

MARE STREET BAPTIST CHURCH BURIAL GROUND: EXCAVATIONS AT 143 MARE STREET, HACKNEY, LONDON E8

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INTRODUCTION

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INTRODUCTION

Adrian Miles

Location and Circumstances of Fieldwork

The archaeological investigation which this document describes was conducted by MOLA (Museum of London Archaeology) at 143 Mare Street, Hackney, London, E8. This document was completed in 2019 and prepared for submission to LAMAS in early 2020. The subsequent delay in its publication is attributable to the disruption caused by the Covid pandemic. This document has not been updated, therefore references to work published after 2019 are absent. The project was carried out as a condition of planning consent which was granted on 6 June 2014 (Hackney Council, permission reference: 2013/2640, condition number 4). The redevelopment of the site involved the demolition of the existing buildings and structures and the erection of a new building comprising five to eight storeys, including upper ground, lower ground floor and a sub-basement, containing 47 residential units and retail accommodation. The excavation area was located in a yard formerly used for maintaining taxis and containing only temporary structures. It was bounded by 143 Mare Street to the east, Helmsley Street to the north and by

Sidworth Street to the west. The Ordnance Survey national grid reference for the centre of the site is 534825 184050 (Fig 1).

An archaeological desk-based assessment was produced (CgMs 2013), which identified that the site was previously occupied by the Mare Street Baptist church and its burial ground.

An archaeological evaluation was carried out by Pre-Construct Archaeology (PCA) in May 2013 (site code: MRE13; Jorgensen 2013). Three trial pits were excavated within the confines of the burial ground. Excavation revealed natural ‘brickearth’ overlain by a shallow subsoil horizon. Three graves were found during the evaluation, which confirmed the presence of *in-situ* burials.

The breaking out of the concrete slab and initial machining for the main phase of archaeological excavation by MOLA took place between 14–17 October, with the main excavation starting on 20 October and running through to 1 December 2014. The work was carried out by one senior archaeologist, with a team of up to seven archaeologists.

The excavation area measured 33m by 10m (an area of 360m², see Fig 1) and was fully recorded in plan. A watching brief was maintained on the area that had been occupied by the church, to the east of the burial area. The programme of analysis which led to the production of this document is set out in the post-excavation assessment report (MOLA 2015).

Archaeological Methodology

All deposits and features were allocated context numbers. A single site planning grid was established, tied in with the Ordnance Survey national grid. All archaeological work was carried out following an agreed methodology (MOLA 2014) and in compliance with the regulations laid out in section 25 of the Burial Act 1857 and under the terms of the burial licence issued by the Ministry of Justice (MoJ) on 10 October 2014 (MoJ reference: OPR/074/001/65) (Fig 16).

All burials were excavated individually, bagged and labelled, and were retained for osteological assessment. Each burial was allocated a context number for the skeleton and a separate number for the coffin (or coffins). The coffins were planned from the site grid at a scale of 1:20 and levelled in relation to a temporary benchmark on the site, and the skeletons were



Fig 16. View of the site during the excavation, looking east

described on the context sheets with a sketch plan. Unusually for post-medieval graveyards, the grave cuts were clearly identifiable and were numbered, planned and described.

The biographical information and decoration on coffin breast plates were recorded in detail. Where preservation allowed, the remainder of the coffin furniture (lid motifs, grips, grip plates, escutcheons and studs) was retained or sampled, and all other finds relating to the burials were also kept.

In the case of burials in lead coffins, the coffin plates and other furniture from the wooden outers were retained, along with any inner plates. The lead shell itself was recorded in accordance with the typology developed for Christ Church Spitalfields crypt (Reeve & Adams 1993, 84–5).

Note on the Documentary Sources

Manuscript sources referred to in the text are listed in the bibliography.

Burial Register

A burial register for Mare Street Baptist church is held in Hackney Archives (HA). This volume consists of 354 entries, dating between 8 December 1823 and 16 October 1853 (HA, D/E 232, MAR 5/4). It does not cover the first decade after the opening of the church and burial ground ('Documentary Evidence' below).

Other Church Records

Hackney Archives also hold church meeting minutes, membership records (including baptisms and burials),

correspondence and other records, building records, photographs and war damage correspondence.

Other Sources

Wills provide a good source of information, but are limited to those who had sufficient assets to be bequeathed. Fourteen wills were examined during the project, related to skeletons which had been ontologically examined. Baptists produced many periodicals, chiefly for the members of their own denomination. Of particular note for the Hackney group was *The Baptist Magazine*, which was published between 1809 and 1907. This was a monthly miscellany, which Francis Augustus Cox, the guiding force behind the Mare Street church, helped establish. The magazine represented the mainstream opinion of the Particular Baptists and almost every notable Baptist Union minister during this period contributed to it. In avoiding discord within the denomination, it was often considered tame and dull, but it faithfully reflected the Baptist consensus of the period (Taylor 1977, 56). A number of the people buried in Mare Street have obituaries, death notices or other articles within its pages.

Organisation of the Report

The report is divided into four principal parts. Following an account of the Mare Street Baptist church and its congregation ('The Church': Miles), the evidence for the foundation, layout, operation and closure of its burial ground is presented ('The Burial Ground': Miles). The excavated population is then examined ('The Burial Population': Miles), with a review of the documentary evidence, including those

individuals with biographical data provided by surviving coffin plates or other sources, and an overall discussion of the main themes and findings of the osteological analysis. The next section ('Burial Practice': Blackmore *et al*) sets out the evidence for funerary and burial practice, including consideration of the coffin furniture and burial finds (with catalogues of illustrated items). The final section ('The People: The Osteological Evidence': Carty) provides the in-depth osteological report, including methodologies and the detailed description of the analysed subsample.

Because of the emphasis on presenting synthesised information relating to significant findings, a complete catalogue of burials from the site is not included in this volume. Full details are available in the project archive (below).

The field, finds and environmental archives from the site have been archived by the Museum of London under the site code MRH14 and are deposited with the Museum of London Archaeological Archive, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED, where they may be consulted by prior arrangement. The human remains assemblage will be available for study via the Museum of London's Centre for Human Bioarchaeology.

The Mare Street osteological metadata can be found at <https://mola.ilo.bl.uk/collections/d99c22e1-7fd0-4171-b018-f5b3bd7100ed?locale=en> (accessed 25 May 2023).

Textual and Graphical Conventions

The basic unit of reference in the site archive and this publication is the context number. This is a unique number given to each archaeological feature or stratum representing a single action (such as a layer, wall, coffin, grave cut etc).

Throughout the report coffin numbers apply to both coffins and their fittings. Context numbers cited in the osteological text refer to skeleton context unless otherwise stated. All context numbers appear in the text and tables in square brackets, thus [10]. Accession numbers given to certain artefacts from the site are shown within angled brackets, thus: <10>. Certain illustrated burial finds have been assigned catalogue numbers (coffin furniture is not catalogued), identified by a letter prefix within angled brackets, thus:

<C1>	coin no. 1;
<G 1>	glass object no. 1;
<S1>	small find no. 1;
<TX1>	textile item no. 1.

For each catalogue entry, the first line gives the discrete catalogue number, the short description (with material), and the figure number. The second line gives the accessioned find number and brief details of location, the context number of the coffin or skeleton with which the object was found and, where relevant, age.

The following abbreviations are used in catalogue entries:

L	length;
W	width;

Diam	diameter;
H	height.

The archaeological sequence is described in terms of the use of the burial ground within a single post-medieval period. Use of land-use terminology is restricted to the identified structures (the burial ground boundary wall, brick graves and cover slabs, referred to as Structure 1 to Structure 7 (S1–S7)).

Archaeological investigations undertaken at other burial sites in Greater London are referred to by their name and/or site code. Owing to the synthetic nature of this report, precise details of truncation and horizontal stratigraphy (such as levelling material and cemetery soil) have not been included on the illustrations. The graphical conventions used on the site plans are shown in Fig 17.

County names in the text refer to historic counties. Weights and measures quoted in the text are, where appropriate, in the units used before metrication. Feet and inches are abbreviated to ft and in. A foot (comprising 12in) is equivalent to 0.3m. A mile is equivalent to 1.61km. An acre is 0.4 hectare, or alternatively a hectare equals about 2.5 acres. A pound (1lb equals 0.45kg) comprises 16 ounces (1oz equals 28g).

Sums of money given in the text are cited in £, s and d, where 12 pence (d) made one shilling (s) and 20 shillings (or 240d) one pound (£). Modern equivalents may be derived from the currency converter on The Bank of England website (<http://www.bankofengland.co.uk/education/Pages/resources/inflationtools/calculator>).

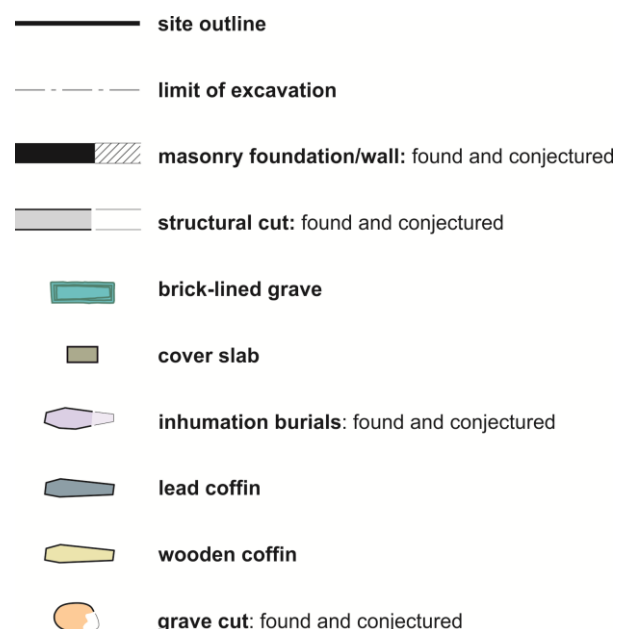


Fig 17. Graphical conventions used in this report

THE CHURCH

Adrian Miles

Documentary Evidence

Origins

The origins of the Baptist church in Mare Street can be found in 1796 in Shore Place, Hackney, c.350m to the east of the later church. A small group from Mr Booth's church in Prescot Street residing in Hackney opened a small house on 13 November 1796, for afternoon services only (*Baptist Annual Reg*, vol 3, 1798–1801, 23). The congregation increased and the building was enlarged during 1797 and it was embodied as a Particular Baptist church on 13 May 1798 with Mr John Rance as pastor (Bennett 1898, 18). The chapel at Shore Place was enlarged again and reopened on 1 September 1801 (*ibid*, 31). Rance was succeeded by Mr Bradley in August 1808; he left at Christmas 1810. The next pastor was Dr Francis Augustus Cox, who was ordained pastor on the 3 October 1811 (Ivimey 1830, 405–6). The church was a Strict Communion Baptist foundation, however Cox favoured a more liberal policy (Bennett 1898, 37–40). By the end of October, Cox's popularity was such that plans were taken into consideration for enlarging the church in the spring.

Foundation

The first stage in the construction of the church on Mare Street was taken on 3 March 1812 when

a copyhold piece of ground ... now offered to the committee, and situated in Mare Street, near the Triangle, Hackney, should be immediately purchased and a new commodious meeting house be erected on it. (Bennett 1898, 40–3) (Fig 18a)

At the next meeting on 5 May, the Pastor reported that the ground had been purchased and that estimates were being prepared, although when these were received on 14 May, they 'exceeded very materially the amount anticipated' (*ibid*). Agreement was obtained on 19 May to go ahead with the new meeting house, the cost of the ground and the building estimated at about £4000 (*ibid*).

An indenture for the land, dated 4 April 1815 survives and is held in Hackney Archives (HA, D/E 232, MAR 8/3). This details the agreement between the owner of the land, James Collins of Spital Square and Rev Francis Augustus Cox and 12 other men (presumably the church committee), comprising:

... all that piece or parcel of ground with the appurtenances thereto belonging situate lying and being in Mare Street within the said Manor ... abutting towards the East on Mare Street aforesaid towards the South on premises belonging to Mr Pearson towards the West and towards the North on other ground of the said

George Jenkins and containing in depth from East to West 165ft from North to South at the West end thereof 108ft 5in from West towards the East on the South side in a line inclining inwards towards the North 37ft 6in and from thence in a straight direction towards the East 97ft 2in and containing at the East end next Mare Street from North to South 74ft 9in and from East to West at the South side 73ft 5in then running from North to South at the East end 15ft 6in and running from East to West on the South side 97ft 2in be the said several dimensions little more or less, Together with all that brick messuage or tenement edifice or building theretofore used as a laundry with a double coach house and premises under the same situate and being at the South East corner of the said piece or parcel of ground ... were so purchased by the said James Collins to the intent and with a view that a Meeting House or place of Religious Worship for the use of a certain congregation of Protestant Dissenters of the denomination of Particular Baptists should be erected and built thereon. And whereas a Meeting House hath been erected and built thereon accordingly and the expense thereof hath been in a great measure discharged and defrayed by public subscription... And whereas by Indenture of Lease bearing date the 23rd day of March 1814 the said James Collins did demise the said piece or parcel of ground Meeting House building and premises to the major part of the parties ... for the term of 30 years from the 25th day of March 1812 at and under the yearly rent of £50 payable quarterly ...

... the Trustees and Trustee for the time being shall from time to time and at all times hereafter permit the said Meeting House and premises to be used occupied and enjoyed for a place of public Religious worship for the service of God by the Society of Protestant Dissenters of the Denomination called Particular Baptists and also by such other persons as shall hereafter be united to the said Society and attend the Worship of God in the said Meeting House and for that purpose to assemble in and resort thereunto at all reasonable and proper times. And also at all times for ever hereafter permit the said room called the Vestry Room to be used with and appendant to the said Meeting house as a Vestry room and the said piece of ground surrounding the said Meeting house called the Burial Ground to be used with and appendant to the said Meeting house as a Burial Ground ... to permit and suffer the said piece of ground called the Burial Ground to be from time to time and at all times hereafter used as a Burial place for the interment of deceased members of the said Society of Protestant Dissenters and others according to the regulations to be prescribed by the majority of the Men members for the time being of the Society attending the said Meeting house being subscribers thereto and Communicants therein. (HA, D/E 232, MAR 8/3)



Fig 18. Details from a – the St John at Hackney parish map (1831), showing the Baptist church and its setting (LA, SC/GL/FLM/031/1831/M0042333CL) and b – the south Hackney tithe map (1843) showing the 1830s westward extension of the church (TNA, IR 30/21/21)

The church book does not include the laying of the foundation stone by Rev Cox, but it had taken place by 4 August 1812, when the church book mentioned it as ‘in a considerable state of forwardness’. It was originally to be opened on 15 October, but this had to be delayed until November (Bennett 1898, 43–4).

Subsequent History

The building was opened for public worship on Thursday 12 November 1812 (Fig 2). The church book notes that ‘it was a very wet day, which prevented the attendance of multitudes. In the afternoon and evening, however, the place was crowded. The amount of the collections was £69 3s 2d’ (Bennett 1898, 48). It was noted that the new building measured 58ft by 50ft (c.17.7m by 15.2m) (*Baptist Mag*, vol 5, 1813, 174), but

the crowds that came to listen to Cox were so large that more accommodation was needed. In April 1818, one of the members, Mr Meyer, had obtained an estimate of £380 to have two side galleries added. He agreed to pay this and only charge the church £250, to be paid in instalments at 5% interest per annum. The galleries were built; however, the congregation still filled the increased space, as Cox's fame spread (Bennett 1898, 49). His congregation was the largest, but certainly not the wealthiest, in the neighbourhood (Briggs 1999, 225).

A further enlargement of the church took place in 1831, with the construction of vestries and a large gallery behind the pulpit, at a cost of more than £500 (Fig 18b).

It is clear that the church had a vault for burial below it, but the size and layout are unknown. The burial register for the church record 40 interments in the vault, the earliest of which was 18 May 1824 and the final interment took place on 27 January 1848.

Following Cox's death in September 1853, he was succeeded by the Revd Daniel Katterns, who had been co-pastor since January 1847.

The first church, to which the burial ground was attached, was destroyed by fire in 1854. A contemporary newspaper reported:

On Saturday night, between the hours of seven and eight o'clock, a fire, attended with the destruction of several thousand pounds' worth of property, broke out in the Baptist Chapel recently belonging to the late Rev Dr Cox, situate in Mare-street, Hackney. The sacred edifice stretched in one direction nearly 100ft, and it was about 70ft wide, containing a spacious gallery, and pews for the accommodation of between 1,200 and 1,500 persons. The fittings of the interior of the chapel were equal to any church of the Establishment, and, it is stated, cost nearly £5,000; independently of which, there was a magnificent organ, which alone cost between £2,000 and £3,000, in one of the galleries.

From all that can be gleaned, it appears that the organist had arrived for the purpose of tuning the instrument, when, on entering the organ loft, he noticed flames in huge bodies shooting forth from some of the barrels of the organ. This induced him at once to give an alarm; but before he had time to leave that part of the building, he became nearly encircled in flame, and, in order to save his life, he was obliged to throw himself down the stairs. Fortunately he escaped unhurt, except with a few bruises.

In the comparatively brief period of ten minutes the flames had extended from the organ loft to the whole of the galleries, firing tin rapid succession the different pews, and the descending to the seats in the aisles. The scene then became one of fearful grandeur, the fire rising above the surrounding house tops, and the reflection drew to the spot upwards of ten thousand persons. The police, under Mr Superintendent Walker and Inspector Paine, were obliged to have ropes drawn across the

streets to keep the immense concourse of persons back.

The engines of the parish, London Brigade, and the West of England office, were remarkably early in arriving, and a plentiful supply of water was procured from the east London Company's main, from which the engines were at once set to work; but notwithstanding the exertions of the men, who were ably directed by Mr Braidwood, Mr Fogo, and Mr Connorton, the work of devastation continued, and eventually the structure presented one tremendous body of flame, and when the roof fell in, large pieces of timber, in a thorough state of ignition, were drifted by the high wind over the contiguous houses, to the danger of setting them in flames. The firemen, however, kept to their work, and they were enabled ultimately to get the control over the fearful element; but not until the spacious chapel was gutted.

As to the origin of the fire, not the least information could be gleamed. The chapel, it is supposed, was insured in the General Fire Office. (*Morning Chronicle*, 28 August 1854, 7 col B)

The fire and its effect on 'Dr Cox's Chapel' was reported by *The Nonconformist*, 30 August 1854 (quoted in Bennett 1898, 76–7):

A year has hardly elapsed since his decease, and the chapel which he built, and under the walls of which his remains are deposited, has disappeared. It was but in June last that a marble monument was erected to his 'lasting memory,' and one short hour has reduced it into dust. We have satisfaction in stating that the chapel was insured in the General Life and Fire Insurance Office for £3,700, though less than the original cost.

Plans were put in place immediately to rebuild the church, with *The Baptist Magazine* (vol 46, 1854, 703) reporting that the Mare Street church was to be rebuilt 'in a style suited to the taste and requirements of the age, and upon a somewhat larger scale', at the same time asking for any financial assistance.

The first stone for the new church was laid on 18 July 1855, by Sir Samuel Morton Peto, the renowned contractor for railways and public works, who also funded the building of Bloomsbury Baptist Chapel (*Baptist Rep* 29, 1855, 281).

The new church (Fig 3) was opened on Wednesday the 18 June 1856, when *The Baptist Magazine* (quoted in Bennett 1898, 80–1) reported that

if the intention was that the new chapel should exceed in magnificence the old one, it has been most successfully accomplished. It is built in the classic style, and in the Doric order; and the passer-by is strongly reminded by the exterior of Shoreditch Church, happily, however, minus the steeple. The front appears nearly all stone, and is approached by a flight of wide stone steps, extending the whole length of the building. The

ceiling is semi-circular, panelled, and moulded. The pulpit is oak, and stands within a large recess at the end of the chapel. The galleries are supported on iron twisted columns, and the ventilation, light, warming apparatus, and acoustic capabilities are pronounced satisfactory. It is designed to seat 1150 persons, has spacious

schoolrooms beneath the chapel, and a powerful organ. The cost of the building is about £7940.

The costs of the rebuilding were largely borne by the congregation, as only £2910 was received from the Insurance Company. The 1870 Ordnance Survey map (Fig 19) marks the church and the now disused graveyard.

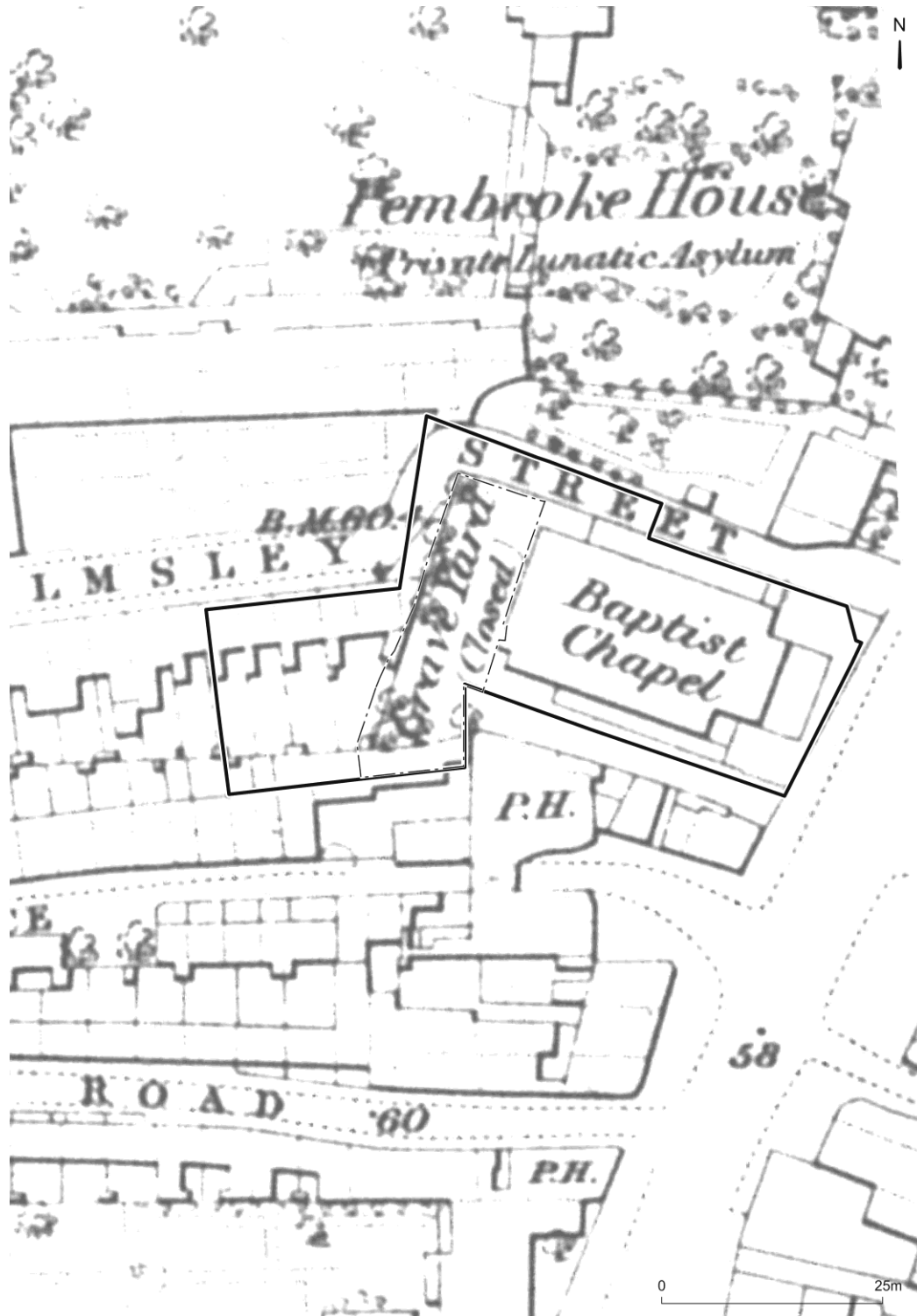


Fig 19. Detail from the first edition 1:2500 Ordnance Survey map of 1870, showing the extent of the archaeological investigation to the west of the church



Fig 20. View showing the rear of the church after it was hit by a V2 rocket on 5 February 1945 (courtesy of Hackney Archives)

The church was damaged by bombs during the Second World War; correspondence relating to the damage is in Hackney Archives (HA, D/E 232, MAR 9/5). On Saturday 7 September 1940, around 5.30pm, a delayed action bomb fell in front of the church and at 7.45pm it exploded. A tram rail was thrown through the roof of the church and various pieces of debris fell on to the roof, damaging it in several places. Further damage was done on 15 October by a High Explosive bomb exploding in Tudor Road, while night-time explosions on 10 November in Tudor Road and King Edward Road also inflicted damage.

The vault below the church had been opened as a public shelter by 25 September 1940, as correspondence suggests that the health and safety of those using it 'may be endangered as a result of the rain falling unhindered through the roof on to the church floor, which is the roof of the shelter' (HA, D/E 232, MAR 9/5).

Further damage was done by the blast from a V1 flying bomb on 29 July 1944, but the final destruction of the church came on 5 February 1945, when a V2 rocket exploded on impact in the rear of the church (Fig 20). A letter from Mr Jackson, Secretary of London Baptist Association, dated 7 February 1945, reads:

We are sorry indeed to hear of the damage done to your church premises last Monday morning. I was pleased to learn that neither your pastor nor

your caretaker were injured, and that the people in the shelter underneath were unharmed. (HA, D/E 232, MAR 9/5)

The church was marked 'total destruction' on the London County Council bomb damage maps (Saunders 2005, pl 40) and was demolished after the war.

THE BURIAL GROUND

Adrian Miles

Documentary Evidence

Foundation

The church was opened in 1812 and it is likely that burials took place from that date. However, the first interment recorded in the surviving burial register took place on 8 December 1823, that of Elizabeth Marchinton of Hackney Fields. It is clear that the register does not cover the full period of use of the burial ground as coffin plate data shows that it was certainly in use by March 1817.

The burial ground is recorded in Chadwick's *Supplementary Report on ... the Practice of Interment in Towns* as 'Dr Cox's chapel, Hackney', being 824 square yards

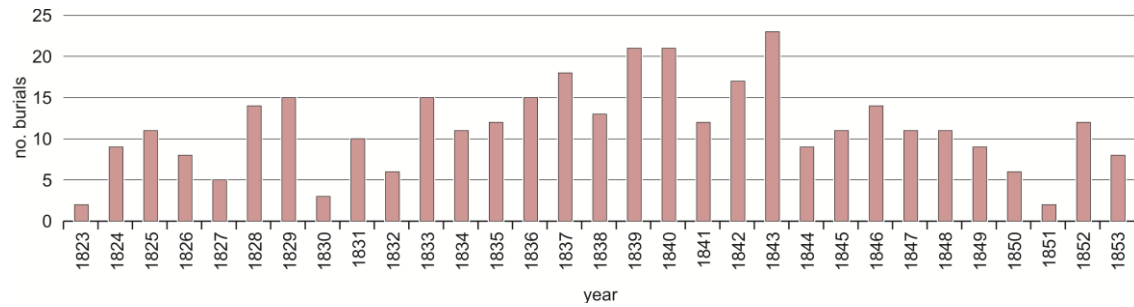


Fig 21. Burials per year (from the burial register)

Table 1. Burial fees (after Cauch 1840, 46)

Location	Details	Fee		
		£	s	d
Under the chapel	ground for double vault	25	0	0
	ground for single vault	15	1	0
	for the first and every interment	1	1	0
	for interment in public vault	6	6	0
	for children under 10 years in public vault	4	4	0
Outside the chapel	ground for double vault 7ft deep	20	0	0
	extra depth per ft	2	2	0
	ground for single vault, or brick grave 7ft deep	12	0	0
	extra depth per ft	1	11	6
	for the first and every interment	1	1	0
	common grave 5ft deep	1	1	0
	flat stones	5	5	0
	head and foot stones	3	3	0

'Children under 10 years half price. Bury at any time. Mr Powell, Sexton, on the premises'

Table 2. Fees actually paid by depth of burial (where recorded in the burial register)

Depth (ft)	Fee							
	Adult				Child			
	£	s	d		£	s	d	
5	1	1	0	0	0	10	6	
6	1	2	6	0	0	12	0	
7	1	4	0	0	0	13	6	
8	1	5	6	0	0	15	0	
9	1	7	0	0	0	16	6	
10	1	8	6	0	0	18	0	
11	1	11	0	1	0	0	6	
12	1	13	6	1	3	0	0	
13	1	16	0	1	5	0	0	
14	1	18	6	1	8	0	0	
15	2	1	0	1	10	6		
16	2	3	6	1	13	0		
17	-	-	-	1	15	6		
18	2	8	6	-	-	-		
19	2	11	0	-	-	-		

in area (689m²), with 26 burials annually and a burial density of 153 per acre (Chadwick 1843, 278). It is not clear how these figures were derived, as the largest number of burials taking place in any year recorded in the register was 23 and the area of the burial ground is c.330m².

Layout and Fees

A burial register for Mare Street Baptist church is held in Hackney Archives (HA). This volume consists of 354 entries, dating between 8 December 1823 and 16

October 1853 (HA, D/E 232, MAR 5/4). The register includes 314 entries in the burial ground outside the church. A further 40 entries are included for interments in the vault below the church.

An attempt to estimate the total number of interments in the ground (rather than the vault) can be made by using the information in the register (Fig 21). Taking the 304 interments in the 29 full years included, the average number of burials per year in the ground was 10.48. If it is assumed that the burial ground was in use from the opening of the church in 1812, the number of burials could be estimated to be 419, compared to the 356 excavated (85% of the theoretical total). However, the only part of the burial area which is clearly truncated is an area in the south-east corner, which covers c.15m². If this contained the same density of burials as the rest of the site, then a total figure of 374 burials may originally have been present.

There is not a sufficiently detailed plan available that shows the burial ground associated with the first church. The 1843 South Hackney Tithe map does show areas at the north and south sides of the west end of the building where burials could have taken place. If they were present, they would have been removed by the construction of the 1855 church.

The fees charged for interment in the burial ground can be found in John Cauch's *The Funeral Guide ...* published in 1840. Cauch was a Mile End based undertaker, who compiled a guide which contained the prices of 'a greater number of Burial places in the Metropolis than was ever before published'. The site is referred to as 'Mare Street, Hackney, (Dr Cox's)' (Table 1). The fees included there can be compared with those

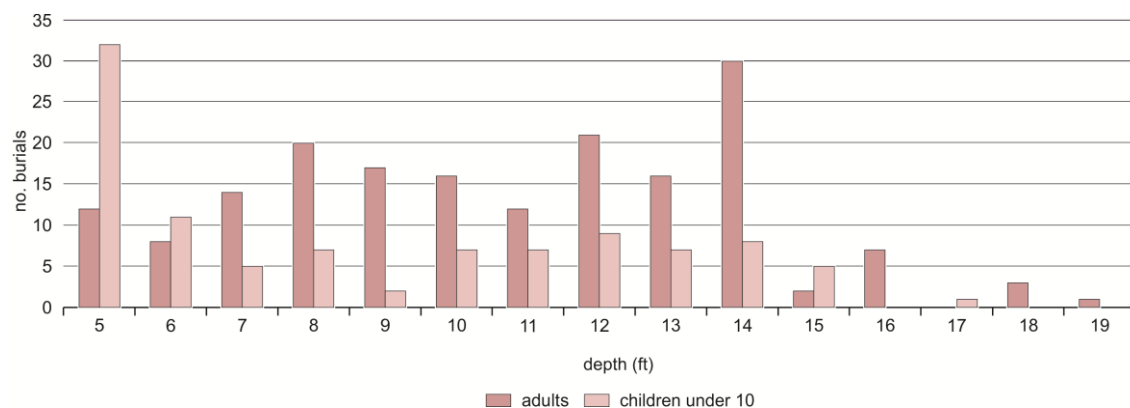


Fig 22. Depth of burial for adults and children aged <10 years (from the burial register)

Table 3. Distribution of burials by depth (all burial register entries)

Depth (ft)	No. adults	No. children (<10 years)	Total
5	12	32	44
6	8	11	19
7	14	5	19
8	20	7	27
9	17	2	19
10	16	7	23
11	12	7	19
12	21	9	30
13	16	7	23
14	30	8	38
15	2	5	7
16	7	0	7
17	0	1	1
18	3	0	3
19	1	0	1

included in the burial register, which also included depths (Table 2).

From the burial register it can be seen how many people were being buried at specific depths (Table 3), with the cost implications therein. Of the 314 interments in the external burial ground, a depth is given for 281 (89.5%). The deepest burial, that of Elizabeth Bunn on 17 April 1836, was at 19ft (5.79m), with other members of the Bunn family accounting for three more of the deepest interments. However, as can be seen from Table 3 and Fig 22, young children were usually buried much less deeply than adults. This is a pattern which has been seen across all of the burial grounds of this date excavated in London.

The cost for memorial stones is also included. For the 314 interments, 73 are recorded as having paid for memorial stones (23.2%), mainly either £4 or £3 3s, with single examples of £7 and £5 5s. Twenty-six of those included in the excavated named sample ('The Named Burials', below) paid for stones (Table 4). Cauch notes that £3 3s was the fee charged for 'Head and Foot Stones', which was the fee charged to ten of the named sample and £5 5s the fee for 'Flat Stones', which was the fee charged to Ann Huxtable. It is not clear what the £4 fee was for, but it does not seem to relate to anything obvious from the burial register.

Closure

The final interment recorded in the register was that of

Elizabeth Bushell of Old Ford Road, who was buried in the churchyard on 16 October 1853. The official closure was instigated by an Order in Council, dated 29 December 1853, which stated: 'burials to cease in the burial-ground of Mare-street Baptist Chapel, and also under the chapel' (*London Gazette*, 3 January 1854, 6). The official closure notice is dated 30 January 1854 and survives in Hackney Archives along with the written correspondence associated with this from the Church and Council Office, Whitehall (HA, D/E 232, MAR 9/1).

Mrs Basil Holmes in her survey of the London burial grounds, carried out on behalf of the London County Council in 1895 and published the following year, describes the ground in her gazetteer (no. 105) as follows:

Baptist Chapel-ground, Mare Street. – About 500 square yards at the back of the chapel. There are several tombstones tumbling about, and the ground is very untidy. (Holmes 1896, 293)

It is also mentioned in the main text of her book:

When visiting the burial-grounds for the London County Council, I was much struck with three that seemed particularly neglected and untidy. These were the Baptist ground in Mare Street, Hackney, which was being used for the storage of old wood, furniture, and flower-pots (*ibid*, 147)

ARCHAEOLOGICAL EVIDENCE

Adrian Miles

The Excavated Area

Present day ground level at the start of the excavation was 17.60m OD. If this level is compared with the adjacent spot heights on the 1870 Ordnance Survey map (58ft or 17.7m OD; Fig 19) it can be seen that there has been no significant change; presumably the ground level when it was functioning as a burial ground was very similar. The area of the excavation covered 360m², although the area in which burials had taken place only covered 300m². A further c.15m² can be seen to have

Table 4. Depth of burial, burial fee charged and additional fee for memorial stones (excavated named sample only)

Forename	Surname	Age (years)	Depth (ft)	Burial fee				Additional fee (stones)		
				£	s	d		£	s	d
John	Allen	69	10	1	8	6				
Alexander	Allen	28	8	1	5	6		4	0	0
Samuel	Andrews	5 years 7 months	6	0	12	0				
Isaac	Booth	79	14	1	18	6		3	3	0
Isaac	Booth	5	5	0	10	6				
Ann	Booth	79	14	1	18	6		3	3	0
Martha	Booth	34	10	1	8	6		4	0	0
Eady	Booth	66	8	1	5	6		4	0	0
Jacob	Booth	30	7	1	4	0		4	0	0
Thomas	Bourne	59	12	1	13	6				
Joseph	Bright	74	14 'brick grave'	16	0	0				
Edmund	Burton	24	11	1	11	0				
Edith	Cooper	12	6	1	2	6				
Emma Augusta	Cox	26	14							
John William	Cox	15	13							
Sarah Fanny	Cox	14	10							
Sarah	Cox	54	7	no charge						
Francis Augustus	Cox	70		no charge						
Daniel	Davan	40	14	1	7	0				
Mary	Dean	80	14	1	18	6				
Lewis James	Drew	1 year 1 month	6	0	12	0				
Walter Joseph	Drew	6 months	25	0	10	6				
William Henry	Drew	8 months	14	1	8	0		3	3	0
Theophilus	Evans	16	10	1	8	0		3	3	0
Ellen	Evans	8	9	0	13	6				
Jane Lucy	Eve	9 months 10 days	6	0	12	0				
Thomas	Faircloth	40	16	2	3	6		3	3	0
Theresa Susan	Giddy	11 months	11	1	0	6				
Martha	Greaves	2	5	0	10	6				
Richard Davis	Hanson	11 months	6	0	12	0				
Elizabeth	Harris	16	13	1	16	0		4	0	0
Thomas	Hayter	44	9	1	7	0				
Charles	Hayter	23	7	1	4	0				
Elizabeth	Hewitson	42	11	1	11	0				
Edward	Hewitson	43	9	1	7	0				
Jesse	Hobson	57	9	1	7	0				
Ann	Huxtable	39	15	2	1	0		5	5	0
Mary Ann	Huxtable	19	14	1	18	6		4	0	0
Isabella	Jones	70	11	1	11	0				
Charlotte	Jordan	18	13	1	16	0		4	0	0
	Jordan	stillborn	5	0	10	6				
Charlotte Augusta	Jordan	6 years 3 months	11	1	0	6		4	0	0
John Causey	Jordan	36	12	1	13	6		4	0	0
Elizabeth	Martin	1 day	5	0	10	6				
Susanna	Martin	19	16	1	13	0		4	0	0
Isabella	Martin	76	6	1	2	6				
Robert	McCurdy	50	5	1	1	0				
Victoria	Meen	1 year 4 months	8	0	15	0				
Emma	Meen	3	14	1	8	0				
Emily	Meen	1	13	1	5	6				
Charlotte	Meen	61	12	1	13	6				
Eliza	Meen	2	10	0	18	0				
Ann Sophia	Morrice	51	14	1	18	6				
Sarah	Munday	38	14	1	18	6		4	0	0
Edward	Munday	71	13	1	16	0		4	0	0
John	Munday	36	12 '1/2 brick grave'	7	13	6				
Lydia	Munday	77		1	1	0		4	0	0
Martha	Penkivil	54	10	1	8	6		3	3	0
Eliza	Pond	1 year 5 months	8	0	15	0				
Rebecca	Pritlove	71	10	no charge						
Lydia	Salmon	2 months	5	0	10	6				
William George	Salmon	3 year 4 months	7	0	13	6				
Elizabeth	Smith	5 months	12	1	3	0		4	0	0
Emily	Smith	18 months		1	0	6		4	0	0
Elizabeth	Swallow	73	14	1	18	6				
George	Tidman	35	9	1	7	0				
Mary	Tidman	16		no charge						

Table 4. (cont)

Eleanor	Vincent	1	14	0	19	3	3	3	0
Eleanor	Vincent	6	13	1	5	6			
Rebecca	Wardall	41	12	1	13	6	3	3	0
Henry	Wardall	88	12	1	17	6			
John	Webb	55	16	2	3	6	3	3	0
John Lawrence	Webb	6 months	14	1	8	0			
Martha Susan	Webb	2 years 3 months	13	1	5	6			
Agnes Ruth	Webb	3 years 9 months	12	1	3	0	4	0	0



Fig 23. Plan showing all grave cuts and the boundary wall (S1) (scale 1:150)

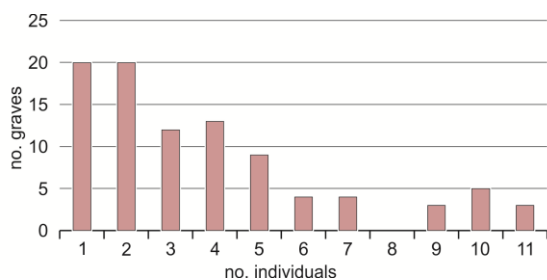


Fig 24. Distribution of single, double and multiple burials

Table 5. Distribution of excavated graves by measured depth

Depths stated in burial register (ft)	Depth of excavated graves (m)	No. of excavated graves
<5	0.85–1.51	9
5	1.52–1.79	4
6	1.80–2.10	8
7	2.11–2.40	6
8	2.41–2.71	9
9	2.72–3.01	22
10	3.02–3.32	22
11	3.33–3.62	8
12	3.63–3.93	2
13	3.94–4.23	0
14	4.24–4.54	1
15	4.55–4.84	0
16	4.85–5.15	0
17	5.16–5.45	0
18	5.46–5.76	1
19	5.77–6.07	0

been truncated by the adjacent garage in the south-east corner. It can be assumed from the layout of the rest of the burial ground that this has probably removed five graves. The southern 4.5m of the site had no graves within it.

Drift Geology

The site lies on Thames Pleistocene terrace gravel deposits, specifically the Hackney Gravel, which are overlain by brickearth (the Langley Silt Complex). The top of the terrace gravel was observed at c.15.3m OD, with the overlying brickearth found at c.16.9m OD, in the southern part of the site. No evidence was found for any activity prior to the usage of the site as a burial ground.

The Burial Ground Boundary Wall (S1)

The boundary wall to the burial ground (S1) survived along the western edge of the excavation (Fig 23). It was constructed from red bricks (225mm long, 105mm wide by 60mm thick) laid in English Bond, bonded by a soft grey lime mortar. The wall ran the full length of the western side, but no northern or southern extensions were found. It survived up to the level of the tarmac for the yard (17.60m OD). It appeared to be constructed of two header courses, each one brick wide (225mm). The eastern header course survived to only six courses (0.4m), while the western one only went down to a depth of 1.0m (16.7m OD).

Layout and Arrangement

A total of 93 graves were excavated, laid out in four north–south aligned rows across the site (Fig 23). It is likely that the eastern row continued slightly to the south, beyond the limit of excavation. Each grave held between one and 11 individual inhumations (Fig 24) with a total of 356 individuals excavated. Four graves were covered with stone slabs (below).

The graves varied in depth between 0.85m and 5.6m below ground level (16.75–12.00m OD). The majority (67.4%) were between 2.4m and 3.6m deep (Table 5). It is not possible to compare these figures with the depths given in the burial register as those are for individuals, not graves.

Brick-Lined Graves and Cover Slabs (S2–S7)

Apart from the boundary wall (above), only two brick structures were found within the excavated area. Both survived in the form of grave linings, one for Joseph Bright (S2) and one for the Munday family (S3), with no surviving evidence for any superstructure or memorial. There were also four graves which were covered by large stone slabs (S4–S7), two of which had two layers of horizontal slabs. These stones were not memorial or ledger slabs and no traces of inscriptions were found (Fig 25).

Joseph Bright's Grave (S2)

This brick-lined grave [458] was coffin shaped and constructed from yellow stock bricks, the top course of which were frogged (Fig 26). It was built in English Bond and measured at least 2.34m by 1.12m externally. The south-west edge had been cut by a later grave, while the east end of the structure was under the concrete wall which formed the limit of the excavation area. However, it was possible to get a full internal measurement: 2.08m long, 0.78m wide at the shoulders and 0.65m deep. It did not appear to be truncated from above, with the highest point being 15.06m OD. The grave contained a single coffin, that of Joseph Bright, who was buried on 17 May 1848. A fee of £16 paid to the church for the ground in which it was built.

The Munday Family Grave (S3)

This brick-lined grave [567] was also coffin shaped and constructed from red bricks, some of which were frogged (Fig 27). It measured 2.42m by 1.04m at its maximum, externally. The lining had originally been capped with stone slabs, but these had been damaged and had fallen into the structure. Its original maximum depth was 2.45m (lowest level: 14.84m OD). Two iron bars had been keyed into the structure 0.65m below the top, presumably to support a coffin within the brick grave. However, as it had been a wooden coffin, when the wood decayed it collapsed and fell into the structure. The grave held the Munday family, with identifiable coffins of four members within. It is likely that there were originally other interments within the



Fig 25. Plan showing the distribution of brick-lined graves (S2–S3) and cover slabs (S4–S7) where more than one layer of slabs was present only the top one is represented (scale 1: 150)

Table 6 Munday family entries in the burial register

Burial register no.	Skeleton no.	Name	Address	Depth (ft)	Date of burial
52	[740]	Sarah Munday	City Road	14	13 April 1829
85	[736]	Edward Munday	City Road	13	13 March 1833
92	[723]	John Munday	City Road	12 '1/2 brick grave'	6 May 1833
199	-	Elizabeth Munday	City Road	'brick grave'	4 July 1840
299	[717]	Lydia Munday	Islington		17 July 1847

structure, but the very poor preservation of the bone made this impossible to confirm. Coffin breast plates for Sarah, John, Edward and Lydia were recovered, but the burial register indicates that Elizabeth was also buried there (Table 6). It appears to have been built following the death of John Munday in May 1833, the fee paid to the church was £7 13s 6d. What distinguished Munday's '1/2 brick grave' from Joseph Bright's 'brick grave' in the burial register is unclear (Table 4).

A further burial of an adult female was found below the structure whom it was not possible to identify. However, she is likely to have been a member of the same family.

Allen Family Grave (S4)

Two layers of stone slabs were found within this grave [543]. The top layer had been laid above the coffin [192] of the highest burial (Alexander Allen, [191]) and was formed of three slabs, only the westernmost of which was still *in situ*. It measured 0.64m by 0.55m by 60mm thick. The top surface of this slab was chamfered and covered with chiselled lines, 5mm apart. The second layer of slabs (Fig 28) was laid above the coffin [259] of John Allen [258], the second burial in the grave. This layer was also formed of three slabs, two of ragstone (0.61m by 0.51m by 70mm thick; 0.96m by 0.66m by 60mm thick) and one of Yorkstone (0.64m by 0.62 by 50mm thick). The first burial in the grave was an unidentified juvenile [280], coffin [281].



Fig 26. Joseph Bright's brick-lined grave (S2), looking east



Fig 27. The Munday family brick grave (S3), looking south

A layer of three stone slabs [452] was found in this grave [78] above the second burial in this grave, that of Elizabeth Swallow [453]. The western stone measured 0.68m by 0.45m by 50mm, the middle 0.72m by 0.41m by 60mm and the eastern 0.38m by 0.38m by 50mm.

Huxtable Family Grave (S6)

Two layers of slabs were found within this grave [472], the upper ones [489] above the coffin of Mary Ann Huxtable, while the second layer was above the coffin of Ann Huxtable. The top layer was formed of three slabs, measuring 0.65m by 0.62, 0.74m by 0.56m and 0.63 by

0.50m. The second layer consisted of two slabs, 0.82m by 0.63m and 0.90m by 0.59m.

Skerritt Grave (S7)

Two slabs [759] covered the burials in this grave [770], those of a 36-year-old female, Elizabeth Skerritt, and an infant, probably Mary Ann Skerritt, who died in June 1824, aged two. The larger slab measured 1.31m by 0.66m by 100mm thick, with the second slab, at the head end, measuring 0.77m by 0.75m by 60mm thick. The top surface was chamfered and covered with chiselled lines, 5mm apart.

THE BURIAL POPULATION

Adrian Miles

Documentary Evidence

The only surviving burial register for Mare Street Baptist church is held at Hackney Archives. This has 354 entries, dating between 8 December 1823 and 16 October 1853, of which 40 interments are recorded as being in the vault. Each entry has a name, residence, date buried, depth or location and the fees paid. The fees are spilt into the sum paid for the burial, the amount to the sexton and any fees for headstones and other extras.

The register does not cover the full period of use of the burial ground. The church was opened in 1812 and it is likely that burials took place from that date. Certainly, it was in use by March 1817 as evidenced by the coffin plate [716] of ‘Miss Mary ..., aged 4 years 5 months’.

Age at Death

Age at death (as recorded in the burial register) of those buried in the vault and the churchyard is shown in Fig 29. For age at death of males and females generally, see Fig 7. There are slight differences between age of death given in the burial register and given in other sources such as coffin breast plates and death certificates. This is largely due to the practice of describing someone aged 68 as ‘in their 69th year’ or ‘in the 69th year of their age’ on coffin breast plates.

Table 7. Documented age and sex distribution using osteological age groups (excavated named sample only)

Age group	Male	Female
Interuterine–neonate	0	1
1–6 months	2	2
7–11 months	2	2
1–5 years	4	11
6–11 years	0	3
12–17 years	2	4
18–25 years	3	5
26–35 years	3	3
36–45 years	6	4
≥46 years	10	14
Adult	0	1



Fig 28. The lower layer of stone slabs (S4) covering the coffin [259] of John Allen [258] (0.5m scale)

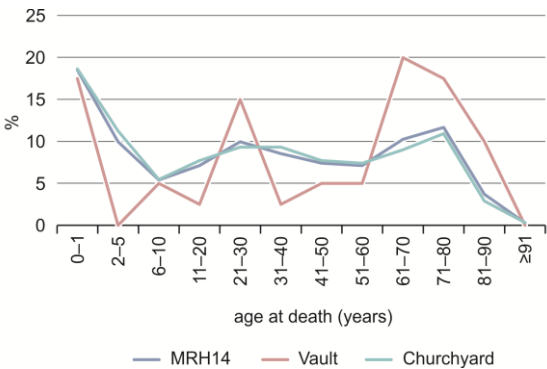


Fig 29. Age at death of excavated individuals compared with that of those documented as interred in the vault or in the burial ground (from the burial register)

Table 8. Summary details of individuals recorded in the burial register who left a will (*italics indicate those also in the excavated named sample*)

Burial register no.	Forename	Surname	Age (years)	Sex	Residence	Year	Will
2	<i>Daniel</i>	<i>Davan</i>	40	<i>M</i>	<i>Globe Road</i>	1823	<i>PROB 11/1678/253</i>
19	John	Sweatman	68	M	Thornough St	1825	PROB 11/1702/49
48	<i>Thomas</i>	<i>Faircloth</i>	40	<i>M</i>	<i>Cambridge Heath</i>	1828	<i>PROB 11/1753/1</i>
60	Timothy	Woodhead	77	M	Hackney Road	1829	PROB 11/1770/362
71	William Edward	Waters	79	M	Hackney	1831	PROB 11/1789/500
85	<i>Edward</i>	<i>Munday</i>	71	<i>M</i>	<i>City Road</i>	1833	<i>PROB 11/1813/196</i>
100	George	Bushell	42	M	Hackney	1834	PROB 11/1834/454
111	<i>Isabella</i>	<i>Jones</i>	70	<i>F</i>	<i>Cumberland Street, Hackney Road</i>	1835	<i>PROB 11/1844/206</i>
102	Benjamin	Tomes	28	M	Hackney	1834	PROB 11/1847/229
153	Isaiah	Birt	79	M	Hackney	1837	PROB 11/1886/115
158	Thomas	Gregory	76	M	Margaret Street	1838	PROB 11/1896/400
171	Jesse	Gouldsmith	79	M	Hackney	1839	PROB 11/1906/380
181	<i>John</i>	<i>Allen</i>	69	<i>M</i>	<i>Hackney</i>	1839	<i>PROB 11/1913/68</i>
182	James	Woodard	52	M	Hackney	1839	PROB 11/1916/362
194	Thomas	Botterill	74	M	Commercial Road	1840	PROB 11/1927/51
206	<i>Isaac</i>	<i>Booth</i>	79	<i>M</i>	<i>Hackney</i>	1840	<i>PROB 11/1937/109</i>
205	<i>Henry</i>	<i>Wardall</i>	88	<i>M</i>	<i>Hackney</i>	1840	<i>PROB 11/1942/23</i>
218	<i>John Causey</i>	<i>Jordan</i>	36	<i>M</i>	<i>Mile End Road</i>	1841	<i>PROB 11/1951/225</i>
238	<i>John</i>	<i>Webb</i>	55	<i>M</i>	<i>Dalston</i>	1842	<i>PROB 11/1974/187</i>
245	Thomas	Dupree	71	M	Hackney	1843	PROB 11/1982/206
279	Peter	Ellis	73	M	Hackney	1845	PROB 11/2026/269
297	<i>Ann</i>	<i>Booth</i>	79	<i>F</i>	<i>Mansell Street, Goodmans Fields</i>	1847	<i>PROB 11/2048/66</i>
303	William	White	55	M	Hackney Terrace	1847	PROB 11/2066/570
312	<i>Joseph</i>	<i>Bright</i>	74	<i>M</i>	<i>Queens Road, Dalston</i>	1848	<i>PROB 11/2076/27</i>
316	<i>Eady</i>	<i>Booth</i>	66	<i>F</i>	<i>Hackney</i>	1848	<i>PROB 11/2087/251</i>
327	<i>Jesse</i>	<i>Hobson</i>	57	<i>M</i>	<i>St Thomas Square, Hackney</i>	1850	<i>PROB 11/2107/167</i>
349	William Houghton	Botterill	60	M	Commercial Road	1853	PROB 11/2171/389
352	<i>Francis Augustus</i>	<i>Cox</i>	70	<i>M</i>	<i>Hackney</i>	1853	<i>PROB 11/2179/138</i>

The ages at death from the burial registers for Mare Street Baptist church, Bow Baptist church, (PAY05, Henderson *et al* 2013) and Henrietta Street Baptist church, Bloomsbury (WKF10, Henderson & Miles 2013) are compared in Fig 8.

