

has exposed the dentine. The pulp cavity was exposed on the molars and there was considerable alveolar resorption in the upper and lower jaw. Slight to medium calculus deposition was present on the lower incisors, canines and 1st premolars. There was a gross carious lesion in the occlusal surface of the lower right 3rd molar and the pulp cavity was empty. The incisors had additional wear which is difficult to attribute to diet. The upper right 1st and 2nd incisors and canine had vertical fracture lines from the root to the incisal edge and all the upper incisors, and to a lesser degree, canines, appear to show wear on the labial surface of the teeth. The lower incisors had small chips and cracks which were visible when viewed with a land lens. These lines might relate to some form of occupational dental abrasion.

L 8 - - 5 4 3 PU PU | PU PU PU 4 PU X PU 8 **R**
——————————————————————————
L X X PU X 4 PU PU PU | / PU PU 4 X X PU C **R**

Table 9: Summary of Pathologies

SK No.	Pathologies
3	Partial SBO
4	Sternum fused and misaligned with manubrium; distorted clavicle; intervertebral disk disease, Schmorl's nodes; porosity and marginal osteophytes on vertebra; new bone formation on frontal bone; flared metaphysis. Dentition: Periodontal disease; impacted upper left 2nd molar, caries, calculus
8	OA on 3rd-5th cervical vertebra, intervetebral disk disease. OA of hip - porous bone and pitting within the acetabulum, large surface osteophytes on head of left and right femur; bone formation within IAM of right petrous. Dentition: hypoplasia, periodontal disease, abscess below lower left 1st molar.
13	Partial SBO, partial sacralization of L5; OA of lower spine, foot (calcaneal and articular surfaces), left wrist (eburnation on radius). Possible OA of hip with osteophytes and marginal lipping on left and right femoral head. Schmorl's nodes T12-L2 (T12 on superior and inferior surfaces).
14	Dentition: interproximal caries
16	OA in neck, spine and hip, and ankle Dentition. Periodontal disease
17	OA in left hand, and neck; intercondylar osteophytes right leg (possible cruciate ligament injury)
Disarticulated Remains	
22	Fragment of sacrum and sacralized 5th lumbar vertebra
24	Incomplete thoracic vertebra: Schmorl's nodes

Discussion

The majority of the inhumations from the arena cemetery were buried in what is considered to follow a Christian tradition - laid supine and facing east, and unaccompanied by grave goods. The extent of the burial ground is unknown and may continue along the bank to the south. Radiocarbon dates on samples taken from SK8 and SK13 have established that the burials date to the 4th century AD. Small rural inhumation cemeteries are relatively common in the Upper Thames region for this period (Booth, *et al*. 2007) but it is uncertain why these people were not buried in the large Frilford cemetery less than a kilometre away. Coins of Constantine II (AD 323-361), Valens (AD 364-378) and Gratian (AD 367-383) were recovered from coffins within the Frilford cemetery (Rolleston, 1869), showing that the burials in the arena bank were contemporary with those.

The idea that these were possibly 'deviant burials', cast out from the rest of society through wrongdoing or physical disfigurement has been considered. However, other than the probable deafness and facial disfigurement suffered by SK8, there were no patholgies in the surviving sample that would have had any outward manifestation other than that seen in any ageing population at that time, and other than SK13, there was nothing to suggest disrespect of the deceased during burial. SK 14, had large stones placed around the head and feet. This was also noted by Rolleston (1869) in the Frilford cemetery, a practice he associated with the Romano-British burials. The prone position of SK13 might indicate a wrongdoing by the individal concerned, but it is not an uncommon practice in this region, where it appears to be without age or gender distinction (Booth *et al.* 2007). It could also have occurred accidentally if the body had been wrapped in a shroud and buried in haste or at night.

It is possible that the arena burials represent an extended family group. Populations in which local families interbreed may develop unique congenital signatures which is reflected in the higher prevalence of certain congenital anomolies if buried in the same cemetery. Only two complete sacra and one partial sacra had survived from the cemetery population, but all had the congenital anomolies of partial SBO and /or sacralization of the 5th lumbar vertebra. With such a small number it is impossible to say how representative this group was of the general population, but this might reflect a potential genetic relationship, supporting the suggestion that this was a family group. The individuals in the arena cemetery were of mixed sex and the majority middle aged or old at the time of death. Their association with the remains of an infant and possible juvenile also seem to point to this being a family group.

During excavation it was found that SK8 had been placed above SK16. The burial of one above another might be accidental, possibly through continuing reuse of the cemetery. If the burial of SK8 had disturbed the earlier burial this could account for the loss of the thoracic cavity of SK16 and the apparent offsetting of the skull with the lower part of the body.

Due to the small number and incomplete nature of the skeletons recovered, any conclusions drawn are necessarily tentative and should be subject to reinterpretation if any further burials be discovered.

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