From a combination of coffin plate data and the surviving burial register, a total of 83 individuals can be identified from the excavated sample at Mare Street Baptist burial ground. These consist of 50 females and 32 males (Table 7). The sex of one stillborn member of the Jordan family [182] is not specified in the sources and is omitted from the table. An additional three individuals are known from their excavated coffin plates, but these were not found in clear association with articulated human remains ('The Named Burials' below).

Sex

The division of the sexes within the 351 entries in the burial register where a sex is given is 176 female to 175 male.

Wills

The Statute of Wills (1540) ruled that wills could be written for males from the age of 14 and females from 12. In 1837 the Wills Act changed that to 21 for both men and women, although the latter were primarily either unmarried or widowed women, since a woman's property by law belonged to her husband until 1882. It is also worth mentioning that until the 20th century

most people did not make a will. Figures produced by the Registrar General from an analysis of the first year of the new Court of Probate, in 1858, showed that only 10.3% of the deceased had left wills. These figures further show that only 15.2% of men over the age of 21 and only 5.6% of women left wills (Grannum & Taylor 2009, 15). Even when a will had been made, if there was little property involved and no dispute as to who should benefit, the will may not have been proved at all, in order to save paying the fee (Guildhall Library 2009).

Of the 83 identified individuals buried at Mare Street, 44 of whom were adult, 14 left wills (16.9% of total, 31.8% of adults), 11 males (52.4% of adult males), and three females (13.0% of adult females). Of the women, two were widows and one was unmarried. As can be seen this is a significantly higher figure than would be expected from the general population, although it should be remembered that there is a bias introduced by the better preservation of lead and brass coffin breast plates, which were generally used by the better off. However, when the figures from the burial register are looked at as a whole, 209 of the 354 entries were of an age to leave a will, 99 male and 108 female. Of these 28 individuals registered a will with the Prerogative Court of Canterbury, 25 males (25.3%) and three females (2.8%) (Table 8). This is a higher percentage for males than the period average, indicating that those buried at Mare Street were generally better off than many other contemporary Londoners.

Table 9. Information from available death certificates for individuals recorded in the burial register

Registration district	Sub-district	Died	Name	Sex	Age (years)	Occupation	Cause of death	Signature, description and residence of informant	Registered
Hackney	Hackney	17 June 1839, Mare Street, Hackney	John Allen	M	68	schoolmaster	paralysis	Alexander Allen, present at death, Mare Street	21 June 1839
Hackney	Hackney	6 November 1842, Mare Street, Hackney	Alexander Allen	M	28	schoolmaster	pneumonia	Thomas Garland, present at death, Mare Street	11 November 1842
Hackney	Hackney	23 August 1839, 96 College Street, Homerton	Samuel Andrews	M	5	son of a stonemason, deceased	decline	the mark of Ann Tebbutt, present at death, Mare Street	24 August 1839
Hackney	South Hackney	24 November 1840, Mare Street, South Hackney	Isaac Booth	M	79	cashier in the Bank of England	age and debility	Abraham Booth, present at the death, 18 Upper King Street, Bloomsbury	26 November 1840
Hackney	South Hackney	12 August 1846, Andrews Road	Isaac Booth	M	4	son of Isaac Booth, hatter	ascites 3 months, anasarca 2 months, marasmus 2 months	Isaac Booth, present at death, 1 Andrews Road	17 August 1846
Whitechapel	Goodman's Fields	7 January 1847, 53 Mansell Street, Whitechapel	Ann Booth	F	79	lady	decay of nature	Ann Shew, her mark, present at death, 53 Mansell Street	9 January 1847
Hackney	South Hackney	15 December 1847, Well Street, South Hackney	Martha Booth	F	33		diseased heart, many years	Martha Underhill, present at the death, 15 Chatham Place, Hackney	17 December 1847
Hackney	South Hackney	18 December 1848, Well Street, South Hackney	Eady Booth	F	66	widow of Isaac Booth, cashier in the Bank of England	stricture of the colon, duration uncertain; laceration of the intestine, 26 hours	Jacob Booth, present at the death, 13 Evershall Street, Saint Pancras	21 December 1848
Saint Pancras	Somers Town	7 September 1852, 13 Eversholt Street	Jacob Booth	M	30	master cordwainer	delirium cum tremens 3 days, convulsions 4 hours	John Cawley, present at the death, 3 Crowndale Place, Oakley Square	11 September 1852
Stepney	Mile End Old Town	22 May 1843, Stepney Green, Stepney	Thomas Bourne	M	59	baker	typhus fever	Mary Cooper, present at the death, Tabernacle Square	30 May 1843
Hackney	Hackney	10 May 1848, 3 Grange Villas, Queens Road, Dalston	Joseph Bright	M	75	gentleman	asthma, many years	the mark of Emma Cornwell, in attendance, 3 Grange Villas, Queens Road, Dalston	16 May 1848
Hackney	West Hackney	22 February 1840, 16 Robinsons Row	Edmund Burton	M	24	clerk to merchant	consumption	Emily Burton, sister, present at death, 16 Robinsons Row, West Hackney	25 February 1840
Saint James Westminster	Golden Square	23 January 1838, 10 Golden Square	Emma Augusta Cox	F	27	-	consumption	William H Summers, 10 Golden Square, solicitor, keeper of the house	25 January 1838
Hackney	South Hackney	31 May 1839, The Triangle, South Hackney	John William Cox	M	15	son of the Rev F A Cox, LLD	pulmonary consumption	William Huxtable, surgeon, in attendance, Mare Street, South Hackney	6 June 1839
Hackney	South Hackney	11 May 1841, West Street	Sarah Fanny Cox	F	14	daughter of Francis Augustus Cox, dissenting minister	pulmonary consumption	Elizabeth Adams, present at the death, West Street	14 May 1841
Kingsbridge	Modbury	25 December 1841, Modbury	Frederick Cox	M	19	son of The Rev Francis Augustus Cox, Hackney, Middlesex	consumption	the mark of Margaret Pearse, nurse, Modbury, present at death	27 December 1841
Hackney	South Hackney	18 September 1846, The Triangle	Sarah Cox	F	54	wife of Francis Augustus Cox, Baptist minister	ovarian dropsy, 10 years	Ann Nightingale, present at the death, Triangle	23 September 1846
Hackney	South Hackney	5 September 1853, King Edwards Road, South Hackney	Francis Augustus Cox	M	70	Baptist minister	pylorus scirrhus	Sarah Rush, present at the death, King Edwards Road, South Hackney	10 September 1853
Saint James Westminster	Saint James's Square	19 April 1840, 70 Burlington Arcade	Lewis James Drew	M	1 year, 1 month	son of John Crowther Drew, hosier	affection of the chest	John Crowther Drew, present at the death, 70 Burlington Arcade	25 April 1840
Saint James Westminster	Saint James's Square	19 August 1844, 70 Burlington Arcade	Walter Joseph Drew	M	7 months	son of John Crowther Drew, hosier	Diarrhea	John Crowther Drew, present at the death, 70 Burlington Arcade	24 August 1844
Saint James Westminster	Saint James's Square	28 January 1846, 7 Burlington Arcade	William Henry Drew	M	6 months	son of John Crowther Drew, hosier	intussusceptis p. mort.	Benjamin Drew, in attendance, 7 Burlington Arcade	5 February 1846
Bethnal Green	Hackney	25 August 1843, 6 Gloucester Street	Theresa Susanna Giddy	F	1 year, 11 months	daughter of John Giddy, tailor	convulsions	John Giddy, present at the death, 6 Gloucester Street	26 August 1843
Hackney	South Hackney	5 March 1843, Denmark Place	Richard Davis Hanson	M	11 months	son of Benjamin Hanson, meat salesman	teething	B Hanson, present at the death, Denmark Place	9 March 1843
Shoreditch	Holywell and Moorfields	22 February 1849, 5 Gloster Street, Curtain Road	Elizabeth Harris	F	16	daughter of Thomas Horatio Harris, soap maker	consumption, 3 months	T H Harris, in attendance, 5 Gloster Street, Curtain Road	24 February 1849
Bethnal Green	Bethnal Green	10 February 1843, 3 East Street	Charles Hayter	M	22	packer	consumption	Joseph West, present at death, 2 Martha Street	14 February 1843

Table 9. (cont)

Bethnal Green	St Matthew's Bethnal Green	11 September 1839, 3 Cranbrook Street	Elizabeth Hewitson	F	42	carpenter	abortion	E Hewitson, present at death, 3 Cranbrook Street	13 September 1839
Bethnal Green	Hackney Road	4 August 1841, 9 Cambridge Circus	Edward Hewitson	M	43	carpenter	phthisis	the mark of Elizabeth Clapham, present at death, 9 Cambridge Circus	5 August 1841
Hackney	South Hackney	30 January 1850, St Thomas Square, South Hackney	Jesse Hobson	M	57	gentleman	apoplexy and paralysis, 16 years, brain disease, fever and exhaustion about 6 days	Mary Liptrott Findley, present at the death, Mare Street, Hackney	2 February 1850
Stepney	Lower Mile End Old Town	13 August 1841, 2 Mile End Terrace, Stepney	John Causey Jordan	M	36	gentleman	disease of the heart	Joseph Allardyce in attendance, 2 Mile End Terrace	18 August 1841
Shoreditch	Haggerstone East	19 December 1848, 40 Margaret Street, Haggerstone	Isabella Martin	F	76	widow of William Martin, shoemaker	apoplexy, 2 days	Susannah Martin, present at the death, 40 Margaret Street, Haggerstone	21 December 1848
Shoreditch	Haggerstone East	26 March 1839, 69 Margaret Street, Haggerstone	Victoria Meen	F	16 months	daughter of a paper stainer	inflammation on the lungs	Joseph Austin Meen, present at the death, 69 Margaret Street, Haggerstone	28 March 1839
Shoreditch	Haggerstone East	20 July 1839, 69 Margaret Street, Haggerstone	Emma Meen	F	3 year, 3 months	daughter of a paper stainer	consumption	Mary Daniels, present at the death, 69 Margaret Street, Haggerstone	22 July 1839
Shoreditch	Haggerstone East	24 July 1840, 69 Margaret Street, Haggerstone	Emily Meen	F	12 months	daughter of Joseph Austin Meen, paper stainer	hoping cough, terminating in convulsions	Joseph Austin Meen, present at the death, 69 Margaret Street, Haggerstone	29 July 1840
Shoreditch	Haggerstone East	2 December 1845, 2 Goldsmiths Place, Haggerstone	Charlotte Meen	F	61	widow of John Meen, bankers clerk	cancer	Mary Mason, present at the death, 32 Essex Street, Hackney	6 December 1845
Shoreditch	Haggerstone East	23 February 1846, 2 Goldsmiths Place, Haggerstone	Eliza Meen	F	2	daughter of Joseph Austin Meen, paper stainer	dentition, effusion upon the brain, convulsions, 4 days	Mary Daniels, present at the death, 2 Goldsmiths Place, Haggerstone	27 February 1846
Saint Luke Middlesex	City Road Saint Luke	28 June 1840, 14 Windsor Terrace	Elizabeth Munday	F	47	spinster	subject to epileptic fits and died of fever of the typhoid kind	Mary Hill, servant, attending on deceased, 14 Windsor Terrace	29 June 1840
Islington	Islington East	13 July 1847, 31 Portland Place, Islington	Lydia Munday	F	77	widow of Edward Munday, salesman	gradual decay of old age	Mary Hill, servant, present at the death, 31 Portland Place, Islington	15 July 1847
Bethnal Green	St Matthew Bethnal Green	10 March 1839, 29 Oval Cottages	Eliza Pond	F	17 months	daughter of John Pond, commercial clerk	teething	J Pond, present at death, 29 Oval Cottages	11 March 1839
Bethnal Green	Hackney Road	14 October 1843, Ann's Place	William George Salmon	M	3 years, 3 months	son of George Salmon, warehouseman	scarlatina, 5 days	George Salmon, in attendance, 10 Ann's Place	16 October 1843
Saint George the Martyr Southwark	Kent Road	30 November 1850, 2 Windsor Place, Southwark	Elizabeth Smith	F	5 months	daughter of William Richard Smith, corn dealer	diarrhea 6 days, convulsions 1 day	W R Smith present at the death, 2 Windsor Place, Southwark	4 December 1850
St Mary Newington	St Mary Newington	22 September 1853, 6 Cumberland Place	Emily Smith	F	18 months	daughter of William Richard Smith, corn dealer	dentition 14 days, hydrocephalus 3 days	W R Smith in attendance, 2 Windsor Place, Old Kent Road	26 September 1853
Edmonton	Cheshunt	9 January 1841, Fore Street	Eleanor Vincent	F	6	daughter of James Vincent, schoolmaster	inflammation of the brain	the mark of Sarah Turner, present at the death, Fore Street	11 January 1841
Hackney	South Hackney	22 November 1840, Providence Row, South Hackney	Henry Wardall	M	88	gentleman	age and debility	Hannah Boldrow, present at the death, Providence Row, South Hackney	24 November 1840
Hackney	Hackney	16 December 1842, 23 Park Road, Dalston	John Webb	M	55	mercantile clerk	apoplexy	William Webb, present at the death, 25 Somerset Place, Dalston	19 December 1842
Hackney	Hackney	5 June 1843, 5 Navarino Place, Dalston, Hackney	John Lawrence Webb	M	6 months	infant of John Webb, clerk in St Catherine's Dock	hooping cough	Mary Elizabeth Webb, present at the death, 5 Navarino Place, Dalston, Hackney	6 June 1843
Hackney	Hackney	21 April 1848, 23 Park Road, Dalston	Martha Susannah Webb	F	2	daughter of John Webb, gentleman	obstruction of the bowels, 14 days	John Webb, present at the death, 23 Park Road, Dalston	24 April 1848
City of London	South West	23 January 1853, 23 Upper Thames Street	Agnes Ruth Webb	F	5	daughter of William Webb, clerk at an iron wharf	purpura	Mary Warden, present at death, 23 Upper Thames Street, London	26 January 1853

Death Certificates

Compulsory civil registration was introduced by the Births and Deaths Registration Act of 1836. It commenced on 1 July 1837, after which date all births,

marriages and deaths for England and Wales had to be registered by the district registrar. Registrars were paid for every registration, which was incentive to make sure as many births and deaths were recorded as possible, but there was still a small amount of non-compliance. A

registrar general was appointed with a central staff in the General Register Office. Of the 52 individuals for which it should have been possible to obtain death certificates, 47 were retrieved (Table 9). Death certificates usually give registration district and sub-district, date and place of death, full name of the decedent, their sex and age, their occupation (or for a child, usually the name of a parent), cause of death (and sometimes the duration of the cause), name, residence and relationship of the informant to the decedent, the date registered and the name of the registrar.

Recorded Occupations

Occupations were recorded on the death certificates of 14 adult males and seven adult females (restricted to wife, widow, spinster, or, in the case of Ann Booth, 'Lady'). In 23 cases when the deceased were children (that is, given as 'son' or 'daughter'), the father's occupation was recorded instead, although the parents of 16 of these children were not identified within the Mare Street burial ground. The range and frequency of recorded occupations are summarised in Table 10.

From this it can be seen that those buried at Mare Street were generally 'the middling sort'. This term was used from the 18th century 'to refer to shopkeepers, manufacturers, better-off independent artisans, civil servants, professionals, lesser merchants and the like' (Hunt 1996, 15). This grouping diversified in the 19th century with the increasing numbers of small entrepreneurs, such as shopkeepers and merchants who undertook to transport and retail the fruits of industry and empire. The increased scale of industry and overseas trade, together with the expansion of empire fuelled the proliferation of commerce and finance in London, such as banks, insurance companies, shipping and railways. This system needed administering by clerks, managers and salaried professionals. The period also witnessed the large-scale expansion of local government and the centralised state, providing

occupations for civil servants, teachers, doctors, lawyers and government officials as well as the clerks and assistants who helped these institutions and services to operate (Loftus 2011).

Although rather later than the period under consideration, Charles Booth's *Map Descriptive of London Poverty* of 1889 shows that the area of the site and Hackney in general at that time was generally 'Well-to-do. Middle-class'.

Table 11 Addresses by parish or district from the burial register

Parish/district	No.	%
St John Hackney	177	50.00
St Matthew Bethnal Green	81	22.88
St Leonard Shoreditch	26	7.34
St Dunstan Stepney	13	3.67
City of London	13	3.67
St Pancras	5	1.41
St Mary Stratford	4	1.13
St James, Piccadilly	4	1.13
St Mary Islington	3	0.85
St James Clerkenwell	2	0.56
Tottenham	2	0.56
Poplar	2	0.56
Kensington	2	0.56
Clapham	2	0.56
Deptford	2	0.56
St George the Martyr, Southwark	2	0.56
Ipswich	2	0.56
St Luke Old Street	1	0.28
St George the Martyr	1	0.28
St Mary Whitechapel	1	0.28
Hornsey	1	0.28
Chelsea	1	0.28
Loughton	1	0.28
Plaistow	1	0.28
Brixton	1	0.28
Camberwell	1	0.28
Lambeth	1	0.28
Twickenham	1	0.28
Sawbridgeworth, Herts	1	0.28

*Table 10. Summary of occupations recorded in the death certificates (see **Error! Reference source not found.**)*

Occupation	No.
Clerk	6
Gentleman	5
Widow	4
Schoolmaster	3
Salesman	2
Shoemaker	2
Baker	1
Baptist minister	1
Carpenter	1
Corn dealer	1
Hatter	1
Hosier	1
Lady	1
Packer	1
Paper stainer	1
Soap-maker	1
Spinster	1
Stonemason	1
Tailor	1
Warehouseman	1
Wife	1

Table 12 Registration districts from death certificates

Registration district	No.
Hackney	19
Shoreditch	7
Bethnal Green	6
Saint James, Westminster	4
Stepney	2
City of London	1
Edmonton	1
Islington	1
Kingsbridge, Devon	1
Saint George the Martyr, Southwark	1
Saint Luke, Middlesex	1
Saint Pancras	1
St Mary Newington	1
Whitechapel	1

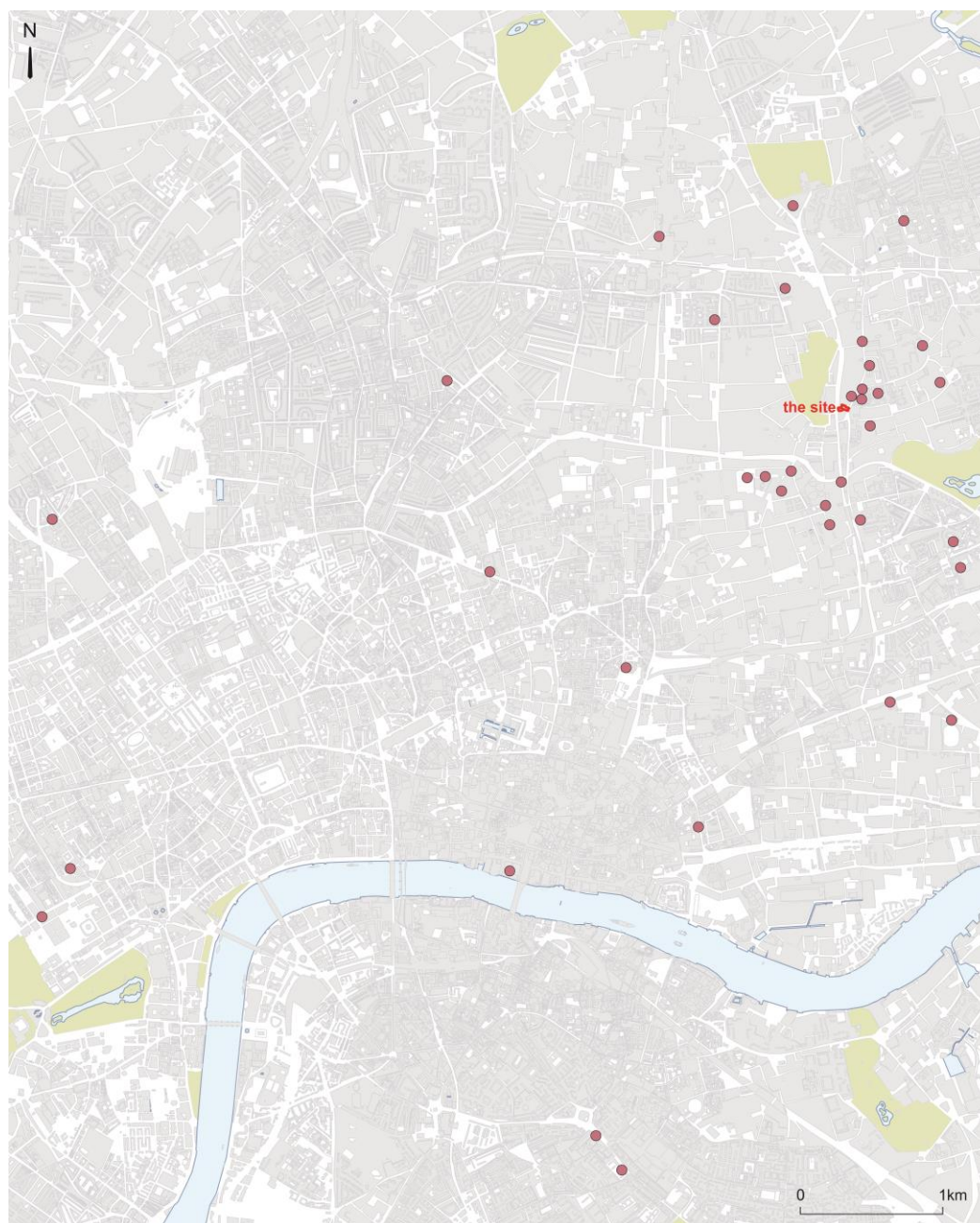


Fig 30. Address at death for Mare Street interments with death certificates (scale 1:50,000)

Addresses and Property Ownership

When the parish register is examined, the address given is generally only a parish or district, rather than a street name (Table 11). From those given, it can be seen that 50.0% of all those interred within the burial ground came from Hackney, with the majority of the remainder coming from the surrounding parishes. A small number came from much further afield, such as the Colborne family, buried in the church vault. Their remains were brought from Ipswich and Sawbridgeworth, because they had historic ties to Bethnal Green Road. The registration districts included on death certificates shows a similar pattern (Table 12). More detailed addresses are available from the 48 death certificates examined, which have been plotted in Fig 30.

However, it should be noted that death certificates record place of death and people did not always die at home. An example from Mare Street is that of Frederick Cox, son of Francis Augustus Cox. His residence is listed in the register as being Hackney, but he died at Modbury, Devon, where he had been staying due to illness. The informant for his death was Margaret Pearse, a nurse from Modbury.

Causes of Death

The recorded causes of death for 47 of the buried individuals from Mare Street can be examined from their death certificates (Table 9). In 14 cases, all dated after 1843, this also includes the duration of the illness.

Table 13. Deaths in Hackney in 1857 by quarter (after Tripe 1858a, 4, table 2)

Quarter	Sub-district						Total
	Stoke Newington	Stamford Hill	West Hackney	Hackney	South Hackney		
1st	31	27	96	202	53		409
2nd	24	18	88	145	43		318
3rd	40	24	101	149	48		362
4th	25	26	107	182	55		395
Total	120	95	392	678	199		1484

Table 14. Corrected deaths in Hackney in 1857 (after Tripe 1858a, 5)

	Sub-district						Total
	Stoke Newington	Stamford Hill	West Hackney	Hackney	South Hackney		
Uncorrected	120	95	322	678	199		1484
Corrected	126	100	410	438	208		1282

Table 15. Births in Hackney by quarter in 1857 (after Tripe 1858a, 3, table 1)

Quarter	Sub-district						Total
	Stoke Newington	Stamford Hill	West Hackney	Hackney	South Hackney		
1st	42	37	196	225	100		600
2nd	36	37	181	213	98		565
3rd	58	47	186	240	102		613
4th	51	32	217	242	114		656
Total	187	153	780	920	414		2434
%	6.8	6.2	32.2	37.8	17		

Table 16. Ages at death (in years) in Hackney by quarter in 1857 (after Tripe 1858a, 5, table 3)

Quarter	Age (years)						Total	%
	<1	0-20	20-40	40-60	60-80	>80		
1st	84	167	56	65	96	25	409	27.5
2nd	61	147	45	50	59	18	318	21.4
3rd	109	182	52	46	64	18	362	24.4
4th	79	171	51	57	91	25	395	26.7
Total	333	667	204	218	309	86	1484	
%	22.4	44.9	13.8	14.7	20.8	5.8		

Table 17. Summary of causes of death in Hackney in 1857 by quarter (after Tripe 1858a, table 4)

Cause of death	Quarter				Total	%
	1st	2nd	3rd	4th		
Zymotic diseases	59	48	112	74	293	19.8
Diseases of uncertain seat	11	23	19	27	80	5.4
Tubercular diseases	75	69	67	65	276	18.5
Diseases of the brain and nerves	49	28	44	40	161	10.9
Diseases of the heart and blood vessels	25	9	11	14	59	3.9
Diseases of the lungs and organs of respiration	95	55	22	80	252	16.9
Diseases of the stomach and digestive organs	11	21	14	25	71	4.8
Diseases of the kidneys, etc	9	5	1	8	23	1.6
Childbirth	6	6	2	5	19	1.3
Diseases of joints, bones	4	2		1	7	0.5
Diseases of the skin, cellular tissue, fascia	2		1		3	0.2
Malformations	2				2	0.1
Premature birth	11	9	9	8	37	2.5
Atrophy	4	1	16	4	25	1.7
Old age and decay	31	25	23	27	106	7.2
Sudden deaths	7	7	4	5	23	1.6
Violent deaths	6	10	14	12	42	2.8
Not specified	2		3		5	0.3
Total	409	318	362	395	1484	

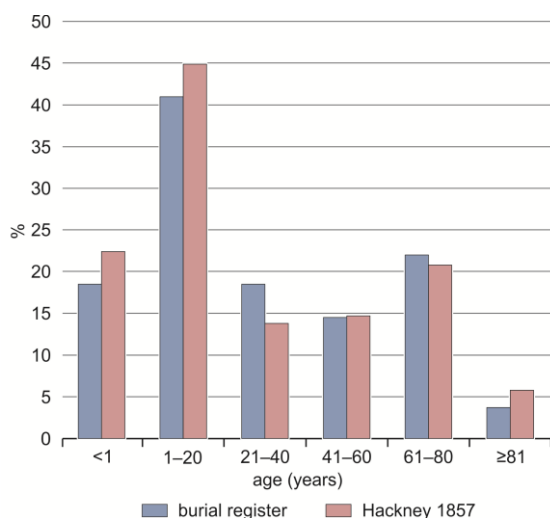


Fig 31. Comparison of age at death recorded in the burial register with those recorded for Hackney in 1857 (after Tripe 1858a, 5, table 3)

Clearly, the causes of death recorded on the certificate are not always accurate. It was not until 1874 that a doctor's certificate was required before the issue of a death certificate and prior to 1858 it was not necessary even to record if the death was certified by a medical practitioner. The information on the certificate then was based on the informant's knowledge and sometimes included multiple causes and durations, such as that for Jesse Hobson, who died aged 57 from 'Apoplexy and Paralysis, 16 years, Brain disease, fever and exhaustion, about 6 days'. Isaac Booth, who died aged four, was recorded as dying from 'Ascites, 3 months; Anasarca, 2 months; Marasmus, 2 months'.

In many cases the visible symptoms were listed as cause of death, rather than the underlying disease. Another problem is the identifying of the cause from the 19th-century terms used. Many of these are non-specific, for example fever, while others could refer to a variety of causes.

The reports of John Tripe, the Medical Officer of Health (MOH) to the Hackney District, set out the work done by his public health and sanitary officers (Tripe 1856; 1857a-c; 1858a-b). The reports provide vital data on birth and death rates, infant mortality, ages at death (Tables 13-16), incidence of infectious and other diseases, and a general statement on the health of the population. The earliest for Hackney is from 1856, only two years after the closure of the burial ground, but the first full report, detailing causes of death, dates to the following year (Table 17). These can be used to provide a comparison with the interred population at Mare Street (Fig 31).

Deaths in the Hackney sub-district were over represented due to the presence of the German Hospital and the Hackney Workhouse in this area (Table 13). A more balanced figure can be seen in the corrected version (Table 14), where these deaths have been distributed across all the districts.

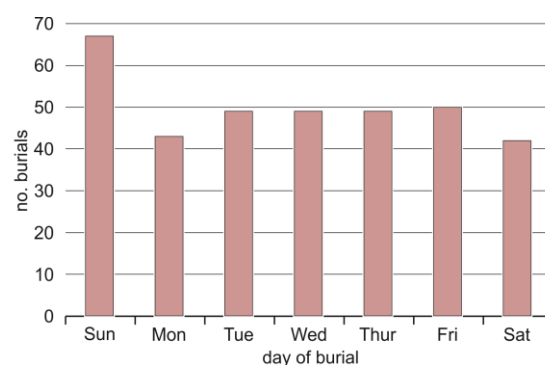


Fig 32. Day of burial at Mare Street Baptist church (from the burial register)

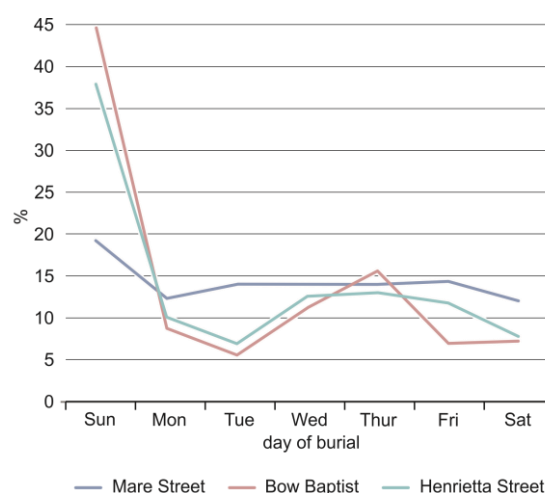


Fig 33. Day of burial at three London Baptist burial sites compared (from the burial registers)

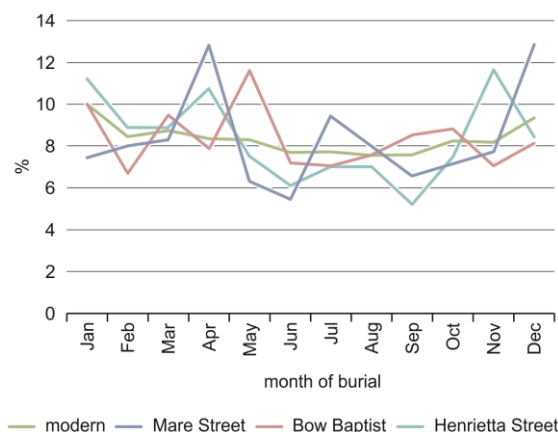


Fig 34. Month of burial at three London Baptist burial sites (from the burial registers) compared with early 21st-century figures from the UK

Day of Burial

When the day that burial occurred, as recorded in the Mare Street Baptist church burial register, is examined, it shows a relatively even distribution (Fig 32), with only a slightly increased percentage of burials taking place on a Sunday (19.2%). There are two other Baptist burial grounds excavated by MOLA for which at least partial



Fig 35. Location of the excavated named burials (scale 1:150)

burial registers are available, Bow Baptist church (PAY05; Henderson *et al* 2013) and Henrietta Street Baptist church, Bloomsbury (WKF10; Henderson & Miles 2013). When day of burial is compared for all three sites (Fig 33), Bow and Henrietta Street show a different pattern, with the highest percentage of burials taking place on a Sunday (44.6% and 37.8% respectively). This is also reflected in the registers of the

non-aligned City Bunhill (GDA06; Connell & Miles 2010), where 83.3% of burials took place on a Sunday.

The month of death for Mare Street can be compared with the other excavated Baptist grounds and with the present-day figures for the United Kingdom of Great Britain and Northern Ireland 2008–12, derived from United Nations Demographic Statistics Database (DSD) figures (Fig 34). All show a general trend of higher numbers of deaths during the colder months.

Illiteracy

Although, generally, those buried at Mare Street were of 'the middling sort', it is interesting to note that six of the informants on the death certificates had to make a mark, rather than being able to sign their name. These were not family members and in most cases were present at the death of elderly individuals. It is likely that they were mainly servants, nurses or carers living at the same addresses as the deceased.

The Named Burials

Adrian Miles with Niamh Carty

This section deals with individuals interred in the excavated part of the burial ground who could be identified. Eighty-six named individuals appear in the catalogue below. The primary source of identification was the coffin plate, where one survived in legible condition ('Coffins', below; Table 18); 29 individuals were identified from accessioned lead or brass plates and 31 from iron plates. In addition to these 60, a further 23 individuals could be identified by partial information from poorly-preserved plates and/or the burial register information alongside the osteological evidence. A further three individuals (Elizabeth Munday, Lydia Munday and William Salmon) are identified by their coffin plates but any associated human remains were either absent or such poor condition that osteological assessment was not possible. The graves of the named individuals are shown in plan in Fig 35. Eighty-three individuals can be linked to an individual skeleton and most were selected as part of the osteological subsample (Section 6). Each entry lists: the name of the identified individual and family; the context number of the associated skeleton; the context number of the associated coffin (which was timber, unless stated otherwise); the accession number(s) of the retained coffin plate(s); osteology and the accession number(s) or catalogue number(s) of any associated finds (detailed in 'The Burial Finds' and 'Textiles', below) and associated biographical information where available. The depth of burial and fees paid, including any memorial stones, can be seen in Table 4.

John Allen

Skeleton [258]

Coffin [259]

Coffin plate <82> (Fig 36): lead.

Osteology: probable male, poorly preserved and definite age category could not be assigned. There was bowing to both femora, indicating resolved (survived) rickets from childhood, after walking had begun. There was osteoarthritis in the cervical vertebrae and dental enamel hypoplasia in the dentition ('Pathology', below). Both the presence of skeletal changes associated with rickets and the hypoplasia suggest nutritional stress experienced during early childhood that was survived. Textile: flannel waistcoat (undershirt) <TX1> ('Textiles', below).



Fig 36. John Allen's lead breast plate <82> (scale 1:4)

John Allen died aged 68 on 17 June and was buried on 25 June 1839. His will (TNA, PROB 11/1913/68; written the 22 October 1834, proved 16 July 1839) describes him as a 'Gentleman of Hackney in the County of Middlesex'. He left all his freehold, copyhold, leasehold and personal estates to his wife, Charlotte Jane Allen.

Allen was born and educated in Truro. For 30 years he kept the Madras House Grammar School at Hackney and had at least one son (Alexander, below) and one daughter. His chief work was *Modern Judaism, or, A Brief Account of the Opinions, Traditions, Rites, and Ceremonies of the Jews in Modern Times* (1816). It was reprinted in 1830; 25 years later it was described by Waller as 'still the best book on this subject in the English language'. He published anonymously *The Fathers, the Reformers, and the Public Formularies of the Church of England in Harmony With Calvin and Against the Bishop of Lincoln* (1812). In 1815 he edited the journals of the evangelical Major-General Andrew Burn and in the same year translated Calvin's *Institutes*. Following his death, his school was continued by his son, Alexander (Reynolds 2004).

Madras House took its name from the Madras system whereby monitors took responsibility for younger boys. Allen first took pupils in Mare Street in 1817, moving to larger premises on the east side in 1821, at 208 Mare Street, where the school had a maximum of nearly 150 boys.

His death was reported in the *Morning Chronicle*.

On Monday, the 17th instant, at Madras-house grammar-school, Hackney, Mr John Allen, author of 'Modern Judaism' and translator of

'Calvin's Institutes,' &c., in his 69th year. (20 June 1839, page 4, col E)

His death certificate shows that he was a schoolmaster, who died in Mare Street, the cause of death being given as 'Paralysis'.

Alexander Allen

Skeleton [191]

Coffin [192]

Coffin plate <83> (Fig 37): lead.

Osteology: young (18–25 years) adult male. There are two button osteomas (benign plaque-like bone tumours with no otherward clinical significance) and dental pathologies in the form of a build-up of calculus, enamel hypoplasia, and resorption of the alveolar bones due to long standing gum disease (periodontal disease). Periodontal disease is a condition that results in inflammation of the bone surrounding the tooth socket in response to gingivitis (gum disease). The weakened bone recedes away from the crowns of the teeth exposing the roots and eventually resulting in tooth loss (Hillson 2005, 304–5).

Alexander Allen died aged 28 on 6 November 1842 and was buried on 14 November. He was born in Hackney on 23 September 1814, the son of John Allen (above) and his wife, Charlotte Jane. He was educated at his father's school and at University College London, where he was distinguished in Greek and Latin. On his father's death he carried on the Madras House Grammar School at Hackney. In 1840, he obtained a degree of Doctor of Philosophy from the University of Leipzig.

In 1836 he produced *Etymological Analysis of Latin Verbs*, in 1837 *Essay on Teaching Greek* (Papers of the Central Society of Education, Vol 1). In the 1840s he studied Old English, Swedish, Danish, Icelandic and German, with a view to a comprehensive work on the history and structure of the English language. His other works included: *Constructive Greek Exercises, for Teaching Greek From the Beginning by Writing* (1839); several more works on Latin and Greek; *A New English Grammar* (1841); and essays on writing Latin and Greek exercises and on parsing in the *Journal of Education*. He also contributed articles to the *Penny Cyclopaedia* and Smith's *Dictionary of Greek and Roman Antiquities* and *Dictionary of Greek and Roman Biography and Mythology*. Allen died of pneumonia, on 6 November 1842, at Mare Street, Hackney (Mew 2004). Following his death, the school passed to Thomas Garland, who was also present at Allen's death.

His death certificate shows that he was a schoolmaster, who died in Mare Street, the cause of death being given as 'Pneumonia'.

Samuel Andrews

Skeleton [202]

Coffin [203]

Coffin plate (not retained): iron.

Osteology: assessed as a subadult aged *c.* five years (from dental and long bone estimations).



Fig 37. Alexander Allen's lead breast plate <83> (scale 1:4)

Samuel Andrews died aged five years, seven months on 23 August 1839 and was buried on 29 August.

His death certificate shows that he was the son of a stonemason and died at 96 College Street, Homerton, the cause of death being given as 'Decline'.

Isaac Booth

Skeleton [307]

Coffin [308]

Coffin plate <86> (Fig 38): lead.

Osteology: older (46+ year old) male. This individual had lost all of his dentition before death and had osteoarthritis to his hands and feet. There were also two button osteomas to the cranium. There was spinal joint disease in the form of widespread intervertebral disc disease, Schmorl's nodes, and osteophytosis.

Isaac Booth died aged 79 on 24 November 1840 at the Triangle, Hackney and was buried on 2 December. Booth (1761–1840) was well known in Baptist circles. Apprenticed in 1775 to an ironmonger, he later became a cashier in the Bank of England. He was a member of the church in Mare Street, Hackney, his father having been involved in its formation in 1798.

Booth married one of his cousins, Eady, with whom he had eight children (Fig 39; Payne 1956, 198–9).



Fig 38. Isaac Booth's lead breast plate <86> (scale 1:4)

His will (TNA, PROB 11/1937/109; written on 3 June 1817, proved on 7 December 1840) describes him as 'of the Bank of England'. He left everything to his wife, Eady Booth, including

freehold messuages, tenements and premises being No 2, 3, 4, 5, and 6 in Brick lane, Old Street, (now Central Street) being a ground rent of £16 16s 1d ... my copyhold situate and being in Mare Street, Hackney.

Booth's obituary was published in *The Baptist Magazine* for 1841 and includes many details of his life. He was the second and only surviving son of the late Revd Abraham Booth, for many years pastor of the Baptist church in Little Prescott Street, Goodman's Fields. Booth was born on 8 May 1761, at Sutton in Ashfield, Nottinghamshire, and came to London to take over at Little Prescott Street on the death of his father. In 1788, he became clerk at the Bank of England, where he worked for 54 years, up until a few days before his death, by which time he had reached the office of senior cashier. He was made one of the deacons of the church in Little Prescott Street in 1827.

Booth was one of the earliest founders of the Sierra Leone Company, which was formed to promote the abolition of slavery. He was a trustee of Stepney College and a strong supporter of the Shakespeare's Walk and Protestant Dissenters charity schools. He was particularly interested in the smallpox vaccine discovered by Jenner and was one of the first to

introduce and practise vaccination. His obituary also includes extensive details about his death:

Mr Booth, throughout his long life continued in the enjoyment of almost uninterrupted good health until the month of August last year, when he was seized with a fit which lasted all night. Prior to this he had not been absent above seven days from sickness, during a period of nearly fifty four years in the service of the Bank of England.

So anxious was he for the faithful performance of his duties, that on his rallying a little strength, he returned to the Bank, which he continued to do until a very few days before his death. He continued, although very feeble to come down stairs to his family until the Thursday previous to his decease, labouring only under the gradual decay of nature, his infirmities being unattended by pain. Whilst the outward man was decaying, his soul had the support of the God of the just. His mind was continually directed to the thoughts of that heaven to which he was journeying; he felt that he was near the end of his pilgrimage; he set his house in order, and he was in constant communion with that God into whose presence he was about to enter. On that day the only individual he saw out of his own immediate family, was one of his nephews, to whom he addressed himself in a fervent manner. He observed, 'I am old, and in my eightieth year, and feel myself decaying, but my support is in Christ. I can compare myself with poor Bunyan, for I have lost my burden, but I have had a hard difficulty to keep it down. I could not do it of myself, but through the aid of my Saviour.' On Friday he was first confined to his room, and on Saturday took to his bed, which he never afterwards left. He expressed a wish to see the Rev Mr Stovel, his pastor to whom he was affectionately attached, and with whom he had an affecting interview. From Saturday morning it was evident that he was dying, but without the least symptom of distress or pain, and his mind being, with but few intervals, perfectly sensible. He was particularly so to the attached and unwearied attentions of his affectionate partner and now widowed wife, whose unremitting care was amply repaid by the serenity of his mind, his patience, his humble and almost infantine submission to her wishes. 'I love you, my dear,' he said, when his intellectual vigour had nigh gone, 'but I love God better; God in Christ, and next to him I love you.' His thoughts were also at times directed to his weeping children round his bed side – mourning, but not like those without hope, for no longer now could words of affection be uttered by his lips. At last he became insensible to the things of time and sense – his soul had nearly thrown off all its sensual and earthly encumbrances, and was preparing its wings for flight to its eternal mansion. When all earthly senses were gone, it was evident that his soul was in constant devotional exercises of

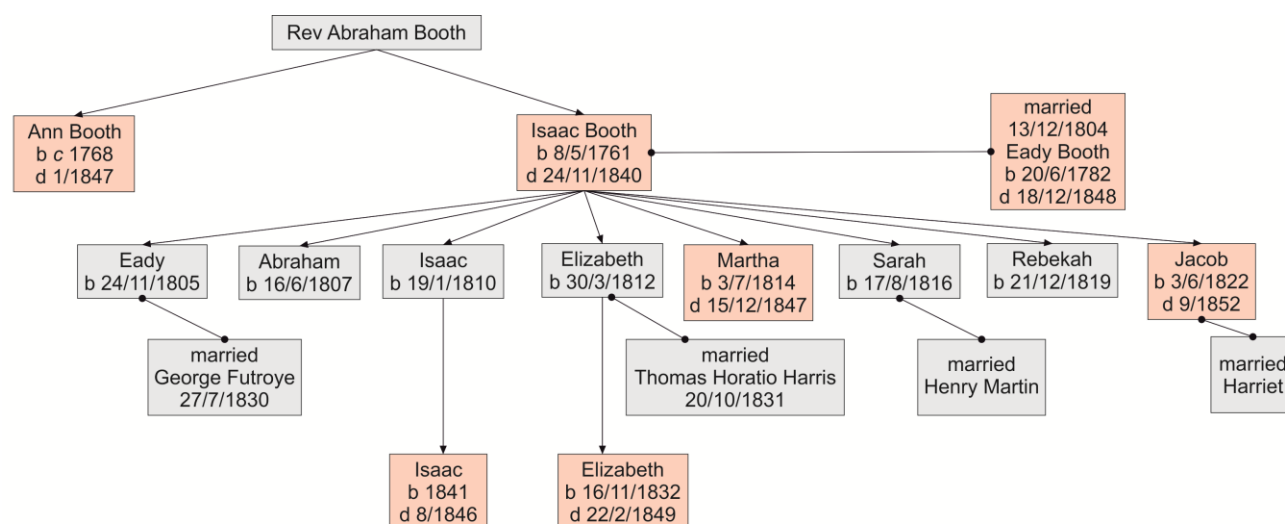


Fig 39. Booth family tree

prayer and praise; his often and repeated ejaculations of Lord and Hallelujah, proved that he was then realizing joys and thoughts his lips could no longer articulate, and precisely at noon on Tuesday he sank into his eternal rest. 'He was not, for God took him.' The triumph was completed, the last enemy was conquered, and without a struggle or a sigh his Spirit had joined that of his father, with his Father and his God in those mansions of bliss prepared for those who love God. The griefs of his afflicted widow and family were assuaged by confidence in that prayer to heaven, 'Let me die the death the righteous, and let my last end be like his.'

His remains were interred on Wednesday, 2 December 1840, in the burial ground attached to Dr Cox's chapel, at Mare Street, Hackney, where he had attended worship for nearly 37 years. The ceremony was conducted by his pastor and the Rev Dr Cox. (*Baptist Mag* 33, 1841, 128–9)

Booth's death certificate shows that he died in Mare Street, the cause of death being given as 'Age and debility'.

Isaac Booth

Skeleton [143]

Coffin [142]

Identified from burial register.

Osteology: subadult aged *c.* four years. There is a possible ossified cyst found associated with this individual, a hollowed out sub-sphere, shaped piece of bone with one flat surface. There were endocranial lesions on the occipital bone (Lewis type 1) which were active at the time of death.

Finds: copper-alloy buttons <S11>–<S12> (Fig 75) may have been intentionally placed with the body rather than from burial clothes; also a complete copper-alloy pin <S23> (Fig 76) ('The Burial Finds', below).

Isaac Booth died aged five and was buried on 17 August 1846. He died at 1 Andrews Road, the son of Isaac Booth, a hatter, who later emigrated to Australia. He was a grandson of Isaac and Eady Booth (Fig 39).

The death certificate shows that the cause of death was given as 'Ascites 3 months, Anasarca 2 months, Marasmus 2 months'. Ascites refers to abnormal accumulation of fluid in the abdominal (peritoneal) cavity, anasarca is the medical term used to describe the general swelling of the whole body, usually due to abnormal fluid retention in the tissues. Marasmus is malnutrition occurring in infants and young children, caused by an insufficient intake of calories or protein and characterised by thinness, dry skin, poor muscle development, and irritability. In the mid-19th century, specific causes were associated with specific ages: in infants under twelve months old, the causes were believed to be unsuitable food, chronic vomiting, chronic diarrhoea, and inherited syphilis. Between one and three years, marasmus was associated with rickets or cancer. After the age of three years, caseous (cheeselike) enlargement of the mesenteric glands (located in the peritoneal fold attaching the small intestine to the body wall) became a given cause of wasting. After the sixth year, chronic pulmonary tuberculosis appeared to be the major cause.

?Ann Booth

Skeleton [287]

Coffin [288]

Identified from burial register.

Osteology: younger (18–25 years) adult female. She has very severe dental caries, deposits of calculus, and has lost teeth before death.

The documentary evidence (burial register) suggests this should be Ann Booth, who died aged 79 and was buried on 14 January 1847. She was the daughter of Abraham Booth and sister of Isaac Booth (Fig 39).

Her will (TNA, PROB 11/2048/66; written on 15 April 1844, codicil 1 November 1845, proved on 21

January 1847) shows her to be of 53 Mansell Street, Goodman's Fields, spinster. She had money invested in 3.5% Bank Annuities and shares in the Coventry Canal Company and other canal companies. She left sums to her nieces and nephews, while Eady Booth, widow of her late brother Isaac Booth, was to be provided for from a fund of £550.

Ann Booth's death certificate shows that she died at Mansell Street, the cause of death being given as 'Decay of Nature'. She is described under occupation as a 'Lady'.

Martha Booth

Skeleton [266]

Coffin [267]

Identified from burial register.

Osteology: young female (26–35 years). She has spinal disease in the form of osteophytosis and dental disease in the form of periodontal disease, teeth lost before death, caries and associated abscesses and deposits of calculus. She also has a bilateral rib deformity which is indicative of long-term corset wear. These changes correspond with similar ones that have been attributed to corset or stay wear (Walker 2012, 275). A note titled 'The evil effects of the corset', published in the *British Medical Journal* in 1903, described these rib deformities and advised women against wearing corsetry that caused a noticeable shortness of breath and restricted movement, warning that the habitual wearer may be permanently deformed by the age of 24 and crippled by 30 years of age (Anon 1903, 388–9).

Finds: incomplete tortoiseshell comb <S1> (Fig 5).

Martha Booth died aged 33 and was buried on 23 December 1847. Her obituary in *The Baptist Magazine* showed that she was born on 3 July 1814 and died on 15 December 1847. She was the daughter of Isaac and Eady Booth (Fig 39), who were living at Providence Row, where she was born. She had suffered from a long illness and

displayed the vigour of her piety in the fortitude of her spirit and the patient endurance of her long affliction. Her illness, which baffled all medical skill and the kindest attendance commenced in 1832: from that time she had few intervals of ease, and none of health. When a little relieved, she was constant in her attendance at the house of God, and evinced an unconquerable attachment to his cause. Her room was one continued scene of patient and instructive subjection to the will of God. In the worst affliction, and to the last, she testified with fervent constancy to the grace of God; encouraging the faith of all observers by her own example of its all sufficiency. The example sufficiency uniformity of her peaceful repose in her forgiving Lord was most remarkable; and when the crisis of her earthly trial came, she had not only peace, but joy. She suffered much, but she greatly rejoiced; and fervently commended to all the service and salvation of that Lord, who, as a refiner of silver, had in the furnace of

affliction, prepared her to reflect his image both in life and death. (*Baptist Mag* 40, 1848, 428–9)

Her death certificate shows that she died at Well Street, South Hackney the cause of death being given as 'Diseased heart, many years'.

Eady Booth

Skeleton [100]

Coffin [99]

Coffin plate (not retained): iron.

Osteology: middle-aged female (36–45 years). Her skull was bathrocephalic (a normal deformity of the posterior skull with bulging of the mid-portion of the occipital bone). She also had healed periostitis on the shafts of both tibiae, which can be indicative of nutritional stress, but this had healed by the time of death. The left mastoid process was much larger than the right, indicating perhaps greater use of the sternocleidomastoid muscle on the left side. The primary actions of this muscle are rotation of the head to the opposite side and flexion of the neck. There was also evidence for a well healed blunt force trauma in the form of a depressed fracture to the right parietal. Her ribs displayed deformities consistent with long-term corset wear. She also had dental disease in the form of teeth lost before death, caries and periodontal disease. Finds: large buckle <S8> (not illustrated), possibly a belt buckle; found in the coffin.

Eady Booth died aged 66 on 18 December 1848 and was buried on 23 December. She was born on 20 June 1782, the daughter of Jacob Booth and Eady Sergeant, in Woodford, Essex. She married Isaac Booth on 13 December 1804 at St Nicholas's church, Deptford (Fig 39).

Her will (TNA, PROB 11/2087/251; written on 4 February 1847, proved on 3 February 1849) shows her to be of Cambridge Row, Hackney. She left her silver cup, marked with the initials IB, to eldest daughter Eady Futvoye, wife of George Futvoye, and her gold watch to daughter Elizabeth Harris, wife of Thomas Harris of Finsbury Square, soap manufacturer. Her daughters Martha Booth and Rebekah Booth were to receive 'all my wearing apparel, household goods, furniture, china, glass, plate, household linen, books, prints, pictures and other articles of the like nature' divided equally between them, as was the residue of her estate. She left the five properties on the east side of Brick Lane, Old Street, bequeathed to her in Isaac Booth's will (above), to her daughter, Martha.

The 1841 census records her living in Mare Street, with her children Martha, Sarah, Rebecca and Jacob (below), who is noted as a shoemaker, along with Susan Heckley, family friend. Her death was announced in *The Baptist Magazine*, along with that of her granddaughter Elizabeth Harris:

On the 18th December last, at the Cottage, Well Street, Hackney, Eady, relict of the late Isaac Booth Esq, son of the late Rev Abraham Booth, formerly pastor of the baptist church, Little Prescott Street, London and on the 22nd of

February 1849, in the 17th year of her age, Elizabeth Harris, granddaughter of the above Eady and Isaac Booth. (*Baptist Mag* 41, 1849, 231–2)

Her obituary was included with her sister Martha (above), under the title ‘Two sisters’ (*Baptist Mag* 40, 1848, 428–9).

Her death certificate gives the cause of death as ‘Stricture of the colon, duration uncertain. Laceration of the intestine, 26 hours’.

Jacob Booth

Skeleton [93]

Coffin [92]

Coffin plate (not retained), iron.

Osteology: young (18–25 years) adult male. He had healed cribra orbitalia in his left orbit indicating a survived period of severe anaemia earlier in life. He also had very heavy deposits of calculus, particularly on the right dentition, along with dental abscesses, caries and enamel hypoplasia.

Jacob Booth died aged 30 and was buried on 11 September 1852. He had been born at Mare Street on 3 June 1822. The 1851 census records him at 13 Eversholt Street, a boot and shoemaker, living with his wife Harriet (Fig 39), son Robert and servant Elizabeth Gunton.

His death certificate shows that he died on 7 September at Eversholt Street. He was described as a Master Cordwainer, the cause of death given as ‘Delirium cum tremens 3 days, Convulsions 4 hours’.

Thomas Bourne

Skeleton [393]

Coffin [394]

Coffin plate <74> (Fig 72): lead.

Osteology: probable male aged 36–45 years. He suffered from osteoarthritis to the cervical vertebrae, spondylolysis in his lower lumbar vertebrae. It is believed that both repetitive trauma such as hard labour or some sports and an inherent genetic weakness can make an individual more susceptible to spondylolysis. He also displayed osteophytosis and Schmorl’s nodes in his spine. He had a singular pipe notch in his mandibular teeth, from habitual pipe smoking, and both periodontal and antemortem tooth loss.

Thomas Bourne died aged 59 on 22 May 1843 (from the death certificate) and was buried on 14 July (according to the burial register). There is no indication of the cause of the delay, if the entry in the register is correct or that they may be two separate people.

The only death certificate that can be located for the right name, age and approximate date shows that he died at Stepney Green. He was described as a baker, the cause of death given as ‘Typhus fever’. However, the burial register gives his address as Goldsmiths Row.

Joseph Bright

Skeleton [456]

Coffin [457]

Coffin plate <70> (Fig 40): lead.

Osteology: fragmentary remains of an older (46+ years) adult male. He had lost all teeth during life and had osteophytosis to the spine and other joints that were present for analysis.

Finds: a counterfeit silver shilling <C1>, marked 1816, was found near his left hip (not illustrated; ‘The Burial Finds’, below).



Fig 40. Joseph Bright’s lead breast plate <70> (scale 1:4)

Joseph Bright of Queens Road, Dalston, died aged 75 on 10 May 1848 and was buried on 17 May. His death was reported ‘At Dalston, Joseph Bright, esq. late a Cashier in the Bank of England’ (*Gentleman’s Mag* 1848, 102). He was one of the cashiers who were authorised to sign Bank of England notes.

His will (TNA, PROB 11/2076/27; written on 10 June 1841, codicil added 10 July 1841, proved on 24 June 1848) states him to be a gentleman of the Bank of England and Bethnal Green. He left three leasehold tenements in Gloucester Street, Cambridge Heath and a leasehold messuage in Durham Street, Hackney Road, to his daughter Mary Ann Bright. He also had a son, Thomas Goldsmith Bright, who had been born on 29 October 1804. A codicil to his will, added 10 July 1841, replaced Thomas Goldsmith with Mary Ann as executor.

His death certificate shows that he died at 3 Grange Villas, Queens Road. His cause of death was given as ‘Asthma, many years’. He was buried in a coffin shaped yellow stock brick structure, S2 (Fig 26).



Fig 41. Edmund Burton's lead breast plate <69> (scale 1:4)



Fig 42. Mary Child's lead breast plate <78> (scale 1:4)

Edmund Burton

Skeleton [318]

Coffin [319]

Coffin plate <69> (Fig 41): lead.

Osteology: probable male, aged 18–25 years. He had

Schmorl's nodes in his spine (nucleus pulposus pressure on the weakest part of the end plate or vertebral development process during early life is a possible explanation for these defects). He also had multiple dental pathologies in the form of caries, calculus build-up, and an impacted third molar in the left mandible, crowded teeth, and dental abscesses.

Finds: two fabric-covered buttons with copper-alloy internal structures (more solid than usual), one, <S13>, an open cruciform structure inside a ring and the other, <S14> a disc with four holes (Fig 74) ('The Burial Finds', below).

Edmund Burton died aged 24 on 22 February 1840 and was buried on 29 February. His death certificate shows that he died at 16 Robinsons Row, West Hackney, his sister, Emily being present. His cause of death was given as 'Consumption'. He was described as a 'Clerk to merchant'.

Mary Child

Skeleton [510]

Coffin [511]

Coffin plate <78> (Fig 42): lead.

Osteology: older adult (46+ years) probable female. She has lost all dentition during life and had intervertebral disc disease and osteophytosis in her spine.

Mary Child died aged 84 on 16 June 1819. Her death was announced:

June 16: At her son-in-law's place (Mr John Perry), in Durham Place (East), Hackney Road, in her 84th year, Mrs Mary Child, formerly of Brighton and Sunbury. (*Gentleman's Mag* 1819, 656)

Edith Cooper

Skeleton [131]

Coffin [132]

Coffin plate (not retained): iron.

Osteology: subadult aged c. nine years. Dental disease in the form of caries and enamel hypoplasia. This skeleton also displays evidence for tuberculosis with lesions to the lumbar vertebrae and associated possible hypertrophic osteoarthopathy (on the humeri, ulnae, radii, tibiae, fibulae, and metatarsals). This individual also survived rickets in childhood, which had struck when crawling had begun, as both the arms and legs were affected.

Edith Cooper died aged 12 on 25 August 1835 and was buried on 2 September.

Jane Cotton

Skeleton [515]

Coffin [516]

Coffin plate <81> (Fig 43): lead.

Osteology: probable female aged 26–35 years. She had a button osteoma on the left frontal bone and osteophytosis at most surviving joints and in the spine



Fig 43. Jane Cotton's lead breast plate <81> (scale 1:4)



Fig 44. Elizabeth Cox's lead breast plate <90> (scale 1:4)

and dental disease in the form of calculus deposits. Her lower dentition was also quite crowded.

Jane Cotton died aged 63 on 6 May 1819.

Elizabeth Cox

Skeleton [782]

Coffin [783]

Coffin plate <90> (Fig 44): lead.

Osteology: adult female aged 26–35 years. She displayed evidence for dental disease in the form of enamel hypoplasia, very heavy deposits of calculus, caries and dental abscesses. Her ribcage had deformities consistent with the long-term wear of a corset.

Elizabeth Cox, first wife of Revd Francis Augustus Cox, died aged 32 on 12 May 1818. She was born around 1786, the daughter of Jonathan King, Gentleman of Watford. She married Cox on 27 June 1809 at St Mary's church, Watford in Hertfordshire (Fig 45).

Emma Augusta Cox

Skeleton [777]

Coffin [778]

Coffin plate (not retained): iron.

Osteology: a young adult female (18–25 years). She had a button osteoma on the right femur, osteophytosis to the spine and dental disease in the form of teeth lost antemortem, caries, enamel hypoplasia, and calculus deposits.

Emma Augusta Cox, daughter of Revd Francis Augustus Cox, died aged 27 and was buried on 30 January 1838. She was born on 18 March 1811 at her maternal grandfather's house in Watford (Fig 45). Her death certificate shows that she died on 23 January and at the time of her death, she was living at 10 Golden Square, Saint James Westminster, in the house of William H Summers, a solicitor. The cause of her death was given as 'consumption'.

John William Cox

Skeleton [775]

Coffin [776]

Coffin plate (not retained): iron.

Osteology: subadult aged $\approx$ 15 years-old at the time of death. There was active cribra orbitalia in the left orbit, indicating anaemia at and before death.

John William Cox, son of Revd Francis Augustus Cox, died aged 15 and was buried on 6 June 1839. He was born on 1 April 1824 at his father's house at Cambridge Heath, Hackney (Fig 45). His death certificate shows that he died on 31 May, at the Triangle, South Hackney, the cause of death given as 'Pulmonary consumption'.

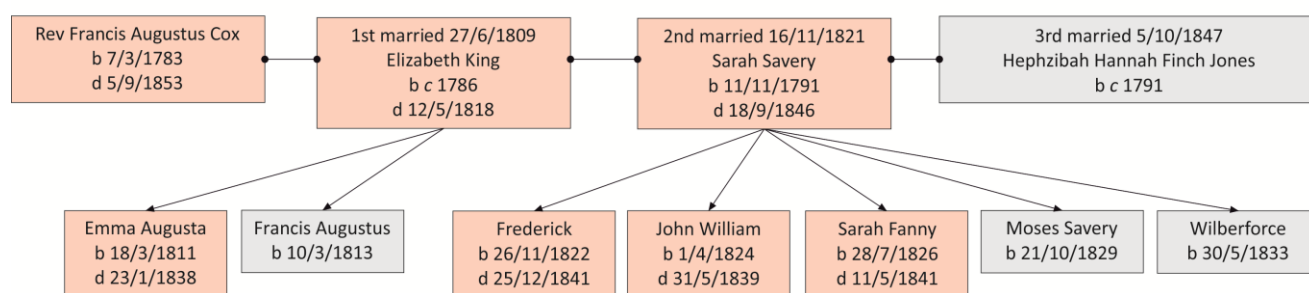


Fig 45. Cox family tree

Sarah Fanny Cox

Skeleton [729]

Coffin [730]

Identified from burial register.

Osteology: aged approximately 12 years. This adolescent had survived rickets during early childhood, but was left with bowing to the lower limbs. There was also active periostitis to the legs, with severe enamel hypoplasia and caries observed in the dentition.

Sarah Fanny Cox, daughter of Revd Francis Augustus Cox, died aged 14 and was buried on 17 May 1841. She had been born on 28 July 1826 at the family home in Cambridge Heath, Hackney (Fig 45). Her obituary recorded that she was the only remaining daughter of the Revd Dr Cox, of Hackney. She joined her father's church at the age of 12 and took part in teaching at the Sunday school. She died on 11 May 1841 after suffering from consumption for two years:

The first very decided attack ensued upon a severe cold, through being caught in a heavy shower of rain, when engaged in efforts to promote the cause. Still the manifestations of disorder possessed for a long time a character of incertitude, and strong hopes were entertained, from the opinions expressed by physicians, of an entire recovery by careful management. For this purpose the usual prescriptions of change of air were resorted to, and her affliction at once alleviated by the administrations of medicine, and the consoling truths of the gospel, as given both at home and by her pious physician in Devonshire. It pleased God, however, to frustrate the hopes and deny the prayers affection, for reasons too deep for sense to fathom, but too wise, though unexplained, for mortals to dispute.

During her two years of approach to dissolution, which approach, however, became only decidedly visible within a few months, the calmness of her spirit and the maturity of her Christian principle displayed themselves. Her remaining life was one continual, and, for so young a disciple, extraordinary act of entire acquiescence in the will of God. She not only did

not murmur, but desired nothing otherwise, and felt that everything was perfectly and undeniably right. Her conscientiousness was extreme, and her love to scripture and to prayer pre-eminent. This is not offered as an incense to her memory, for that could not reach her now, but as a humble acknowledgment of the power of grace and the love of God. When death had received his final commission, she fell in a tranquil triumph into the arms of her Saviour; and left us sorrowing for her, yet rejoicing with her, as 'absent from the body present with the Lord'. (*Baptist Mag* 33, 1841, 299–300)

Her death certificate shows that she died on 11 May 1841 at West Street, South Hackney, the cause of death given as 'Pulmonary consumption'.

Frederick Cox

Skeleton [727]

Coffin [728]

Coffin plate (not retained): iron.

Osteology: young adult (18–25 years) probable male. He displayed very severe enamel hypoplasia to his anterior teeth, along with caries and calculus deposits. His fifth lumbar vertebra was fused to the first sacral vertebra (a mostly asymptomatic congenital anomaly).

Frederick Cox died aged 19 and was buried on 1 January 1842. He was the son of Revd Francis Augustus Cox (Fig 45), who wrote a memoir of him for *The Baptist Magazine*.

He was born at the family home in Cambridge Heath, Hackney on 26 November 1822. He was initially educated at home and then subsequently under the tuition of Dr John Allen (above), prior to entering University of London.

In July 1838, Frederick was placed with a merchant in the City of London; but, after a few months, it was found that his tastes lay in a different direction and after being recommended to the college at Stepney, he commenced his theological course there in the autumn of 1840.

After reaching 15 Frederick grew rapidly and became more susceptible to illness, initially thought to

be 'a derangement of the biliary system'. He was sent on continual journeys for his health, including to Devon in October 1841. He was seized with a haemorrhage at Modbury, near Plymouth, on the night of 27 November. He was not aware of the nature of it and lay down again to rest till the morning. Subsequently to this he appeared to convalescence for a fortnight. However, a second haemorrhage took place on 6 December and then the next day there was another return of bleeding and he died shortly afterwards.

Frederick's body was brought from Devon and interred at Hackney on Saturday, 1 January; Dr Murch officiated the occasion, while the Revd J. Sherman of Surrey Chapel delivered a funeral discourse on the following Sunday at Mare Street (*Baptist Mag* 34, 1842, 57–9).

His death certificate shows that he died on 25 December 1841, at Modbury, near Kingsbridge, Devon. The cause of death was given as 'consumption'.



Fig 46. Sarah Cox's lead breast plate <79> (scale 1:4)

Sarah Cox

Skeleton [666]

Coffin [667]

Coffin plate <79> (Fig 46): lead.

Osteology: adult female, aged 36–45 years. Her cranium was bathrocephalic. She had dental disease in the form

of teeth lost before death, abscesses, and calculus deposits. Interestingly she had a gold leaf filling to her upper right second premolar and file marks to this tooth and the upper left first molar, indicating access to dentistry.

Sarah Cox died aged 54 on 18 September 1846 and was buried on 24 September. She was born on 11 November 1791, the daughter of Moses Savery esq. of Bovey Tracey, Devon, a serge maker and Mary, his wife. Her birth was registered at the Hen Street Baptist chapel, Bovey Tracey, on 25 December 1791 (Fig 45). She became the second wife of Revd Francis Augustus Cox (below), whom she married on 16 November 1821, at Stoke Damerel, Devon.

Her death certificate shows that she died at the Triangle, South Hackney, the cause of death given as 'Ovarian Dropsy, 10 years'.

Francis Augustus Cox

Skeleton [650]

Coffin [636] lead, [637], [638]

Coffin plates <84> and <95> (Fig 47): lead (outer and inner).

Osteology: adult male aged 36–45 years. He had evidence for diffuse idiopathic skeletal hyperostosis with fusion of his seventh to eleventh thoracic vertebrae and at the sacro-iliac joint. The condition may cause pain, stiffness and restricted motion and may be related to a rich diet, lack of exercise ('Pathology', below). He also displayed osteophytosis to his spine and dental pathology such as teeth lost before death, gross abscesses, caries and calculus deposits.

Textile: 18 fragments of wool flannel with nail holes <TX8>, probable lining of lead coffin ('The Burial Finds', below).

The Revd Francis Augustus Cox DD died aged 70 on 5 September and was buried on 13 September 1853 (Fig 48).

His will describes him as of Downs Park Road, Clapton, Middlesex, Minister of the Gospel (TNA, PROB 11/2179/138; written on 25 September 1852, codicil added 24 August 1853, proved on 10 October 1853). He left to his wife Hephzibah Hannah Finch Cox

the message and premises in which they lived in Downs Park Road, Clapton and all the ready money, household furniture, plate, china, wine, books and whatever else may be therein ... also six shares in the Globe Insurance Company and ten quarter shares in the Cheltenham Gas Company, which were hers before our marriage and also the sum of one thousand pounds sterling. I give devise and bequeath unto my son



Fig 47. Francis Augustus Cox's lead breast plate <84> and inner plate <95> (scale 1:4)

Moses Savery Cox ... all my estate and interest in two messuages and premises in the Triangle, Hackney and ground rents from other houses and property near thereto which I also under lease from Mr William Curling an annuity of fifty pounds secured to me on an estate at Olney, Buckinghamshire and my messuages and premises situate at Old Stratford ... I give devise and bequeath unto my son Wilberforce Cox ... my meadow land situate at Leighton Buzzard, Bedfordshire...also a piece of ground in Wing Lane, Leighton Buzzard ... also my copyhold acreditaments and premises in Castle Yard, Holland Street, Blackfriars ...and my leasehold messuage and premises in Cambridge Heath, Hackney ... I give devise and bequeath unto my son Francis Augustus Cox ... all principal and interest money ... on a mortgage from Mr Bannister of a messuage and premises at Bedford and on a mortgage from Mr Mowan of messuages and premises at Olney ... and also my ten shares in the General Fire and Life Assurance Society, King William Street ... I give devise and bequeath unto my sister Louisa Matilda Killingworth ... a piece of freehold land adjoining her estate at Deanshanger, Buckinghamshire, also fifty pounds sterling ... The remnants to be divided equally between Moses and Wilberforce.

A codicil added on 24 August 1853, allowed for the sale of the house in Downs Park Road and the purchase

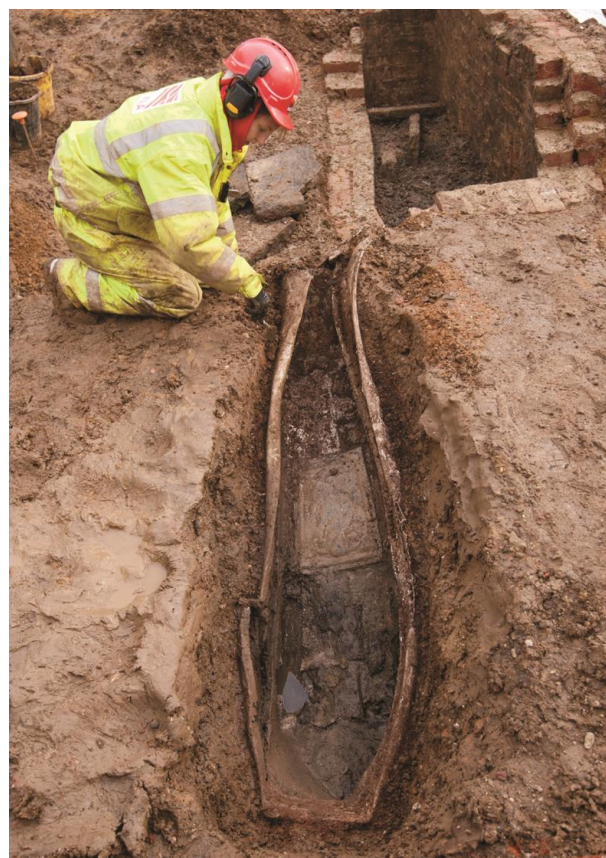


Fig 48. View of Francis Augustus Cox's coffins under excavation, looking east

of one in King Edwards Road, Hackney, the leasehold of St Thomas's Hospital; this house to go to Hephzibah. There were minor changes to the amounts left to his son, Francis Augustus Cox.

His successor at Mare Street, Revd Daniel Katterns wrote his reminiscences of Revd Cox for *The Baptist Magazine*. Cox was born in the spring of 1783 at Leighton Buzzard, Bedfordshire, an only son, and for many years an only child. He inherited a considerable amount of property from his grandfather, who was a well-respected member of the Baptist church in that town. He was only 16 when he was admitted to college at Bristol in the summer of 1798, then under the superintendence of Dr Ryland. On the completion of his studies there he went Edinburgh University, where he took his degree of Master of Arts.

He began his ministerial career in Devonport as assistant to Isaiah Birt, who later became his associate at Mare Street for two years at the evening services of the Sabbath (Cox 1846, 17). His first ministerial position was at Clipstone, Northamptonshire, where he was ordained on 4 April 1804. In the first two years of his pastorate there he baptised 56 persons and the increase of the congregation called for the erection of a larger chapel. When the position in the Baptist church at Cambridge, to succeed Robert Hall, became free in the summer of 1806, Cox occupied the pulpit there for 12 months. This had been a temporary arrangement, and at the expiration of a term, which had failed to satisfy either pastor or people, it was not renewed (Briggs 2000, 392). Cox then returned to Clipstone and visited several Baptist churches which happened to be vacant. At length he was directed to Hackney, where a small church existed, which had been formerly under the care of Mr Rance. It met in a building in Shore Place, which he took over in February 1811. It was not long, however, before the building in Mare Street was erected for the increasing congregation. During Cox's 42 years as pastor, the church's membership increased more than six-fold. His preaching attracted a large and distinguished congregation.

Within the denomination Cox was an early supporter of the Baptist Union, becoming president in 1834, 1835, and again in 1852. He was joint secretary from 1824 of the Baptist Home Missionary Society; a promoter of the Baptist Irish Society and the Bible Translation Society; secretary of the Baptist Continental Society for nearly five years from 1831; and chairman in 1838 of the Baptist board on colonial apprenticeships. He helped start the *Baptist Magazine* in 1809, putting up some of the capital, and later contributed articles. He was mathematics tutor and occasional examiner at Stepney College from 1813 to 1822, and wrote a jubilee history of the Baptist Missionary Society, on whose committee he sat for forty years. While he was in America in 1835 the University of Waterville conferred on him an honorary DD.

Beyond the denomination Cox was secretary of the General Body of Dissenting Ministers of the Three Denominations for those residing in and near London and Westminster from 1838 to 1841, and an active campaigner for greater religious freedom. He helped orchestrate the final campaign for the repeal of the Test and Corporation Act in 1827–8; helped found *The*

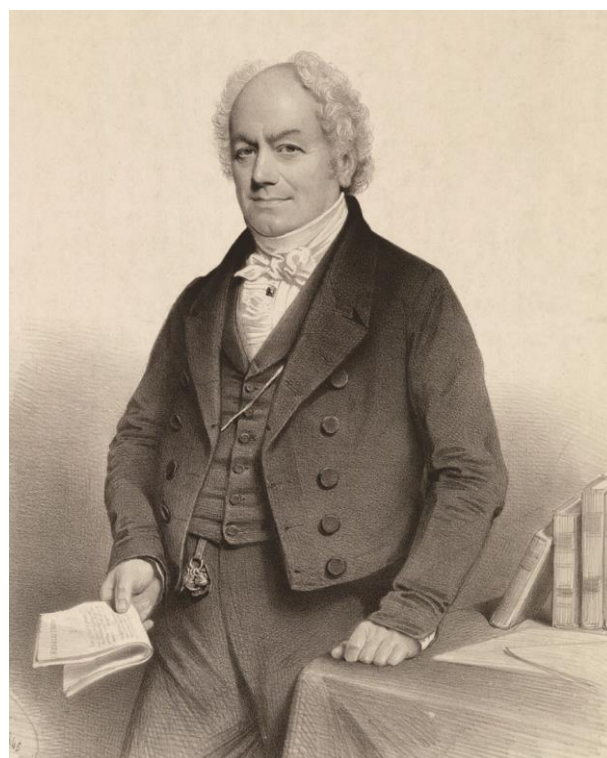


Fig 49. Portrait of Francis Augustus Cox, by Charles Baugniet, lithograph 1845 (© National Portrait Gallery, London)

Patriot newspaper in 1832; and was associated with groups such as the Protestant Society for the Protection of Religious Liberty, the Society for Promoting Ecclesiastical Knowledge, the Evangelical Voluntary Association, and the Religious Freedom Society. In 1844 he helped found the Anti-State Church Association, becoming one of its first secretaries, and in 1845 he led the opposition to state support for the Catholic Maynooth College. In the mid-1820s he had been a prime mover in the scheme to establish a London university, which culminated in the formation of University College. Ministers of religion were excluded from the college council, but Cox was initially librarian. The university project brought him into contact with Lord Brougham who, as lord rector of Glasgow University, had secured for Cox an honorary LLD in 1824 (Briggs 1999).

In addition to his public and pastoral duties Cox also published several works, starting in 1806 with an *Essay on the Excellence of Christian Knowledge*. Subsequent works included *The Life of Philip Melancthon* (1815); *Female Scripture Biography* (1817); a pamphlet, *On Baptism* (1824), in response to attacks by prominent Congregationalists; his two-volume *History of the Baptist Missionary Society, From 1792 to 1842* (1842), and, with James Hoby, *The Baptists in America* (1836). In addition Cox contributed numerous articles to journals including the *Eclectic Review* and the *Journal of Sacred Literature*, and in 1849 he edited the *Missionary World* (Briggs 2000).

Two things especially adapted him for public business and contributed to his prominence; his habitual good temper and his talent as a public speaker. Being ready, fluent, discreet, and attractive, his

appearance was prepossessing, and his manners were always gentlemanly and bland. In the earlier part of life he was tall, thin, and graceful; but as he increased in years, his form became portly, the remains of his dark curly hair became perfectly white, and his whole aspect was that of a fine old man (Fig 49).

Cox was married three times: firstly, in 1809, to Elizabeth King of Watford, but soon after their marriage she 'suffered greatly from bodily indisposition' before 'an illness of very distressing character' left him a widower, with a son and daughter. Following her death, he married Sarah Savery in 1821, to whom he was married for 17 years, although for her final seven years, she had an incurable and painful illness. His third wife, whom he married on 5 October 1847, was the widowed Hephzibah Hannah Finch Jones, who was born in Teale, Berkshire, c.1791. Their marriage was registered in Cheltenham, Gloucestershire.

Four of his seven children, his two daughters and two of his sons, died before him, one son, Frederick, became consumptive and died while training for the ministry at Stepney. His three remaining children were all in, or on their way to, Australia for health reasons at the time of his death (Fig 45).

His own health was generally good; yet ten or 12 years prior to his death he endured great pain for some months which was only ended by a severe surgical operation. Half a year ago Katterns perceived

that the habitual vivacity of his friend was greatly lessened, and that his physical energies were declining. Pains in the region of the stomach of a peculiar character, which medical skill could not remove, and the cause of which was enveloped in mystery, combined with a total inability to take food, undermined his constitutional vigour'.

He died at King Edward's Road, South Hackney on the morning of 5 September 1853. A post-mortem examination on the following day showed that the cause of his suffering was a large internal cancer of the stomach (*Baptist Mag* 45, 1853, 610–4; Chadwick 2004). Poll books show him living in Paragon, Mare Street from 1832–9, 1 Triangle between 1840–6 and 1 Downs Park Road from 1850 to his death.

Following Dr Cox's death a mural tablet was erected inside the Mare Street chapel, in his memory. The tablet was without any symbol or ornament than a lamp, emblematical of immortality, with which it was surmounted; and it bore the following inscription (*Baptist Rep* 28, 1854, 221):

IN LASTING MEMORY OF
FRANCIS AUGUSTUS COX, D D, LL D,
Born March 7, 1783; Died September 5, 1853.
His Mortal Remains, interred in the Adjoining
Ground,
Await the Resurrection of the Just.
Converted in Childhood,
At the Age of 15 he entered Bristol College,
Graduating afterwards in Edinburgh University.
His Labours in the Christian Ministry,
Begun in 1804 at Clipstone in Northamptonshire,

Were in 1806 Transferred to Cambridge, and in
1811
to Hackney.

In this Building,
Erected and Twice Enlarged during his Pastorate,
His Last Sermon was Preached, July 31, 1853.
Commanding in Person, Winning in Address,
Eloquent and Learned,
Blameless, Humble, Amiable, Devout,
By Example Confirming whom he persuaded by
Appeal,
He turned Many to Righteousness.
Prompt in Every Good Cause,
His Chief Delight was in Proclaiming the Gospel of
the Grace of God:
Having Finished his Course,
He came to his Grave in a Full Age,
Like as a shock of Corn Cometh in in his Season.
Honoured and Lamented by All,
Chiefly by them that have Erected this Tablet,
His Church and Congregation.

His death certificate shows that he died at King Edwards Road, South Hackney, the cause of death given as 'Pylorus scirrhus'. This appears to be a common 19th-century ailment, which resulted from restrictions of the gastrointestinal system with symptoms of bad indigestion, stomach pain, and vomiting and a resulting very restricted diet which often led to malnutrition (Canton 1843).

Mary Davan

Skeleton [628]

Coffin [629]

Coffin plate <68> (Fig 50): lead.

Osteology: this older (46+ years) female adult displayed evidence for rotator cuff disease at both shoulders. This is a degenerative condition that increases with age (Rogers & Waldron 1995, 40) (Table 82). This may lead to pain, stiffness and weakening in the shoulder (Resnick 2002, 2087). She had osteoarthritis in the neck and osteophytosis, Schmorl's nodes and intervertebral disc disease throughout the spine. Osteophytosis was also present in all joints that were available for analysis. She had lost all teeth in her maxilla and had caries, calculus, deposits and periodontal disease in her mandibular dentition.

Mary Davan died on 23 January 1823, the wife of Daniel Davan.

Daniel Davan

Skeleton [623]

Coffin [624]

Coffin plate <71> (Fig 72): lead.

Osteology: middle-aged (36–45 years) adult male with bilateral hallux valgus (a condition associated with restrictive, ill-fitting shoes: see 'Pathology'. below). He also displayed evidence for healed porotic hyperostosis to his cranium which may represent a survived period of



Fig 50. Mary Davan's lead breast plate <68> (scale 1:4)



Fig 51. View of Daniel Davan's lead breast plate in situ, looking west

anaemia. There were caries, large abscesses and calculus deposits in his teeth.

Daniel Davan died aged 39 on 9 December and was buried on 16 December 1823. His will (TNA, PROB 11/1678/253; written on 17 November 1823, proved on 20 December 1823) left all his property, cash, clothes and everything belonging to him, or his late wife Mary, to his father, Daniel Davan Sr.

Mary Dean

Skeleton [701]

Coffin [702]

Coffin plate (not retained): iron.

Osteology: older (46+ years) probable female displayed evidence for bilateral rotator cuff disease. She also has perimortem (unhealed) fractures to her sixth thoracic and first and second lumbar vertebrae which may indicate a bad fall just before death. Compression fractures are usually caused by osteoporosis, especially in older women. She has osteoarthritis to her neck, right hand, and shoulders and osteophytosis and intervertebral disc disease to her spine. She has lost all maxillary teeth.

Mary Dean died aged 80 and was buried on 18 February 1838.

Lewis James Drew

Skeleton [504]

Coffin [505]

Identified from burial register.

Osteology: infant aged approximately one to six months.

Finds: a sheet transfer-printed crazed/mosaic-type design pearlware eggcup <S19>, in blue over the outer surface and inside the rim was buried with him (Fig 5) ('Burial Finds', below).

The documentary evidence suggests this should be Lewis James Drew, died aged one year and one month and buried on 26 April 1840. His death certificate shows that he died 19 April at 70 Burlington Arcade, the cause of death given as 'Affection of the chest'. He was the son of John Crowther Drew, a hosier.

Walter Joseph Drew

Skeleton [507]

Coffin [508]

Identified from burial register.

Osteology: an infant aged approximately 1 year.

Walter Joseph Drew died aged six months and was buried on 25 August 1844. His death certificate shows that he died on 19 August at 70 Burlington Arcade, the cause of death given as 'Diarrhea'. He was the son of John Crowther Drew, a hosier.

William Henry Drew

Skeleton [521]

Coffin [522]

Coffin plate (not retained): iron.

Osteology: this infant aged approximately nine months old, died with active cribra orbitalia in the right orbit.

William Henry Drew died aged eight months on 29 January and was buried on 4 February 1846. His death certificate shows that he was the son of John Crowther Drew, a Hosier. He died at 7 Burlington Arcade, the cause of death given as 'Intussusceptis p. mort'. It is most likely that the house numbering is an error, as both the 1841 and 1846 Post Office Directories list John Drew, ready-made linen warehouse, at 70 Burlington Arcade.

Theophilus Evans

Skeleton [84]

Coffin [85]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately 16 years with evidence for tuberculosis throughout the spine (Fig 11) and in the form of rib lesions. This individual had survived rickets in infancy and had very severe enamel hypoplasia and caries in the dentition and active periostitis to the right clavicle.

Theophilus Evans died aged 16 and was buried on 21 March 1824.

Ellen Evans

Skeleton [68]

Coffin [69]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately seven years, died with active cribra orbitalia in both orbits.

Ellen Evans died aged eight and was buried on 14 April 1824.

Jane Lucy Eve

Skeleton [133]

Coffin [134]

Coffin plate (not retained): iron.

Osteology: infant aged approximately one year with evidence for active rickets in the upper and lower limbs.

Jane Lucy Eve died aged nine months, 10 days and was buried on 31 January 1836.

Thomas Faircloth

Skeleton [512]

Coffin [513]

Coffin plate <72> (Fig 52): lead.

Osteology: a probable male, very poorly preserved and fragmentary. The dentition displayed enamel hypoplasia.



Fig 52. Thomas Faircloth's lead breast plate <72> (scale 1:4)

Thomas Faircloth died aged 40 on 9 December and was buried on 19 December 1828. His will (TNA, PROB 11/1753/1; written on 5 December 1828, proved on 26 March 1829) stated him to be 'formerly of Foulmire in the county of Cambridge, grocer, but now of 11 Heath Place, Cambridge Heath, Hackney, Gentleman'. He left everything to his wife Sophia Faircloth apart from sums to John Coote, Mary Ann Faircloth, Thomas Faircloth, James Faircloth, Sarah Faircloth, Emma Faircloth and to the children of Stephen and Sarah Ward of Foulmire.

Theresa Susan Giddy

Skeleton [244]

Coffin [229]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately one year with active cribra orbitalia in both orbits and active endocranial lesions in the occipital. Inflammation and or haemorrhage of the meninges can lead to new bone formation on the internal bone surfaces of the cranial vault. These have been linked to trauma, infection and metabolic disease (Lewis 2004, 93). This infant also displayed evidence for a full craniotomy, indicative of an autopsy being performed after death.

Finds: near complete copper-alloy pin <S20> (Fig 76) ('Burial Finds', below).

Theresa Susan Giddy died aged one year, 11 months and was buried on 30 August 1843. Her death certificate shows that she died on 25 August 1843 at 6 Gloucester Street, Bethnal Green, the cause of death given as

'Convulsions'. She was the daughter of John Giddy, tailor.

Martha Greaves

Skeleton [122]

Coffin [123]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately one year with evidence for active rickets to the upper and lower limbs and the pelvis and thorax and active endocranial lesions to the occipital.

Martha Greaves died aged two and was buried on 17 January 1837.

Richard Davis Hanson

Skeleton [298]

Coffin [299]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately one year.

Richard Davis Hanson died aged 11 months, 25 days on 5 March and was buried on 13 March 1843. His death certificate shows that he died on 5 March 1843 at Denmark Place, South Hackney, the cause of death given as 'Teething'. He was the son of Benjamin Hanson, a meat salesman.

Elizabeth Harris

Skeleton [325]

Coffin [326]

Coffin plate <80> (Fig 53): lead.

Osteology: subadult aged approximately 14 years with active rib lesions. New bone formation on the visceral (lung facing) surfaces of the ribs represents an inflammatory response to direct contact with a lung infection. These changes may represent a non-specific indicator of tuberculosis ('Pathology', below). There was healed cribra orbitalia in the right orbit and caries, abscesses, and deposits of calculus in the dentition.

Elizabeth Harris died aged 16 on 22 February 1849 and was buried on 1 March. A notice of death was published: '... on the 22nd of February 1849, in the 17th year of her age, Elizabeth Harris, granddaughter of ... Eady and Isaac Booth' (*Baptist Mag* 41, 1849, 231–2).

Her death certificate shows that she died at 5 Gloster [Gloucester] Street, Curtain Road, Shoreditch, the cause of death given as 'Consumption, 3 months'. She was the daughter of Thomas Horatio Harris, soap maker. She had been born on 16 November 1832, at her father's house at 15 London Wall, St Alphage, City of London.

Thomas Hayter

Skeleton [441]

Coffin [442]

Coffin plate (not retained): iron.



Fig 53. Elizabeth Harris's lead breast plate <80> (scale 1:4)

Osteology: adult male aged 26–35 years with active rib lesions concentrated on the left-hand side. He had a possible pipe notch and had lost teeth before death. His remaining dentition had deposits of calculus, enamel hypoplasia, caries and there was periodontal disease of the alveolar bone.

Thomas Hayter died aged 44 and was buried on 5 November 1837.

Charles Hayter

Skeleton [309]

Coffin [310]

Coffin plate (not retained): iron.

Osteology: probable male aged 18–25 years. He had evidence for healed endocranial lesions to the occipital and active rib lesions across the entire visceral surface of the ribcage. His femora displayed coxa vara. It can be either congenital or acquired. The common mechanism in congenital cases is a failure of medial growth of the epiphyseal plate. There were gross caries, calculus deposits, and enamel hypoplasia present in the dentition.

Charles Hayter died aged 22 on 10 February 1843 and was buried on 17 February. His death certificate shows that he died at 3 East Street, Bethnal Green, the cause of death given as 'Consumption'. He was described as 'a packer'.

Elizabeth Hewitson

Skeleton [76]

Coffin [77]

Coffin plate (not retained): iron.

Osteology: adult female aged 26–35 years, with congenital radioulnar synostosis to the right arm. This is a rare congenital malformation causing limited rotational movements of the forearm, which may lead to difficulties with some activities of daily living. She displayed pedal symphalangism and bilateral hallux valgus. It is essentially ankylosis of the interphalangeal joints. It is a common anatomical variant. She had Schmorl's nodes in her spine and caries, calculus deposits and periodontal disease.

Elizabeth Hewitson died aged 42 on 11 September and was buried on 20 September 1839. Her death certificate shows that she died at 3 Cranbrook Street, Bethnal Green, the cause of death given as 'Abortus'. She was the wife of Edward Hewitson.

Edward Hewitson

Skeleton [61]

Coffin [62]

Coffin plate (not retained): iron.

Osteology: adult male aged 26–35 years with possible 'clay-shoveler's fractures' to the upper thoracic vertebrae ('Pathology', below; Fig 109). There were also Schmorl's nodes and osteophytosis present in the vertebrae. He had healed cribra orbitalia in both orbits and porotic hyperostosis to the cranium. He had survived rickets in early childhood. He had two small clay tobacco pipe notches in the mandibular dentition along with caries, enamel hypoplasia, abscesses, and had lost teeth before death.

Edward Hewitson died aged 43 and was buried on 11 August 1841. His death certificate shows that he died at 9 Cambridge Circus, Hackney Road, Bethnal Green, the cause of death given as 'Phthisis'. His occupation was given as carpenter.

Elizabeth Ann Hobson

Skeleton [496]

Coffin [497]

Coffin plate <87> (Fig 54): lead.

Osteology: adult female aged 26–35 years, poorly preserved. She had survived rickets in early childhood and had spina bifida occulta, which is both congenital and asymptomatic. Dental abscesses, caries and periodontal disease.

Elizabeth Ann Hobson died aged 24 probably in 1820.

Ursula Hobson

Skeleton [797]

Coffin [798]

Coffin plate <92> (Fig 72): lead.



Fig 54. Elizabeth Ann Hobson's lead breast plate <87> (scale 1:4)

Osteology: probable young adult female (18–25 years) with active bilateral rib lesions. She had healed periostitis to the lower limbs and Schmorl's nodes in the spine. There were also caries, abscesses, and deposits of calculus.

Finds: incomplete tortoiseshell comb <S2> (Fig 5).

Ursula Hobson died aged 22 on 15 January 1820.

Jesse Hobson

Skeleton [152]

Coffin [153]

Coffin plate (not retained): iron.

Osteology: male aged 36–45 years, poorly preserved, with a brachycranial cranium and bilateral hallux valgus. There was osteophytosis present in all major joints. Dental disease was present in the form of lost teeth, caries and periodontal disease.

Jesse Hobson died aged 57 and was buried on 6 February 1850. He was born on 22 March 1792, in Cottesbrook, Northamptonshire, the son of William and Ann Hobson (TNA, RG 4/4663).

His will (TNA, PROB 11/2107/167; written on 2 April 1849, proved on 8 February 1850) states him to be a merchant of Leadenhall Street, City of London (Fig 55). He left everything to his wife Lydia Hobson.



Fig 55. Doorway of 45 Leadenhall Street showing the premises of Jesse Hobson & Son, ale and porter merchants, by James Findlay, c.1850 (London Metropolitan Archives (City of London))

His death certificate shows that he died on 30 January, at St Thomas Square, South Hackney. The cause of death was given as 'Apoplexy and Paralysis, 16 years, Brain disease, fever and exhaustion about 6 days'. Under occupation, he was described as 'Gentleman'.

Ann Huxtable

Skeleton [498]

Coffin [499]

Coffin plate < 177> (Fig 56): brass.

Osteology: adult female aged 26–35 years with a possible healed blunt force trauma to the left frontal. The fifth lumbar vertebra was sacralised. She has lost teeth antemortem, caries and periodontal disease.

Textiles: eleven fragments of a warp-faced silk ribbon <TX6>, ?from bonnet or grave clothes ('Textiles', below).

Ann Huxtable died aged 39 on 20 September 1828 and was buried on 27 September.



Fig 56. Ann Huxtable's brass breast plate <177> (scale 1:4)

Mary Ann Huxtable

Skeleton [460]

Coffin [461]

Coffin plate <101> (Fig 71): brass

Osteology: young adult female aged 18–25 years, poorly preserved and fragmentary, with evidence for hypertrophic osteoarthropathy to the right ribs, legs, right humerus, and feet. There was healed cribra orbitalia to the orbits and deposits of calculus to the teeth.

Textiles: silk plain weave ribbon <TX5>, ?from bonnet or gown ('Textiles', below; Fig 79).

Mary Ann Huxtable died aged 20 on 4 April 1834 and was buried on 12 April.

Isabella Jones

Skeleton [410]

Coffin [411]

Coffin plate (not retained): iron.

Osteology: probable female aged 36–45 years with healed cribra orbitalia in both orbits. There is also intervertebral disc disease and osteophytosis to the spine.

Isabella Jones died aged 70 on 12 March 1835 and was buried on 18 March. Her will showed her to be a widow, formerly of Mile End Road, but of 30 Cumberland Street, Hackney Road at the time of her death. She left small sums to her brother, Christopher Thomas Perry, nephew Joseph Perry, son of her late brother William Perry £5, niece Elizabeth Wetherhead, widow, daughter

of her late brother Joseph Perry. She left to her sister, Jane MacDonald and her daughter Jane:

all my stock in 3% annuities at the Bank of England [and] interest etc. also 6 best silver tea spoons, my silver sugar tongs, a pair of my best salt spoons, my best tea caddy and spoon, four of my best table spoons, my silver pint mug, my large japanned tea board, two pair of my best sheets, two damask table cloths, my patch work quilt, my best card table, my small chest of drawers and my best tea table, also all wearing apparel...I give to Mrs Mary Leslie, sister to my dear husband my large family bible, my china cistern and silver tap and brackets (TNA, PROB 11/1844/206; written 2 December 1833, proved 27 March 1835).

The residue of her estate was left to her sister Jane MacDonald.

Charlotte Jordan

Skeleton [208]

Coffin [209]

Coffin plate <94> (damaged, not illustrated): lead.

Osteology: young adult female aged 18–25 years with an impacted third molar in the left mandible. There were also caries and deposits of calculus in the dentition.

Finds: complete tortoiseshell comb <S5> (Fig 5).

Charlotte Jordan died aged 18 and was buried on 7 March 1826.

Jordan (stillborn)

Skeleton [182]

Coffin [-]

Identified from burial register.

Osteology: foetus/neonate, aged approximately 30 gestational weeks.

A stillborn child was buried on 27 June 1828.

Charlotte Augusta Jordan

Skeleton [183]

Coffin [184]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately 5 years; survived rickets.

Charlotte Augusta Jordan died aged 6 years, 3 months and was buried on 2 September 1834.

Jane Jordan

Skeleton [420]

Coffin [421]

Coffin plate <93> (Fig 57): lead.

Osteology: not included in the subsample.

Finds: incomplete tortoiseshell comb <S4> (Fig 5).



Fig 57. Jane Jordan's lead breast plate <93> (scale 1:4)

Jane Jordan died aged 17 years five months on 18 September ?1837.

John Causey Jordan

Skeleton [166]

Coffin [167]

Coffin plate <67> (Fig 72): lead.

Osteology: probable adult male, poorly preserved and could not be assigned a definite age category. Dental calculus and bilateral hallux valgus.

John Causey Jordan died aged 36 on 13 August 1841 and was buried on 18 August. His will (TNA, PROB 11/1951/225; written on 9 January 1838, proved on 21 August 1841) showed him to be a mariner of No 2 Mile End Terrace, Mile End. He left everything to his brother, Samuel Jordan of Gracechurch Street, to maintain his mother, Isabella Jordan, including legacies left by his father John Jordan, formerly of Stamford, Lincolnshire.

Jordan's death certificate shows that he died at Mile End Terrace. The cause of death given as 'Disease of the heart'. His occupation was given as 'Gentleman'.

Elizabeth Martin

Skeleton [539]

Coffin [540]

Identified from burial register.

Osteology: subadult aged approximately 3 years.

Elizabeth Martin died aged one day and was buried on 16 September 1842.

Susanna Martin

Skeleton [534]

Coffin [535]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately 16 years with dental disease in the form of gross caries, deposits of calculus, and enamel hypoplasia. Dental crowding. Erosive lesions were present on both femoral necks which is indicative of synovial osteochondromatosis ('Osteochondroses', below).

Finds: incomplete tortoiseshell comb <S3> (Fig 5).

Susanna Martin died aged 19 on 19 September 1842 and was buried on 27 September.

Isabella Martin

Skeleton [57]

Coffin [58]

Coffin plate (not retained): iron.

Osteology: older adult female (aged 46+ years) had healed cribra orbitalia in both orbits and had lost all teeth during life; she had osteoarthritis in her spine, hands, wrists and right knee and osteophytosis in the spine and on most joints.

Isabella Martin died aged 76 and was buried on 24 December 1848. Her death certificate shows that she died 19 December, at 40 Margaret Street, Haggerstone, the cause of death given as 'Apoplexy, 2 days'. She was the widow of William Martin, Shoe maker and Susanna Martin (above) was present at her death.



Fig 58. Robert McCurdy's lead coffin plate <85> (scale 1:4)

Robert McCurdy

Skeleton [571]

Coffin [572]

Coffin plate <85> (Fig 58): lead.

Osteology: older adult male (46+ years) with healed rib lesions and a compression fracture to his eighth thoracic vertebra. He had also lost teeth during his life.

Robert McCurdy died aged 50 and was buried on 13 February 1842.

Victoria Meen

Skeleton [316]

Coffin [317]

Identified from burial register.

Osteology: infant approximately nine months old at the time of death with active cribra in both orbits and active rickets (in the ribs, arms and legs). There is also evidence for active scurvy in the cranium.

Victoria Meen died aged one year, four months and was buried on 3 April 1839. Her death certificate shows that she died on 26 March, at 69 Margaret Street, Haggerstone, the cause of death given as 'Inflammation on the lungs'. She was the daughter of Joseph Austin Meen, paper stainer.

Emma Meen

Skeleton [313]

Coffin [314]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately two years with active rickets (in the legs and arms) and associated fractures to the ribs, lower arms, and left legs. There is also enamel hypoplasia in the deciduous dentition.

Emma Meen died aged three years, three months and was buried on 26 July 1839. Her death certificate shows that she died on 20 July, at 69 Margaret Street, Haggerstone, the cause of death given as 'Consumption'. She was the daughter of Joseph Austin Meen, paper stainer.

Emily Meen

Skeleton [120]

Coffin [121]

Identified from burial register.

Osteology: infant aged approximately one year with active rickets (in the arms, legs, and ribs). The cricoid cartilage (part of the 'voice box') had also ossified.

Emily Meen died aged 12 months and was buried on 30 July 1840. Her death certificate shows that she died 24 July, at 69 Margaret Street, Haggerstone, the cause of death given as 'Hooping Cough, terminating in convulsions'. She was the daughter of Joseph Austin Meen, paper stainer.

Charlotte Meen

Skeleton [118]

Coffin [119]

Identified from burial register.

Osteology: middle aged adult female (36–45 years) with evidence for cancer in the form of osteoclastic metastatic carcinoma (to the cranium, left clavicle, pelvis, and femora) ('Neoplastic disease', below; Fig 15). She also had evidence of long-term corset wear to the ribs. There was widespread dental disease with caries, deposits of calculus, abscesses, lost teeth and periodontal disease.

Charlotte Meen died aged 61 and was buried on 8 December 1845. Her death certificate shows that she died on 2 December at 2 Goldsmiths Place, Haggerstone, the cause of death given as 'Cancer'. She was the widow of John Meen, banker's clerk.

Eliza Meen

Skeleton [116]

Coffin [117]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately two years at death.

Eliza Meen died aged two and was buried on 3 March 1846. Her death certificate shows that she died 23 February at 2 Goldsmiths Place, Haggerstone, the cause of death given as 'Dentition, Effusion upon the Brain, Convulsions, 4 days'. She was the daughter of Joseph Austin Meen, paper stainer.

Ann Sophia Morrice

Skeleton [450]

Coffin [451]

Coffin plate (not retained): iron.

Osteology: older adult (46+ years) female had lost all teeth during life. She had osteoarthritis to her lower back and healed periostitis to her legs and widespread osteophytosis across the skeleton.

Ann Sophia Morrice died aged 51 and was buried on 23 November 1831.

Sarah Munday

Skeleton [740]

Coffin [741]

Coffin plate <98> (Fig 59): lead.

Osteology: adult female aged approximately 26–35 years, poorly preserved and fragmentary. She had an early case of hyperostosis frontalis interna and spinal osteophytosis. She had caries, abscesses, and periodontal disease.

Sarah Munday died aged 38 on 6 April 1829 and was buried on 13 April.



Fig 59. Sarah Munday's lead breast plate <98> (scale 1:4)



Fig 60. Edward Munday's lead breast plate <96> (scale 1:4)

Edward Munday

Skeleton [736]

Coffin [737]

Coffin plate <96> (Fig 60): lead.

Osteology: very poorly preserved and fragmentary remains could not be assigned an accurate age and sex. Deposits of calculus were present.

Edward Munday died aged 71 and was buried on 13 March 1833. His will (TNA, PROB 11/1813/196; written on 27 February 1832, proved on 23 March 1833), states him to be a gentleman, 'late of Leadenhall, London, but now of Windsor Terrace, City Road'.

He left small sums to his brothers William and Thomas and brother-in-law James Lowther? His wife Lydia Munday was to get all the household furniture, wearing apparel, plate, linen and china plus his leasehold messuage or tenement and premises in South Street, Marylebone, and after her death to the children of his late daughter Sarah Munday. Lydia also got leasehold messuage and premises in the Commercial Road for her lifetime, after which they went to daughter Elizabeth Munday; leasehold premises in Leadenhall Market for her lifetime, after which they went to son John Munday; leasehold messuage and premises in Sun Street, Bishopsgate Street for her lifetime, after which they went to the children of her late daughter Mary Wright and a leasehold messuage or tenement and premises in Windsor Terrace, City Road and after her death to his daughter Jane Munday. She was also to receive the residue for her lifetime and then to be split between their surviving children.

John Munday

Skeleton [723]

Coffin [724]

Coffin plate <97> (Fig 61): lead.

Osteology: very fragmentary, lower limbs only; not be assigned an age or sex category. Osteoarthritis of the right knee.

John Munday died aged 36 and was buried on 6 May 1833.

Elizabeth Munday

Skeleton [-]

Coffin [-]

Identified from burial register.

Osteology: no identifiable human remains (see below).

Elizabeth Munday of City Road, died aged 47 on 28 June 1840 and was buried on 4 July in a brick-lined grave (burial register). She must originally have been interred within the family structure and it is possible, given the poor condition of the skeletons from this grave, that there was an extra inhumation present. Those individuals identified during the excavation were done so largely by the presence of coffin plates, rather than the very poor skeletal remains.

Her death certificate shows that she died at 14 Windsor Terrace, City Road, the cause of death given as 'Subject to epileptic fits and died of Fever of the Typhoid Kind'. She was described as a spinster.



Fig 61. John Munday's lead breast plate <97> (scale 1:4)



Fig 62. Lydia Munday's lead breast plate <99> (scale 1:4)

Lydia Munday

Skeleton [717]

Coffin [718]

Coffin plate <99> (Fig 62): lead.

Osteology: preservation too poor for assessment.

Lydia Munday died aged 77 on 13 July 1847 and was buried on 17 July.

Her death certificate shows that she died at 31 Portland Place, Islington, the cause of death given as 'Gradual decay of Old Age'. She was the widow of Edward Munday, salesman.

Martha Penkivil

Skeleton [745]

Coffin [742] lead, [743], [744]

Coffin plates <178> and <89> (Fig 63): brass (outer), lead (inner).

Osteology: adult female aged 36–45 years with intervertebral disc disease and osteophytosis in the spine. She had lost teeth before death and had deposits of calculus on the remaining teeth. She was buried with a dental prosthesis. The prosthesis associated with [745] consisted of a partial dental bridge, <169>, comprising human maxillary central incisors (perhaps 'Waterloo' teeth) fixed into a rose gold mount with silver pins ('Dentistry', below).

Martha Penkivil died aged 54 on 28 August and was buried on 2 September 1824.

Eliza Pond

Skeleton [245]

Coffin [246]

Coffin plate (not retained): iron.

Osteology: infant aged approximately 18 months with active rickets (to the ribs) and a possible retained anterior fontanelle. There was active cribra orbitalia in both orbits and brown staining to all deciduous teeth.

Eliza Pond died aged one year, five months on 12 March 1839 and was buried on 15 March. Her death certificate shows that she died 10 March 1839 at 29 Oval Cottages, Bethnal Green, the cause of death given as 'Teething'. She was the daughter of John Pond, commercial clerk.

Rebecca Pritlove

Skeleton [164]

Coffin [165]

Coffin plate (not retained): iron.

Osteology: older adult female (46+ years) with concha bullosa in the right maxilla. This is a fairly common condition which may be congenital or associated with chronic sinus infections, environmental pollution and allergies ('Other Congenital Conditions', below). She had possible osteoporosis and dental disease in the form of tooth loss, abscesses, and periodontal disease; she appeared to have worn a corset for a prolonged period of her life.



Fig 63. Martha Penkivil's brass breast plate <178> and lead inner plate <89> (scale 1:4)

Rebecca Pritlove died aged 71 on 11 November 1840 and was buried on 22 November. Her death (with the spelling Pretlove) was registered in Hackney (GRO BMD 1840, October–December, Hackney Union, 3, 110).

Confusingly, another Rebecca Pretlove, aged 72, died on 30 July 1840 and was buried on 4 August, in the burial ground of the Nonconformist chapel in St Thomas Square, Mare Street, 350m north-east of the site. Her death was also registered in Hackney (GRO, BMD 1840, July–September, Hackney Union, 3, 96) and she left a will, written on 16 May 1832, proved on 16 September 1840, which shows that she had a cousin named Rebecca Pretlove of College Street, Homerton, who is presumably the woman buried in the excavated Baptist ground.

Lydia Salmon

Skeleton [578]

Coffin [579]

Coffin plate (not retained): iron.

Osteology: neonate (40 gestational weeks) with active scurvy in the cranium which may indicate scurvy in the mother.

Finds: complete copper-alloy pin <S22> (Fig 76) ('Burial Finds', below).

Lydia Salmon died aged 2 months on 13 December and was buried on 21 December 1829.

William George Salmon

Skeleton [-]

Coffin [-]

Coffin plate (not retained): iron. The plate was found in the same grave as Theresa Susan Giddy (above).

Osteology: association with a particular infant burial uncertain.

William George Salmon died aged three years, four months on 14 October 1843 and was buried on 16 October.

His death certificate shows that he died at 10 Ann's Place, Bethnal Green, the cause of death given as 'Scarlatina, 5 days'. He was the son of George Salmon, warehouseman.

Mary Ann Skerritt

Skeleton [768]

Coffin [769]

Identified from burial register.

Osteology: preservation too poor for assessment.

Mary Ann Skerritt died aged two and was buried on 21 June 1824.

Elizabeth Skerritt

Skeleton [766]

Coffin [765]

Coffin plate <76>: lead (not illustrated).

Osteology: female aged 26–35 years with dental disease in the form of teeth lost antemortem, calculus, enamel hypoplasia, teeth that had rotated through crowding and an unusual peg molar in her right mandible.

Elizabeth Skerritt died aged 36 and was buried on 16 October 1824. Her entry in the burial register lists her as Mary, not Elizabeth.

Elizabeth Smith

Skeleton [262]

Coffin [263]

Coffin plate (not retained): iron.

Osteology: infant aged approximately 6 months old.

Elizabeth Smith died aged five months on 30 November 1850 and was buried on 5 December.

Her death certificate shows that she died at 2 Windsor Place, Old Kent Road, Southwark, the cause of death given as 'Diarrhea 6 days, Convulsions 1 day'. Elizabeth was the daughter of William Richard Smith, corn dealer.

Emily Smith

Skeleton [212]

Coffin [213]

Coffin plate (not retained): iron.

Osteology: subadult aged 18 months, evidence of trauma to the left leg in the form of myositis ossificans (Fig 111), active periostitis, and necrosis of left femoral neck.

Emily Smith died aged 18 months, three weeks on 22 September 1853 and was buried on 27 September.

Her death certificate shows that she died at 6 Cumberland Place, St Mary Newington, the cause of death given as 'Dentition 14 days, Hydrocephalus 3 days'. Emily was the daughter of William Richard Smith, corn dealer, who is still recorded as at 2 Windsor Place, Old Kent Road.

Elizabeth Swallow

Skeleton [453]

Coffin [454]

Coffin plate <88> (Fig 64): lead.

Osteology: older adult female (46+ years) with osteoarthritis to the thoracic and lumbar spine, as well as intervertebral and osteophytosis. She had lost all teeth in the maxilla and had periodontal disease and calculus deformity in the mandible. She had a deformed ribcage from long-term corset wear.

Textile: baize or flannel cloth <TX7>, ?lid or coffin lining ('Textiles', below).

Elizabeth Swallow died aged 73 on 24 October 1829 and was buried on 1 November.

George Tidman

Skeleton [678]

Coffin [679]

Coffin plate (not retained): iron.

Osteology: adult male (26–35 years) with a bathrocephalic cranium. He had active rib lesions on the left hand side. There were Schmorl's nodes and osteophytosis in the spine and lost teeth, deposits of calculus and caries in the dentition.

George Tidman died aged 35 on 28 June 1830 and was buried on 5 July.

Mary Tidman

Skeleton [614]

Coffin [615]

Coffin plate (not retained): iron.

Osteology: subadult aged approximately 16 years, with Schmorl's nodes in the spine. There was an impacted upper canine, rotated dentition and caries. Also spina bifida occulta and healed bilateral cribra orbitalia.

Mary Tidman died aged 16 on 24 June 1836 and was buried on 6 July.

Eleanor Vincent

Skeleton [634]

Coffin [635]

Identified from burial register.

Osteology: infant aged approximately 6 months.

Eleanor Vincent died aged one year and was buried on 21 November 1834.

Eleanor Vincent

Skeleton [617]

Coffin [618]

Coffin plate (not retained): iron.

Osteology: subadult aged 1–5 years with active cribra orbitalia in both orbits and deposits of calculus on the teeth.

Eleanor Vincent died aged six and was buried on 11 January 1841. Her death certificate shows that she died 9 January 1841 at Fore Street, Edmonton, the cause of death given as 'Inflammation of the Brain'. She was the daughter of James Vincent, schoolmaster.

Rebecca Wardall

Skeleton [408]

Coffin [409]

Coffin plate <73> (Fig 65): lead.

Osteology: adult female aged 36–45 years, extremely fragmentary. Antemortem tooth loss.

Rebecca Wardall died aged 41 on 3 November 1830 and was buried on 9 November.



Fig 64. Elizabeth Swallow's lead breast plate <88> (scale 1:4)



Fig 65. Rebecca Wardall's lead breast plate <73> (scale 1:4)



Fig 66. Henry Wardall's lead breast plate <77> (scale 1:4)



Fig 67. John Webb's lead breast plate <75> (scale 1:4)

Henry Wardall

Skeleton [352]

Coffin [353], [354] lead, [355]

Coffin plate <77> (Fig 66): lead.

Osteology: elderly male (aged 46+ years) with total tooth loss antemortem. Osteoarthritis in the neck, thumbs, and feet. He had evidence for DISH in the spine and pelvis and had survived rickets in childhood. There was active periostitis on both scapulae.

Textiles: flannel waistcoat (undershirt) <TX2> (Fig 6; Fig 77), woollen stockings <TX3> (Fig 6; Fig 78), felted wool pillow <TX9> (Fig 6; Fig 80) ('Textiles', below).

Henry Wardall died aged 88 and was buried on 28 November 1840. His will showed him to be a gentleman of the parish of Chepping Wycombe, Buckinghamshire. He left everything to his daughters Mary Wardall, Elizabeth Wardall and Anne Wardall, including his 'freehold messuage or dwelling house, heredit and premises situate and being (No. 96) in Old Gravel Lane in the parish of St George' (TNA, PROB 11/1942/23; written 23 June 1835, proved 15 February 1841). The records of the Sun Fire Office, dated 20 March 1817, show that Henry Wardall had insurance policies for both 95 and 96 Old Gravel Lane. No. 95 was listed as Henry Wardall Senior, gent, while No.96 was Henry Wardall and Son, glaziers painters and colourmen (LMA, CLC/B/192/F/001/MS 11936/475/929327 and /929328).

His death certificate shows that he died 22 November at Providence Row, South Hackney, the cause of death given as 'Age and debility'. He was described as a gentleman.

John Webb

Skeleton [384]

Coffin [385]

Coffin plate <75> (Fig 67): lead.

Osteology: adult male aged 25–36 years, with osteophytosis in the spine and antemortem tooth loss, periodontal disease and deposits of dental calculus.

John Webb died aged 55 on 16 December 1842 and was buried on 24 December. His will (TNA, PROB 11/1974/187; written 30 September 1839, proved 17 January 1843) shows him to be a gentleman of Park Road, Dalston. He left all his household furniture, plate, linen, china, glass, books, prints, pictures, wines, liquor and other household stores and effects to his wife, Martha Webb. All the rest of his estate was to go to his two sons, William Webb of Somerset Place, Dalston, gentleman and John Webb of Park Road, gentleman.

His death certificate shows that he died at 23 Park Road, Dalston, the cause of death given as 'Apoplexy'. He was described as a mercantile clerk.

John Lawrence Webb

Skeleton [382]

Coffin [383]

Identified from burial register.

Osteology: subadult aged approximately one year.

John Lawrence Webb died aged six months and was buried on 5 June 1843. His death certificate shows that he died 5 June 1843 at 5 Navarino Place, Dalston, Hackney, the cause of death given as 'Hooping Cough'. He was described as an 'Infant of John Webb, Clerk in St Catherines Dock'.

Martha Susan Webb

Skeleton [242]

Coffin [243]

Identified from burial register.

Osteology: subadult aged approximately two years. There was active cribra orbitalia in both orbits and active rickets in the ribs, pelvis, arms and leg. The first rib was bifid.

Martha Susan Webb died aged two years, three months and was buried on 29 April 1848. Her death certificate, in the name of Martha Susannah Webb, shows that she died 21 April 1848 at 23 Park Road, Dalston, the cause of death given as 'Obstruction of the bowels, 14 days'. She was the daughter of John Webb, gentleman.

Agnes Ruth Webb

Skeleton [240]

Coffin [241]

Identified from burial register.

Osteology: subadult aged approximately three years, with healed cribra orbitalia in both orbits and active rickets in the arms, legs, and pelvis.

Agnes Ruth Webb died aged three years, nine months and was buried on 28 January 1853. Her death certificate shows that she died 23 January, at 23 Upper Thames Street, the cause of death given as 'Purpura'. She was the daughter of William Webb, clerk at an iron wharf.

The Excavated Population: Overview of the Osteological Evidence

Niamh Carty and Adrian Miles

The detailed report on the excavated population (the osteological subsample of 238 individuals) forms the final section of this report. This section summarises the most significant aspects of the excavated population and considers their social implications.

Environment and Living Conditions

In the first half of the 19th century, while the Mare Street Baptist burial ground was in use, Hackney experienced substantial growth as people moved into the area. Its character changed from a semi-rural suburb to a much more densely populated, urban and industrial area (Baker 1995b). In 1801 there were 2,050 inhabited houses, by 1831 this had doubled, and by 1851

there were 9,027 inhabited houses (Baker 1995a, 14). The population density increased from 0.0–4.9 people per acre (0.4ha) in 1801 to 10–19.9 people per acre in 1851 (Modha 2006, fig 3.1). This increase would have undoubtedly had a large bearing on environmental pollution for the local inhabitants, in the form of overcrowding and the transmission of new and existing infectious diseases (Roberts & Cox 2003, 344–5). There were public health concerns. By 1845 sewerage was posing a problem and 'preoccupied the new district board's medical officer of health in 1856' (Baker 1995c, 108). The uncontrolled spread of housing turned the Hackney Brook into an open sewer, a problem that was not addressed until the 1880s (*ibid*). The impact on rates of infectious disease can be seen in the recorded increase in deaths from cholera (not visible in skeletal tissue due to rapid progression of the disease) during this period. There were eight recorded deaths in Hackney during 1831–32 and 229 deaths in 1848–49 (Hunter 2007, 26).

Infectious disease is an inflammatory response by the body when it is under attack by either bacteria or virus, either through contracting a disease or a secondary response to an injury or trauma, such as a fracture. The appearance and severity of the infectious disease resulting from any pathogen depends upon the ability of that pathogen to damage the host as well as the ability of the host to resist the pathogen (Török *et al* 2009, 3–5; Aufderheide & Rodríguez-Martín 2009, 118–9). The crude prevalence rate of infectious disease at Mare Street was 21% (50/238: 21%), which included 15 subadults (15/86: 17.4%) and 35 adults (35/152: 23%). This has been linked to both specific infectious disorders and non-specific nutritional and environmental stress experienced by the individual. Roberts and Cox (2003, 344) recorded a crude prevalence rate of 26.3% (52/198) for non-specific periostitis during the post-medieval period, suggesting that the rates observed at Mare Street were low in comparison. This may indicate that if the population experienced infectious disease, it was of the acute type, and they died before it made an appearance on the skeleton.

One infectious disease that is not present in the assemblage is syphilis. It is speculated that this may be due to the strict moral rules and codes adhered to by those who were members of the Baptist faith.

Tuberculosis is contracted via the inhalation of bacteria-laden exhaled droplets from an infected person. It is an infectious disease that affects humans and is caused by bacteria of the mycobacterium complex, most often *M tuberculosis* and *M bovis*. Skeletal involvement in tuberculosis is very low; it ranges from 1% to 9%. Identification of tuberculosis in skeletal remains is based on the vertebral column, which is affected in 25–70% of cases of skeletal tuberculosis and the weight bearing joints, such as the hip and the knee (Roberts 2012, 435; Aufderheide & Rodríguez-Martín 2009, 118–20). Tuberculosis did not occur as a diagnosis until the late 1830s and earlier terms like 'consumption' could subsume a wide range of conditions in addition to tuberculosis (Wilbur *et al* 2008, 964). Skeletal changes relating to tuberculosis was observed in five individuals (5/238: 2.1%), these included two adults (2/152: 1.3%)

and three subadults (3/86: 3.5 %) ('Tuberculosis', below). Eight individuals were recorded as dying from consumption in the death certificates (Table 9; three adult males, one adult female, one subadult male and three subadult females) but none of these individuals had evidence for the skeletal changes associated with tuberculosis. Roberts and Cox (2003, 339) recorded a crude prevalence rate of 0.5% across the post-medieval period in Britain, suggesting that the rates recorded at Mare Street were higher than the national average.

In terms of skeletal changes that directly impact upon respiratory health, rib lesions and maxillary sinusitis have both been used as a gauge of environmental stresses on the respiratory systems of those in the past. Rib lesions reflect new bone formation on the inner (visceral) surface of the ribs. These lesions have been suggested as a non-specific of tuberculosis (Santos & Roberts 2001; 2006). Evidence of rib lesions were observed in 19 individuals at Mare Street (19/238: 8%), these included five subadults (5/86: 5.8%) and 14 adults (14/152: 9.2%) and the majority were active at the time of death (15/19: 79%) ('Rib lesions', below). This was comparable to a crude prevalence rate of 4.8% recorded for the period (Roberts and Cox 2003, 339). The increasing industrialisation in London and likely exposure of those who were buried at Mare Street to environmental and industrial pollutants may also be reflected in the evidence of maxillary sinusitis at Mare Street that was observed in three individuals (3/238: 1.3%), two males (2/69: 2.9%) and one female (1/81: 1.2%) ('Sinusitis', below).

Lifestyle: Occupations and Fashion

In Hackney, trade, manufacture and handicrafts were said to employ 838 families by 1811 and 2,505 by 1831. Industries of note included an 18th-century porcelain factory, a rope works in the 1820s, a perforating works, a paint factory, textile (calico) works, silk weavers, and an optical glass works. There were also jobs available at the wharves (Baker 1995b, 92–101). In general, in 19th century London, there was some element of moderate to heavy physical labour involved in most jobs (Clayton & Rowbotham 2009, 1240). Men worked on average 9 to 10 hours a day for 5.5 to 6 days a week, giving a range from 50 to 60 hours of physical activity a week, even some leisure activities such as gardening and informal football could also involve substantial physical effort. While some working-class Victorian women worked from home, many of them worked in shops, factories and workshops, ensuring long days on their feet, as well as the additional burden of housework (*ibid*).

In an analysis of the occupational data recorded in the non-parochial Baptist registers, A D Gilbert reported that 70% of Baptists had the following occupations: merchants; manufacturers; shopkeepers; farmers and artisans (in society at large these made up 41% of those employed); and 6% came from the labourer and collier/miner occupations. Sixty-three per cent alone were artisans (Gilbert quoted in Briggs 1994, 270). C J Radcliffe's analysis of the Prospect Place New Connection Chapel in Bradford (1837–52) revealed a high proportion of working-class individuals in the congregation and in the deacons (Radcliffe 1975; Briggs

1994). This congregation attracted young people and women who were treated with more respect than in society at large (Briggs 1994, 271–2). In Bethnal Green (1880–1901) the biggest representation of an occupation among married men in the Baptist congregations was skilled working class (37.5%), clerical (24%), semi-skilled working class (10.6%), and retail (10.6%). In Lewisham (1899–1914), the largest proportion was clerical (35.5%), skilled working class (19.7%), semi-skilled working class (11.8%) and retail (10.5%) (*ibid*, 275). The documented Mare Street population appear to have been drawn largely, though not exclusively, from the middle classes ('The Buried Population', above).

There was some evidence for occupational stress in the Mare Street assemblage. Bone fractures were recorded in 17.2% (41/238) of the overall sample, 27% of adults (41/152), 47.8% of males (33/69) and 9.9% (8/81) of females, possibly reflecting a higher risk of occupational injury for males. Edward Hewitson [61] aged 43 years had healed fractures to the spinous processes of the fifth to the seventh thoracic vertebrae, possibly 'clay-shoveler's fractures' and indicate that perhaps at some point in his life a large amount of shovelling (or a similar activity) was undertaken.

Eleven adults (/152: 7.2, 6/69: 8.7% of males and 5/81: 6.2% of females) displayed evidence of injuries to the muscle and tendon attachment points of the shoulder characteristic of rotator cuff disease ('Rotator cuff disease', below). This condition may be the result of either a substantial injury to the shoulder or to progressive degeneration or wear and tear of the tendon tissue. Repetitive overhead activity, heavy lifting over a prolonged period of time, and the development of bone spurs in the bones around the shoulder may irritate or damage the tendon (Walker 2012, 178).

Schmorl's nodes affected the vertebrae of 32.2% of adults (49/152) and displayed the highest crude prevalence rate for adult males (31/69: 44.9%) ('Schmorl's nodes', below). This affected 8% of observable adult vertebrae (449/3672) with a distribution in the weight-bearing regions of the mid to lower thoracic and lumbar spine. Over twice the number of male vertebrae were affected (310/1688: 18.4%) than female vertebrae (139/1984: 7%). Schmorl's nodes are generally caused by degeneration resulting from increased load-bearing and may reflect stresses placed on the spine perhaps a result of manual labour or other activities (Resnick 2002, 1430).

Other evidence of lifestyle can be seen through modification of the skeleton through the wearing of restrictive clothing and shoes or from smoking. Eighteen adults (18/238: 7.6%), all female (18/81: 22.2%), displayed abnormal deformities to the ribs related to long-term corset or stay wear (Walker 2012, 275).

Hallux valgus, often associated with restrictive footwear, was observed in 6.3% of individuals (15/238). More males (8/69: 11.6%) than females (6/81: 7.4%) were affected.

Pipe notches are caused by persistent clenching of clay tobacco pipes between the teeth. Pipes were made from hardened clays which if held between the same teeth for long periods of time would wear these teeth

into scalloped circular holes that the pipe would fit (Walker & Henderson 2010). Pipe smoking was widespread but intermittent amongst working class males and a cigar or cheroot might be smoked on special occasions. Snuff had largely fallen out of favour, as had chewing tobacco. The big expansion in mass tobacco consumption by the working classes did not take place until after 1883, when industrial cigarette production was introduced (Clayton & Rowbotham 2009, 1244–5). Adult males at Mare Street (9/69:13%) had a much higher rate of pipe notches across all ages than adult females (1/81: 1.2%) and may be explained in part by the restrictive rules in place on tobacco smoking in the Baptist faith (Briggs 1994, 333).

Childhood

Subadult mortality at Mare Street was highest in the one to five-year age category. The London Bills of Mortality record that 40% of all deaths relate to children aged five years and below (Roberts & Cox 2003, 304). Children would have been especially susceptible to infectious disease and nutritional stress.

Thirty-six individuals (/238: 15.1%) displayed evidence of bone changes consistent with a diagnosis of vitamin D deficiency rickets. This affected 23.3% of subadults (20/86) and 10.5% of adults (16/152) ('Rickets', below). The adults affected represent individuals who survived a period of Vitamin D deficiency in childhood that left a long-lasting impression on their skeletons in the form of marked bowing deformities in the arms and/or legs.

By 1850, medical men were variously agreed on hereditary, early weaning, improper diets, dirty skin, impure air, and a northern climate as playing a part in its aetiology. (Hardy 2003, 337)

As Charles West, founder of the children's hospital at Great Ormond Street remarked, the physical characteristics of such people were 'familiar to us all': a stunted figure, large head, misshapen chest, twisted long bones and enlarged wrists and ankles (*ibid*, 337). The children from Mare Street would have been exposed to the effects of the industrialisation of London, with increased levels of pollution from coal fires and overcrowded, cramped living conditions inhibiting sunlight exposure. This was also combined with questionable diets. The diets of working-class women and children too often consisted largely of bread and tea, with sugar and the occasional smear of jam or margarine. Babies of all social classes were generally weaned on 'pap', bread and water or bread and milk (Oddy 1970, 157) and they were often also kept indoors throughout the winter months (Hardy 2003, 338). John Snow (1857) suggested that the high rates of rickets in urban contexts may have also been related to the addition of aluminium to bread (quoted in Dunnigan 2003, 340). Roberts and Cox (2003, 310) recorded a crude prevalence rate of 3.7% (93/2545) of rickets in the post-medieval period throughout Britain, suggesting that the rate of rickets at Mare Street was high and affected a mixture of social classes.

There was evidence of fractures amongst the subadult population. Emily Smith [212] aged 18 months, had myositis ossificans traumatica to the proximal shaft of the left femur. This injury may have resulted from a fall or indirect trauma related to childbirth to the left hip of this child.

Ten subadults had endocranial lesions (/86: 11.6%). The highest frequencies occurred in infants aged 7–11 months (3/6: 50%). Inflammation and or haemorrhage of the meninges can lead to new bone formation on the internal bone surfaces of the cranial vault. These have been linked to trauma, infection and metabolic disease (Lewis 2004, 93). Higher rates were recorded in subadults at the lower social status site of St Mary and St Michael's burial ground (14.2%: 62/437) (Henderson *et al* 2013, 207) and lower rates were recorded in subadults at the higher social status assemblage from St Marylebone churchyard (3.8%: 3/78) (Miles *et al* 2008, 156).

Twenty-nine subadults had evidence for cribra orbitalia (/86: 33.7%). Cribra orbitalia represents a non-specific indicator of disease that manifests itself as porous lesions into the orbital roofs of the skull. This may indicate a response to iron deficiency anaemia or an adaptive response to increased pathogen loads (Stuart-Macadam 1992). Higher rates were recorded in subadults at the lower social status site of St Mary and St Michael's burial ground (41%: 179/437) (Henderson *et al* 2013, 198) and lower rates were recorded in subadults at the higher social status assemblage from St Marylebone churchyard (25.6%: 19/78) (Miles *et al* 2008, 149).

Survived stress in childhood can be seen in dental enamel hypoplasia ('Pathology', below). True prevalence rates of hypoplasia were similar between subadults and adults with 10.9% (127/ 1161) of subadult teeth affected and 13.1% (301/2300) of adult dentition. Slightly lower rates were recorded in the dentition of subadults at the lower social status site of St Mary and St Michael's burial ground (6.1%: 204/3357) and higher rates of 16.5% of the adult dentition (807/4890) (Henderson *et al* 2013, 123). Lower rates were recorded in subadult dentition (5.0%: 31/626) and higher rates in the adult dentition (20.1%: 444/2211) at the higher social status assemblage from St Marylebone churchyard (Miles *et al* 2008, 111).

Diet

The religious humanitarianism practiced by Baptists and their associations with the anti-slavery movement, meant that sugar was officially boycotted from 1792 to 1833 (Powers & Miles 2011, 244). However, the high rates of carious erosions in the teeth of the Mare Street population suggested that this did not have a large influence on dental health.

In 1801, 97% of the population of London and the Home Counties consumed wheat products, with 2% barley and 1% oats also consumed (Collins 1975, 105). This was supplemented with vegetables, such as onions, carrots, turnips, cabbage and broccoli which were affordable, leeks, watercress, and Jerusalem artichokes which were frequently grown in urban allotments. Fruits

were consumed when in season. (Clayton & Rowbotham 2009, 1241–2). Fish, especially ‘red herrings’ (kippers), which were a staple of the working-class diet throughout the year because they were easily cooked, and meats were consumed in smaller quantities. Many households kept hens in their backyards which provided eggs (Roberts 1984). Oddy (1970, 153) has argued that

the nineteenth century Briton restricted his choice of food by prejudices and preferences about which we today know very little: but it seems clear that attitudes of distrust towards fruit, vegetables, milk remained strong until the very end of the nineteenth century.

Perishability of animal based food stuffs meant that much was only available in dried or cured forms, so that grain products by virtue of their durability formed the basis of the diet (*ibid.* 154). The availability and variety of produce was also dependent on social status and wealth.

Nutritional defects or excesses can be ascertained from skeletal remains in a number of different disorders. Cribra orbitalia and porotic hyperostosis may indicate iron deficiency. The crude prevalence of cribra orbitalia where one or both orbits were affected was 18.1% (43/238). There was a higher prevalence amongst females (10/81: 12.3%) compared to males (4/69: 5.8%). Roberts and Cox (2003, 307) recorded a crude prevalence rate of 9% (238/2660) across post-medieval Britain. Pitted lesions to the outer surfaces of the cranial vault characteristic of porotic hyperostosis were identified in 5% of individuals (12/238). This included 6.6% of adults (10/152), 10.1% of males (7/69), 3.7% (3/81) of females and 2.3% of subadults (2/86).

Skeletal changes resulting from Vitamin C deficiency can result in haemorrhaging in the cranium and mouth (Walker 2012, 210). The crude prevalence rate of scurvy was 2.9% (7/238). Four subadults were affected (/86: 4.7%) and three adults (/152: 2%), two males (/69: 2.9%) and one female (/81: 1.2%).

Four individuals have skeletal changes indicative of osteoporosis (/238: 1.7%), 2.6% of adults (4/152), 3.7% of females (3/81) and 1.4% of males (1/69). This condition may also be explained by age-related changes or by calcium deficiency.

Three adult females (/238: 1.3% overall, 3/152: 1.9% of adults, 3/81: 3.7% of females) displayed erosive lesions into articular joint surfaces characteristic of gout. This is caused by an inflammatory response to the build-up of urate crystals in the joints and has been associated with obesity, excessive alcohol intake, renal impairment and hypertension (Rogers 2000, 172).

Seven individuals displayed bone changes diagnostic of diffuse idiopathic skeletal hyperostosis (DISH) (7/238: 2.9%, 7/152: 4.6% of adults, 6/69: 8.7% of males and 1/81: 1.2% of females) which has been linked with diabetes and obesity (Walker 2012, 183).

Medical Care and Practice

Hackney was well-served with hospitals and access to some form of medical care. Hackney workhouse

infirmary, the forerunner of Hackney hospital, at first consisted merely of beds for the sick or idiots. The infirmary in 1849 consisted of a single range on the west side of the grounds, immediately south of the women's wards; a smallpox ward was put up with the help of the inmates in 1860 and an iron building for sick children by 1866 (Baker 1995c, 110). The parish had subscribed to a smallpox hospital at King's Cross since 1815 and to the county lunatic asylum since 1836 or earlier (Baker 1995c, 108–9).

Two adults displayed evidence of medical procedures ('Surgical Intervention', below). An older adult male [284], with saw marks to the clavicles, manubrium and ribs suggests a thoracotomy was performed post-mortem, during an autopsy. Similar examples were excavated from Newcastle Infirmary, which dated from 1753 to 1845 (Mitchell *et al* 2011, 92–3). Theresa Susan Giddy [244], aged 11 months, had undergone a complete craniotomy indicating an autopsy was carried out after death. She died from 'convulsions' according to her death certificate.

At least some of the population at Mare Street had access to dental care and treatment. Evidence of dentistry was present in three individuals. Two individuals were buried with associated dental prostheses; Martha Penkivil [745] aged 36–45 years and a female [185] aged 26–35 years ('Dentistry', below; Fig 100a–b). Sarah Cox [666], aged 54 years, had a gold filling in the maxillary teeth Fig 100c).

Summary

The range of diseases and stresses encountered in the remains of the individuals, who were part of the Baptist congregation at Mare Street, who lived and died in Hackney, were very similar to those detected in other Nonconformist skeletal assemblages in London and other contemporary assemblages from elsewhere in Britain. Childhood in early 19th-century London brought with it environmental and nutritional stresses which resulted in many ailments for the children at Mare Street and many did not survive beyond the weaning stresses at one year. However, if childhood was survived, they stood a good chance of surviving into older adulthood. Adults had low levels of trauma and infectious disease and fairly similar rates of degenerative and dental diseases as other comparable contemporary assemblages, they had evidence for both dietary excess and deficiency and access to medical and dental care was apparent.

BURIAL PRACTICE

Lyn Blackmore, Julian Bowsher, Hilary Davidson, Valerie Griggs, Adrian Miles and Beth Richardson

Coffins, Coffin Furniture and Fittings

Adrian Miles with Valerie Griggs

Lead Coffins

Only three lead coffins were excavated, [354] (Henry

Wardall), [636] (Francis Augustus Cox) and [742] (Martha Penkivil) (Figs 35, 68), dated between 1824 and 1853, all conforming to the standard 'triple-shell' pattern of the period. This consisted of a wooden inner coffin sealed in a lead shell, usually bearing an inscribed lead plaque (inner plate) and enclosed by a wooden outer coffin.

The wooden outer was the coffin that was visible at the funeral. These were normally fabric covered, with

upholstery pins both holding the fabric in place and acting as decoration. They were usually decorated with a breast (or 'depositum') plate, normally manufactured in lead (Fig 69a) or brass (Fig 69b), two lid motifs, escutcheons, grips and grip plates. However, at Mare Street, wood preservation was too poor to determine much from the outers, except their presence.

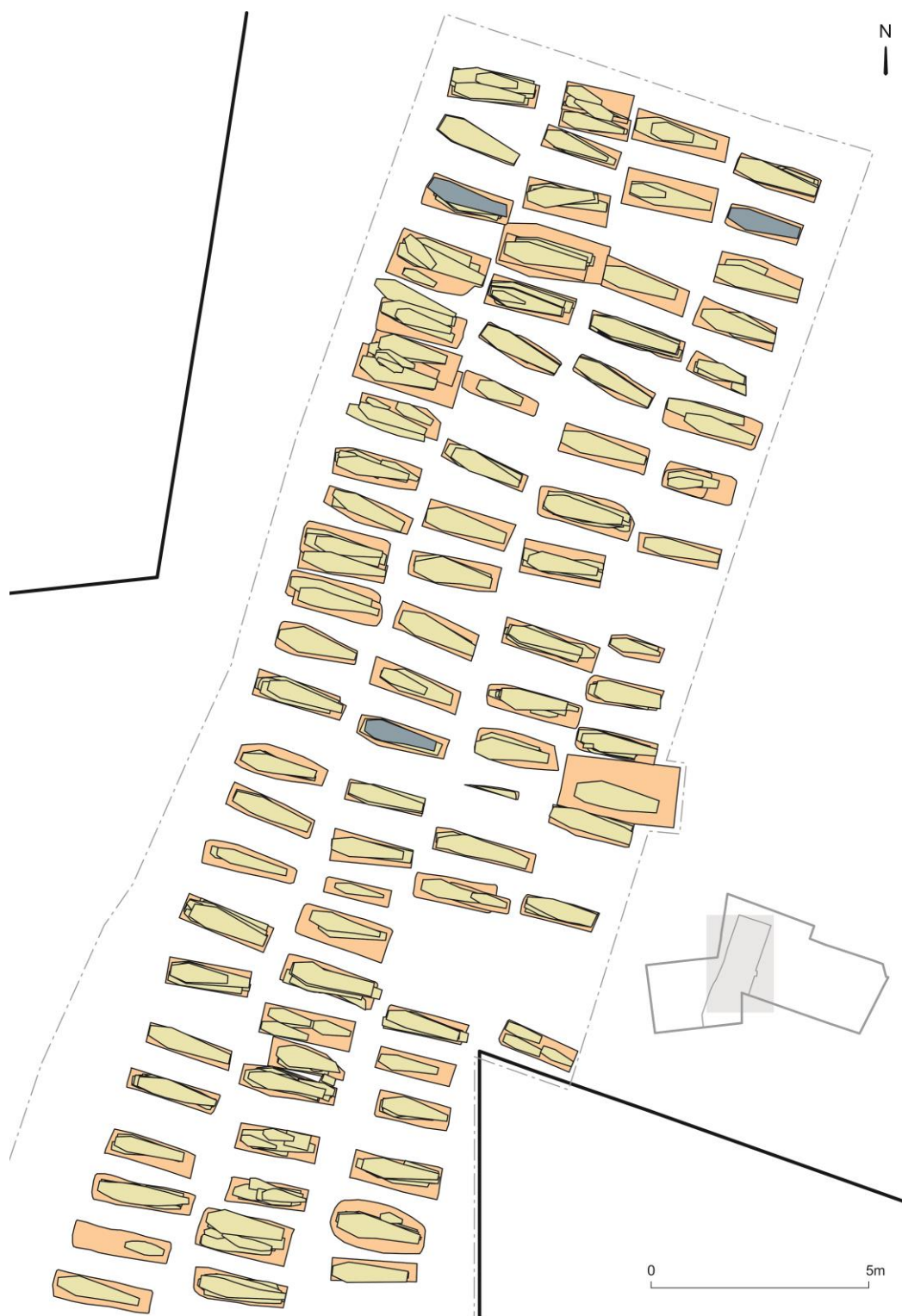


Fig 68. Plan showing all coffins within grave cuts. KEY: blue lead; green wooden (scale 1:150)



Fig 69. Lead coffins: a – for Henry Wardall, with lead breast plate and b – for Martha Penkivil, with brass breast plate. The breast plates are from the decayed outer (wooden) coffins (0.5m scales)

Wooden Coffins

Apart from the three lead shells (above), all the coffins excavated at Mare Street had been manufactured in wood (Fig 68). The poor level of preservation was such that wood identification samples were not taken, but the standard coffins of this period were normally elm. As with the outers for lead coffins, the majority would have been fabric covered and decorated with upholstery studs.

The poor preservation again made it unclear how they had been constructed, but contemporary coffins were normally manufactured from six pieces of wood: two sides, two ends, a base and lid which were generally nailed together. The sides had up to six kerfed saw lines internally to allow them to be bent to fit the base. In some instances, the internal base of the coffin was sealed

with resin or pitch, which was then covered with sawdust or bran. Rosemary or balm was sometimes added to counteract the smell of decomposition, providing a soft base upon which to lay the body and acting as an absorbent for body fluids (Plume *c.*1900, 21).

Most of the recorded Mare Street coffins were decorated with upholstery studs of *c.* 10mm diameter, also used to hold in place the fabric which covered the coffin. Coffin furniture was attached to the coffin using small tacks.

Coffin Breast Plates

A total of 37 coffin breast plates were recovered intact during the excavation, three of brass and 34 of lead, and many were in poor condition. Almost all other coffins



Fig 70. View of the reverse of a tin-dipped iron breast plate, showing poor preservation and traces of design (50mm scale)



Fig 71. Mary Ann Huxtable's brass breast plate <101> (scale 1:4)

showed traces of tin-dipped iron plates, although they were very poorly preserved and none were retained. Coffin plates were the primary source of identification for the excavated named individuals ('The Named Burials', above).

Inscriptions, either complete or partial, could be recognised on 75 iron breast plates, which were recorded on site but not retained. A further 25 illegible coffin plates were recorded, as they had traces of decoration (Fig 70).

Three brass breast plates were recorded during the project (Fig 71). Each plate was individually produced and engraved and therefore cannot be directly compared with others. The inscriptions were engraved rather than acid etched. The thicker parts of the engraving were often filled with a black wax.

Lead breast plates come in two main forms, depositum (outer) plates and inner plates. The depositum plate was the main decorative plate attached to the wooden outer coffin and was intended to be seen at the funeral. These plates were produced with a variety of designs (eg Fig 72), examples of which have been recorded from other archaeological excavations. Lead plates show much greater variation than the cheaper, stamped tin-dipped iron plates; their raised borders in particular tend to be individually hand-chased. The inner plate was attached directly to the lead of a triple-shell coffin and is normally plain, sometimes with an inscribed or punched border.

The recovered and retained breast plates from the site comprise 35 outer and two inner plates. In the case of Henry Wardall (skeleton [352], coffin [354]), an inscription was cut directly into the top of the lead shell.

There were 13 rectangular outer plates excavated and retained, five male and eight female; 20 trapezoid lead plates retained, 12 male and eight female and two diamond shaped plates, one of which was female, the other uncertain. Of the two inner plates, one was rectangular and one trapezoid.

The styles and designs were compared against other assemblages from London (Christ Church, Spitalfields (CAS84; Reeve & Adams 1993), St Luke, Old Street (OLR00; Boyle *et al* 2005), St George, Bloomsbury (BBM02; Boston *et al* 2009), St Andrew, Holborn (HUD01; Miles 2002), New Bunhill Fields, Islington Green (IGN97; Miles & Griggs 1997), St George the Martyr, Borough (SGY05; Miles 2009; 2014), St Brides, Fleet St (WFG62; Griggs 2019), St John, Wapping (SJN97; Miles 1998). Although identical plates are found, it is much more common to find plates that have the same general appearance, but which on closer examination vary. Changes are found in the foliage, scallop shells, flowers and other motifs and this is the case here. There were 29 lead plates for which a design could be determined, representing 23 different types (Table 18). Direct comparisons were found for 18 of the plates from Mare Street, consisting of 13 different types (three separate designs were represented by three plates each). The most common source of directly comparable material was St Andrew, Holborn, with six types, consisting of 12 examples.

Coffin Handles (Grips)

Coffin handles (grips) were recovered from 157 contexts. In many cases, due to slumping, it was not possible to assign a grip to a specific coffin and these



Fig 72. Typical lead breast plates of John Causey Jordan <67>, Daniel Davan <71>, Thomas Bourne <74> and Ursula Hobson <92> (scale 1:4)

Table 18. Summary of retained coffin breastplates, with details of identifiable types

Context no.	Accession no.	Forenames	Surname	Year of death	Plate material	Size	Shape	Plate type	
								Exact match	Closest parallel
[259]	<82>	John	Allen	1839	lead	adult	T		OLR 4.44
[192]	<83>	Alexander	Allen	1842	lead	adult	T		OLR 4.15
[308]	<86>	Isaac	Booth	1840	lead	adult	T	HUD [953]	
[394]	<74>	Thomas	Bourne	1843	lead	adult	T		CAS 21
[457]	<70>	Joseph	Bright	1848	lead	adult	T	IGN 151A	
[319]	<69>	Edmund	Burton	1840	lead	adult	T	HUD [953]	
[321]	<100>	Robert	Burton??	183	lead	adult	R		CAS 28
[511]	<78>	Mary	Child	1819	lead	adult	R	HUD [954]	
[516]	<81>	Jane	Cotton	1819	lead	adult	R	HUD [705]	
[783]	<90>	Elizabeth	Cox	1818	lead	adult	R		OLR 4.17
[667]	<79>	Sarah	Cox	1846	lead	adult	T	OLR 4.36	
[636]	<95>	Francis Augustus	Cox	1853	lead	adult	T (inner)		
[637]	<84>	Francis Augustus	Cox	1853	lead	adult	T	SJN [336]	OLR 4.36
[624]	<71>	Daniel	Davan	1823	lead	adult	R	HUD [705]	
[629]	<68>	Mary	Davan	1823	lead	adult	T	OLR 4.35	
[513]	<72>	Thomas	Faircloth	1828	lead	adult	T	HUD [745]	
[326]	<80>	Elizabeth	Harris	1849	lead	adult	T		OLR 4.36
[497]	<87>	Elizabeth Ann	Hobson	1810?	lead	adult	R	CAS 8	
[798]	<92>	Ursula	Hobson	1820	lead	adult	R	HUD [277]	
[499]	<177>	Ann	Huxtable	1828	brass	adult	T		
[461]	<101>	Mary Ann	Huxtable	1834	brass	adult	T		
[421]	<93>	Jane	Jordan	1837	lead	adult	D		OLR 4.11
[167]	<67>	Causey	Jordan	1841	lead	adult	R		CAS 17 and 28
[572]	<85>	Robert	McCurdy	1842	lead	adult	R		OLR 4.2
[741]	<98>	Sarah	Munday	1829	lead	adult	T	HUD [745]	
[724]	<97>	John	Munday	1833	lead	adult	T		CAS 21
[737]	<96>	Edward	Munday	1833	lead	adult	T	HUD [357] and [243] 1830–1	
[718]	<99>	Lydia	Munday	1847	lead	adult	R	OLR 4.13	
[742]	<89>	Martha	Penkivil	1824	lead	adult	R (inner)		
[743]	<178>	Martha	Penkivil	1824	brass	adult	R		
[766]	<76>	Elizabeth	Skerritt	1824	lead	adult	R	HUD [705]	
[454]	<88>	Elizabeth	Swallow	1829	lead	adult	T		BBM11
[409]	<73>	Rebecca	Wardall	1830	lead	adult	T	HUD [745]	
[355]	<77>	Henry	Wardall	1840	lead	adult	T	HUD [953]	
[385]	<75>	John	Webb	1842	lead	adult	T		OLR 4.2

Key: T = trapezoid, R = rectangular; OLR = St Luke, Old Street; HUD = St Andrew, Holborn; CAS = Christ Church, Spitalfields; IGN = New Bunhill Fields, Islington Green; SJN = St John, Wapping; BBM = St. George, Bloomsbury

grips were not retained. During the excavation, only the best-preserved grip from each coffin was retained.

Of those coffin handles examined 82 (52.2%) were plain rounded styles with no embellishment, which was prevalent throughout the 18th and 19th centuries (80 of type 1 and 2 of type 2 after Miles & White 2008, 66). Decorated iron handles were recovered from 75 (47.8%) contexts. The design of the majority of these is

of two winged cherubs at the centre above a central flower with floral and leaf motifs, a very common design in the 19th century. One new design was recorded from context [115], dated after 1846.

The Burial Finds

Beth Richardson

Introduction

Excluding coffin furniture and textiles ('Coffins', above; 'Textiles' below) there are 124 individual burial finds. These are discussed in three categories: items deliberately placed with the burial, dress accessories (which include personal items such as jewellery) and items probably associated with funerary textiles. The finds are generally closely comparable to those from other late post-medieval burial grounds (*eg* Richardson 2012; 2013; 2015; Cherryson *et al* 2012, 22–80) although some are unusual (*eg* an eggcup placed with an infant burial [504]) and quantities of some items, such as women's hair combs, are higher than on many sites. The burials are exceptionally well documented with many named burials, so that it has been possible to associate some finds with individuals whose date of death is known.

Personal Items and Dress Accessories

Hair Accessories

A small number of hairpins (not illustrated) and six hair combs were found with eight female burials (Fig 5). The plain U-shaped iron hairpins, are broken but would have originally been between 55 and 70mm long; examples of the same date are known from other London burial grounds (*eg* Richardson 2013, 88, fig 99). The tortoiseshell hair combs (side combs and larger long-toothed combs used at the back) are types used for securing and dressing women's hair. Five combs were found with named burials: Ursula Hobson who died in 1820 aged 22 (<S2>); Jane Jordan who died in ?1837 aged 17 (<S4>); Susanna Martin who died in 1842, aged 19 (<S3>); Charlotte Jordan who died in 1826, aged 18 (<S5>); and Martha Booth who died in 1847, aged 33 (<S1>). A further comb (<2>, [680]; not illustrated) was found with a woman aged over 46. The same wide age range for burial with hair combs is apparent at other broadly contemporary London burial grounds (*eg* Richardson 2013, 87–8). Combs and hair pins are not common finds; the only other known examples of combs used as hair accessories are two from Bow Baptist burial ground (*ibid*, 87), and single examples from St Paul's, Hammersmith (Loe 2009, 9) and St Martins-in-the-Bull Ring, Birmingham (Bevan 2006, 180). Burial practice at this time was for the corpse to be clothed in a shroud or purpose-made burial clothes mimicking contemporary nightwear, with burial caps or close-fitting bonnets, presumably with the hair undressed, although a few individuals were buried in their own night clothes or day wear. It is not clear whether these combs (and the few hairpins) were used simply to pin the hair back under bonnets or for visible and more elaborate hairstyles.

Catalogue

Hair combs

<S1> Tortoiseshell comb (Fig 5)

<116>, [266]

Incomplete, extant W(idth) 43mm, L(ength) 30mm; tooth length 27mm. End section; five larger teeth at one end, including end tooth (three per 10mm; max W 2mm) and 10 teeth at the broken end (six per 10mm; one missing, max W 1.3mm). Found with Martha Booth, died 1847, aged 33.

<S2> Tortoiseshell comb (Fig 5)

<120>, [797]

Incomplete, extant W 43mm, L 30mm; tooth length 27mm. Slightly curved back; five larger teeth at one end, including end tooth (three per 10mm; max W 2mm) and 10 teeth at the broken end (six per 10mm; one missing, max W 1.3mm). Found with Ursula Hobson, died aged 22 in 1820.

<S3> Tortoiseshell comb (Fig 5)

<121>, [534]

Incomplete, extant W 62.5mm, L 28mm, Th(ickness) 1.7; tooth length 24mm. Slightly curved back; 29 complete and three incomplete uniformly sized teeth (seven per 10mm; max W 1 mm); also one loose tooth. Found with Susanna Martin, died 1842, aged 19.

<S4> Tortoiseshell comb (Fig 5)

<132>, [420]

Incomplete, W 54mm, L 88mm, Th 3.2mm. Slightly curved back, originally with six widely spaced teeth, four still *in situ* (W of inner teeth 5mm, outer teeth 6mm). Found with Jane Jordan, died ?1837, aged 17.

<S5> Tortoiseshell comb (Fig 5)

<133>, [208]

Complete, W 47mm, extant L 49mm, Th 2mm. Slightly curved back; eight widely spaced teeth (W of inner teeth 3.5mm; outer teeth 5mm). Found with Charlotte Jordan, died 1826, aged 18.

Jewellery

Two single earrings were found with (unnamed) burials: part of a drop-earring <S7> with burial [332], a female aged 25–36 years, and a circular hinged sleeper <S6> with burial [583], a male aged 25–36 years (Fig 73). Burial [583] lay in the same grave as subadult burial [576], aged 13–16 years and it is possible the earring was actually associated with this burial. Both earring casings are made from a gold/bronze alloy; the drop earring has a copper-alloy hooked catch.

Earrings are rare finds on post-medieval burial sites; other London examples (singles and pairs) have been found in St Marylebone's burial grounds (Egan 2008, 65; Richardson 2015, 71–2) and in crypts at Christ Church, Spitalfields (Reeve & Adams, 1993, 89) and St Luke's, church Old Street (Boyle *et al* 2005, 100).



Fig 73. Earrings from burials: <S 6> and <S 7> (scale 2:1)



Fig 74. Copper-alloy internal supports for fabric-covered buttons <S 13>–<S 16> (scale 1:1)

Earrings

<S6> Gold/copper-alloy earring (Fig 73)

<146>, [583]

Complete, Diam 12mm, Th 0.9mm. Hinged sleeper earring with tightly fitting joint at the other end. Made from an alloy of gold, copper-alloy and other metal elements. Found with unnamed male [583] (above)

<S7> Gold/copper-alloy earring (Fig 73)

<156> [332]

Incomplete, extant L 10mm, span 9mm. One end of earring with a thin casing made from an alloy of gold, copper-alloy and other metal elements (Diam 0.9mm) enclosing a copper-alloy hook at one end and with unspecified copper-alloy corrosion at the other end. Found with unnamed female [332].

Fasteners

A large buckle, <S8>, is an unusual burial find. It could have been a belt buckle but was found (possibly an accidental inclusion) inside the coffin of an adult female, Eady Booth aged 66, who died in 1848.

There are 41 buttons from 28 burials. The majority (28) are single or double rings which acted as internal supports for fabric-covered 'Dorset' buttons, often retaining thread, wound tightly around the rings, and scraps of textile <S15> and <S16> (Fig 74). A further two, found with an adult male, Edmund Burton, who died aged 24 in 1840 ([318]), are fabric-covered buttons with more solid copper-alloy internal structures – one an open cruciform structure inside a ring, <S13>, and the other a disc with four holes, <S14> (Fig 74). There are also seven small shell (mother-of-pearl) buttons, two bone and two copper-alloy buttons (a selection of which are illustrated in Fig 75).

The range is narrower than the button assemblages from four broadly contemporary London burial grounds with similar demographics to Mare Street, all of which had a range of porcelain, glass, copper-alloy and bone buttons (and bone discs from Dorset buttons) from undergarments and everyday clothing (Richardson 2012; 2013).

The copper-alloy buttons <S11>, <S12> (Fig 75) were found with a five-year-old child, Isaac Booth ([143]) and are likely to have been intentionally placed with the body rather than from burial clothes, especially as they are extremely mismatched (<S11> is particularly large). These are the only buttons from the site which would have definitely originated from day wear; the fabric-covered buttons, shell and bone buttons are likely to have come from undergarments, shirts, nightwear or purpose-made grave clothing (eg Litten 1991, 80, fig 39; Richardson 2013, 89–90).

Where positions have been recorded they were all found in the neck or wrist areas. No buttons were found with Henry Wardall ([352]) who was buried wearing a waistcoat-like undergarment with buttonholes (<TX2>, below, 5.3, Fig 6; Fig 77).

Buckle

<S8> Composite (copper-alloy/iron) buckle (not illustrated)

<168>, [100]

Complete L 32mm, W 38mm, Th 6mm. Buckle with D-shaped copper-alloy frame, the ends of the loop projecting for 3mm beyond the bar, which is offset, not flush with the frame (total Th at this point 10mm). Iron pin/tongue *in situ*. Buried with Eady Booth, died aged 66 in 1848.



Fig 75. Buttons made of bone <S 9>–<S 10>, copper-alloy <S 11>–<S 12> and shell (mother-of-pearl) <S 17>–<S 18> (scale 1:1)

Buttons

<S9> Bone button (Fig 75)
<118>, [396]

Complete; diam 12.2mm, Th 3mm. Recessed panel on front, flat back, three holes in straight line with one hole cut into rim.

<S10> Bone button (Fig 75)
<119>, [595]

Complete, Diam 13.3mm, max Th 2.6mm. Recessed panel on front and rounded back; four central holes.

<S11> Copper-alloy button (Fig 75)
<136>, [143]

Complete; Diam 33mm, Th approx 1mm. Circular; faint impressed triangular dots all over exterior surfaces, possibly a textile impression; stub of loop fastening on back. Copper/lead alloy? Found with Isaac Booth died 1846, aged 5.

<S12> Copper-alloy button (Fig 75)
<137>, [143]

Complete, Diam 15mm. Flat disc and integral conical housing on back for base of attachment, cast in ?tin alloy; crushed attachment loop in copper alloy. Found with Isaac Booth died 1846, aged 5.

<S13> Composite textile/copper-alloy button (Fig 74)
<160>, [318]

Near-complete, Diam 13.5mm. Circular button with frame made up of rim and two diagonally crossing internal spokes (seen in X-ray); regular round protrusions on rim and four evenly spaced inside rim with one larger central protrusion (these seem to make up the spokes although they may be joined by underlying support); two layers of textile adhering on upper side (different weaves), further textile on underside. Found with Edmund Burton died 1840, aged 24.

<S14> Composite textile/copper-alloy button (Fig 74)
<162>, [318]

Near-complete, Diam 13.5mm. Circular button with four large central perforations in central recess; two layers of textile adhering on upper side (different weaves), further textile on underside. Found with Edmund Burton died 1840, aged 24.

<S15> Copper-alloy button (Fig 74)
<20>, [220]

Incomplete, Diam 14mm, Th 1.6mm. Complete butt-jointed copper-alloy ring frame for textile-covered 'Dorset' button; mineralised textile adhering.

<S16> Copper-alloy button (Fig 74)
<180>, [332]

Complete; Diam 10.5mm. Internal support for textile-covered 'Dorset' button.

<S17> Shell button (Fig 75)
<129>, [548]

Complete, Diam 9mm, Th 1.4mm. Disc-shaped with four small holes in central recess and flat back.

<S18> Shell button (Fig 75)
<131>, [595]

Complete (laminated), Diam 10mm, Th 1.2mm. Disc-shaped with four small holes in central recess.

Items Deliberately Placed with Burials

Ceramics

Lyn Blackmore with Beth Richardson

A ceramic eggcup <S19> (Fig 5), was found at the foot of a decayed coffin [505] with Lewis James Drew [504], who died in 1840 aged one year and one month. Two other male babies from the same family died in 1844

and 1846 and were buried in the same grave, although without burial finds. Made in pearlware, <S19> has sheet transfer-printed crazed/mosaic-type design in blue over the outer surface and inside the rim. Although basically the same as a standard eggcup, this example differs from the norm in that it has an everted, internally concave rim, possibly for a lid or to catch any spills from a runny egg. Part of the rim is missing and as no other sherds from the eggcup were found in the grave it must be assumed that it was damaged when placed in the coffin.

The discovery of a ceramic vessel in this child burial is unusual, although not unknown. Indeed, it forms part of a tradition dating back to the late 17th century or earlier, in which pewter and ceramic plates and, less commonly, ceramic saucers, dishes, cups and stoups seem to have been deliberately placed in burials, although it is possible that some at least were intended for removal and left inside the coffin by mistake (eg Richardson 2014; Cherryson *et al* 2012, 77–8). However, this is the first eggcup to be found. Other ceramic vessels have been recovered from ten other burials in five post-medieval cemeteries in central London (eg Richardson & Pearce 2012, 50–3; Richardson 2013, 91; 2017, 56–7). These include two infants buried, as here, with proportionally smaller items: one aged one to five years in the St Mary and St Michael's burial ground, the other aged ten weeks, in the New Bunhill Fields, Southwark burial ground (both with tea plates). A ceramic plate and cup and a pewter plate have recently been found in burial contexts at St Lawrence's church in Brentford (site code BJB18; Michael Henderson pers comm), and 15 other examples of burials with pottery or pewter vessels are currently known from the rest of Britain, with others from Europe and the Americas. The position of these vessels varies: the majority were placed in the area of the stomach but they sometimes occur at the feet, as here, by an arm or adjacent to the skull. Their function is unclear, but they could have been used to hold salt, which was thought to delay decomposition and ward off evil spirits, holy water or had some personal or family significance (Cherryson *et al* 2012; Richardson 2014).

Egg cup

<S19> Ceramic eggcup (Fig 5)

<187>, [505]

Complete; H c.64mm, ext rim Diam 54, int Diam c.38mm. Pearlware, with sheet transfer-printed crazed/mosaic-type design in blue over outer surface and inside rim; internally concave rim. Found with Lewis James Drew, died aged one year in 1840.

Coins

Julian Bowsher with Beth Richardson

There is only one coin from a burial, <C1>, a counterfeit silver shilling marked 1816, found near the left hip of burial [456], Joseph Bright, from Dalston who died aged 74 in May 1848. The surface has no relief and the design appears to have been etched on to a blank. Its weight is almost a quarter less than it should be. In 1816

there was a recoinage for the first time in nearly 20 years and the new designs of all denominations were clearly attractive to forgers. Most coins found in 19th-century burials are low denomination farthings and halfpennies or tokens; thus this deposition was more ritual or token rather than a mark of value. As Bright was described as a 'gentleman' a coin with the appearance of silver might represent a mark of respect; alternatively, Bright had been a cashier at the Bank of England and the coin may have been something he had acquired as a curio. Coins placed on or near the head, chest and arms have now been found with a number of post-medieval burials in Britain. Many of these are thought to represent a continuation of much earlier folk traditions, perhaps of payment to St Peter or to Charon, the ferryman who transported souls of the dead to the underworld (eg Richardson 2012, 53; Cherryson *et al* 2012, 73).

Coin

<C1> Silver coin (not illustrated)

<115>, [456]

(George III), 1816; irregular. Diam 23mm; Wt 4.45g. Ax 12; Wr C.

Obv GEOR:III D:G: BRITT:REX F:D:, 1816, laur head r. Rev garter strap HONI SOIT Q MAL Y PENSE, crown over quartered shield with central smaller the same. Buried with Joseph Bright, died aged 74 in 1848.

Items probably associated with funerary textiles

Pins are common finds on post-medieval burial sites, although never found in great quantity, suggesting that they were not used routinely to fasten shrouds, coffin upholstery and other burial textiles. On this site there 53 pins were recovered from 41 burials (where identifiable 18 adult burials and 16 subadults). The pins have spherical wound-wire heads or machine-made flat 'upset' heads in a ratio of approximately 70:30. This is typical of mid-19th-century pin assemblages when workshop or factory-made pins were beginning to come into use. Examples of each type are illustrated in Fig 76. Some pins have traces of tinning (eg <S22>) and some are still attached to fragments of textile.



Fig 76. Copper-alloy pins with flat 'upset' machine-made heads <S 20>–<S 21> and wound-wire heads <S 22>–<S 23> (scale 1:1)

Pins

<S20> Copper-alloy pin (Fig 76)

<14> [244]

Near complete, extant L(ength) 27.5mm, head Diam 2mm, shank Diam 1mm. Slightly bent with flat-topped conical head, shank of uniform Diam, missing tip. Found with Theresa Susan Giddy, died 1843, aged nearly two years.

<S21> Copper-alloy pin (Fig 76)

<21>, [220]

Incomplete, extant L 24.5mm, head Diam 2mm, shank Diam 1.2mm. Flat-topped conical head, shank of uniform Diam; tip missing.

<S22> Copper-alloy pin (Fig 76)

<52>, [578]

Complete, L 27.3mm, head Diam 2mm, shank Diam 0.9mm. Spherical wound wire head, shank of uniform Diam to just above tip. Tinning. Found with Lydia Salmon, died 1829, aged 2 months.

<S23> Copper-alloy pin (Fig 76)

<139>, [142]

Complete, L 27.6mm, head Diam 1.5mm, shank Diam 0.5mm. Spherical wound wire head, shank of ?uniform Diam to just above tip. Found with Isaac Booth, died 1846, aged 5.

Textiles

Hilary Davidson

Introduction

The Mare Street textiles are valuable additions to the growing body of evidence for 19th-century middling and lower-class burial practices. Although small, this group provides a higher proportion of identifiable textiles associated with named bodies than most previously analysed sites. The finds divide into clothing pieces, small adornments (probably from bonnets or burial clothes) and coffin furnishings. That clothing comprises the highest percentage of the objects is unusual. Previous studies of burial textiles (*eg* Davidson 2012; 2013; 2016; Janaway 1993; Walton-Rogers 2006; 2011) contain large numbers of woollen scraps whose purpose is often uncertain unable to be definitively identified as clothing or shrouds unless stitching holes are found, or which may be part of the coffin furnishing. The original function of most of the Mare Street textiles can be identified.

Burial Textiles

Clothing

WOOLLEN CLOTHING

The most significant finds are two wool flannel undershirts or 'waistcoats', as they were known. The most complete <TX2> belonged to Henry Wardall

[353], who died aged 88 in 1840 (Fig 6; Fig 77). John Allen [258], who died in 1839 aged 69, wore the less well-preserved <TX1>. Flannel waistcoats were common, and widespread throughout the 18th and 19th centuries, yet very few have survived in historic dress collections, and they have been little researched (Baumgarten 1992; Davidson 2019). The best documented examples belonged to Admiral Lord Nelson (1758–1805) (National Maritime Museum ZBA4566) and Thomas Coutts (1735–1822), founder of the bank Coutts & Co (Victoria and Albert Museum, 371X-1908 and CIRC.716:4-1912; see Wilcox 2012). The Mare Street shirts are material evidence backing up their presence in documents as regular gentry and professional level clothing. Wardall and Allen were both described as gentlemen in their wills. The former was a tradesman, with a family business of glaziers and painters; the latter was a schoolmaster. Flannel underwear was the early forerunner of thermal wear, keeping wearers of both sexes warm in the form of undershirts, bodices, drawers and petticoats. Men wore the creamy, plain weave or knitted, raised nap (fluffy) undyed wool flannel garments under or over the visible linen shirt to keep heat in (although doctors also advised their use in tropical climes to regulate body temperature). Typically, they have a front opening with large Dorset (thread-wrapped metal ring) buttons of $\frac{3}{4}$ to 1 inch diameter, no collar, elbow or full-length straight sleeves attached without armhole shaping, gaps or square gussets at the armpit, and binding of cotton or silk around the edges. Both Mare Street examples conform to type. The larger size excavated buttons ('Buttons', above) are probably detached from similar flannel waistcoats and are consistent with the size and technique seen in museum survivals.

The presence of flannel undershirts on the bodies of two old men who may have died from illness, conforms to the Georgian and Victorian usage of this garment. Flannel was the fabric of comfort and illness, as Jane Austen's 17-year-old heroine, Marianne, famously emphasises in *Sense and Sensibility* (1811):

But he talked of flannel waistcoats, and with me a flannel waistcoat is invariably connected with the aches, cramps, rheumatisms, and every species of ailment that can afflict the old and the feeble.

Austen likewise marked a relative's return to health by noting 'my uncle is still in his flannels, but is getting better again' (Le Faye 2005, 49). Thomas Coutts wore flannel shirts, drawers and dressing gowns to keep his slight body warm for decades before his death aged 87. Nelson was a typical naval man in his flannel wearing. Wool's ability to stay warm while wet was exploited by and recommended for professional, mercantile and leisure seafarers. Perhaps Wardall valued the same qualities as a tradesman working outside in English weather. Wardall's waistcoat <TX2> in particular is a valuable social and historical record due to its extensive repairs, patches and darning (Figs 6, 77).

Evidence for mundane reinforced textiles can be hard to find as worn and repaired garments were not



Fig 77. Waistcoat of Henry Wardall (died 1840) <TX 2>, front and back view (scale 1:5)

kept or were used to the end of their durability then recycled through rag-and-bone men. Wardall's suggests a garment owned for a long time, comfortable, familiar, and carefully maintained – a good choice for burial, and a very rare find for dress history. Allan's waistcoat has strain on the buttonhole section, also demonstrating he wore it while alive.

Wardall's knee-high woollen, machine-knitted stockings <TX3> are in comparatively good condition. They were knitted flat, and then seamed down the back of the leg (Figs 6, 78). Although over the knee stockings are common in burial contexts (see particularly Janaway 1993), the fact that Wardall was buried in a shirt he clearly used in life offers the possibility the stockings may also have been worn before death. If so, their length then suggests the tradesman wore knee-length

breeches regularly, consistent with labouring men throughout the 19th century (De Marly 1986), rather than the ankle-length trousers more usual in professional and gentry society.

<TX1> Flannel waistcoat

<183>, [258]

Three sections of the same wool flannel waistcoat. Worn by John Allen, died 17 June 1839, aged 68 years. Worn before death, as there is strain on the buttonholes. Two larger sections (L 62mm, W 170mm and L 50mm, W 310mm). The front edge is folded. Long section is button section, evidence of stitch attachment. Two buttonholes, one has copper-alloy ring adhering to it. A smaller section (L 75mm, W 33mm) has buttonhole and verdigris impression of button with copper-alloy



Fig 78. Stockings of Henry Wardall (died 1840) <TX 3>, with detail showing ?embroidered detailing (scale 1:5, detail 1:2)

fragments. Adhered closed front section. No thread stitching remaining. No evidence of secondary fabric facing.

<TX2> Flannel waistcoat (Fig 6; Fig 77)
<171>, [352]

Woollen flannel waistcoat or undershirt worn by Henry Wardall (see also <TX3> and <TX9>), died 22 November 1840, aged 88 years. Left hand sleeve of shirt with three fragments of flannel. Sleeve in two parts, one main and one narrow under-arm section. Elbow length sleeves. Two of the fragments have been cut and stitched, and fit back into gaps in the shirt (L 135mm, W 100mm and L 110mm, W 130mm). The third fragment has a hemmed edge, three other sides raw, with stitch holes (L 125mm, W 105mm). The main piece has three unthreaded buttonholes remaining. Large flannel facing. Gusset is a large patch. Curved upper front neck edge. Felled seams. Double fell on arm seam. Impression of thread remains in the buttonholes. Stitching thread was probably cotton by this date.

<TX3> Woollen stockings (Fig 6; Fig 78)
<170>, [352]

Woollen machine knitted stocking worn by Henry Wardall (see also <TX2> and <TX9>). Knitted flat then seamed, fully fashioned. Double black line of single knitting around the top, possibly embroidered after manufacture as it disappears on the back. Has slits and tears. Twenty stitches per in/8 stitches per 10mm. Twenty-four rows per inch/15 rows per 10mm. W (top) 171mm, (ankle) 122mm. Foot piece L 140mm, W 112mm.

SILK CLOTHING

Fragments of silk plain weave ribbon <TX5> come from the bonnet or gown of Mary Ann Huxtable [460], who died in April 1834 (Fig 79). They were originally white, consistent with the colouration found in satin ribbons from other sites. It is unclear whether they are ordinary 'fashionable' ribbons, or one of the cheaper varieties

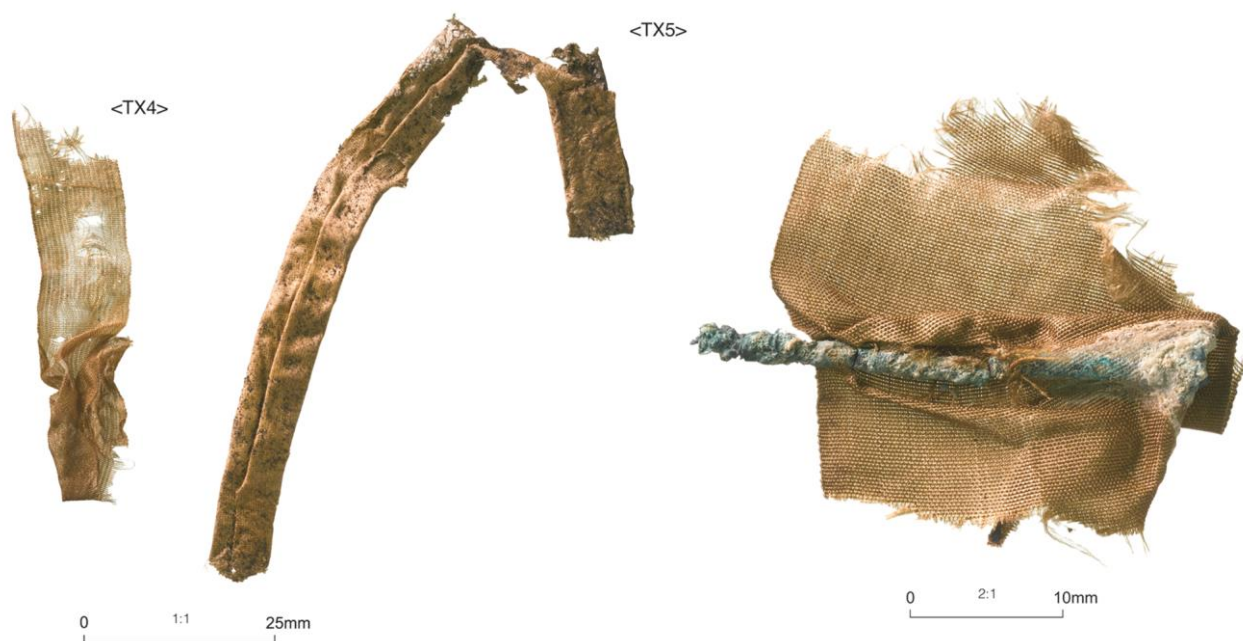


Fig 79. Silk ribbons <TX 4> and <TX 5> probably from bonnets or gowns, with detail of <TX 5> showing copper-alloy pin for attachment. Found with female skeletons (scale 1:1, detail 2:1)

used for burial. Strips of stiffened bias binding in this group, with a copper-alloy pin holding pieces of ribbon onto the binding, reflect the kind of trims seen on fashionable bonnets, and gowns at this date, though stiffness is more typical of bonnets.

The rest of young Miss Huxtable's grave clothing may also have been ordinary dress, as opposed to the shrouds or sham clothes that appear, from other burial finds, to be more common. A similar ribbon piece <TX4> comes from the body of an unnamed young adult female aged 18–25 (Fig 79). <TX6> is 11 parts of a warp-faced silk ribbon, 1½ inch wide, from the grave of Mrs Ann Huxtable (died 20 September 1828 age 39), possibly for a bonnet, or grave clothes, as adhesions to copper-alloy pins attach the ribbon to scraps of wool, and machine-made net.

<TX4> Silk ribbon (Fig 79)

<6>, [362]

White silk plain weave ribbon with pin holes. Now a golden colour. Sixty warp threads and 22 weft threads per centimetre. L 80mm, W 12mm. See above for context.

<TX5> Silk ?bonnet or gown (Fig 79)

<188>, [460]

Pieces of a bonnet or gown in three pieces. Found with Mary Ann Huxtable died 4 April 1834, aged 20 years. Silk plain weave ribbon 1¼ inch (32.5mm) wide. Also strips of stiffened bias binding 8.5mm wide. Probably once white. Adhering copper/copper-alloy pin holds pieces of ribbon onto binding. Kind of trims seen on fashionable bonnets and gowns, though stiffness suggests a bonnet.

<TX6> Silk ?bonnet

<182>, [499]

Eleven parts of a ribbon for a ?bonnet. Found with Ann

Huxtable, died 20 September 1828, aged 39 years. Warp faced silk ribbon, with full width 1½ inch. Some sections folded into ⅛ in width. Bow pinned into place with copper-alloy pins. Back of knot has small sections of wool fabric adhering. Another small section has coarser ½ inch wide plain weave silk ribbon, with copper-alloy pin, and sections of machine-made net. Longest piece is 253mm long.

Coffin Furnishings

Two pieces of fabric are linings for coffins. The fragment <TX7> is baize or flannel, used to line the coffin or the coffin lid. The 18 fragments of <TX8> are wool flannel with nail holes that also suggest use as a coffin lining.

WOOLLEN TEXTILE

<TX7> Woollen lid or lining cloth

<173>, [454]

Coffin lid or lining cloth. Found with Elizabeth Swallow, died 24 October 1829, aged 73. Baize or flannel. Plain weave with a fulled face. Irregular shape, 150 x 208mm.

<TX8> Woollen ?coffin lining

<172>, [636]

Eighteen pieces of wool flannel coffin lining. Found within the lead inner coffin of Francis Augustus Cox [650], died 5 September 1853, aged 70 years. Some evidence of nail holes. Possibly winding sheet but more likely lining. Conserved in three layers. The longest piece is 370mm long and includes a selvedge. All pieces of same fabric.



Fig 80. Felted wool pillow <TX 9>, showing the upper and lower pieces, with a detail of the lower showing whip stitching and scalloped edge (scale 1:5, detail 1:1)

FELTED WOOL PILLOW

Frances Pritchard with Beth Richardson

A pillow <TX9> was found beneath the head of Henry Wardall, who died in 1840 (Figs 6, 80). Pillows are comparatively rare finds but are known from other post-medieval burial grounds including St. Martin's-in-the Bull Ring, Birmingham (Walton Rogers 2006, 167), Spitalfields, London (Jannaway 1993, 103) and St Luke's, Islington (Boyle *et al* 2005, 87). They were stuffed with a variety of materials including plant materials, wool, horsehair and kapok, and sometimes decorated with ribbons and bows (Cherryson *et al* 2012, 34). The pillow from a 19th-century burial at St Martin's-in-the Bull Ring, made from woollen cloth trimmed with

a cut scalloped edging, is perhaps the most similar in style to the pillow from Mare Street.

<TX9> Felted wool pillow (Fig 6; Fig 80)

<174>, [353]

<184>, [353]

Two parts of a pillow found beneath skull of Henry Wardall (see also <TX2> and <TX3>). Near-complete. Piece <174> L 293mm, W 185, Th c.7mm. Loosely felted wool, folded double on both short sides; two types of stitching worked in two-ply thread (z-spun/s-ply); long catch stitches 2.3–3mm from lower edge probably to hold the wadding together, and widely spaced whip stitches 2–3mm apart along the upper edge creating a decorative scalloped effect. A separate single layer of the same material <184>, L 293mm, W 268, Th c. 5mm, was

either originally attached or possibly laid over the top. It has the same widely scalloped edging on three sides; the fourth (short) side is damaged.

THE PEOPLE: THE OSTEOLOGICAL EVIDENCE

Niamh Carty

Introduction

Osteological analysis was undertaken of a subsample of 238 articulated human skeletons (67% of the assessed sample of 354 skeletons, excluding two very poorly-preserved examples that did not survive lifting and processing) recovered during the excavation. All were interred in the burial ground of the Mare Street Baptist church in the first half of the 19th century (*c.*1812–53).

Survival of associated coffin plates, together with corresponding burial register information, enabled the identification of many of the individuals though invaluable biographical information. This, together with the excellent state of preservation of many of the skeletal remains, enhanced the analysis, to produce information on the congregation of the Mare Street Baptist church. In particular, the opportunity to study death certificates of 47 individuals complemented and enhanced the historical, diagnostic and osteological study of this assemblage. Integrated discussion of this evidence can be found in ‘The Burial Population’ above. Individuals mentioned below are identified by the context number of the skeleton, with the name and documented age given where available.

Methodology

The 238 skeletons in the subsample selected for analysis (above) includes nearly all named individuals (*n*=80), plus all those that satisfied the following criteria: >80% complete; well or moderately well preserved; aged subadults and confidently sexed adults (*n*=158). All results given in this section are based on the analysed subsample only. All articulated human remains from the subsample were recorded directly onto an Oracle 9i (v9.2.0) relational database system (Connell & Rauxloh 2007; Powers 2012).

Adult age at death estimates employed a combination of pubic symphysis, auricular surface and sternal rib end morphology, and dental attrition (Brothwell 1981; Iscan *et al* 1984; 1985; Lovejoy *et al* 1985; Brooks & Suchey 1990). On this basis, each individual was placed into an age category (Table 19). Individuals aged below 18 years of age were classed as ‘subadults’. Their age was estimated using a combination of long bone diaphyseal growth, stage of epiphyseal fusion, and tooth development and eruption (Moorees *et al* 1963a; 1963b; Mares 1970; Gustafson & Koch 1974; Scheuer & Black 2000).

The assessment of biological sex was only attempted for adults (≥18 years) and was based on a group of morphological characteristics in the Os coxae and skull (Powers 2012). Each adult was assigned to one of the

following categories: male, probable male, intermediate, probable female, female, undetermined. A selection of metric and non-metric data was recorded for all adult skeletons and was stored in the site archive for reference (*ibid*). The calculation of adult stature employed metric data from the right femur, applying the formulae devised by Trotter (1970).

Table 19. Age categories used in analysis

Category	Description	Age range
Subadult	inter-uterine-neonate	up to 4 weeks
	early post-natal infant	1–6 months
	later post-natal infant	7–11 months
	early childhood	1–5 years
	later childhood	6–11 years
	adolescent	12–17 years
Adult	young adult	18–25 years
	early middle adult	26–35 years
	later middle adult	36–45 years
	mature adult	≥46 years
Unclassified	adult	>18 years
	subadult	<18 years



Fig 81. Skeletal preservation in a – subadults and b – adults

Table 20. Demographic profile of the analysed subsample

Age (years)	Subadult	Male	Probable male	Probable female	Female	Undetermined	Total
Perinatal	4	-	-	-	-	-	4
1-6 months	8	-	-	-	-	-	8
7-11 months	6	-	-	-	-	-	6
1-5	36	-	-	-	-	-	36
6-11	18	-	-	-	-	-	18
12-17	14	-	-	-	-	-	14
18-25	-	7	4	2	18	-	31
26-35	-	17	-	2	22	-	41
36-45	-	14	1	1	13	-	29
≥46	-	22	1	3	20	-	46
Adult	-	-	3	-	-	2	5
Total	86	60	9	8	73	2	238

Table 21. Adult demographic profile showing sex groups actually used in analysis

Age (years)	Male/probable male		Female/probable female		Undetermined		Total	
	n	%	n	%	n	%	n	%
18-25	11	15.9	20	83.3	0	-	31	20.4
26-35	17	24.6	24	29.6	0	-	41	27.0
36-45	15	21.7	14	17.3	0	-	29	19.1
≥46	23	33.3	23	28.4	0	-	46	30.3
Adult	3	4.3	0	-	2	100.0	5	3.3
Total	69		81		2		152	

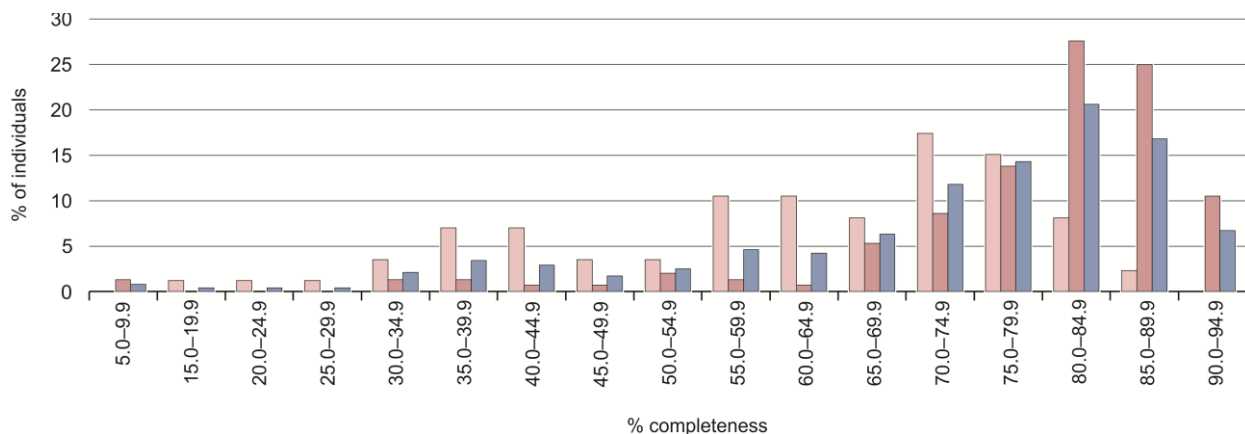


Fig 82. Skeletal completeness

The diagnosis of pathological conditions followed the procedures set out by Roberts and Connell (2004, 34). The dental catalogue used the two digit Fédération Dentaire Internationale (1971) system to identify teeth.

Preservation and Completeness

Preservation

The preservation of bone was generally good (195/238: 81.9%). Only 14 contexts were poorly preserved (14/238: 5.9%). Despite the thickening of bones that accompanies increasing maturity, a larger proportion of

subadult skeletons were well preserved when compared to adults (Fig 81).

Completeness

The absence of intercutting burials within the burial ground resulted in high rates of skeletal completeness. 119 adults had complete crania which inhibited observations of internal cranial structures. Only 5.3% (8/152) were less than 50% complete, while more than half (117/152: 77%) were over 75% complete. Fewer subadults were recovered intact, 24.4% (21/86) were less than 50% complete although 43% (37/86) were

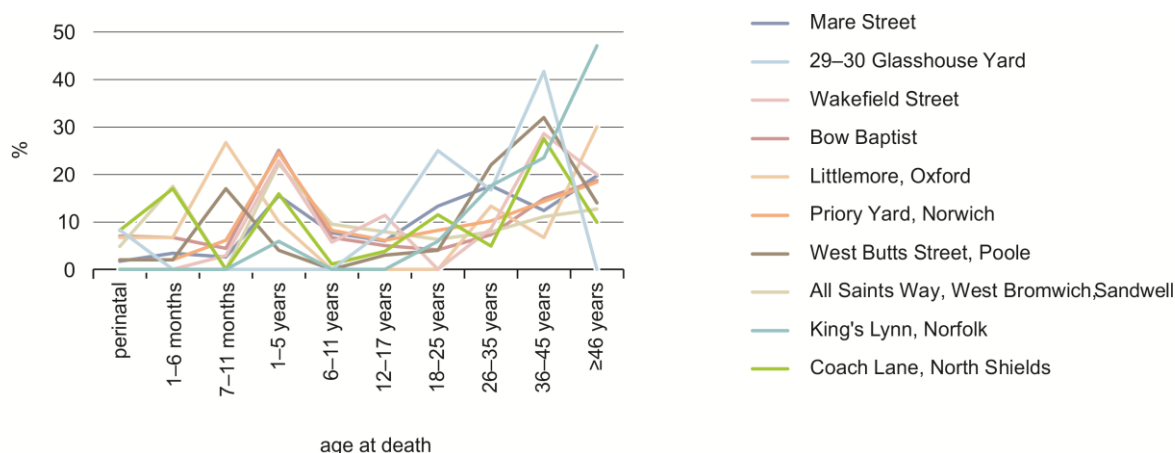


Fig 83. Distribution of aged individuals (%) at Mare Street ($n=233$) compared with other Baptist burial grounds in London (29-30 Glasshouse Yard ($n=12$), Wakefield Street ($n=35$), Bow Baptist ($n=342$)) and elsewhere (Littlemore, Oxford ($n=30$), Priory Yard, Norwich ($n=49$), West Butts Street, Poole ($n=100$), All Saints Way, West Bromwich ($n=63$), Kings Lynn, Norfolk ($n=17$)) and the Quaker burial ground at Coach Lane, North Shields ($n=182$))

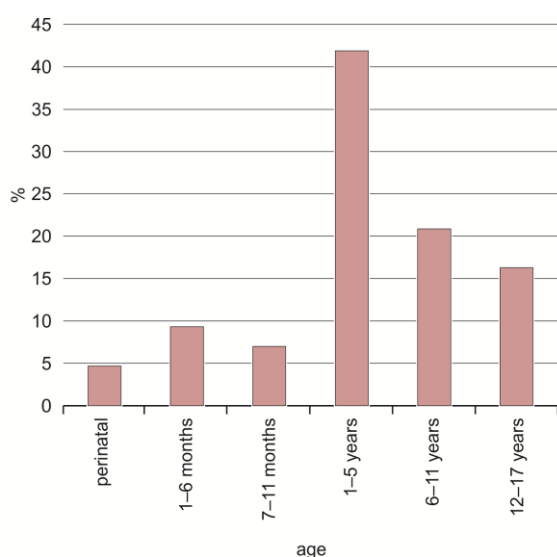


Fig 84. Subadult age at death by age category ($n=86$)

over 75% complete (Fig 82).

As always in osteological studies, the true prevalence rates (per bone) allow for a far more accurate and representative measure of pathological bone changes than crude prevalence rates (rates per individual).

Demography

Two hundred and thirty-eight individuals were selected for full osteological analysis (above; Table 20). For the purpose of analysis of the adults, males were combined with probable males and females with probable females (Table 21).

The Mare Street subsample contained 152 adults and 86 subadults (ratio 1.77:1). The percentage distribution of individuals who were sufficiently preserved to be placed into specific age categories revealed a low mortality rate in perinatal and infant age categories and an increase in mortality risk in the

younger child age category. There was a notable decrease after this into adolescence and early adulthood and relatively high numbers of older (≥ 46 years) individuals (Fig 83). The mortality profile was comparable to that observed at contemporary Nonconformist sites: the Baptist burial ground at Priory Yard, Norwich (1726-1854; Caffell & Clarke 2011), Bow Baptist burial ground, London (1816-53; Henderson *et al* 2013), Kings Lynn, Norfolk (1773-1855; Boston 2011), Wakefield Street, London (1820-30; Henderson 2012) and the Quaker burial ground at Coach Lane, North Shields (1711-1820; Proctor *et al* 2016). Common features include high subadult mortality in the one to five years age category, and a subsequent drop in all age categories until the older adult (≥ 46 years) category (Fig 83).

The data from All Saints Way, West Bromwich (1812-53; Daly 2012) matches the high subadult mortality in the one to five years age category seen at Mare Street, but there were only a small number of adults included in the subsample for analysis at this site, which is perhaps reflected in the low numbers of older adults present. In contrast, there is a peak in mortality at the seven to eleven months age category (infant) at both the West Butts Street, Poole (1804-55; McKinley 2008) and the slightly later 19th century burial ground of Littlemore, Oxford (1862-88; McCarthy *et al* 2011; 2012). No subadults were recorded at Glasshouse Yard, London (mid-17th century; Daykin 2017; Henderson 2009) (Fig 83).

At Mare Street subadult mortality was highest in the one to five years age category (Fig 84). When expressed in years there was a distinct peak in mortality for infants aged one (22/86: 25.6% of subadults) (Fig 85). This peak could reflect weaning stress at this age, as it is reported that in the 17th and 18th centuries, the mean weaning age in Britain dropped from 18 months to 7.25 months, which has been attributed to women moving to urban areas for employment (Lewis 2007, 102).

Mare Street produced 69 males and 81 females, a ratio of 0.8:1, which is similar to that recorded at Bow Baptist church (0.74:1; Henderson *et al* 2013, 103). The

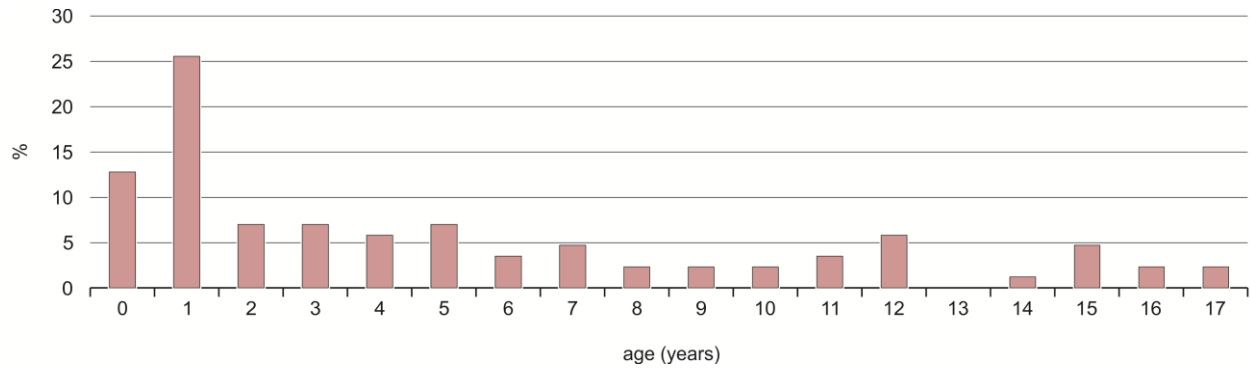


Fig 85. Subadult age at death in years (%) ($n=86$)

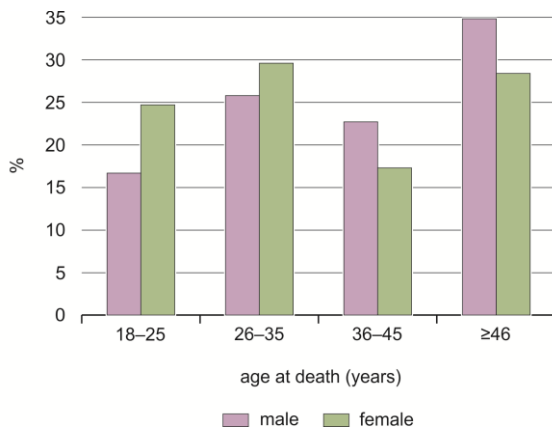


Fig 86. Age distribution (%) of adult males ($n=66$) and females ($n=81$)

larger proportion of females in the skeletal assemblage at Mare Street could reflect the attractiveness of converting to the Baptist faith for 19th-century women, and the subsequent many and varied roles (and relative freedom) available to women within the Baptist church. Briggs (1994, 278–82) noted that women could be hymn-writers, educators, philanthropists, run orphanages, and be heavily involved in overseas missions. By the late 19th century women were also appearing as platform speakers (although the women who were involved in this pursuit were mainly the wives

or family members of ministers). Another possible explanation for the female bias was that any man who was a member of a municipal corporation until 1828 (*Sacramental Test Act 1828*) was required to swear an oath that they received Church of England communion, so they were more restricted than women when changing faiths or converting (Powers & Miles 2011, 243).

In those sexed adults who could be assigned a specific age category, the mortality pattern was broadly similar, although a slightly greater proportion of females died between 18–36 years of age when compared to males (Fig 86). The position was reversed in the next two age categories (36–45 years and ≥46 years). This may reflect increased risk of death during the main child-bearing years for females.

Metric Data

Stature

The mean living stature for males from the Mare Street subsample was 169.0cm for males and 159.3cm for females, broadly similar to a range of contemporary comparable assemblages (Table 22). Adult stature is affected by genetic and environmental factors such as diet and exposure to infectious disease in childhood (Mays 2016).

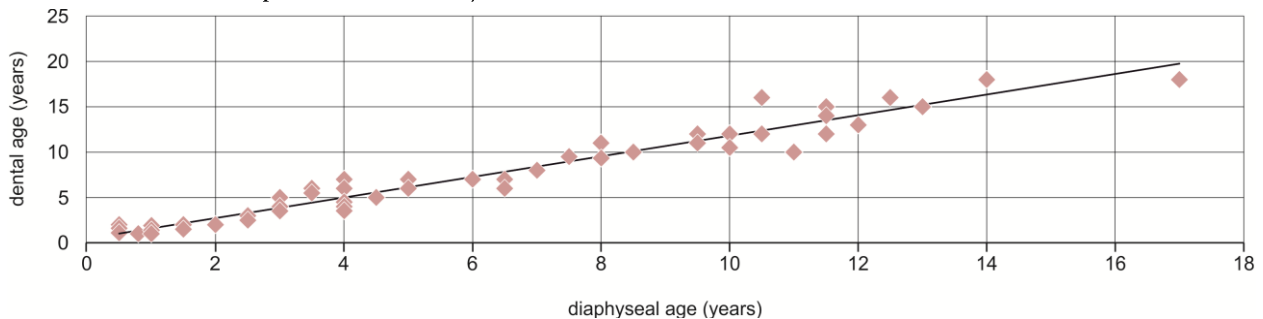


Fig 87. Subadult age at death calculated from diaphyseal length and dental age ($n=66$) (following Moorees et al 1963a; 1963b; with Smith, 1991 recalibration from Buikstra and Ubelaker 1994, fig 23)

Table 22. Adult stature at Mare Street compared with other Nonconformist sites in London and the rest of the Britain (above, 'Demography' for sources)

Burial ground sample	Male					Female				
	n	Mean (cm)	SD (cm)	Min (cm)	Max (cm)	n	Mean (cm)	SD (cm)	Min (cm)	Max (cm)
Wakefield Street	11	171.8	-	168.7	182.4	4	160.3	-	156.1	162
Coach Lane, North Shields	20	171	-	164	178	17	160	-	135.0	170
29-30 Glasshouse Yard	1	170.9	-	170.9	170.9	1	159.2	-	159.2	159.2
Bow Baptist	55	169.7	4.9	157.6	182.1	68	158.3	4.1	148.0	166
King's Lynn, Norfolk	7	169	-	153	181	9	160	-	152.0	166
West Butts Street, Poole	22	169	6.2	157	186	42	158	7.4	140.0	174
Mare Street	56	168.96	5.832	153.04	183.27	64	159.3	5.7624	145.8	173.9
All Saints Way, West Bromwich	15	168.9	4.6	160.9	176.2	10	158.8	4.6	152.9	166.9
Baptist Chapel Burial Ground, Littlemore, Oxford	3	168	-	168	169	7	158	-	152.0	166
Priory Yard, Norwich	10	168	-	157	175	11	155	-	145.0	163

Subadult Growth

Rates of subadult growth for the Mare Street subsample were measured by comparing diaphyseal lengths of bones with dental development (Fig 87). Age calculated from diaphyseal length frequently fell below that of dental age (57/66: 86.3%) reflecting a population that failed to obtain full growth potential throughout childhood.

Skeletal Indices

It is possible to determine some degree of biological relationship by calculating the cranial index. However, these calculations can be arbitrary and questionable (Pietrusewsky 2000). Cranial indices (ratio of the maximum width (side to side) of the head multiplied by 100 divided by its maximum length (front to back)) were calculated for the subsample (Table 23). Mean values for males, females, and all adults fell within the mesocranic (having a skull of medium proportions) range.

A total of 126 adults, including 58 males and 66 females, had sufficiently preserved crania to permit calculations of cranial index. The majority of individuals lay within the dolichocranic (a long skull shape) and mesocranic ranges.

At West Butts Street, Poole, a similar pattern was observed, with a majority of crania falling within the dolichocranic range (14/39: 35.9%) (McKinley 2008, 67).

The majority of adults at the contemporary site of St Mary and St Michael's fell into the dolichocranic and mesocranic ranges and at Sheen's burial ground and Bow Baptist the majority were mesocranic (Henderson *et al* 2013, 217).

Calculations of post-cranial indices included levels of platymeria (flatness of the femur) and platycnemia (flatness of the tibia), used to investigate the degree of flattening in the diaphyseal shafts of the lower limb long bones. Post-cranial indices are calculated to investigate external diaphyseal morphology in the lower limbs, particularly the degree of flattening which can be linked to stress (Larsen 1999, 222).

The platymeric index measures the degree of anteroposterior flattening in the proximal femoral shaft.

Table 23. Cranial index of the subsample (n=126)

	Mean	Min	Max
Male	75.41	67.78	84.83
Female	75.51	68.75	82.76
All adult	75.46	84.83	67.78

Table 24. Platymeric index (mean) (n=291)

	Right femur	Left femur
Male	92.3	87.61
Female	88.74	85.84
All adults	90.35	86.64

Table 25. Platycnemic index (mean) (n=271)

	Right tibia	Left tibia
Male	71.6	70.97
Female	71.6	71.4
All adults	71.6	71.2

Measurements could be taken for 291 femora and produced similar mean indices (eurymeric) for males and females (Table 24). The majority of adult femora were platymeric (laterally flattened with a platymeric index of 75.0 to 84.9) or eurymeric (having a broad femur with a platymeric index of 85 to 100).

The level of transverse flattening of the proximal shaft of the tibia was measured through the platycnemic index. A total of 271 tibiae contained sufficiently preserved tibiae for index calculation. The mean index for both males and females was eurycnemic (dorsoventrally flattened with a platycnemic index of 70 or more) (Table 25). The majority of tibiae were eurycnemic.

Table 26. Cranial non-metric traits

Cranial trait	Present		Absent		Total observable		Prevalence (%)	
Metopism	8		131		139		5.8	
Lambdoid bone	5		123		128		3.9	
Inca bone	11		116		127		8.7	
Bregmatic bone	1		133		134		0.7	
Sagittal wormians	52		83		135		38.5	
	Left	Right	Left	Right	Left	Right	Left	Right
Asterionic bone	17	17	107	109	124	126	13.7	13.5
Epipteric bone	10	11	113	116	123	127	8.1	8.7
Coronal wormians	56	56	79	78	134	134	41.8	41.8
Lambdoid wormians	56	56	79	79	135	135	41.5	41.5
Squamo-parietal wormians	4	4	129	130	133	134	3.0	3.0
Parietal notch bone	3	3	126	127	129	130	2.3	2.3
Torus auditivi	0	0	146	147	146	147	-	-
Torus maxillaris	4	2	137	138	141	140	2.8	1.4
Torus palatinus	3	3	138	137	141	140	2.1	2.1
Supraorbital foramen	53	58	89	88	142	146	37.3	39.7
Supraorbital groove	73	77	69	69	142	146	51.4	52.7
Mastoid foramen	4	5	139	140	143	145	2.8	3.4
Foramen of Huschke	1	1	143	145	144	146	0.7	0.7
Parietal foramen	36	39	102	99	138	138	26.1	28.3
Accessory infraorbital foramen	1	2	137	137	138	139	0.7	1.4
Posterior condylar canal	5	5	133	135	138	140	3.6	3.6
Multiple mental foramen	1	0	138	140	139	140	0.7	-
Torus mandibularis	0	0	141	140	141	140	-	-
Mylohyoid bridge	0	0	138	140	138	140	-	-

Table 27. Post-cranial non-metric traits

Element	Post-cranial trait	Present		Absent		Total observable		Prevalence (%)	
Sternum	sternal foramen	0		111		111		-	
	manubrio-corpae synostosis	2		230		232		0.9	
		Left	Right	Left	Right	Left	Right	Left	Right
Scapula	os acromiale	4	6	125	124	129	130	3.1	4.6
	acromial articular facet	21	22	109	109	130	131	16.2	16.8
Humerus	sepal aperture	7	6	132	130	139	136	5.0	4.4
	supracondylar process	0	1	138	135	138	136	-	0.7
Atlas	posterior bridge	2	2	138	138	140	140	1.4	1.4
	lateral bridge	2	2	138	138	140	140	1.4	1.4
	transverse foramen bipartite	5	7	135	133	140	140	3.6	5.0
Ilium	double facet	16	18	124	122	140	140	11.4	12.9
	accessory sacral/Iliac facets	1	1	143	142	144	143	0.7	0.7
Femur	acetabular crease	0	0	143	145	143	145	-	-
	third trochanter	4	3	135	138	139	141	2.9	2.1
	Allen's fossa	37	38	105	106	142	144	26.1	26.4
Patella	hypotrochanteric fossa	1	1	138	140	139	141	0.7	0.7
	vastus notch	0	0	125	123	125	123	-	-
	bipartite	0	0	125	123	125	125	-	-
Tibia	medial squatting facet	2	2	125	128	127	130	1.6	1.5
	lateral squatting facet	2	2	125	128	127	130	1.6	1.5
Calcaneus	facet absent	1	1	115	120	116	121	0.9	0.8
	facet double	5	5	114	118	119	123	4.2	4.1
Talus	os trigonum	22	24	104	99	126	123	17.5	19.5
	talar facet double	3	3	124	122	127	125	2.4	2.4
	squatting facet	0	0	127	125	127	125	-	-

Table 28. True prevalence of dental disease

Dental pathology	Deciduous			Permanent			Total		
	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Caries	609	40	6.6	2852	450	15.8	3461	490	14.2
Calculus	609	17	2.8	2852	1182	41.4	3461	1199	34.6
Hypoplasia	609	18	3.0	2852	410	14.4	3461	428	12.4
Periapical lesion	1078	0	-	5723	151	2.6	6801	151	2.2
Periodontitis	1078	3	0.3	5723	713	12.5	6801	716	10.5
Ante-mortem tooth loss	1078	0	-	5723	2088	36.5	6801	2088	30.7

Table 29. Crude prevalence of dental disease

Dental pathology	Subadults (n=83)		Adults (n=152)		Total (n=238)	
	No. affected	%	No. affected	%	No. affected	%
Caries	28	32.6	106	69.7	134	56.3
Calculus	14	16.3	109	71.7	123	51.7
Hypoplasia	16	18.6	53	34.9	69	29.0
Periapical lesion	3	3.5	71	46.7	74	31.1
Periodontitis	0	-	74	48.7	74	31.1
Ante-mortem tooth loss	9	10.5	143	94.1	152	63.9

Table 30. True prevalence of subadult dental disease

Dental pathology	Deciduous			Permanent			Total		
	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Caries	609	40	6.6	552	35	6.3	1161	75	6.5
Calculus	609	17	2.8	552	43	7.8	1161	60	5.2
Hypoplasia	609	18	3.0	552	109	19.7	1161	127	10.9
Periapical lesion	1076	0	-	1161	2	0.2	2237	2	0.1
Periodontitis	1076	3	0.3	1161	0	-	2237	3	0.1
Ante-mortem tooth loss	1076	0	-	1161	13	1.1	2237	13	0.6

Table 31. True prevalence of adult dental disease

Dental pathology	Deciduous			Permanent			Total		
	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Caries	0	0	-	2300	415	18.0	2300	415	18.0
Calculus	0	0	-	2300	1139	49.5	2300	1139	49.5
Hypoplasia	0	0	-	2300	301	13.1	2300	301	13.1
Periapical lesion	2	0	-	4562	149	3.3	4564	149	3.3
Periodontitis	2	0	-	4562	713	15.6	4564	713	15.6
Ante-mortem tooth loss	2	0	-	4562	2075	45.5	4564	2075	45.5

Non-Metric Traits

A series of 39 cranial, six mandibular and 47 post-cranial non-metric traits were recorded based on observations of presence or absence (Powers 2012). Non-metric traits represent minor non-pathological variations in the anatomy of an individual skeleton including the incidence of ossicles or small bones within the cranial sutures, abnormal proliferative bone growths such as spurs or bridges, ossification failures resulting in defects and variations in the location and number of foramina (openings) in the bone (Buikstra & Ubelaker 1994, 85; Finnegan 1978).

Non-metric variation may have a genetic background or may be influenced by environmental factors and may suggest family groups within a burial

ground (Brothwell & Zakrzewski 2004; Finnegan 1978). They can also provide data for insights into levels of interbreeding, gene flow drift and population dissimilarity (Tyrrell 2000, 289).

Cranial Non-Metric Traits

The most frequently recorded cranial traits were the presence of supraorbital grooves (notches in the supraorbital margin of the frontal bone), coronal wormian bones (ossicles located within the coronal suture in the cranial vault), lambdoid wormian bones (ossicles located within the lambdoid suture in the cranial vault), supra orbital foramina (perforations in the supraorbital margin of the frontal bone) and parietal foramina (openings perforating the parietal

bones). There was a low or no incidence of torus auditivi, accessory infraorbital foramen, multiple mental foramina, torus mandibularis and the mylohyoid bridge (Table 26).

Post-Cranial Non-Metric Traits

The highest rates recorded in the post-cranial skeleton included Allen's fossa (located near the anterior superior margin of the femoral neck close to the border of the head), os trigonum (ossicle present on the talus), acromial articular facet (articular facet present on the inferior surface of the acromial process), and the double facet at atlas (Table 27). There was low or no incidence of the sternal foramen, supracondylar process, acetabular crease, vastus notch, bipartite patella, or the talar squatting facet.

Discussion

McCarthy *et al* (2011, 21) suggested that the low levels of variability in non-metric traits in the Baptist Littlemore assemblage may relate to the strictly enforced Particular Baptist policy of endogamy (marriage within one's own church family) and the consequent close level of relatedness between individuals. At Mare Street, although there was a high proportion of certain cranial and post-cranial non-metric traits in two named family groups (the Coxes and the Booths), the actual numbers involved are small and not statistically significant.

Within the whole analysed adult sample there are some traits that are quite common, which may indicate a degree of relatedness within the assemblage. However, there are methodological problems with bias when correlating non-metric trait frequency with age and sex that make this impossible to confirm.

Pathology

Dental Disease

The most common forms of dental disease were catalogued for the crude prevalence rates amongst the population and the true prevalence rates affecting each tooth and alveolus. True prevalence rates of dental disease across the sample are presented as a representative sample (Table 28). True prevalence rates reflect the percentage of dental diseases caries, calculus and enamel hypoplasia affecting the observable dentition.

True prevalence rates of diseases which affect the tooth sockets; periapical lesions, periodontitis and antemortem tooth loss show the percent of affected bone from the tooth sockets present. Crude prevalence rates show the number of individuals who had dental disease (Table 29).

No dental diseases were observable amongst subadults under one year old. Enamel hypoplasia was the most commonly observed dental disease in subadults with 10.9% of subadult dentition affected (127/1161) (Table 30) and calculus was the most

commonly observed in adults with 49.5% (1139/2300) of all adult teeth affected (Table 30). Rates of dental disease are relatively even between adult males and females (Fig 88).

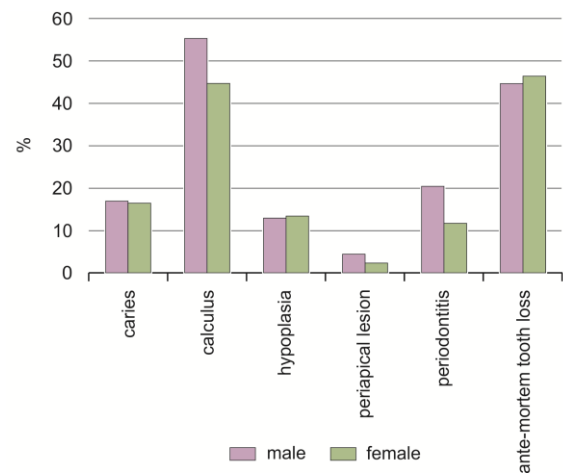


Fig 88. True prevalence of dental disease among adults by sex (males $n=69$, females $n=81$)

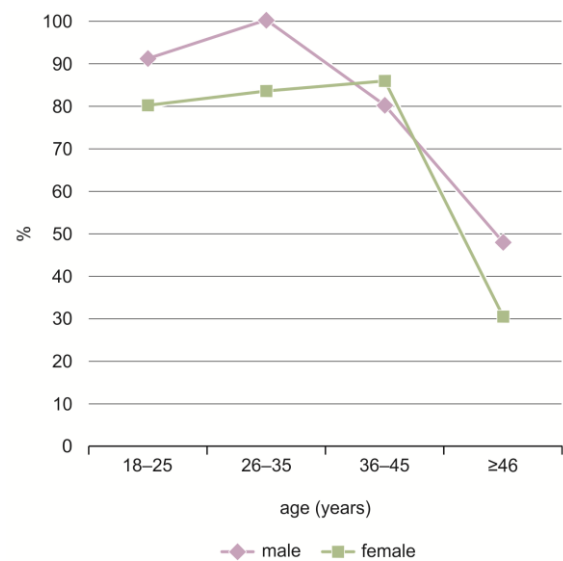


Fig 89. Crude prevalence of caries among adults by sex (males $n=69$, females $n=81$)

Table 32. Crude prevalence of caries by age

Age (years)	Subadult			Adult			All		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	-	-	0	-	-	4	-	-
1-6 months	8	-	-	0	-	-	8	-	-
7-11 months	6	-	-	0	-	-	6	-	-
1-5	36	8	22.2	0	-	-	36	8	22.2
6-11	18	11	61.1	0	-	-	18	11	61.1
12-17	14	9	64.3	0	-	-	14	9	64.3
18-25	0	0	-	31	26	83.9	31	26	83.9
26-35	0	0	-	41	37	90.2	41	37	90.2
36-45	0	0	-	29	24	82.8	29	24	82.8
≥46	0	0	-	46	18	39.1	46	18	39.1
Adult	0	0	-	5	1	20.0	5	1	20.0
Total	86	28	32.6	152	106	69.7	238	134	56.3

Table 33. 'Corrected' true prevalence of caries by age

Age (years)	Caries			Ante-mortem tooth loss			Corrected caries (%)
	No. teeth	No. affected	%	No. sockets	No. affected	%	
1-5	424	20	4.7	881	0	-	4.7
6-11	352	28	8.0	622	3	0.5	8.0
12-17	350	27	7.7	435	10	2.3	8.0
18-25	758	105	13.9	939	118	12.6	16.0
26-35	852	156	18.3	1282	387	30.2	26.6
36-45	423	66	15.6	903	439	48.6	31.9
≥46	226	51	22.6	1390	1124	80.9	74.1

Table 34. True prevalence of calculus

Dentition	Subadult			Adult		
	No. observed	No. affected	%	No. observed	No. affected	%
Deciduous	609	17	2.8	0	0	-
Permanent	552	43	7.8	2300	1139	49.5
Total	1161	60	5.2	2300	1139	49.5

Table 35. Crude prevalence of calculus by age

Age (years)	Subadult			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	6	0	-
1-5	36	2	5.6	0	0	-	36	2	5.6
6-11	18	7	38.9	0	0	-	18	7	38.9
12-17	14	5	35.7	0	0	-	14	5	35.7
18-25	0	0	-	31	28	90.3	31	28	90.3
26-35	0	0	-	41	36	87.8	41	36	87.8
36-45	0	0	-	29	24	82.8	29	24	82.8
≥46	0	0	-	46	19	41.3	46	19	41.3
Adult	0	0	-	5	2	40.0	5	2	40.0
Total	86	14	16.3	152	109	71.7	238	123	51.7

Table 36. True prevalence and severity of supra-gingival and sub-gingival calculus

Severity	Subadult (n=1161)		Male (n=1048)		Female (n=1211)		Adult (n=2300)		All (n=3461)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Supra-gingival										
1	39	3.4	261	24.9	205	16.9	467	20.3	506	14.6
2	20	1.7	128	12.2	126	10.4	254	11.0	274	7.9
3	0	-	73	7.0	78	6.4	151	6.6	151	4.4
Sub-gingival										
1	1	0.1	77	7.3	48	4.0	125	5.4	126	3.6
2	0	-	46	4.4	43	3.6	89	3.9	89	2.6
3	0	-	12	1.1	41	3.4	53	2.3	53	1.5
Total	60	5.2	597	57.0	541	44.7	1139	49.5	1199	34.6

Caries

Dental caries are produced by the breakdown of the tooth structure by bacteria progressively forming a cavity at the epicentre of the decay. Ultimately, the entire dental crown may be destroyed and the infection can spread to the root which can lead to additional dental diseases (Hillson 1996, 269).

Caries affected more than two thirds of the adult population with 69.7% (106/152) and almost a third of subadults (32.6%: 28/86) (Table 32). Adult males and females had a similar distribution of caries across all age categories but with a slightly higher rate of younger adult (18–25 years) and younger middle adult males (26–35 years) affected by caries (Fig 89). Fewer caries were recorded in the older age category (≥46 years) reflecting the high levels of antemortem tooth loss recorded in that age category (below, Antemortem tooth loss).

Calculating ‘corrected’ caries prevalence assumes that the rate of carious lesions would have been the same in the lost teeth as in the remaining ones (Table 33). This shows a more pronounced increase in caries with age than what was observed.

The crude prevalence rate was low at Mare Street when compared with other contemporary assemblages. A slightly higher overall crude prevalence rate of caries was recorded at Priory Yard, Norwich (75%: 18/24) (Caffell & Clarke 2011, 262), at Bow Baptist (63.6%: 136/214) (Henderson *et al* 2013, 116), at All Saints Way, West Bromwich (64.3%: 9/14) (Daly 2012, 19) and at Littlemore, Oxford (83%: 10/12) (McCarthy *et al* 2011, 22–3). However, when the true prevalence rate was compared, a higher rate was observed at Mare Street than at Bow Baptist, with an overall rate of 6.7% (164/2459) (Henderson *et al* 2013, 117) and 10.1% (17/156) at Wakefield Street (Henderson 2012, 10) and 14.2% (35/246) at All Saints Way, West Bromwich (Daly 2012, 19).

Calculus

Calculus refers to hardened deposits of bacterial plaque that form on the surface of the teeth, trapping bacteria and food debris, which can cause further infection (Hillson 1996, 254–5).

Calculus true prevalence rates show that 49.5% (1139/2300) of observable adult teeth and 5.2% (60/1161) of all subadult teeth are affected (Table 34). Calculus rates were high in the adult population with 71.7% (109/152) affected and much lower in the subadult population with 16.3% affected (14/86) (Table 35). Overall, males and females had similar rates of calculus with 66.7% of males (46/69) and 76.5% of females (62/81) affected, but the rates varied across the age categories. There were slightly more females affected than males through ages 26–45 years (Fig 90).

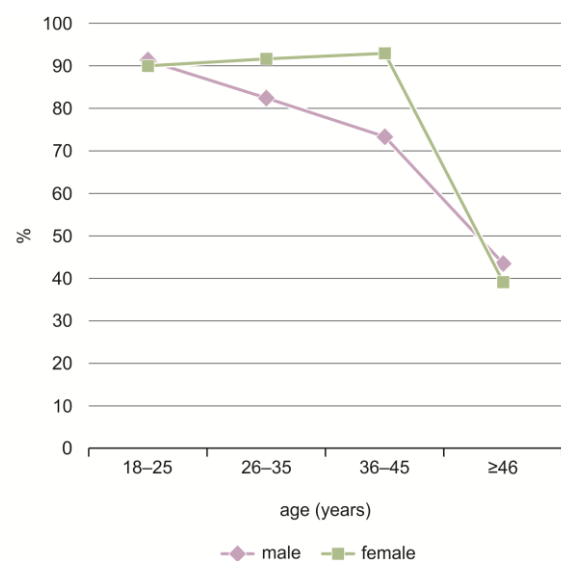


Fig 90. Crude prevalence of calculus by sex (males $n=69$, females $n=81$)

Calculus is classified according to location, supra-gingival or sub-gingival, and severity (size) of the plaque deposit. Supra-gingival forms on the crown of the tooth while sub-gingival forms from the junction of the root and crown and below on the root surface. Severity was recorded using codes 1–3 (slight–heavy) representing thickness and extent of the calculus as it appears on each tooth. The most commonly occurring calculus in subadults with 3.4% (39/1161) and adults with 20.3% (467/2300) is supra-gingival code 1 (Table 36). Adult

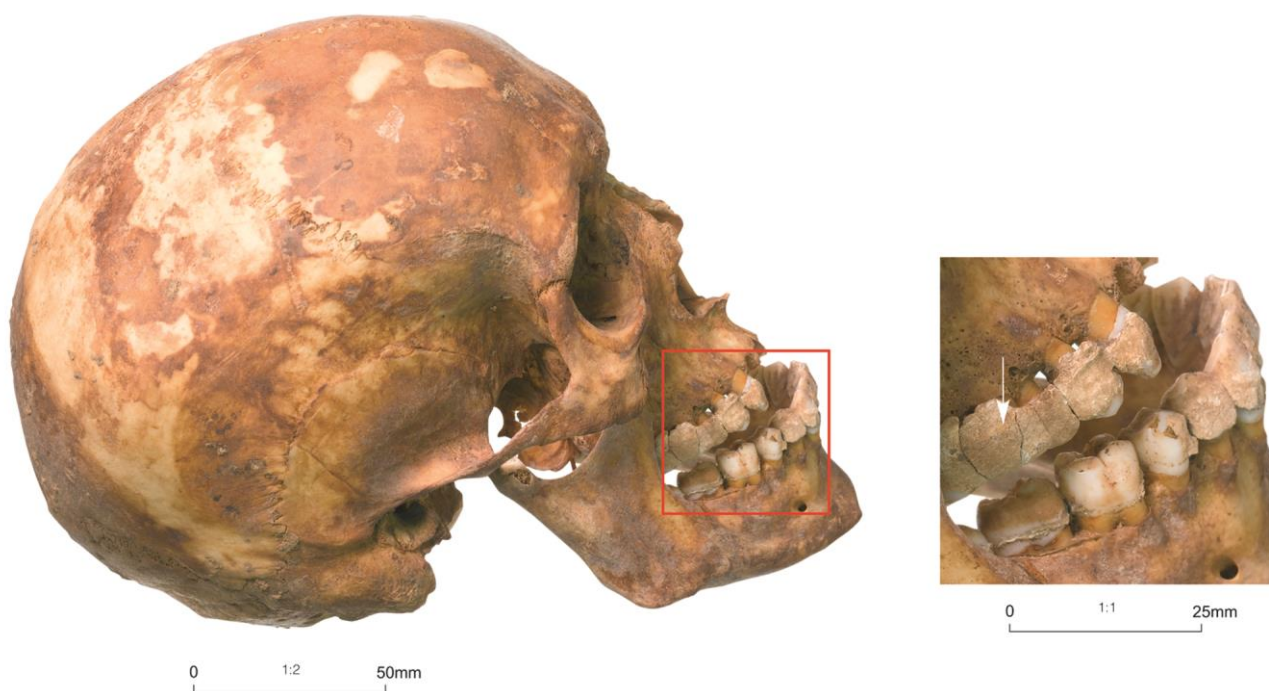


Fig 91. Lateral view of the right mandibular and maxillary dentition of adult male [697], showing severe supra-gingival calculus (scale 2:1, detail 1:1)

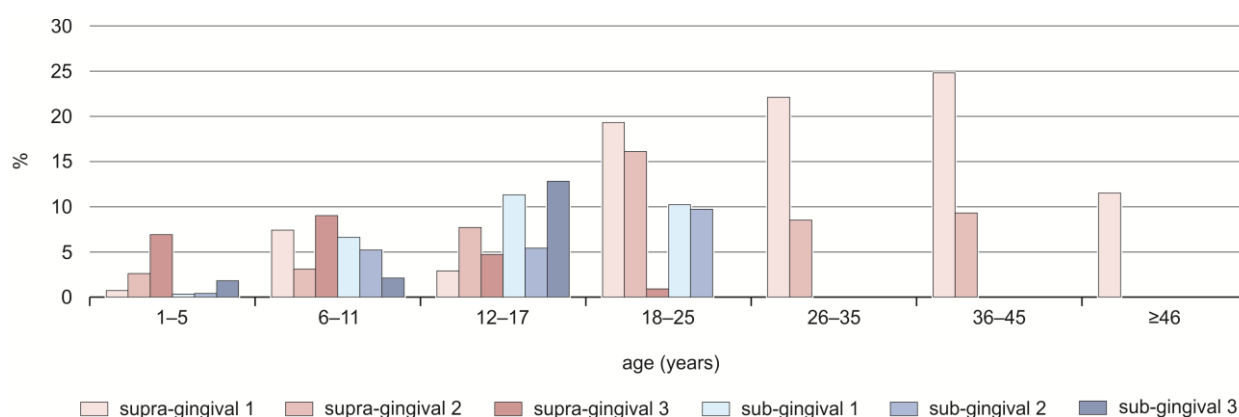


Fig 92. True prevalence and severity of supra-gingival and sub-gingival calculus by age

male [697] displayed particularly severe supra-gingival calculus to the mandibular and maxillary right dentition (Fig 91).

The distribution of calculus across the age categories shows that mild supra-gingival calculus was the most prevalent by a great margin up for adults ≥ 46 years, for subadults aged 12–17 years gross sub-gingival calculus was the most prevalent and for younger subadults gross supra-gingival calculus was the most prevalent (Fig 92).

A slightly higher crude prevalence rate of calculus for adults was recorded at Priory Yard, Norwich (87.5%: 21/24) (Caffell & Clarke 2011, 262) and similar rates were recorded at Bow Baptist (70.1%: 150/214) (Henderson *et al* 2013, 116) and at Littlemore, Oxford (75%: 9/12) (McCarthy *et al* 2011, 30–1). Much higher true prevalence rates of calculus were recorded at Mare Street than those recorded at Bow Baptist (3.5%:

87/2459) (Henderson *et al* 2013, 117) or the 22.4% (35/156) recorded at Wakefield Street (Henderson 2012, 10).

Enamel Hypoplasia

Dental enamel hypoplasia refers to defects in the development of the tooth enamel which usually appear as horizontal grooves. These defects are graded from barely visible to deep linear furrows with exposed dentin. Hypoplasia may also appear as localised circular defects (Hillson 1996, 291).

True prevalence rates of hypoplasia were similar between subadults and adults with 10.9% (127/1161) of subadult teeth affected and 13.1% (301/2300) of adult dentition (Table 37). In the subadult data this can indicate that individuals were undergoing systematic

Table 37. True prevalence of hypoplasia

Dentition	Subadult			Adult		
	No. observed	No. affected	%	No. observed	No. affected	%
Deciduous	609	18	3.0	0	0	-
Permanent	552	109	19.7	2300	301	13.1
Total	1161	127	10.9	2300	301	13.1

Table 38. Crude prevalence of hypoplasia by age

Age (years)	Subadult			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	6	0	-
1-5	36	1	2.8	0	0	-	36	1	2.8
6-11	18	6	33.3	0	0	-	18	6	33.3
12-17	14	9	64.3	0	0	-	14	9	64.3
18-25	0	0	-	31	17	54.8	31	17	54.8
26-35	0	0	-	41	22	53.7	41	22	53.7
36-45	0	0	-	29	7	24.1	29	7	24.1
≥46	0	0	-	46	5	10.9	46	5	10.9
Adult	0	0	-	5	2	40.0	5	2	40.0
Total	86	16	18.6	152	53	34.9	238	69	29.0

Table 39 Severity of defects in teeth affected by hypoplasia

Defect	Subadult (n=127)		Adult (n=300)		Total (n=427)	
	No. affected	%	No. affected	%	No. affected	%
Just discernible	60	47.2	150	49.8	210	49.1
Clear grooves	11	8.7	97	32.2	108	25.2
Gross defects	27	21.3	36	12.0	63	14.7
Circular defect	29	22.8	17	5.6	46	10.7

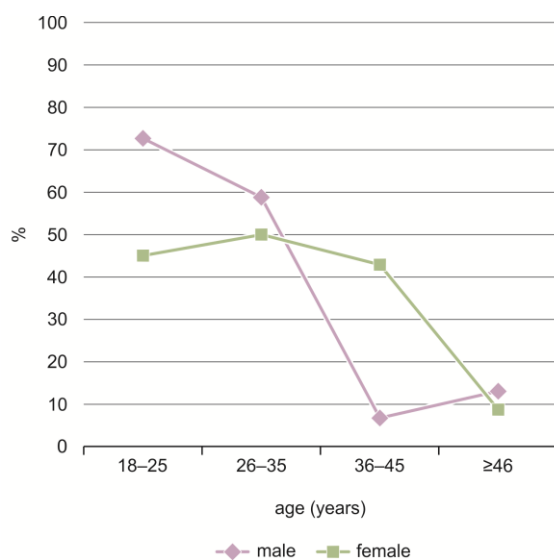


Fig 93. Crude prevalence of hypoplasia by sex (males n=69, females n=81)

stress from the initial stage of dental development *in utero* through to later childhood and may reflect reduced maternal health and nutrition. This may also be a reflection of huge fluctuations in food prices

during this period in Britain, which were not replicated in wage rates in the early years of the 19th century (Roberts & Cox 2003; Daly 2012, 21). This meant that not all food types were available or affordable at all times to the general populace.

Hypoplasia has been called a biological window through which one can observe the long-term consequences of metabolic stress (Goodman & Armelagos 1988). Only 34.9% (53/152) of adults had hypoplasia (Table 38) with slightly more females (29/81: 35.8%) affected than males (24/69: 34.8%) (Fig 93). Of the 427 teeth with hypoplasia the majority had just discernible pathological changes to the tooth enamel (210/427: 49.2%) (Table 39).

Similar overall crude prevalence rates were recorded at Bow Baptist (26.5%: 108/416) (Henderson *et al* 2013, 116) and higher rates were recorded at Littlemore, Oxford (40%: 10/25) (McCarthy *et al* 2011, 28-9). The rate of true prevalence at Mare Street was lower than that recorded at All Saints Way, West Bromwich (29.8%: 130/436) (Daly 2012, 20) and at Glasshouse Yard (34.2%: 56/164) (Henderson 2009, 18-9). Subadult [84] (Theophilus Evans, aged 16 years), had evidence of severe hypoplastic defects in the form of pitting to the biting (occlusal) surfaces of both the maxillary and mandibular teeth, particularly to the crowns of all first molars and the anterior surfaces of the incisors and canines (Fig 9). This subadult also had evidence for

Table 40. Crude prevalence of periodontal disease by age

Age (years)	Subadult				Adult				Total			
	No. individuals	No. affected	%		No. individuals	No. affected	%		No. individuals	No. affected	%	
Perinatal	4	0	-	-	0	0	-	-	4	0	-	-
1-6 months	8	0	-	-	0	0	-	-	8	0	-	-
7-11 months	6	0	-	-	0	0	-	-	6	0	-	-
1-5	36	0	-	-	0	0	-	-	36	0	-	-
6-11	18	0	-	-	0	0	-	-	18	0	-	-
12-17	14	0	-	-	0	0	-	-	14	0	-	-
18-25	0	0	-	-	31	5	16.1	-	31	5	16.1	-
26-35	0	0	-	-	41	23	56.1	-	41	23	56.1	-
36-45	0	0	-	-	29	23	79.3	-	29	23	79.3	-
≥46	0	0	-	-	46	23	50.0	-	46	23	50.0	-
Adult	0	0	-	-	5	0	-	-	5	0	-	-
Total	86	0	-	-	152	74	48.7	-	238	74	31.1	-

Table 41. True prevalence of periodontal disease

Dentition	Subadult				Adult			
	No. observed	No. affected	%		No. observed	No. affected	%	
Deciduous	1076	0	-	-	2	0	-	-
Permanent	1161	0	-	-	4562	713	15.6	-
Total	2237	0	-	-	4564	713	15.6	-

Table 42. Crude prevalence of periapical lesions by age

Age (years)	Subadult				Adult				Total			
	No. individuals	No. affected	%		No. individuals	No. affected	%		No. individuals	No. affected	%	
Perinatal	4	0	-	-	0	0	-	-	4	0	-	-
1-6 months	8	0	-	-	0	0	-	-	8	0	-	-
7-11 months	6	0	-	-	0	0	-	-	6	0	-	-
1-5	36	1	2.8	-	0	0	-	-	36	1	2.8	-
6-11	18	0	-	-	0	0	-	-	18	0	-	-
12-17	14	2	14.3	-	0	0	-	-	14	2	14.3	-
18-25	0	0	-	-	31	13	41.9	-	31	13	41.9	-
26-35	0	0	-	-	41	23	56.1	-	41	23	56.1	-
36-45	0	0	-	-	29	16	55.2	-	29	16	55.2	-
≥46	0	0	-	-	46	19	41.3	-	46	19	41.3	-
Adult	0	0	-	-	5	0	-	-	5	0	-	-
Total	86	3	3.5	-	152	71	46.7	-	238	74	31.1	-

Table 43. True prevalence of periapical lesions

Dentition	Subadult				Adult			
	No. observed	No. affected	%		No. observed	No. affected	%	
Deciduous	1076	3	0.3	-	2	0	-	-
Permanent	1161	2	0.2	-	4562	149	3.3	-
Total	2237	5	0.2	-	4564	149	3.3	-

tuberculosis throughout the spine and in the form of rib lesions and had survived rickets in infancy. Together this evidence suggests that this individual had an underlying increased stress from early childhood which may have made him more vulnerable to these metabolic and infectious diseases.

Periodontal Disease

Periodontitis is the inflammation of the bone surrounding the tooth socket in response to gum

disease (gingivitis). This weakened bone recedes away from the crowns of the teeth exposing the dental roots and can ultimately result in tooth loss (Hillson 1996, 260).

There were 48.7% of adults (74/152) who had observable periodontal disease (Table 40). There was a steady increase of periodontal disease with age as seen when comparing adult males and females. Both sexes increased at a similar frequency, but males are affected more in the 26-35 year age category (Fig 94). Periodontitis affected 15.6% of all observable alveoli (Table 41).

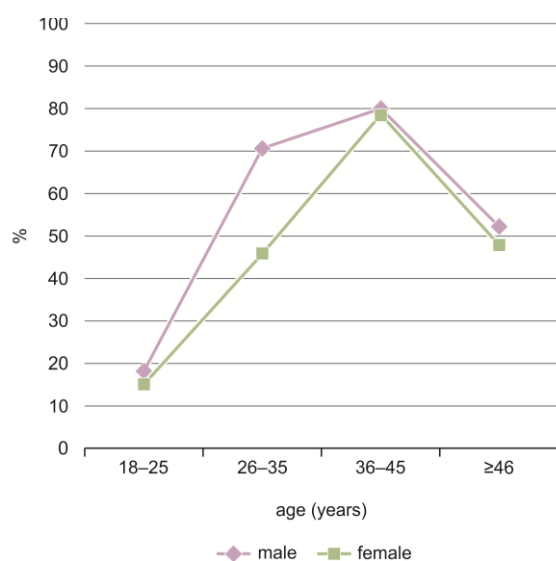


Fig 94. Crude prevalence of periodontal disease by sex (males $n=69$, females $n=81$)

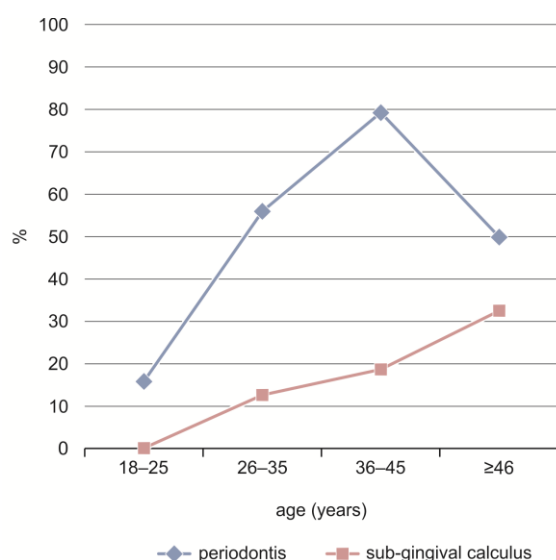


Fig 95. True prevalence of periodontal disease and sub-gingival calculus

There was a direct correlation between increases in periodontal disease and sub-gingival calculus. As the bone resorbs from the tooth it becomes easier for calculus to adhere below the gum line. There was a decline in prevalence of observable periodontitis in older adults aged ≥ 46 years. This may be related to the healing of bone at absent tooth locations, making diagnosis difficult (Hillson 1996, 265). This can be observed in all adult age categories except in the ≥ 46 year age category, which is related to the high levels of antemortem tooth loss (Fig 95).

The crude prevalence rate of periodontal disease at Mare Street was lower than that recorded at Bow Baptist

(46.3%: 99/214) (Henderson *et al* 2013, 116), at Littlemore, Oxford (47%: 7/15) (McCarthy *et al* 2011, 26).

Periapical Lesions

Infection of a tooth or socket can result in the formation of an abscess in the bone around the dentition. The resulting inflammation is triggered by bacteria that enter the pulp through caries or attrition to teeth (Hillson 1996, 284-6).

Over a quarter of the sample had periapical lesions (Table 42). Males were most affected with 56.5% (39/69) and 39.5% of females (32/81) affected (Fig 96). True prevalence rates were low with 3.3% of all observable tooth sockets affected (149/4564) (Table 43).

A lower overall crude prevalence rate was recorded in adults at Bow Baptist (20.1%: 43/214) (Henderson *et al* 2013, 116) and at All Saints Way, West Bromwich (2%: 11/540) (Daly 2012, 19).

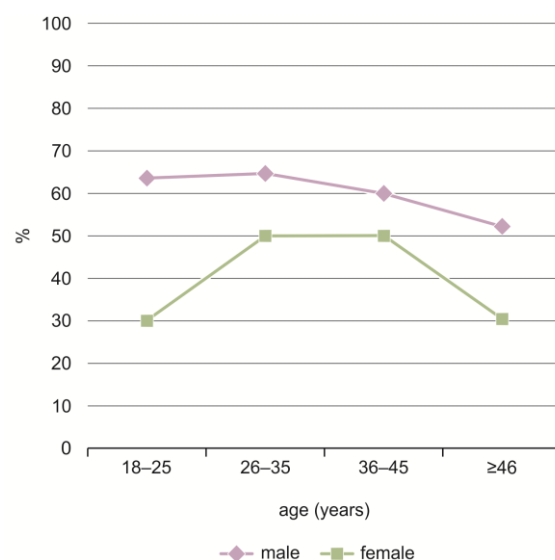


Fig 96. Crude prevalence of periapical lesions by sex (males $n=69$, females $n=81$)

Table 44. Crude prevalence of ante-mortem tooth loss by age

Age (years)	Subadult				Adult				Total			
	No. individuals	No. affected	%		No. individuals	No. affected	%		No. individuals	No. affected	%	
Perinatal	4	0	-		0	0	-		4	0	-	
1-6 months	8	0	-		0	0	-		8	0	-	
7-11 months	6	0	-		0	0	-		6	0	-	
1-5	36	0	-		0	0	-		36	0	-	
6-11	18	3	16.7		0	0	-		18	3	16.7	
12-17	14	6	42.9		0	0	-		14	6	42.9	
18-25	0	0	-		31	27	87.1		31	27	87.1	
26-35	0	0	-		41	41	100.0		41	41	100.0	
36-45	0	0	-		29	29	100.0		29	29	100.0	
≥46	0	0	-		46	44	95.7		46	44	95.7	
Adult	0	0	-		5	2	40.0		5	2	40.0	
Total	86	9	10.5		152	143	94.1		238	152	63.9	

Table 45. True prevalence of ante-mortem tooth loss

Dentition	Subadults				Adults			
	No. observed	No. affected	%		No. observed	No. affected	%	
Deciduous	1076	0	-		2	0	-	
Permanent	1161	13	1.1		4562	2075	45.5	
Total	2237	13	0.6		4564	2075	45.5	

Table 46. Crude prevalence of congenital absence of teeth in adults

Male			Female			Adult		
No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
69	1	1.4	81	4	4.9	152	5	3.3

Table 47. True prevalence of adult dental anomalies by sex

Anomaly	Subadult (n=1078)				Male (n=1080)		Female (n=1211)		Adult (n=2300)		Total (n=6801)	
	No. affected	%			No. affected	%	No. affected	%	No. affected	%	No. affected	%
Carabelli's cusp	3	.3			4	0.4	2	0.2	6	0.3	9	0.1
Crowding	20		1.9		26	2.4	30	2.5	56	2.4	76	1.1
Enamel pearls	0		-		0	-	0	-	0	-	0	-
Impacted	2		0.2		5	0.5	4	0.3	9	0.4	11	0.2
Peg-shaped	0		-		4	0.4	3	0.2	7	0.3	7	0.1
Rotation	3		0.3		9	0.8	13	1.1	22	1.0	25	0.4

Table 48. True prevalence of subadult dental anomalies

Anomaly	Deciduous (n=1078)		Permanent (n=5723)		Total (n=6801)	
	No. affected	%	No. affected	%	No. affected	%
Carabelli's cusp	0	-	9	0.2	9	0.1
Crowding	0	-	76	1.3	76	1.1
Enamel pearls	0	-	0	-	0	-
Impacted	0	-	11	0.2	11	0.2
Peg-shaped	0	-	7	0.1	7	0.1
Rotation	0	-	25	0.4	25	0.4

Table 49. Crude prevalence of dental anomalies

Anomaly	Subadult (n=86)		Male (n=69)		Female (n=81)		Adult (n=152)		Total (n=238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Carabelli's cusp	2	2.3	1	1.4	1	1.2	2	1.3	4	1.7
Crowding	4	4.7	5	7.2	9	11.1	14	9.2	18	7.6
Enamel pearls	0	-	0	-	0	-	0	-	0	-
Impacted	2	2.3	1	1.4	1	1.2	2	1.3	4	1.7
Peg-shaped	0	-	3	4.3	3	3.7	6	3.9	6	2.5
Rotation	1	1.2	4	5.8	7	8.6	11	7.2	12	5.0

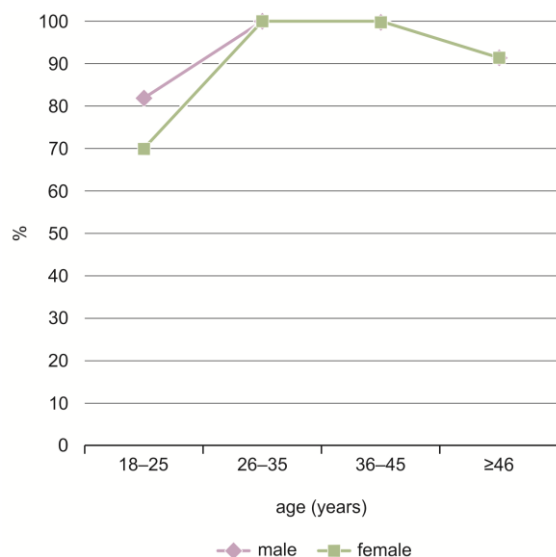


Fig 97. Crude prevalence of ante-mortem tooth loss by sex (males n=69, females n=81)

Antemortem Tooth Loss

Nearly all of the adult population were affected by antemortem tooth loss which increased with age (143/152: 94.1%). Nine of the 86 subadults had lost at least one tooth prior to death (Table 44). Males were affected more than females in the 18–25 year age category but the exact same rate overall were affected in other adult ages (Fig 97). There is a direct correlation between advanced age and antemortem tooth loss. As expected, adult true prevalence rates (2075/4564: 45.5%) were much greater than the subadult rates (13/2237: 0.6%) (Table 45).

The most frequently lost permanent teeth were from the first molar positions of the mandible. The counts of antemortem tooth loss for these positions were very close with 107 right first molar mandibular teeth lost and 103 left mandibular first molar teeth lost (Fig 98). This was followed by the second and third molars of the left mandible.

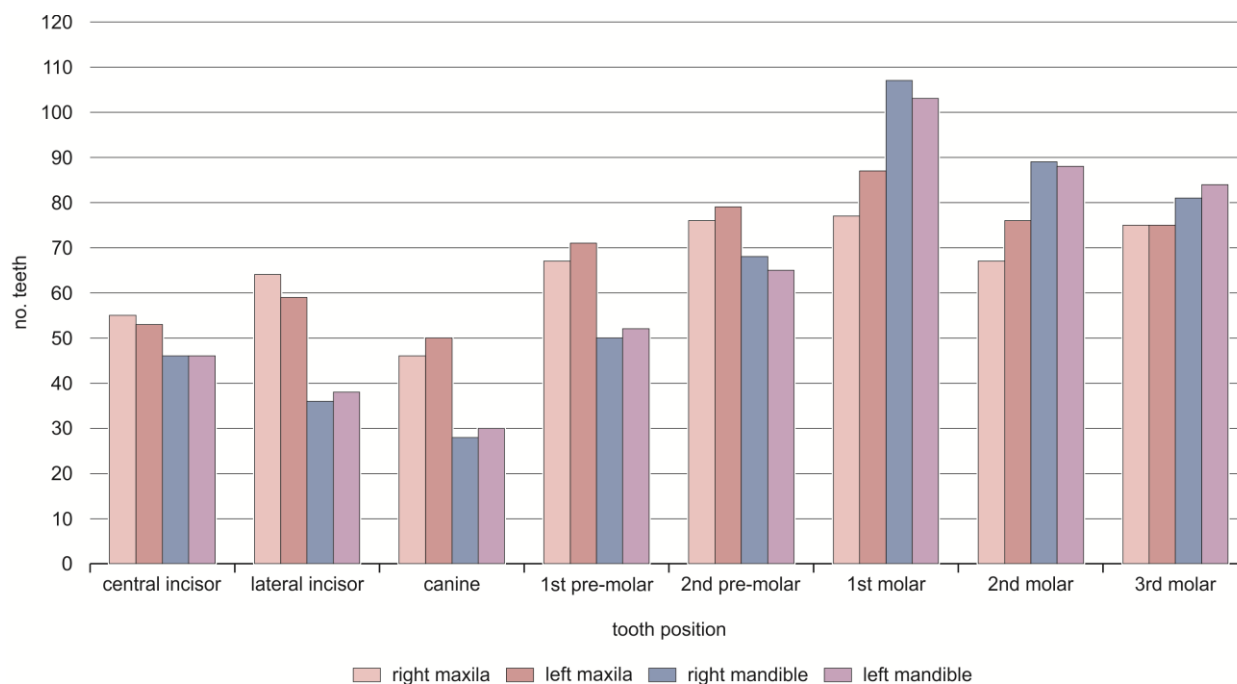


Fig 98. Ante-mortem tooth loss (no. of teeth) by tooth position (n=2088)

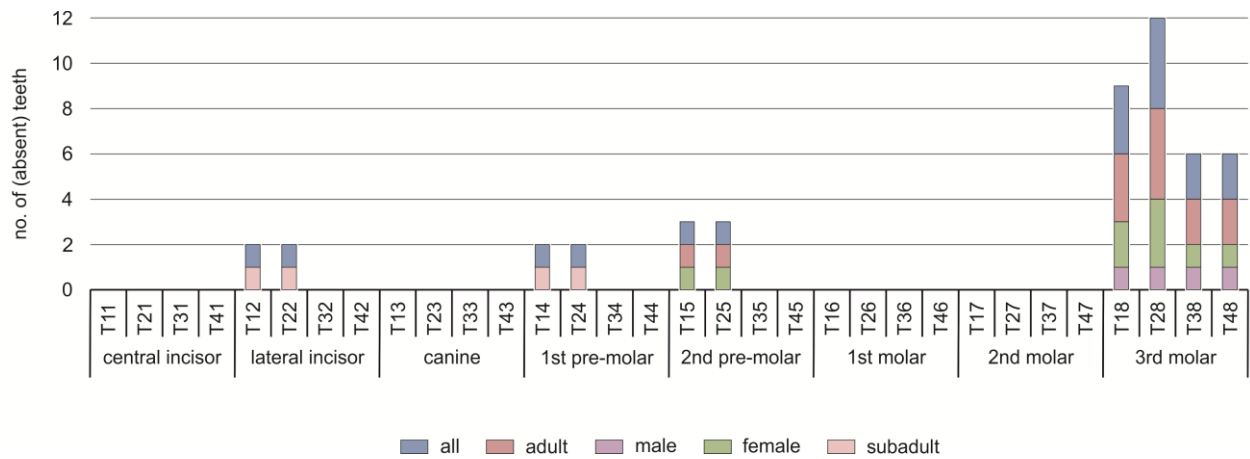


Fig 99. Distribution of congenitally absent teeth by tooth position (n=47)

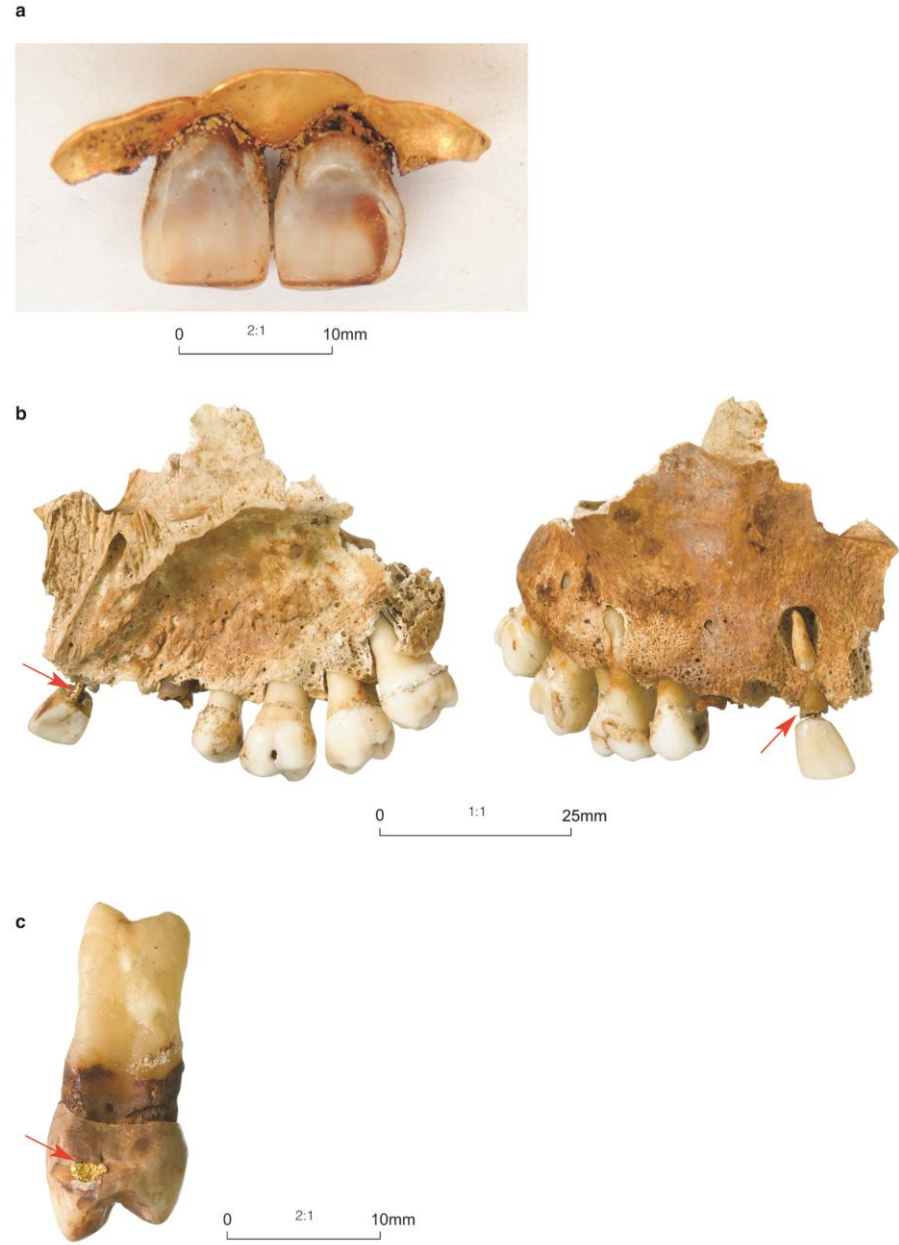


Fig 100. Evidence of dentistry: a – the rose gold dental prosthesis <169> of Martha Penkivil [745] (scale 2:1); b – lingual and anterior views of a tooth crown and gold mounting pin to the right maxillary lateral incisor (arrowed) of adult female [185] (scale 1:1) and c – a gold filling in the maxillary right first premolar of Sarah Cox [666] (scale 2:1)

Sixteen adults had lost all maxillary teeth, seven males all aged ≥ 46 years ([41]; [235]; [329]; [352] – Henry Wardall, aged 88 years; [494]; [581]; [670]); and one male aged 36–45 years ([101]). There were nine females, all aged ≥ 46 years ([57] – Isabella Martin, aged 76 years; [59]; [157]; [162]; [350]; [453] – Elizabeth Swallow, aged 73 years; [569]; [610]; [695]).

Nine adults had lost all mandibular dentition, four males aged ≥ 46 years ([251]; [406]; [468]) and one male aged 36–45 years ([3]), and five females all aged ≥ 46 years ([154]; [270]; [628] – Mary Davan; [680]; [701] – Mary Dean, aged 80 years).

Seven individuals were completely edentulous (all dentition lost antemortem), all aged ≥ 46 years, four males ([307] – Isaac Booth, aged 79 years; [352] – Henry Wardall, aged 88 years; [456] – Joseph Bright, aged 74 years; and [750]); and three females ([450] – Ann Sophie Morrice, aged 51 years; [510] – Mary Child, aged 84 years; and [586]).

A higher crude prevalence rate of prevalence rate of antemortem tooth loss was recorded at Priory Yard, Norwich (85.3%: 29/34) (Caffell & Clarke 2011, 262), at Bow Baptist (80.4%: 172/214 of adults) (Henderson *et al* 2013, 116) and at Littlemore, Oxford (93%: 14/15) (McCarthy *et al* 2011, 24–5). A lower rate was recorded at Glasshouse Yard (20%: 5/23) (Henderson 2009, 18).

Dental Anomalies

Two subadults had congenitally absent dentition (2/86:2.3%). Theophilus Evans [84], who died aged 16 years ('The Named Burials', above), was missing both upper lateral incisors and subadult [658], aged 6–11, was missing both upper first premolars. Of the adult population, one male and four females had congenitally absent teeth (Table 46). Third molars were the most commonly absent, with the first and second premolars and the lateral incisor also absent (Fig 99).

Crowding was the most frequently prevalent dental anomaly amongst both the adult and subadult sample with 1.1% (76/6801) of observable teeth affected (Table 47; Table 48; Table 49).

Dentistry

Two individuals were found buried with associated dental prostheses (2/238:0.8%); Martha Penkivil [745], aged 54 years, and a female [185], aged 26–35 years. Martha Penkivil had a partial dental bridge <169>, that used human maxillary central incisors (Fig 100a) fixed into a rose gold mount with silver pins. The metal had been carefully shaped to fit the contours of the gums and on both sides was extended to form a clip around the remaining lateral incisors in order to hold it in

Table 50. Crude prevalence of miscellaneous dental pathology

Dental pathology	Subadult (n=86)		Male (n=69)		Female (n=81)		Adult (n=152)		All (n=238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Pipe notches	0	-	9	13.0	1	1.2	10	6.6	10	4.2
Dental staining	1	1.2	0	-	0	-	0	-	1	0.4
Wear	0	-	1	1.4%	1	1.2	2	1.3	2	0.8
Trauma	0	-	0	-	0	-	0	-	0	-
Other	3	3.5	0	-	2	2.5	2	1.3	5	2.1

Table 51. Crude prevalence of pipe notches by age and sex

Age (years)	Male			Female		
	No. observed	No. affected	%	No. observed	No. affected	%
18–25	11	0	-	20	0	-
26–35	17	0	-	24	0	-
36–45	15	5	33.3	14	1	7.1
>46	23	1	4.3	23	0	-
Adult	3	3	100.0	0	0	-
Total	69	9	13.0	81	1	1.2

Table 52. Number of pipe notches

No. notches	Males (n=69)		Females (n=81)		Adults (n=152)		Total (n=238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected+	%
1	5	7.2	1	1.2	6	3.9	6	2.5
2	2	2.9	0	-	2	1.3	2	0.8
3	1	1.4	0	-	1	0.7	1	0.4
4	1	1.4	0	-	1	0.7	1	0.4

place. The bridge may have used 'Waterloo' human teeth, named for the practice of removing teeth from the dead from the Battle of Waterloo (1815), although the teeth are remarkably similar in size, shape and morphology to the remaining dentition. Slight wear was observed on the occlusal surfaces of both teeth, but it was not possible to determine if this had resulted from mastication by the new owner of the prosthesis or if it was already present. There was a slight groove present on the mesial side of the cemento–enamel junction of the left lateral incisor, where the metal had rubbed against the teeth. The opposing right lateral incisor and the maxilla itself were not present for analysis.

Female [185] had a tooth crown with a gold mounting pin. This crown belongs to the right maxillary lateral incisor. This crown had either been removed through dentistry or trauma and had been reattached via the gold pin that was inserted into the crown with a hole drilled into the corresponding root. The pin is tapered at the end with grooving (allowing it to be screwed into place). This tooth had developed an abscess at the root with an external drain on the cheek facing (buccal) side, possibly a result of the drilling introducing bacteria into the root (Fig 100b). Sarah Cox [666], aged 54 years had linear file marks and a gold filling in the first right maxillary premolar on the mesial, interproximal surface. This appeared to be gold leaf pushed into the cavity. Additional linear file marks were present on the distal interproximal surface of the left maxillary first molar but there was no evidence of a filling. Microscopic folds in the gold suggest that gold foil may have been used (Molleson & Cox 1993, 54). This appears to represent preventative dentistry to stop the cavity getting any larger or deeper (Fig 100c). Evidence of gold fillings has previously been recorded in assemblages at the higher status St Marylebone churchyard (Miles *et al* 2008, 118) and at its Paddington Street north burial ground (Henderson *et al* 2015, 95).

Other Dental Disorders

Dental trauma and occupational or habitual changes to teeth were recorded under miscellaneous dental pathology. The most prevalent morphological changes observable were pipe notches (Table 50).

Pipe Notches

Pipe notches occur from the persistent clenching of clay tobacco pipes between the biting surfaces of the teeth. Pipes were made from hardened clays which if held between the same teeth for long periods of time would wear these teeth into scalloped circular holes that the pipe would fit into. Adult males (9/69: 13%) had a much higher rate of pipe notches across all ages than adult females (1/81: 1.2%) (Table 51). Of the ten individuals with pipe notches, many had more than one notch (Table 52).

Much higher rates of pipe notches were observed at Priory Yard, Norwich, evidence for notches was seen in 57.1% (4/7) of males and 12.5% (1/8) of females with observable dentitions (Caffell & Clarke 2011, 261) and 58 adult dentitions (/248: 23.4%) from St Mary and St

Michael's burial ground had evidence for pipe notches (Henderson *et al* 2013, 132). At West Butts Street, Poole, pipe notches were observed in one adult male (McKinley 2008, 76).

Congenital Anomalies

Spinal Disorders

Vertebral border shifts and minor anomalies (Powers 2012, 64–8; after Barnes 1994) affected 40 individuals (/238: 16.81%) in the subsample, ten males (/69: 14.5%), 21 females (/81: 25.93%) and nine subadults (/86: 10.5%) (Table 53). Non-union of neural arches affected five adults (5/152: 3.3%) (Table 54). True prevalence rates were calculated against the number of neural arches present. Spondylolysis, the separation of the neural arch at the pars interarticularis, may be caused by a fatigue fracture following lower back stress or repeated trauma. It has been considered as an environmental and cultural condition where repeated activities lead to the biomechanical stress that acts on the lower back (Arriaza 1997, 395–6). However, it is included in this section as there may be a congenital predilection that increases some individuals' predisposition to the condition (Merbs 1983, 35, 39; Waldron 1991, 64). Three adult males had evidence for bilateral spondylolysis (/69: 4.3%) and one subadult (/86: 1.2%) had evidence for unilateral spondylolysis on the right side (Table 55).

Adult female [731], aged 18–25 years, had two vertebrae with a 'butterfly' defect (Table 55). Both the fourth and eighth thoracic vertebrae had sagittal cleft centra (type A, after Barnes 1994, 37). Mary Tidman [614], aged 16 years, had spina bifida occulta, the incomplete fusion of the neural arches of all of the sacral vertebrae but with partial fusion of the fourth.

There was congenital fusion of the second and third cervical vertebrae of adult male [284], aged ≥46 years (Table 55). This abnormality may result in severe neck pain, decreased neck mobility, muscular weakness, and can cause sensory deficits of both upper limbs and sudden unexpected death (Kadadi *et al* 2016, 12). It may be related to the occipitalisation of the first cervical vertebra in the same individual.

Congenital kyphosis, the anteroposterior curvature of the spine, was observed in two individuals (/238: 0.8%) (Table 55). Both cases were slight and occurred in the mid thoracic and upper lumbar spines except for a single example in the upper thoracic region.

There was a single case of scoliosis, the lateral curvature of the spine. The third and fourth thoracic vertebrae of female [10], aged ≥46 years, were fused at the inferior and superior articular facets, and a rib was fused to the right side of the fifth thoracic vertebra at the costovertebral joint. The sixth and seventh, and eighth and ninth thoracic vertebrae were fused at the inferior and superior articular facets (apophyseal) and fused down the left-hand side of the vertebral bodies. There was lateral wedging to the left with the spine curved at a 45° angle to the left. Osteoporosis was considered due to the age of this individual but no other diagnostic criteria for it were observed (Table 55).

Table 53. True prevalence of vertebral border shifts (vertebrae: L = lumbar; S = sacral)

Border shift	Male			Female			All adults			Subadult			All individuals		
	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Occipitocervical border	69	2	2.9	80	0	-	149	2	1.3	84	0	-	233	2	0.9
Atlas occipitalised		2				-		2			0			2	
Lumbosacral border	67	4	6.0	77	12	15.6	144	18	12.5	74	2	2.7	218	20	9.2
Ala-like transverse process on L5 - articulating (left-partial sacralisation)		0			0			2			0			2	
Complete sacralisation of L5		4			12			16			1			17	
Ala-like transverse process on L6 - articulating (left-partial sacralisation)		0			0						1			1	
Sacrocaudal border	53	3	5.7	67	2	3.0	120	4	3.3	34	1	2.9	154	6	3.9
Complete sacralisation of 1st caudal vertebrae		2			2			4			1			5	
Complete separation of S5		1			0			0	-		0	-		1	

Table 54. True prevalence of neural arch non-union (vertebrae: L = lumbar; S = sacral)

Element	Male			Female			Adult			Subadult			Total		
	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
L5	67	4	6.0	74	0	-	141	4	2.8	69	1	1.4	210	5	2.4
S1	64	0	-	74	0	-	138	0	-	59	1	1.7	197	1	0.5
S2	59	0	-	73	0	-	132	0	-	50	1	2.0	182	1	0.5
S3	55	0	-	69	0	-	124	0	-	47	1	2.1	171	1	0.6
S4	52	0	-	66	0	-	118	0	-	38	1	2.6	156	1	0.6
S5	52	0	-	66	0	-	118	0	-	33	1	3.0	151	1	0.7
Coccyx 1	17	1	5.9	11	0	-	28	1	3.6	6	0	-	34	1	2.9
All vertebrae	1830	5	0.3	2123	0	-	3953	5	0.1	1837	6	0.3	5790	11	0.2

Table 55. Crude prevalence of congenital spinal disorders

Pathology	Subadult (n=86)		Male (n=69)		Female (n=81)		Adult (n=152)		All (n=238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Spondylolysis (bilateral)	0	-	3	4.3	0	-	3	2.0	3	1.3
Spondylolysis (unilateral, right)	1	1.2	0	-	0	-	0	-	1	0.4
Butterfly vertebrae	0	-	0	-	1	1.2	1	0.7	2	0.8
Spina bifida occulta	1	1.2	0	-	0	-	0	-	1	0.4
Congenital fusion	0	-	1	1.4	0	-	1	0.7	1	0.4
Kyphosis	0	-	2	2.9	0	-	2	1.3	2	0.8
Scoliosis	0	-	0	-	1	1.2	1	0.7	1	0.4

Table 56. Crude prevalence of congenital cranial disorders

Pathology	Subadult (n=86)		Male (n=69)		Female (n=81)		Adult (n=152)		All (n=238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Eagle syndrome	0	-	3	4.3	2	2.5	5	3.3	5	2.1
Brachyranic	0	-	1	1.4	1	1.2	2	1.3	2	0.8
Facial asymmetry	1	1.2	1	1.4	0	-	1	0.7	2	0.8
Barthocephaly	0	-	1	1.4	3	3.7	4	2.6	4	1.7
Concha bullosa	0	-	0	-	1	1.2	1	0.7	1	0.4

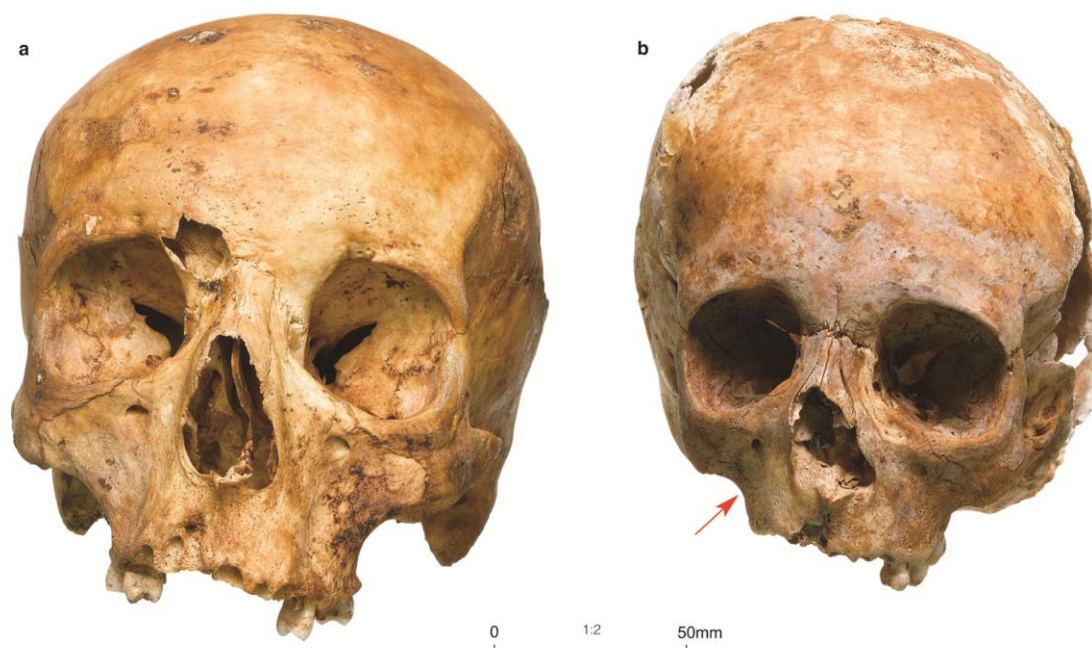


Fig 101. Anterior views of two crania showing marked facial asymmetry to the left maxilla: a – adult male [214] and b – subadult [105] (scale 1:2)

Additionally, Martha Susan Webb [242], aged two years and three months, has a bifid right first rib (type B, after Barnes 1994, 75) and female [448], aged ≥ 46 years, had exaggerated vertical dimensions of the vertebral bodies. The latter condition reflects diminished compressive forces on the potential longitudinal growth of the vertebral bodies and can also be associated with narrowing of the intervertebral discs (Castriota-Scanderbeg & Dallapiccola 2005, 168–9).

Other Congenital Conditions

Fourteen individuals had cranial changes classed as congenital or developmental disorders (14/238: 5.9%) (Table 56). Five adult individuals display skeletal changes possibly related to Eagle syndrome, two females (/81: 2.5%) and three males (/69: 4.3%). Eagle syndrome is characterised by an elongated temporal styloid process or calcified stylohyoid ligament at the base of the skull and may cause recurrent pain in the oropharynx and face. Eagle defined the length of a normal styloid process at 2.5–3.0cm (Gervickas *et al* 2004). An elongated styloid process occurs in about 4% of the general population, while only between 4–10.3% of these patients is symptomatic, giving a true incidence of about 0.16%, with a female-to-male predominance of 3:1. Bilateral involvement is quite common but does not always involve bilateral symptoms.

Two crania were brachycranial (short, broad skull shape) and four were bathrocephalic (step-like posterior projection of the skull), both normal cranial shape variations. Two individuals displayed facial asymmetry. One male [214], aged 18–25 years, displayed facial asymmetry with the right maxilla slightly higher than the left side. The right nasal cavity measured 52.1mm and the left 54.4mm. The nasal spine

was also slightly deviated to the right (Fig 101a). Subadult [105], aged seven to eleven years, displays marked facial asymmetry with the septum deviating to the right and the anterior nasal spine presenting much higher than the left. The right maxillary palate was deeper and more cleft than the left (Fig 101b). Common causes of facial asymmetry are early loss of deciduous teeth, a congenital missing tooth or teeth, and habits such as thumb sucking (Cheong & Lo 2011).

Rebecca Pritlove [164], aged 71 years, had concha bullosa. The right maxilla has a gross expansion of the right inferior nasal concha (middle turbinate). There is also a slight left side deviation of the nasal septum. This is a fairly common condition affecting approximately 35% of the population. Most individuals with concha bullosa are asymptomatic and are detected to have the same upon evaluation of headache. This condition is also associated with chronic sinus infections and also with environmental pollution and allergies (Bhandary & Kamath 2009). The sternum body of subadult [159], aged 12–17 years, was abnormally short and wide. This may have been caused by delayed caudal cohesion of the sternal bands and aplasia of the lower caudal portions. It has a tapered caudal end also. This represents a type 4 mesosternum (Barnes 1994, 219). It may also relate to a 'pigeon chest', a deformity of the ribcage as a result of rickets (Ortner 2003).

Elizabeth Hewitson [76], aged 42 years, had congenital fusion of the right lower arm. The right radial head was completely flattened and had been incorporated into the olecranon process of the ulna, extending the joint surface posteriorly and resulting in complete fusion of the two bones (Fig 102). The ulnar shaft was thin with very slight muscle attachments and no supination occurring. There was no fusion at the distal ends of the bones. Congenital radioulnar

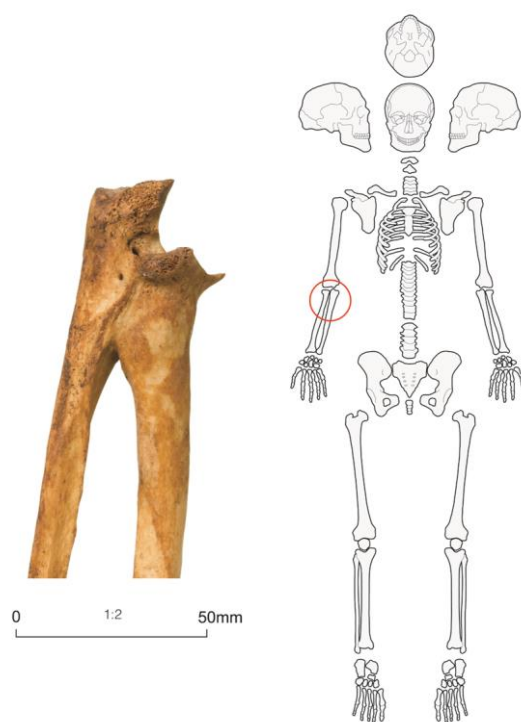


Fig 102. Congenital radio-ulnar synostosis of the right forearm (elbow joint) of Elizabeth Hewitson [76] (scale 1:2)

synostosis is a rare condition that causes limited rotational movements of the forearm and may lead to difficulties with some activities of daily living. However, this is the most common congenital functional disorder of the elbow joint. Cleary and Omer (1985) reported an average patient age at diagnosis of 6 years, with a range of from 6 months to 22 years. There is no sex predilection and no particular inheritance pattern is apparent. Sixty percent of cases are bilateral.

There is coalition of the left scaphoid and trapezium wrist bones of older adult male [470]. Charles Hayter [309], aged 23 years, had bilateral coxa vara, a deformity of the hip where the angle formed between the head and neck of the femur and its shaft (Mikulicz angle) is decreased, usually defined as less than 120° , but generally is asymptomatic in life (Fairbank 1928).

There was congenital bony talocalcaneal coalition between the left calcaneus and talus at the middlefacet of adult male [443], via a smooth bridge of bone joining these two foot bones. Talocalcaneal coalition accounts for 45% of all tarsal coalitions, and although all three facets of the talocalcaneal joint can be affected, the

middle facet is most commonly involved (Sakellariou *et al* 2000). There is cartilaginous fusion of the same joint on the right foot.

There was bilateral calcaneonavicular cartilaginous coalition in the feet of young adult female [434]. The new joint surfaces between the two foot bones (distal calcaneus and navicular) were porous and roughened but not fused. Symptoms can include: pain, typically on the outside and top of the foot; flat feet or a flat foot, rigidity and stiffness in the affected foot, and muscle spasms (Newman & Newburg 2000).

The left cuboid and navicular of younger adult female [731] had enlarged facets between them with macro-porosity and marginal lipping possibly indicating the beginning of cartilaginous navicular/cuboid coalition. This type of tarsal coalition is extremely rare and largely asymptomatic except at specific moments of stress and exercise (Awan & Graham 2015).

Two adult individuals displayed symphalangism of the foot phalanges, the ankylosis of the interphalangeal joints of the toes. This is a common anatomical variant, especially in the toes, although rarely may be associated with various syndromes or carpal/tarsal coalitions (Nakashima *et al* 1995).

Valgus deformity of the proximal phalanx of the great toe, known as hallux valgus (a deviation of the distal portion of the great toe) may be associated with a genetic predisposition, but is commonly associated with the wearing of restrictive, ill-fitting shoes in modern populations (McRae 1999, 181). Hallux valgus was observed in 6.3% of individuals (15/238) (Tables 57, 58). Nearly double the amount of males (8/69: 11.6%) than females (6/81: 7.4%) were affected by this deformity.

At Bow Baptist, the crude prevalence rates of hallux valgus were 5.8% ((24/416) and 11.2% of adults (24/214), ten males (/86: 11.6%) and 14 females (/115: 12.2%) were affected (Henderson *et al* 2013, 192).

Table 58. Crude prevalence of hallux valgus

Age (years)	Male			Female		
	No. observed	No. affected	%	No. observed	No. affected	%
18–25	11	0	-	20	0	-
26–35	17	1	5.9	24	3	12.5
36–45	15	5	33.3	14	0	-
>46	23	1	4.3	23	3	13.0
Adult	3	1	33.3	0	0	-
Total	69	8	11.6	81	6	7.4

Table 57. True prevalence of hallux valgus (MT = metatarsal)

Element	Subadult			Male			Female			Adult			Total		
	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Foot															
Right MT1	34	1	2.9	55	7	12.7	73	5	6.8	128	12	9.4	161	13	8.1
Right proximal phalanges	15	1	6.7	149	5	3.4	120	4	3.3	269	9	3.3	284	10	3.5
Left MT1	39	1	2.6	55	7	12.7	68	6	8.8	123	13	10.6	162	14	8.6
Left proximal phalanges	19	1	5.3	154	5	3.2	120	2	1.7	174	9	5.2	293	10	3.4

Table 59. Crude prevalence of infectious disease

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	3	8.3	0	0	-	0	0	-	0	0	-	36	3	8.3
6-11	18	6	33.3	0	0	-	0	0	-	0	0	-	18	6	33.3
12-17	14	6	42.9	0	0	-	0	0	-	0	0	-	14	6	42.9
18-25 years	0	0	-	11	7	63.6	20	6	30.0	31	13	41.9	31	13	41.9
26-35	0	0	-	17	4	23.5	24	5	20.8	41	9	22.0	41	9	22.0
36-45	0	0	-	15	2	13.3	14	3	21.4	29	5	17.2	29	5	17.2
≥46 years	0	0	-	23	5	21.7	23	3	13.0	46	8	17.4	46	8	17.4
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	15	17.4	69	18	26.1	81	17	21.0	152	35	23.0	238	50	21.0

Table 60. Crude prevalence of selected infectious diseases

Type	Subadult (n=86)		Male (n=69)		Female (n=81)		Adult (n=152)		Total (n=238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Non-specific periostitis	11	12.8	17	24.6	16	19.8	33	21.7	44	18.5
Non-specific osteomyelitis	1	1.2	0	-	0	-	0	-	1	0.4
Tuberculosis	3	3.5	1	1.4	1	1.2	2	1.3	5	2.1

Infectious Disease

Evidence of infectious disease was observed in 50 individuals (/238: 21%); 15 subadults (/86: 17.4%) and 35 adults (/152: 23%) (Table 59). Non-specific periostitis was the most frequently observed in the total sample at 18.5% (44/238) (Table 60). Rates of infectious disease were more evenly distributed amongst the female age categories while in males there was a much higher rate of younger adult males affected, which may indicate higher rates of stress for males in this age group.

At Priory Yard, Norwich, 20 adults (/39: 51.3%) and eight subadults (/24: 33.3%) had evidence for infectious disease (Caffell & Clarke 2011, 260), compared with just under a quarter of the assemblage at Bow Baptist (84/416: 20.2%), affecting 29.4% of adults (63/214) and 10.4% of subadults (21/202) (Henderson *et al* 2013, 132).

Non-Specific Infection

PERIOSTEAL LESIONS

Evidence of non-specific infectious disease was observed in 45 individuals (/238: 18.9%); these included 12 subadults (/86: 14%) and 33 adults (/152: 21.7%) (Table 61). There was a high rate of infectious disease in subadults in the 12-17 year age category (42.9%: 6/14). Male and female patterns of non-specific infectious disease were similar across all age categories, with a decrease after the 18-25 year age category.

Almost all of the non-specific infectious disease resulted from periosteal lesions (which includes rib lesions and maxillary sinusitis). Evidence of non-specific periosteal lesions were observed in 44 individuals (/238: 18.5%), 11 subadults (/86: 12.8%) and 32 adults (/152:

21.1%) (Table 62). The majority of periosteal lesions were active at the time of death (28/44: 63.7%), 31.8% (14/44) of all lesions were remodelled and 4.5% were mixed lesions showing both active and healing bone changes (2/44) (Fig 103).

The true prevalence rates of non-specific periosteal lesions are shown in Tables 63-5. The most commonly affected bone was the left tibia (21/211: 10%).

At Bow Baptist, the crude prevalence rates of periostitis for adults was 29.4% (63/214) and for subadults was 10.4% (21/202) (Henderson *et al* 2013, 133). At Coach Lane, North Shields, lower rates of periostitis were observed, with 8.5% of individuals (7/82) affected, with males (8%: 2/25) significantly less affected than females (3/19: 15.8%) (Proctor *et al* 2016, 61). At Glasshouse Yard, the crude prevalence rates of periostitis were 8% (2/25), one subadult (1/25: 4%) and one adult (1/23: 4.3%) (Henderson 2009, 14).

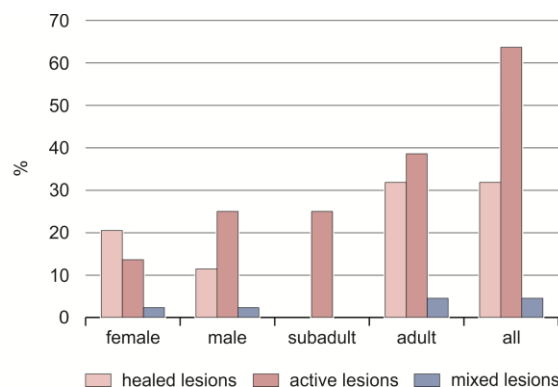


Fig 103. Stages of healing of non-specific periosteal lesions in the total sample (n=44)

Table 61. *Crude prevalence of non-specific infectious disease*

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	2	5.6	0	0	-	0	0	-	0	0	-	36	2	5.6
6-11	18	4	22.2	0	0	-	0	0	-	0	0	-	18	4	22.2
12-17	14	6	42.9	0	0	-	0	0	-	0	0	-	14	6	42.9
18-25	0	0	-	11	6	54.5	20	6	30.0	31	12	38.7	31	12	38.7
26-35	0	0	-	17	4	23.5	24	4	16.7	41	8	19.5	41	8	19.5
36-45	0	0	-	15	2	13.3	14	3	21.4	29	5	17.2	29	5	17.2
≥46	0	0	-	23	5	21.7	23	3	13.0	46	8	17.4	46	8	17.4
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	12	14.0	69	17	24.6	81	16	19.8	152	33	21.7	238	45	18.9

Table 62. *Crude prevalence of non-specific periosteal lesions*

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	1	2.8	0	0	-	0	0	-	0	0	-	36	1	2.8
6-11	18	4	22.2	0	0	-	0	0	-	0	0	-	18	4	22.2
12-17	14	6	42.9	0	0	-	0	0	-	0	0	-	14	6	42.9
18-25	0	0	-	11	6	54.5	20	6	30.0	31	12	38.7	31	12	38.7
26-35	0	0	-	17	4	23.5	24	4	16.7	41	8	19.5	41	8	19.5
36-45	0	0	-	15	2	13.3	14	3	21.4	29	4	13.8	29	5	17.2
≥46	0	0	-	23	5	21.7	23	3	13.0	46	8	17.4	46	8	17.4
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	11	12.8	69	17	24.6	81	16	19.8	152	32	21.1	238	44	18.5

Table 63. *True prevalence of non-specific periosteal lesions in crania and mandibles*

Element	Side	Subadult			Male			Female			Adult			Total		
		No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Frontal	right	83	0	-	69	1	1.4	80	0	-	149	1	0.7	232	1	0.4
	left	82	0	-	68	0	-	80	0	-	148	0	-	230	0	-
	total	165	0	-	137	1	0.7	160	0	-	297	1	0.3	462	1	0.2
Sphenoid	right	84	0	-	68	0	-	80	1	1.3	148	1	0.7	230	1	0.4
	left	82	0	-	68	0	-	80	1	1.3	148	1	0.7	230	1	0.4
	total	166	0	-	136	0	-	160	2	1.3	296	2	0.7	460	2	0.4
Maxilla	right	73	0	-	67	0	-	78	1	1.3	146	1	0.7	219	1	0.5
	left	74	0	-	66	0	-	79	2	2.5	146	2	1.4	220	2	0.9
	total	147	0	-	133	0	-	157	3	1.9	292	3	1.0	439	3	0.7
Mandible	right	83	1	1.2	67	0	-	79	1	1.3	146	1	0.7	229	1	0.4
	left	83	1	1.2	66	0	-	79	1	1.3	145	1	0.7	228	1	0.4
	total	166	2	1.2	133	0	-	158	2	1.3	291	2	0.7	457	2	0.4

Table 64. True prevalence of non-specific periosteal lesions in long bones

Element	Side	Subadult			Male			Female			Adult			Total		
		No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Clavicle	right	71	1	1.4	61	0	-	74	0	-	135	0	-	206	1	0.5
	left	71	4	5.6	62	0	-	74	2	2.7	136	2	1.5	207	6	2.9
	total	142	5	3.5	123	0	-	148	2	1.4	271	2	0.7	413	7	1.7
Humerus	right	76	3	3.9	65	0	-	77	1	1.3	142	1	0.7	218	4	1.8
	left	77	0	-	65	0	-	76	0	-	141	0	-	218	0	-
	total	153	3	2.0	130	0	-	153	1	0.7	283	1	0.4	436	4	0.9
Radius	right	70	1	1.4	63	0	-	77	0	-	140	0	-	210	1	0.5
	left	74	1	1.4	64	0	-	78	0	-	142	0	-	216	1	0.5
	total	144	2	1.4	127	0	-	155	0	-	282	0	-	426	2	0.5
Ulna	right	70	3	4.3	63	0	-	73	0	-	136	0	-	206	3	1.5
	left	73	2	2.7	64	0	-	77	0	-	141	0	-	214	2	0.9
	total	143	5	3.5	127	0	-	150	0	-	277	0	-	420	5	1.2
Femur	right	77	3	3.9	68	2	2.9	80	5	6.3	150	7	4.7	227	10	4.4
	left	76	3	3.9	68	2	2.9	79	5	6.3	148	7	4.7	224	10	4.5
	total	153	6	3.9	136	4	2.9	159	10	6.3	298	14	4.7	451	20	4.4
Tibia	right	74	4	5.4	61	7	11.5	77	8	10.4	139	15	10.8	213	19	8.9
	left	73	4	5.5	61	8	13.1	76	9	11.8	138	17	12.3	211	21	10.0
	total	147	8	5.4	122	15	12.3	153	17	11.1	277	32	11.6	424	40	9.4
Fibula	right	68	2	2.9	61	3	4.9	76	7	9.2	137	10	7.3	205	12	5.9
	left	68	2	2.9	60	4	6.7	75	6	8.0	135	10	7.4	203	12	5.9
	total	136	4	2.9	121	7	5.8	151	13	8.6	272	20	7.4	408	24	5.9

Table 65. True prevalence of non-specific periosteal lesions in appendages and other bones (S = sacral vertebra; MT = metatarsal)

Body area/ element	Side	Subadult			Male			Female			Adult			Total		
		No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Ribs	right	723	5	0.7	639	5	0.8	660	6	0.9	1299	11	0.8	2032	16	0.8
	left	734	3	0.4	619	7	1.1	679	4	0.6	1298	11	0.8	2022	14	0.7
Vertebrae																
S1	-	60	0	-	64	0	-	76	1	1.3	140	1	0.7	200	1	0.5
Right scapula	right (total)	76	0	-	65	1	1.5	76	0	-	141	1	0.7	217	1	0.5
Glenoid	right	77	0	-	65	0	-	76	0	-	141	0	-	218	0	-
Coracoid	right	25	0	-	64	0	-	75	0	-	139	0	-	164	0	-
Acromion	right	75	0	-	65	1	-	75	0	-	140	1	0.7	215	1	0.5
Blade	right	75	0	-	65	0	-	76	0	-	141	0	-	216	0	-
Left scapula	left (total)	77	0	-	66	1	1.5	77	0	-	143	1	0.7	220	1	0.5
Glenoid	left	78	0	-	66	0	-	77	0	-	143	0	-	221	0	-
Coracoid	left	19	0	-	64	0	-	75	0	-	139	0	-	158	0	-
Acromion	left	76	0	-	66	1	1.5	77	0	-	143	1	0.7	219	1	0.5
Blade	left	76	0	-	66	0	-	76	0	-	142	0	-	218	0	-
Ilium	right	76	0	-	66	0	-	81	1	1.2	147	1	0.7	223	1	0.4
	left	76	0	-	66	0	-	81	1	1.2	147	1	0.7	223	1	0.4
Right foot																
Talus	right	47	0	-	60	1	1.7	70	1	1.4	131	2	1.5	178	2	1.1
Calcaneus	right	52	1	1.9	59	0	-	72	1	1.4	132	1	0.8	184	1	0.5
MT1	right	34	1	2.9	55	0	-	73	0	-	128	0	-	161	1	0.6
MT2	right	36	1	2.8	55	0	-	71	0	-	126	0	-	162	1	0.6
MT3	right	37	1	2.7	56	0	-	70	0	-	126	0	-	163	1	0.6

Table 65. (contd)

MT4	right	35	1	2.9	55	0	-	70	0	-	125	0	-	160	1	0.6
MT5	right	40	1	2.5	56	0	-	72	0	-	128	0	-	168	1	0.6
Left foot																
Talus	left	39	0	-	61	0	-	70	0	-	132	0	-	171	0	-
Calcaneus	left	47	1	2.1	58	0	-	70	1	1.4	129	1	0.8	176	1	0.6
MT1	left	39	2	5.1	55	0	-	68	0	-	123	0	-	162	2	1.2
MT2	left	33	1	3.0	56	0	-	63	0	-	119	0	-	152	1	0.7
MT3	left	32	1	3.1	55	0	-	67	0	-	122	0	-	154	1	0.6
MT4	left	33	1	3.0	56	0	-	66	0	-	122	0	-	155	1	0.6
MT5	left	33	1	3.0	55	0	-	69	0	-	124	0	-	157	1	0.6

Table 66. Crude prevalence of rib lesions

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	0	-	0	0	-	0	0	-	0	0	-	36	0	-
6-11	18	2	11.1	0	0	-	0	0	-	0	0	-	18	2	11.1
12-17	14	3	21.4	0	0	-	0	0	-	0	0	-	14	3	21.4
18-25	0	0	-	11	3	27.3	20	3	15.0	31	6	19.4	31	6	19.4
26-35	0	0	-	17	2	11.8	24	2	8.3	41	4	9.8	41	4	9.8
36-45	0	0	-	15	2	13.3	14	0	-	29	2	6.9	29	2	6.9
≥46	0	0	-	23	1	4.3	23	1	4.3	46	2	4.3	46	2	4.3
Adult	0	0	-	3	0	-	0	0	0.0	5	0	-	5	0	-
Total	86	5	5.8	69	8	11.6	81	6	7.4	152	8	5.3	238	19	8.0

SINUSITIS

Evidence of maxillary sinusitis was observed in three individuals (/238: 1.3%), two males (/69: 2.9%) and one female (/81: 1.2%). Recording of the condition was largely inhibited by the high levels of bone preservation and number of intact crania (50.4%: 120/238).

At Priory Yard, Norwich, much higher rates of sinusitis were recorded (10/24: 41.7%) (Caffell & Clarke 2011, 261). At West Butt's Street, Poole, four adults had evidence for sinusitis (McKinley 2008, 88). At Bow Baptist, the crude prevalence rate of maxillary sinusitis was 0.9% (2/214) for adults (Henderson *et al* 2013, 134).

RIB LESIONS

Evidence of rib lesions were observed in 19 individuals (/238: 8%), five subadults (/86: 5.8%) and 14 adults (/152: 9.2%) (Table 66). The rib lesions were located on the inner (visceral) surfaces of the ribs and these can indicate chronic lung infections or tuberculosis (Ortner 2003). The majority of rib lesions were active at the time of death (15/19: 79%) (Fig 104). There was an overall decline in the presence in rib lesions with advancing age in adults.

At Priory Yard, Norwich, a higher rate of rib lesions was recorded with evidence for rib lesions in eight adults (/39: 20.5%), seven females (/20: 35%) and one male (/13: 7.7%) (Caffell & Clarke 2011, 260). At West Butt's Street, Poole, six adults (/79: 7.6%) were affected

(McKinley 2008, 86). At Bow Baptist, the crude prevalence rates of rib lesions were 9.9% (41/416), 16.8% of adults (36/214) and five subadults (/212: 11.3%) (Henderson *et al* 2013, 135).

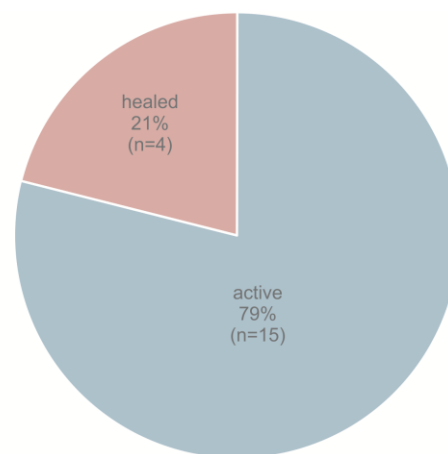


Fig 104. Stages of healing of rib lesions in the total sample (n=19)

OSTEOMYELITIS

Evidence of osteomyelitis (an infection and inflammation of the bone) was observed in one subadult [50] aged one to five years. There was localised

Table 67. Crude prevalence of tuberculosis

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	1	2.8	0	0	-	0	0	-	0	0	-	36	1	2.8
6-11	18	2	11.1	0	0	-	0	0	-	0	0	-	18	2	11.1
12-17	14	0	-	0	0	-	0	0	-	0	0	-	14	0	-
18-25	0	0	-	11	1	9.1	20	0	-	31	1	3.2	31	1	3.2
26-35	0	0	-	17	0	-	24	1	4.2	41	1	2.4	41	1	2.4
36-45	0	0	-	15	0	-	14	0	-	29	0	-	29	0	-
≥46	0	0	-	23	0	-	23	0	-	46	0	-	46	0	-
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	3	3.5	69	1	1.4	81	1	1.2	152	2	1.3	238	5	2.1

Table 68. True prevalence of tuberculosis (MT = metatarsal)

Body area/ element	Side	Subadult			Male			Female			Adult			Total		
		No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%	No. observed	No. affected	%
Maxilla	right	73	1	1.4	67	0	-	78	0	-	146	0	-	219	1	0.5
	left	74	1	1.4	66	0	-	79	0	-	146	0	-	220	1	0.5
	total	147	2	1.4	133	0	-	157	0	-	292	0	-	439	2	0.5
Femur	right	77	0	-	68	0	-	80	1	1.3	150	1	0.7	227	1	0.4
	left	76	0	-	68	0	-	79	1	1.3	148	1	0.7	224	1	0.4
	total	153	0	-	136	0	-	159	2	1.3	298	2	0.7	451	2	0.4
Tibia	right	74	1	1.4	61	0	-	77	0	-	139	0	-	213	1	0.5
	left	73	1	1.4	61	0	-	76	0	-	138	0	-	211	1	0.5
	total	147	2	1.4	122	0	-	153	0	-	277	0	-	424	2	0.5
Ribs	right	723	1	0.1	639	0	-	660	0	-	1299	0	-	2032	1	0.1
	left	734	1	0.1	619	0	-	679	0	-	1298	0	-	2022	1	0.1
Ilium	right	76	0	-	66	0	-	81	1	1.2	147	1	0.7	223	1	0.4
	left	76	0	-	66	0	-	81	1	1.2	147	1	0.7	223	1	0.4
Left foot																
MT1	left	39	0	-	55	1	1.8	68	0	-	123	1	0.8	162	1	0.6
Vertebrae																
Cervical	-	505	4	0.8	444	1	0.2	526	0	-	970	1	0.1	1475	5	0.3
Thoracic	-	896	12	1.3	793	2	0.3	901	0	-	1664	2	0.1	2560	13	0.5
Lumbar		383	2	0.5	329	0	-	383	1	0.3	712	1	0.1	1095	4	0.4
Sacral		230	0	-	285	0	-	354	1	0.3	639	1	0.2	869	1	0.1
Right hand																
Proximal phalange	right	15	0	-	182	1	0.5	185	0	-	367	1	0.3	382	1	0.3
Intermediate phalange	right	12	0	-	124	1	0.8	118	0	-	242	1	0.4	254	1	0.4
Left hand																
Proximal phalange	left	12	0	-	187	1	0.5	158	0	-	345	1	0.3	357	1	0.3
Hand (unsided)																
Proximal phalange		220	0	-	129	1	0.8	249	0	-	378	1	0.3	598	1	0.2

osteomyelitis and severe swelling of the proximal diaphysis of the right ulna. The entire olecranon process/joint surface was destroyed, with a large lesion or sub-circular sinus with smooth margins. The bone within this sinus was heavily pitted with porosity and the walls of the sinus were thinned. There are some patches of dead bone (sequestered).

At Coach Lane, North Shields, osteomyelitis was observed in 4.9% of individuals (4/82) (Proctor *et al* 2016, 61). At Bow Baptist, the crude prevalence rates of osteomyelitis were 1.2% (5/416), 2.3% of adults (5/214) and 0.5% of subadults (1/202) (Henderson *et al* 2013, 135).

TUBERCULOSIS

Bone changes diagnostic of tuberculosis were observed in five individuals (/238: 2.1%), two adults (/152: 1.3%) and three subadults (/86: 3.5 %) (Table 67). The most commonly affected bones were the tenth thoracic vertebra (0.9%: 2/219), eleventh thoracic vertebra (2/220: 0.9%) and the fifth lumbar vertebra (2/216: 0.9%) (Table 68).

The bodies of the fourth cervical to the twelfth thoracic vertebrae of Theophilus Evans [84], aged 16 years, displayed shallow, lytic, sharp-edged, smooth-walled lesions with floors of remodelled trabeculae, located on the lateral, anterior and posterior surfaces. The largest lesion was situated at the body of the twelfth thoracic vertebra and has resulted in collapse of the spinal column and Pott's disease at this location at a 45° angle (Fig 11). The disease results from tubercular lesions in the vertebrae and in a process called caseous necrosis, the disc tissue dies, leading to vertebral narrowing and eventually to vertebral collapse and spinal damage. There were also active rib lesions present.

Subadult [656], aged one to five years, displayed bilateral erosive lesions on the joint surfaces of the distal femora and the proximal tibiae (knees) with flaring and hypervascularisation. The lesions comprised hollow, scooped out bases with margins (scalloped) and no new bone formation. The maxillae also showed severe alveolar resorption at the sockets of the incisors where the crypts had almost completely disappeared and macroporosity and roughness to the surfaces of the palate possibly also related to tuberculosis. Approximately one-quarter to one-third of children with tuberculosis develop extra-pulmonary involvement. Skeletal tuberculosis occurs in approximately 5% of children with extra-pulmonary tuberculosis. The vertebral body is the most common skeletal site involved followed by lower limb bones.

Rarely, intra-articular inflammation can occur in children either as a result of direct invasion of the tuberculous bacillus into the joint or as a consequence of an aseptic reactive arthritis (so-called Poncet's disease) related to an extra-articular tuberculous focus (Rajakumar & Rosenberg 2008). Male [214], aged 18–25 years, had multifocal isolated lesions of osteomyelitis at the distal and proximal end of the left first metatarsal. Proximal and intermediate unsided hand phalanxes were also completely destroyed by erosive lesions (Fig 105) and lytic lesions were also present on the body of the second cervical vertebra, and between the ninth and tenth thoracic vertebrae. These bone changes may suggest that this individual suffered from tuberculosis. A diagnosis of sarcoidosis was also considered. This is a systemic, granulomatous disorder that affects multiple organ systems, but most often the lungs and the skin. The incidence of radiographically evident osseous involvement is between 1% and 13%, with an average of 5% on conventional imaging. Sarcoidosis generally involves the peripheral skeleton with the bones of the

fingers and toes most frequently affected. The majority of osseous lesions occur in the phalanges of the hands (Cengiz *et al* 2012, 130; Resnick 2002, 4772–4).



Fig 105. Unsided hand phalanges of adult male [214] with distinctive lesions, possibly resulting from tuberculosis or sarcoidosis (scale 1:1)

At Priory Yard, Norwich, evidence for tuberculosis was seen in one adult (1/39: 2.6%) (Caffell & Clarke 2011, 260). At West Butt's Street, Poole, there was one possible case of tuberculosis in an adult male (McKinley 2008, 86). At Coach Lane, North Shields, tuberculosis was observed in 1.2 % of individuals (1/82) (Proctor *et al* 2016, 61). At Bow Baptist, the crude prevalence rates of tuberculosis were 1.9% (8/416), affecting 3.3% (7/214) of adults and 0.5% of subadults (1/204) (Henderson *et al* 2013, 138).

POLIOMYELITIS

An older adult female [569] had a markedly shorter left leg. The left tibia measures 311mm and the right measures 326mm. The left tibia and femur were also very gracile with little or no muscle attachment (Fig 106). Radiography revealed a possible diagnosis of poliomyelitis. Poliomyelitis (polio) is a highly infectious viral disease. Flaccid asymmetric weakness and muscle atrophy are the hallmarks of its clinical manifestations, due to loss of motor neurons and denervation of their associated skeletal muscles (Aufderheide & Rodríguez-Martín 1998, 212).

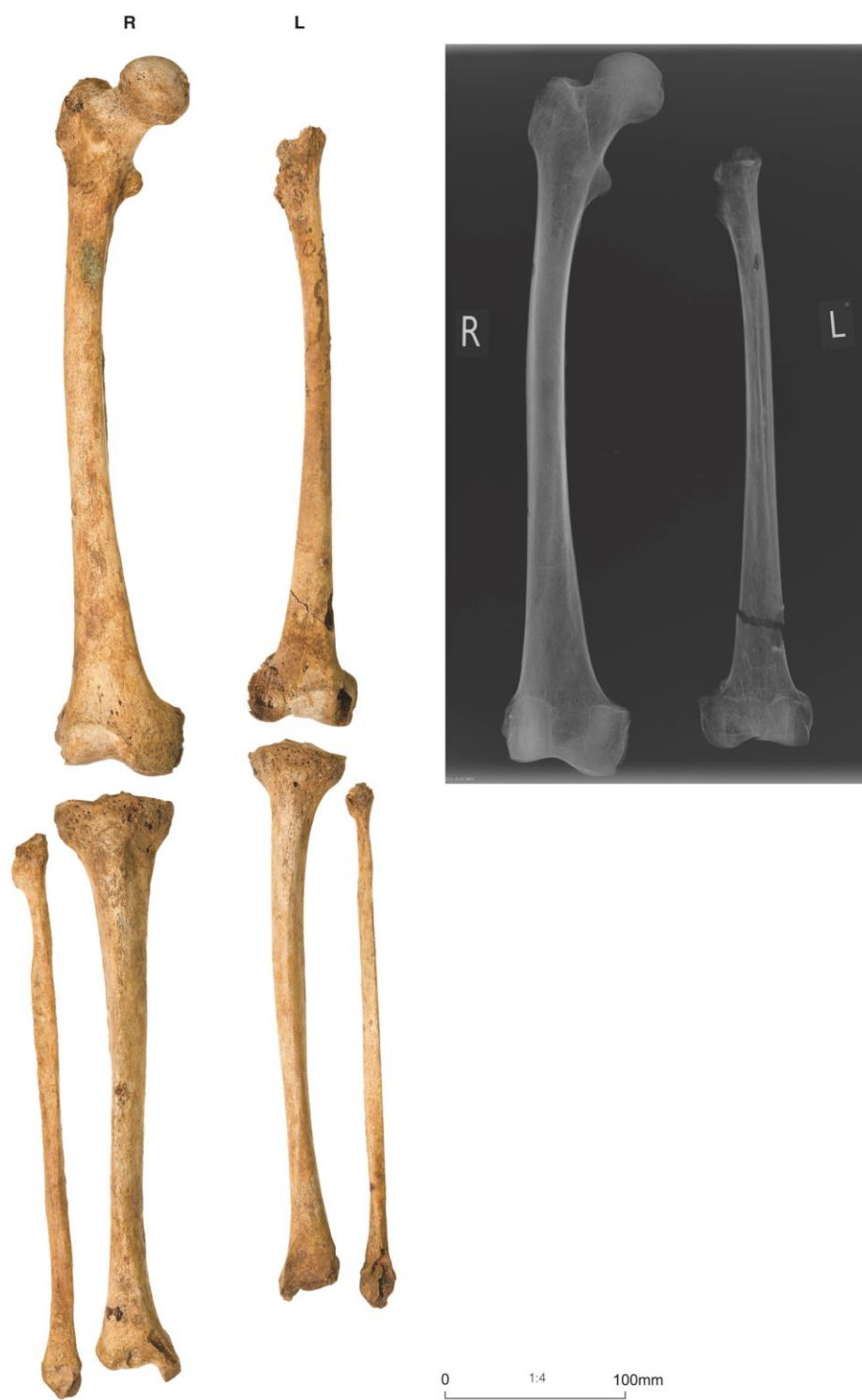


Fig 106. View of the right and left legs of adult female [569], with X-ray of the right and left femurs, showing possible evidence of poliomyelitis (scale 1:2)

Trauma

Evidence of trauma was observed in just over a quarter of burials (63/238: 26.5%), 39.65% (60/152) of adults with a much higher rate recorded amongst males (45/69: 65.2%) than females (15/81: 18.5%). Traumatic bone changes were recorded in 3.5% of subadults (3/86) (Table 69). Trauma crude prevalence showed an increase with advancing age, no subadults $\leq$ five years were affected and the oldest adult age category $\geq$ 46 years had the highest frequency of injuries (26/46: 56.5%). Males demonstrated a higher crude

prevalence in all of the age categories, except the younger adult age category, compared to their female counterparts. Healed fractures are the most common type of trauma (11.3%: 27/238).

Fractures

Bone fractures were recorded in 17.2% (41/238) of burials: 27% of adults (41/152), 47.8% of males (33/69) and 9.9% (8/81) of females. No subadults had evidence for fractures. Fracture crude prevalence

demonstrated an increase with age and males presented a higher rate in each age category than females, except the 18–25 years group with a slightly higher rate amongst females (2/20: 10.0%) (Table 70).

Analysis of the fracture type, force and mechanism revealed that the majority of fractures had resulted from direct forces such as falls or blows (Table 71). The most common fracture type was a compression fracture of the vertebral body (23.9%: 22/92) and the most common force and mechanism was a direct from a fall or blow (37%: 34/92) (Fig 107; Table 71). No definite dental trauma was recorded (see Table 50).

This fracture rate was comparable to that recorded at Bow Baptist where fractures were visible in 13%

(54/416) of individuals, 23.8% of adults (51/214) and three subadults (/202: 1.5%) (Henderson *et al* 2013, 145). A crude fracture prevalence rate of 10% (10/100; 9/74: 9% of adults) was recorded at the Baptist burial ground at West Street, Poole (McKinley 2008, 77). Lower rates were recorded at Coach Lane, North Shields (6/82: 7.32%) (Procter *et al* 2016, 67), West Bromwich (9/46: 19.56%) (Daly 2012, 8), Glasshouse Yard (2/25: 8%) (Henderson 2009, 14) and Wakefield Street (3/48: 6.3%) (Henderson 2012, 12). At Kings Lynn there was a crude prevalence rate of 38.9% (7/18) (Boston 2011, 128).

Table 69. Crude prevalence of trauma

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1–6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7–11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1–5	36	3	8.3	0	0	-	0	0	-	0	0	-	36	3	8.3
6–11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12–17	14	0	-	0	0	-	0	0	-	0	0	-	14	0	-
18–25	0	0	-	11	2	18.2	20	2	10.0	31	4	12.9	31	4	12.9
26–35	0	0	-	17	11	64.7	24	8	33.3	41	19	46.3	41	19	46.3
36–45	0	0	-	15	10	66.7	14	1	7.1	29	11	37.9	29	11	37.9
≥46	0	0	-	23	22	95.7	23	4	17.4	46	26	56.5	46	26	56.5
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	3	3.5	69	45	65.2	81	15	18.5	152	60	39.5	238	63	26.5

Table 70. Crude prevalence of fractures

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1–6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7–11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1–5	36	0	-	0	0	-	0	0	-	0	0	-	36	0	-
6–11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12–17	14	0	-	0	0	-	0	0	-	0	0	-	14	0	-
18–25	0	0	-	11	1	9.1	20	2	10.0	31	3	9.7	31	3	9.7
26–35	0	0	-	17	10	58.8	24	4	16.7	41	14	34.1	41	14	34.1
36–45	0	0	-	15	7	46.7	14	0	-	29	7	24.1	29	7	24.1
≥46	0	0	-	23	15	65.2	23	2	8.7	46	17	37.0	46	17	37.0
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	0	-	69	33	47.8	81	8	9.9	152	41	27.0	238	41	17.2

Table 71. Force and mechanism of fractures

Force/mechanism	Subadult		Male		Female		Adult		Total	
	No. of fractures	%	No. of fractures	%	No. of fractures	%	No. of fractures	%	No. of fractures	%
All types	6	100.0	65	100.0	21	100.0	86	100.0	92	100.0
Direct blow or indirect: fall onto outstretched hand	0	-	1	1.5	7	33.3	1	1.2	1	1.1
Direct: blow	0	-	4	6.2	2	9.5	11	12.8	11	12.0
Direct: blow or indirect: fall	0	-	9	13.8	0	-	11	12.8	11	12.0
Direct: blow to the spine or indirect: sudden muscle contraction	0	-	3	4.6	10	47.6	3	3.5	3	3.3

Table 72. (contd)

Direct: fall/blow	0	-	24	36.9	2	9.5	34	39.5	34	37.0
Direct: fall/blow/punch	0	-	5	7.7	0	-	7	8.1	7	7.6
Direct: falling directly on the elbow	0	-	2	3.1	0	-	2	2.3	2	2.2
Indirect: fall/jump	0	-	6	9.2	0	-	6	7.0	6	6.5
Indirect: hyperextension	0	-	2	3.1	0	-	2	2.3	2	2.2
Indirect: occupational?	0	-	1	1.5	0	-	1	1.2	1	1.1
Indirect: pathological	6	100.0	8	12.3	0	-	8	9.3	14	15.2

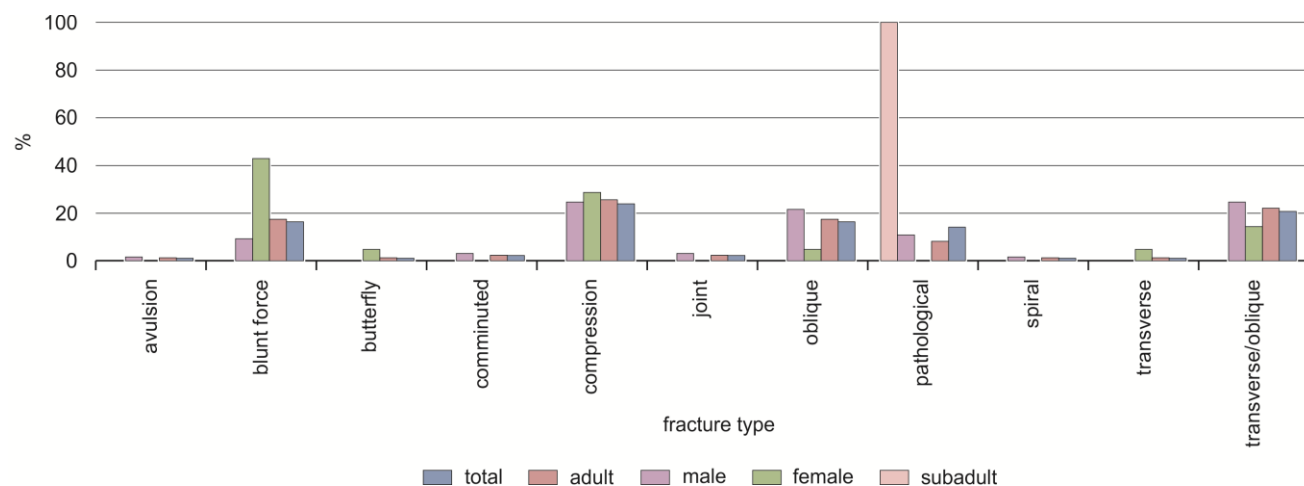


Fig 107. Fracture type (n=92)

Table 72. True prevalence of cranial fractures (n= number of elements)

Element	Side	Subadult			Male			Female			Adult			Total		
		n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%
Frontal	right	83	0	-	69	1	1.4	80	2	2.5	149	3	2.0	232	3	1.3
	left	82	0	-	68	0	-	80	2	2.5	148	2	1.4	230	2	0.9
	total	165	0	-	137	1	0.7	160	4	2.5	297	5	1.7	462	5	1.1
Parietal	right	83	0	-	69	0	-	80	2	2.5	149	2	1.3	232	2	0.9
	left	83	0	-	69	0	-	80	1	1.3	149	1	0.7	232	1	0.4
	total	166	0	-	138	0	-	160	3	1.9	298	3	1.0	464	3	0.6
Basioccipital	total	81	0	-	69	1	1.4	80	0	-	149	1	0.7	230	1	0.4
Nasal	right	47	0	-	65	1	1.5	75	1	1.3	140	2	1.4	187	2	1.1
	left	47	0	-	65	4	6.2	75	1	1.3	140	5	3.6	187	5	2.7
	total	94	0	-	130	5	3.8	150	2	1.3	280	7	2.5	374	7	1.9

Table 73. Rib fractures by number of ribs (true prevalence) and ribcage (crude prevalence)

Element	Side	Subadult			Male			Female			Adult			Total		
		n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%
Ribs	right	723	2	0.3	639	20	3.1	660	2	0.3	1299	22	1.7	2032	24	1.2
	left	734	1	-	619	9	1.5	679	5	0.7	1298	14	1.1	2022	15	0.7
Ribcage	right	83	1	1.2	64	10	15.6	78	1	1.3	142	11	7.7	225	12	5.3
	left	84	1	1.2	64	4	6.3	78	3	3.8	142	7	4.9	226	8	3.5

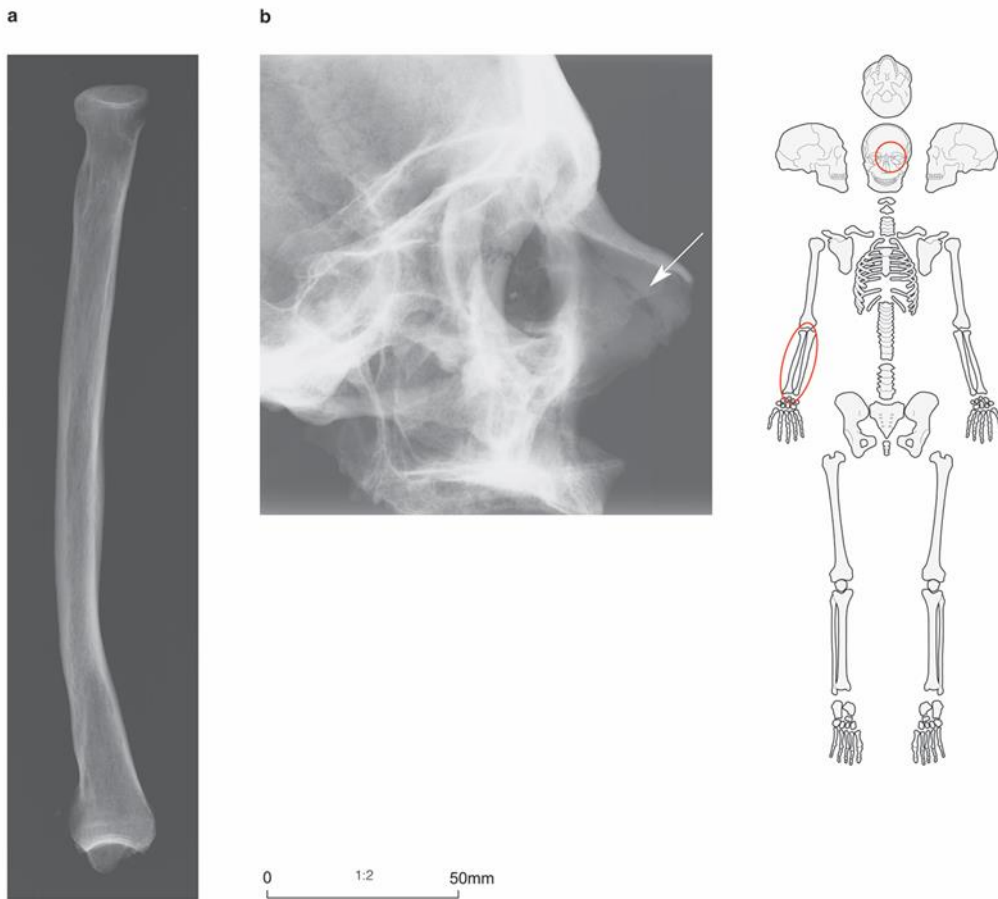


Fig 108. X-rays of adult male [670], showing a – healed Galeazzi fracture of the right radius and b – healed nasal fracture (arrowed) (scale 1:2)

SKULL FRACTURES

Twelve individuals had suffered fractures to the skull (/238: 5%), 7.9% of adults (12/152), 8.7% of males (6/69) and 7.4% of females (6/81).

True prevalence rates by cranial bone can be seen in (Table 72). When divided into regions, the majority of skull fractures occurred at the left nasal bone (5/187: 2.7%) and the right frontal (1.3%: 3/232). Females were more likely to suffer fractures to both the cranial vault and facial region than males. Facial fractures may result from direct or indirect trauma; depressed fractures to the nasal bones may result from interpersonal violence such as a blow or punch to the face (Lovell 1997, 155–6).

Older adult male [180] had a healed fissure to the right occipital condyle (Fig 12). Occipital condyle fractures result from blunt high-energy trauma to the head/neck and are rare traumatic injuries (Waseem *et al* 2014). Another older adult male [670] displayed multiple healed fractures. There was a healed oblique fracture of the right distal radius. The region of the fracture was completely remodelled with shortening of the shaft and approximately 30% posterior displacement of the fractured end. This may represent a Galeazzi fracture which results from a fall that causes an axial load to be placed on a hyperpronated forearm (Ravooft *et al* 2014). There was also a healed fracture to the left nasal bone that had resulted in an asymmetrical nasal area (Fig 108) with the nose pointing slightly to the left. The same individual had a healed oblique fracture to the lateral end of the right clavicle which had

resulted in shortening of the bone and healed fractures in three right and one left ribs.

At Bow Baptist, the crude prevalence rates of skull fractures were 1.7% (7/416), five adult males (5/214: 2.4% of adults; 5/86: 5.8% of adult males) and two subadults (2/202: 1%) (Henderson *et al* 2013, 147).

RIB FRACTURES

The majority of rib fractures represent direct trauma from a blow or fall onto the back or chest. Rib fractures can also occur from occupational habits particularly in older adults, such as violent coughing or vomiting (Lovell 1997, 159; Galloway 1999, 107). Fifteen individuals had fractured ribs (15/238: 6.3%; 14/152: 9.2% of adults, 1/86: 1.2% of subadults, 11/69: 15.9% of males and 3/81: 3.7% of females). There were more rib fractures occurring in the right ribcage (12/225: 5.3%) than the left ribcage (8/226: 3.5%) (Table 73).

Adult male [612], aged 36–45 years, had hypertrophic non-union fractures (a callus is formed, but the broken parts have not reunited) in both first ribs. The right rib had fractures at the angle and an oblique fracture at the point of non-union in the midshaft. The fractured ends were remodelled with areas of hypertrophy and increased bone density. Isolated fractures of the first rib are uncommon in modern contexts but can result from indirect trauma associated with sporting and other activities (Subramonia & Holdsworth 2004, 40).

Table 74. True prevalence of vertebral fractures (L = lumbar; n = number of elements; T = thoracic)

Element	Subadult			Male			Female			Adult			Total		
	n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%
T1	71	0	-	64	1	1.6	74	0	-	138	1	0.7	209	1	0.5
T3	69	0	-	63	1	1.6	73	0	-	136	1	0.7	205	1	0.5
T4	72	0	-	63	1	1.6	73	0	-	136	1	0.7	208	1	0.5
T5	74	0	-	63	1	1.6	74	0	-	137	1	0.7	211	1	0.5
T6	73	0	-	64	2	3.1	75	1	1.3	139	3	2.2	212	3	1.4
T7	75	0	-	63	1	1.6	75	0	-	138	1	0.7	213	1	0.5
T8	78	0	-	63	2	3.2	76	0	-	139	2	1.4	217	2	0.9
T9	79	0	-	64	1	1.6	76	0	-	140	1	0.7	219	1	0.5
T10	79	0	-	64	1	1.6	77	0	-	141	1	0.7	220	1	0.5
T11	78	0	-	65	2	3.1	77	0	-	142	2	1.4	220	2	0.9
T12	78	0	-	64	2	3.1	76	0	-	140	2	1.4	218	2	0.9
L1	79	0	-	65	1	1.5	79	1	1.3	144	2	1.4	223	2	0.9
L2	79	0	-	65	1	1.5	77	1	1.3	142	2	1.4	221	2	0.9
L3	76	0	-	65	0	-	76	1	1.3	141	1	0.7	217	1	0.5
L4	75	0	-	67	0	-	76	1	1.3	143	1	0.7	218	1	0.5
L5	74	0	-	67	1	1.5	75	1	1.3	142	2	1.4	216	2	0.9

At Bow Baptist, the crude prevalence rates of rib fractures were 2.6% (11/416) including ten adults (10/214: 4.7%); 7/86 males (8.1%) and 3/115 females (2.6%) (Henderson *et al* 2013, 150).

VERTEBRAL FRACTURES

Nine individuals (9/238: 3.8%, 9/152: 5.9% of adults, 7/69: 10.1% of males, 2/81: 2.5% of females) had evidence of spinal fractures. In total 0.4% of observable vertebrae had evidence of fracture (24/6036). The sixth thoracic vertebrae was most frequently involved (3/212: 1.4%). (Table 74).

Edward Hewitson [61], aged 43 years, had healed fractures to the spinous processes of the fifth to the seventh thoracic vertebrae (Fig 109). The calluses had ossified and the fractures were well healed. These may represent ‘clay-shoveler’s fractures’, a term that was used to describe isolated spinous process fractures third thoracic vertebra in Western Australian labourers normally occurring in the sixth cervical vertebra to the during the 1930s. In the modern era, this fracture pattern has been observed in a variety of patients, including football players, power-lifters, golfers, and

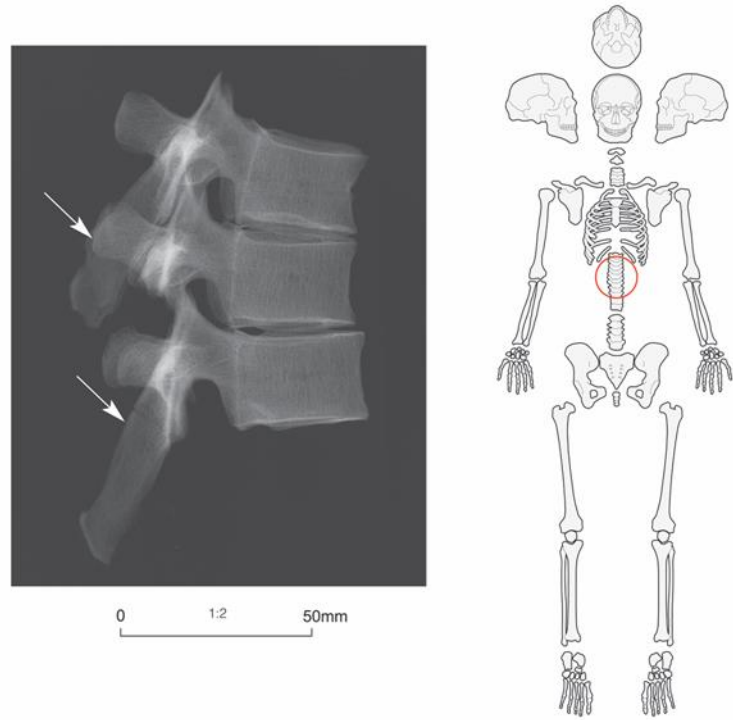


Fig 109. X-ray of the fifth to the seventh thoracic vertebrae of Edward Hewitson [61], showing healed fractures to the spinous processes (scale 1:2)

Table 75. True prevalence of long bone fractures (n = number of elements)

Element	Side	Subadult			Male			Female			Adult			Total		
		n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%
Clavicle	right	71	0	-	61	1	1.6	74	0	-	135	1	0.7	206	1	0.5
	total	142	0	-	123	1	0.8	148	0	-	271	1	0.4	413	1	0.2
Humerus	right	76	0	-	65	1	1.5	77	0	-	142	1	0.7	218	1	0.5
	total	153	0	-	130	1	0.8	153	0	-	283	1	0.4	436	1	0.2
Radius	right	70	0	-	63	1	1.6	77	0	-	140	1	0.7	210	1	0.5
	total	144	0	-	127	1	0.8	155	0	-	282	1	0.4	426	1	0.2
Ulna	right	70	1	1.4	63	0	-	73	0	-	136	0	-	206	1	0.5
	left	73	1	1.4	64	2	3.1	77	0	-	141	2	1.4	214	3	1.4
	total	143	2	1.4	127	2	1.6	150	0	-	277	2	0.7	420	4	1.0
Femur	left	76	1	1.3	68	0	-	79	0	-	148	0	-	224	0	-
	total	153	1	0.7	136	0	-	159	0	-	298	0	-	451	1	0.2
Tibia	right	74	0	-	61	3	4.9	77	1	1.3	139	4	2.9	213	4	1.9
	left	73	1	1.4	61	2	3.3	76	0	-	138	2	1.4	211	3	1.4
	total	147	1	0.7	122	5	4.1	153	1	0.7	277	6	2.2	424	7	1.7
Fibula	right	68	0	-	61	4	6.6	76	0	-	137	4	2.9	205	4	2.0
	left	68	0	-	60	3	5.0	75	0	-	135	3	2.2	203	3	1.5
	total	136	0	-	121	7	5.8	151	0	-	272	7	2.6	408	7	1.7

trauma patients. This injury occurs primarily in untrained workers who perform activities involving lifting weights rapidly with extended arms. The task of shovelling was the most common cause in the past (Jordana *et al* 2006).

At Bow Baptist, the crude prevalence rates of vertebral fractures affected 6.1% of adults (13/214), 3.1% of the total assemblage, with higher rates in males (10/86: 11.6%) than females (3/115: 2.6%) (Henderson *et al* 2013, 151).

LONG BONE FRACTURES

Long bone fractures (including those of the clavicle) were present in 5% of individuals (12/238): 7.2% of adults (11/152), 14.5% of males (10/69), 1.4% of females (1/69) and 1.2% (1/86) of subadults. The right fibula was the most frequently fractured long bone (2%: 4/205). All remaining fractures had a true prevalence $\leq$ 2.0%. True prevalence rates of all long bone fractures can be seen in (Table 75). There was a healed fracture to the lateral side of the right proximal tibial plateau of an older adult male [180] with associated osteoarthritis that caused severe bone changes to this knee. The proximal tibia was splayed with severe marginal osteophyte growth and when articulated with the femur the tibia deviates slightly to lateral of the normal position. The tibial plateau is one of the most critical loadbearing areas in the human body; fractures of the plateau affect knee alignment, stability, and motion. The most common mechanism of injury involves axial loading, such as results from a fall. Other patterns of injury result from laterally directed forces or from a twisting injury (Coleman *et al* 2015). This individual also displayed a healed skull fracture (above).

An adult male [337], aged 26–35 years, had suffered trauma to the left ankle with fractures to the distal ends of the left tibia and fibula. The tibia was fractured between the medial and lateral malleolus and the distal

end had shifted superiorly resulting in shortening and major displacement of the fractured fragments with widespread ‘hair-on-end’ new bone formation and porosity. The distal fibula was completely fractured in two and the lateral malleolus had shifted laterally and superiorly reattaching via a new bridge of bone that was also covered in both active and healed bone formation. The talus was also covered in porosity and new bone and there was a possible fracture to the tubercle of the left navicular (Fig 13). This is a type B3 malleolar fracture based on the Müller-AO classification of malleolar fractures (Danis-Weber) or type 3 (fragment exceeds more than 25% of the articular surface). As well as deformity around the ankle this injury may have resulted in swelling, haematoma, or bony tenderness, and instability and pain on attempting to walk. It generally results from an exo-rotation force on the supinated foot (McRae 1999, 463).

At Bow Baptist, the crude prevalence rates of long bone fractures were 4.8% (20/416): 8.4% of adults (18/214) and 1% of subadults (2/202), this included 11 males (11/86: 12.8%) and seven females (7/115: 6.1%) (Henderson *et al* 2013, 153).

OTHER FRACTURE LOCATIONS

Seven individuals (7/238: 2.9%) had fractures at additional locations of the skeleton including the pelvis, hands and feet. This included 4.6% (7/152) of adults, 8.7% of males (6/69) and 1.2% (1/81) of females. True prevalence can be seen in (Table 76).

Two adult males had fractured finger bones (metacarpals). One male [3], aged 36–45 years, had a well-healed fracture to the distal right first metacarpal (base of thumb) with flattening to the joint surface, eburnation and marginal osteophyte formation. This was possibly a compression fracture to the joint resulting from an axial blow directed against the partially flexed metacarpal. This individual also had a healed fracture

to the midshaft of the right fibula. Another male [630] aged 25–36 years, had a healed fracture of the fifth right metacarpal.

The right inferior ischiopubic ramic ridge in the pelvis of female [189], aged 36–45 years, was fractured along the ischiopubic ramus ridge with misalignment of the fractured ends and a hiatus between the healed remodelled fragments and the rest of the ramus. There was also mature spiculated bone at this point and associated soft tissue ossifications (Fig 110). Fractures of the ischiopubic are generally the result of a direct blow, often in elderly patients, and are the result of minimal

traumatic force (Steinitz *et al* 2004). The right second metatarsal of male [648], aged 25–36 years, was fractured towards the distal end with 25° dorsal and slight medial deformity. A callus of new bone surrounded the fracture resulting in thickening of the shaft. Lesser metatarsal stress fractures (usually involving the second or third metatarsal bone) are associated with pain in the midfoot to forefoot. They typically occur following prolonged or repetitive walking and are sometimes called ‘march fractures’ (Fukuda *et al* 2008).

Table 76. True prevalence of other fracture locations (n = number of elements)

Body area/ element	Side	Subadult			Male			Female			Adult			Total		
		n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%	n	Fractures	%
Pubis	right	56	0	-	62	0	-	72	1	1.4	134	1	0.7	190	1	0.5
Right hand																
MC5	right	35	0	-	55	2	3.6	67	0	-	122	2	1.6	157	2	1.3
Left hand																
Hamate	left	13	0	-	43	1	2.3	41	0	-	84	1	1.2	97	1	1.0
Right foot																
MT2	right	36	0	-	55	1	1.8	71	0	-	126	0	-	162	1	0.6
Left foot																
Navicular	left	26	0	-	56	2	3.6	64	0	-	120	2	1.7	146	2	1.4

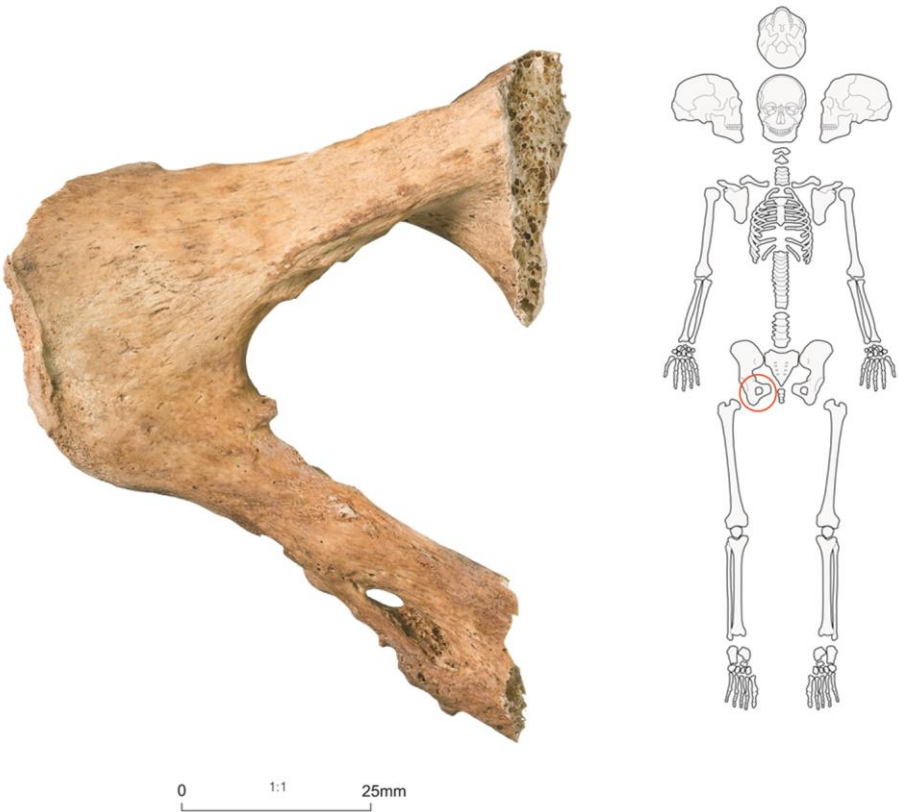


Fig 110. Medial view of a fracture to the right inferior ischiopubic ramic ridge (arrowed) of adult female [189] (scale 1:2)

Table 77. Crude prevalence of soft tissue trauma

Age (years)	Subadult			Male			Female			Adult			Total		
	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%	No. individuals	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	1	2.8	0	0	-	0	0	-	0	0	-	36	1	2.8
6-11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12-17	14	0	-	0	0	-	0	0	-	0	0	-	14	0	-
18-25	0	0	-	11	1	9.1	20	0	-	31	1	3.2	31	1	3.2
26-35	0	0	-	17	0	-	24	0	-	41	0	-	41	0	-
36-45	0	0	-	15	1	6.7	14	0	-	29	1	3.4	29	1	3.4
≥46	0	0	-	23	3	13.0	23	1	4.3	46	4	8.7	46	4	8.7
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	1	1.2	69	5	7.2	81	1	1.2	152	6	3.9	238	7	2.9

Soft Tissue Trauma

Soft tissue injuries were recorded in 2.9% of individuals (7/238): 3.9% of adults (6/152), 8.7% of males (6/69), 1.2% of females (1/81) and one subadult 1/86: 1.2%). There was a slight increase with age with the highest frequency recorded in the 46 and over year age category (4/46: 8.7%) (Table 77).

Two cases were represented by enthesophytes which affected 0.8% of individuals (2/238). These represent modifications to tendinous and ligamentous attachments in the form of new bone expressions or excavations into the bone surface. These may be related to activity related development of the musculature or traumatic injury and can result from other pathological conditions with a propensity for bone formation (Knüsel 2000, 387; Resnick 2002, 4727).

Five individuals had myositis ossificans (2.1%: 5/238), a localised soft tissue ossification in the muscle tissue, often in association with hematoma and in response to trauma (Resnick 2002, 4643, 4727; Ortner 2003, 134).

Emily Smith [212], aged 18 months, had a large bone spur (myositis ossificans traumatica) measuring 16.7mm superior to inferior and 5.5mm medial to lateral projecting from the proximal shaft of the left femur (just inferior to the femoral head on the medial side). The femoral shaft was covered with new woven bone indicating an active infection and that bone changes occurred a short time before death (Fig 111). This could be related to a birth trauma (Sferopoulos *et al* 2017).

Soft tissue trauma was observed in four adults at West Butts Street, Poole (4/72: 5.55%) (McKinley 2008, 79). At Coach Lane, North Shields, myositis ossificans was observed in 3.7% of individuals (3/82) (Proctor *et al* 2016, 61). At Bow Baptist, the crude prevalence rates of myositis ossificans was 6.7% (28/416) including 12.6% of adults (27/214) and 0.5% of subadults (1/202) (Henderson *et al* 2013, 160).

Subluxation

Four individuals showed evidence of subluxation or dislocation injuries (4/238: 1.7%), 2.6% of adults (4/152), 4.3% of males (3/69) and 1.2% of females (1/81). Two of these injuries occurred at the right elbow (2/4: 50.0%). After the shoulder, the elbow is the most commonly dislocated major joint in the body, accounting for 10–25% of all elbow injuries, and approximately 6.8% of fractures or dislocation with an annual incidence of 6.1 dislocations per 100,000 populations (Sears & Spear 2014). The common posterior or postero-lateral dislocation of the elbow is caused by a fall on the outstretched hand with the elbow incompletely extended (Osborne & Cotterill 1966, 340).

Older adult male [750] had a subluxation injury at the right elbow joint with gross contour change in all distal right humeral joint surfaces and the proximal right radius and ulna, together with very large osteophytes and pitting, particularly to the medial humerus, the olecranon and medial side of the radial head.

Bilateral subluxation injuries were recorded in both elbows of adult male [3], aged 36–45 years, with more dramatic changes in the right side, with gross contour change in all the joint surfaces of the distal humerus, proximal radius and ulna, and severe osteophytes, pitting and eburnation reflecting secondary degenerative osteoarthritis. The left elbow was fractured and there was atrophy to the left humeral shaft that was shorter (324mm) and less robust than the right arm (339mm) and to a lesser extent the left radius and ulna (Fig 112).

At Bow Baptist, the crude prevalence rate of subluxation was 1.4% (6/416): 5.8% of males (5/86) and 0.9% of females (1/115). The majority of these injuries (4/6: 66.7%) was located at the elbow joint (Henderson *et al* 2013, 164).



Fig 111. (above) Anterior view of the left femur of Emily Smith [212], showing myositis ossificans traumatica (arrowed) (scale 1:2)



Fig 112. (right) View of elbow joints of adult male [3], showing bilateral subluxation injuries (scale 1:2)

Surgical Intervention

Towards the end of the 18th century autopsies, carried out for the most part to establish the cause of death were gaining acceptance. By the 19th century it formed a common aspect of the coroner's inquest (Powers & Miles 2011, 239). Two individuals showed evidence of surgical intervention (2/238: 0.8 %).

Theresa Susan Giddy [244], aged 11 months, had undergone a craniotomy. Both tables of the frontal bones of this young child have been sawn horizontally at a level of c.33mm superior to the orbits. A small notch (17.45mm) in the cut above the right orbit/glabella may represent the point where the calvarium was removed. Very fine cut marks visible superior to the main saw cut line, on the ectocranial surface, reflect scalpel incisions during the peeling back of the soft tissue. On the left



Fig 113. Saw cuts providing evidence of a thoracotomy performed on older adult male [284] (scale 1:2)

side of the cranium, the saw cut ran horizontally from the frontal bone through the left parietal bone, passing just superior ($c.0.43\text{mm}$) to the squamous suture. The cut continued on to the occipital bone, passing through the left lambdoid suture and running superior ($c.24.13\text{mm}$) to the external occipital protuberance. This cut continued through the right lambdoid suture and through the right parietal.

Older adult male [284], had bilateral saw cuts to the medial clavicles, the left manubrium, the sternal end of the first right rib and the sternal ends of two upper right and one left ribs. These saw cuts suggested an autopsy was carried out after death to investigate the upper thorax. (Fig 113). Transected clavicles and ribs may also indicate thoracotomy procedures. This was performed by sawing through the midshaft of both clavicles and cutting through the ribs of both hemi-thoraces. The fact that a midline cut through the sternum was not performed, and bilateral osteotomies in the mid-clavicular plane preferred, suggests that the sternum and anterior part of the ribs were probably removed to

visualise the thoracic organs (Mitchell *et al* 2011). There was no pathology evident on the skeleton that would indicate the reason for an autopsy or thoracotomy, although the individual also displayed fusion of two cervical vertebrae (above 'Congenital anomalies') and bony cysts in the mouth (below, 'Neoplastic Disease').

Joint Disease

Spinal Joint Disease

Joint disease is one of the most frequent types of post-cranial skeletal pathology identified in archaeological populations. While gradual deterioration through advancing age has a contributing influence in the development of joint disease, biomechanical factors related to activity or trauma may also play a role. This can have implications in the interpretation of lifestyle and may have been responsible for a great deal of pain and disability (Rogers 2000, 163; Roberts & Manchester 2005, 132). The crude and true prevalence of adult spinal joint disease is shown in Tables 78 and 79 respectively.

OSTEOPHYTOSIS

Mechanically induced stresses placed on the spine through activities such as bending and lifting or heavy manual work can rupture the fibrous capsule of the intervertebral disc. This can stimulate new bone growth at the margins of the vertebral bodies as a compensatory reaction (Roberts & Manchester 2005, 140; Burt *et al* 2013, 57).

Osteophyte formation showed the highest overall crude prevalence rate of spinal joint disease affecting 67.1% of individuals (102/152) with a similar crude prevalence amongst males (48/69: 69.6%) and females

(54/81: 66.7%). This affected 36.1% of observable adult vertebrae (2037/3672). Osteophytes were distributed throughout the spinal column with a slightly higher prevalence between the fourth and sixth thoracic vertebrae and lower prevalence in the seventh to tenth thoracic vertebrae (Tables 78, 79; Fig 114).

A similar true prevalence rate for osteophytes was observed at West Butt's Street, Poole (40%: 558/1409) (McKinley 2008, 80). Lower rates were recorded at Bow Baptist (22.9%: 1093/4779) (Henderson *et al* 2013, 169) and at Wakefield Street (15.8%: 48/304) (Henderson 2012, 13).

Table 78. Crude prevalence of adult spinal joint disease

Sex	No. individuals	Osteoarthritis		Osteophytosis		Schmorl's nodes		Intervertebral disc disease		Fusion	
		No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Male	69	14	20.3	48	69.6	31	44.9	26	37.7	12	17.4
Female	81	20	24.7	54	66.7	18	22.2	27	33.3	9	11.1
Adult	152	34	22.4	102	67.1	49	32.2	53	34.9	21	13.8

Table 79. True prevalence of adult spinal joint disease

Sex	No. vertebrae	Osteoarthritis		Osteophytosis		Schmorl's nodes		Intervertebral disc disease		Fusion	
		No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Male	1688	484	28.7	1076	63.7	310	18.4	207	12.5	50	3.0
Female	1984	405	20.4	961	48.4	139	7.0	234	12.0	47	2.4
Adult	3672	889	24.2	2037	55.5	449	12.2	441	12.0	97	2.7

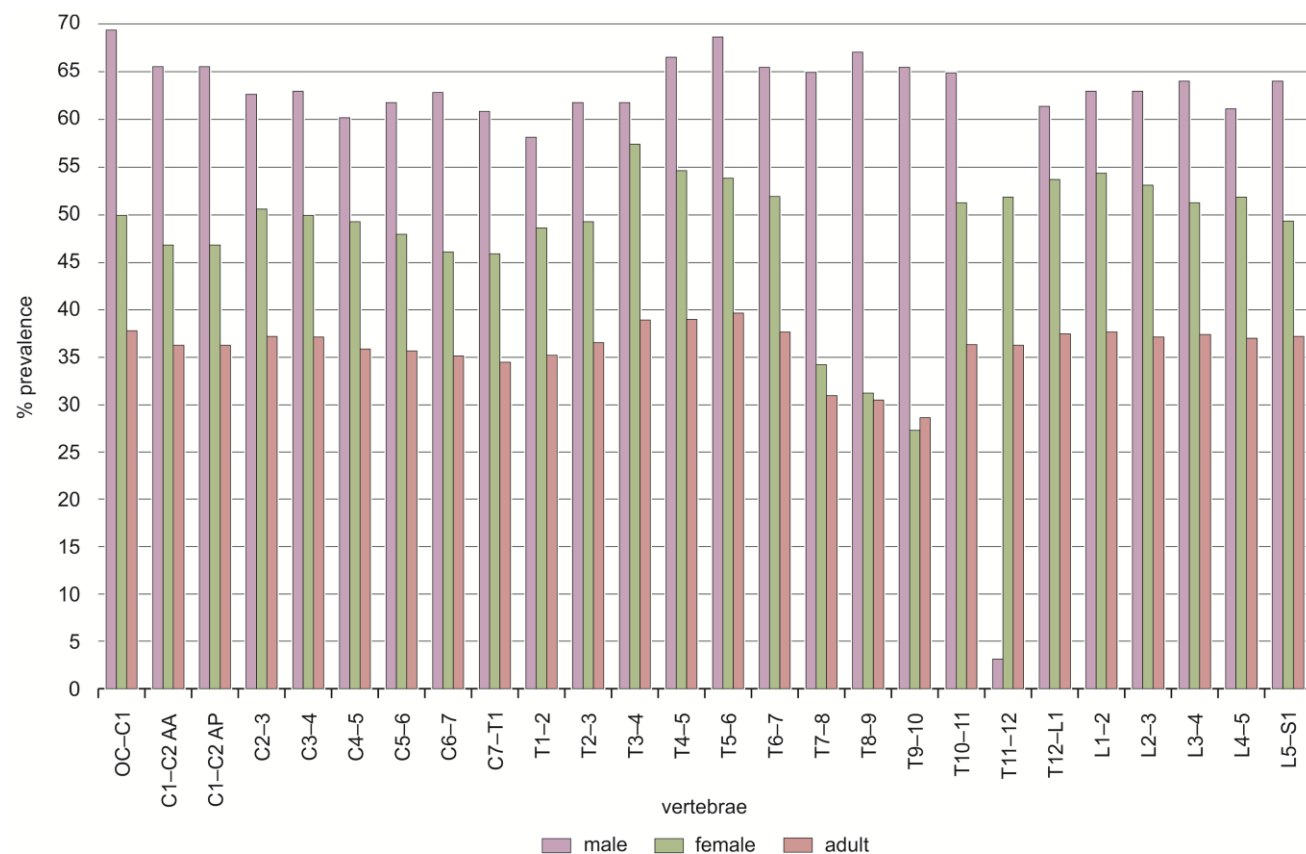


Fig 114. True prevalence of osteophyte formation by vertebral joint in adults, males and females

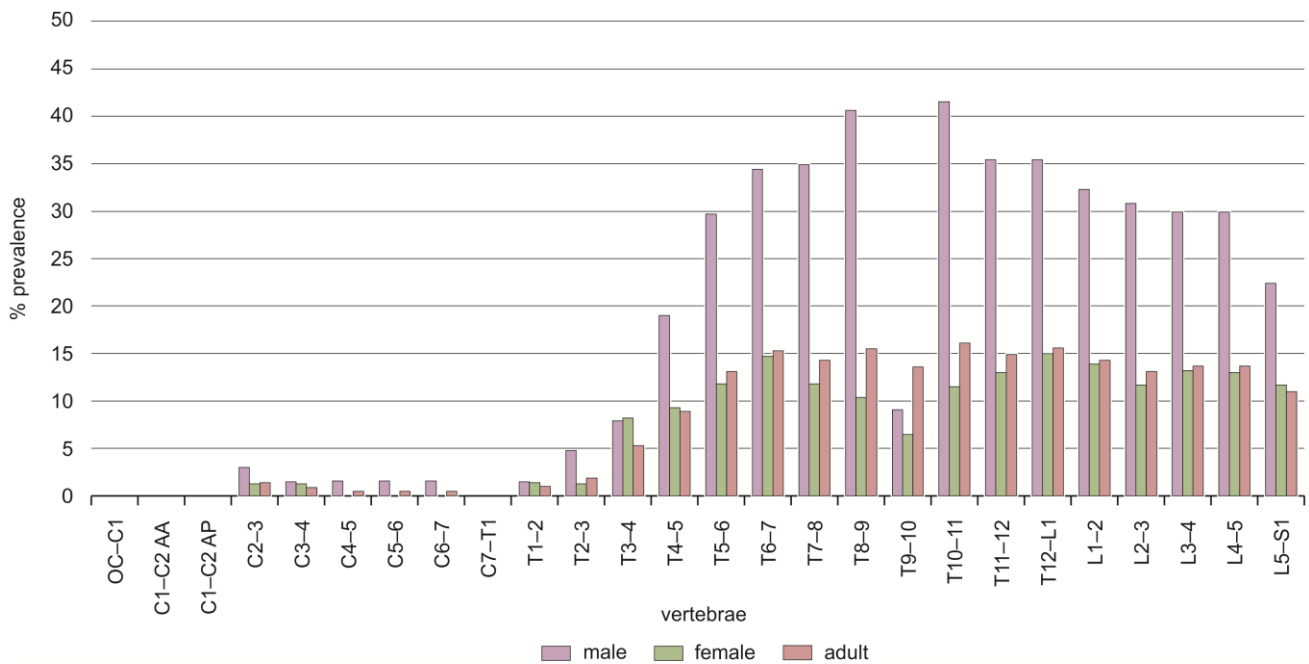


Fig 115. True prevalence of Schmorl's nodes by vertebral joint in adults, males and females

SCHMORL'S NODES

If herniation of the intervertebral disc occurs, a fibrous 'capsule' containing a gelatinous internal substance can exert pressure resulting in indentations on the superior and inferior surfaces of the vertebral body (Rogers 2000, 169; Roberts & Manchester 2005, 140; Burt *et al* 2013, 60). Schmorl's nodes affected 32.2% of adults (49/152: 32.2%) and displayed the highest crude prevalence rate for adult males (31/69: 44.9%). This affected 8% of observable adult vertebrae (449/3672: 8%) with a distribution in the weight-bearing regions of the mid to lower thoracic and lumbar spine. The affected rate of male vertebrae (310/1688: 18.4%) was over twice that of females (139/1984: 7%) (Fig 115).

Similar true prevalence rates of Schmorl's nodes were observed at West Butt's Street, Poole (8%: 116/1409) (McKinley 2008, 80-1), at Bow Baptist (12%: 574/4779) (Henderson *et al* 2013, 169) and at Wakefield Street (5.3%: 16/304) (Henderson 2012, 13). A much higher rate was observed at All Saints Way, West Bromwich (40.2%: 18/266) (Daly 2012, 10).

INTERVERTEBRAL DISC DISEASE

Degeneration of the cartilaginous joints may result in coarse pitting on the superior and inferior surfaces of the vertebral bodies (Rogers 2000, 169; Burt *et al* 2013, 59-60). This was present in 34.9% (53/152) of adults

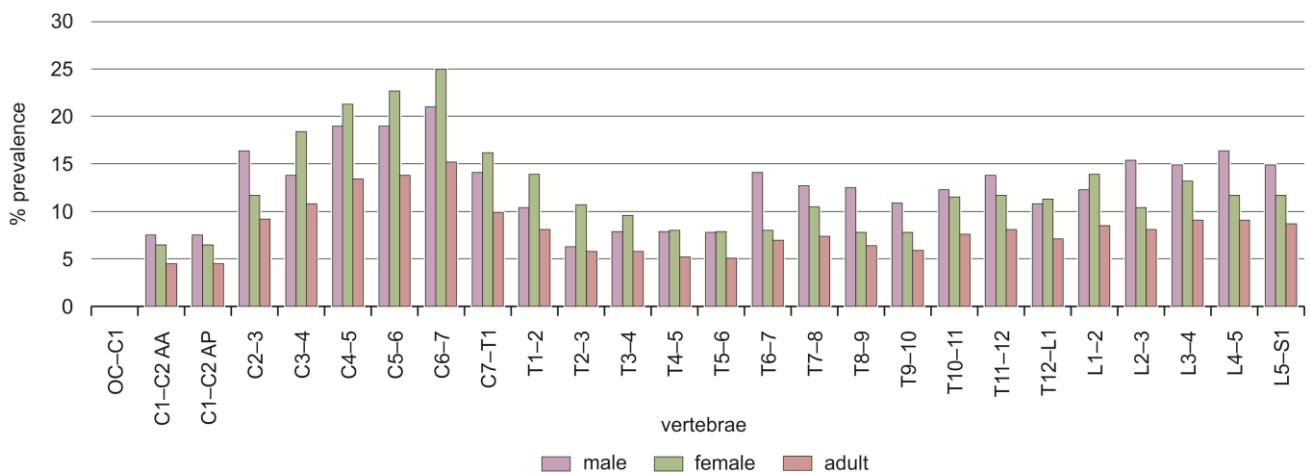


Fig 116. True prevalence of intervertebral disc disease by vertebral joint in adults, males and females

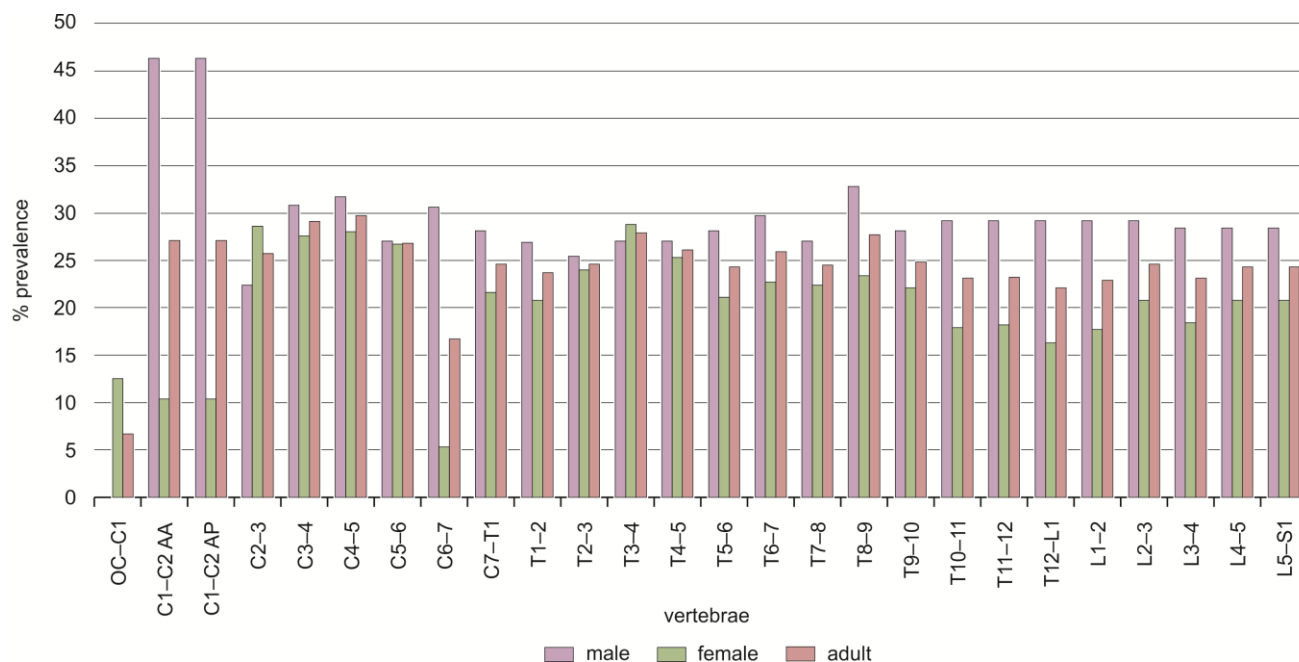


Fig 117. True prevalence of osteoarthritis by vertebral joint in adults, males and females

Table 80. Crude prevalence of primary extra-spinal osteoarthritis (n = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	Osteoarthritis	%	n	Osteoarthritis	%	n	Osteoarthritis	%	n	Osteoarthritis	%	n	Osteoarthritis	%
all subadults	86	0	-	0	0	-	0	0	-	0	0	-	86	0	-
18-25	0	0	-	11	0	-	20	1	5.0	31	1	3.2	31	1	3.2
26-35	0	0	-	17	1	5.9	24	1	4.2	41	2	4.9	41	2	4.9
36-45	0	0	-	15	2	13.3	14	0	-	29	2	6.9	29	2	6.9
≥46	0	0	-	23	13	56.5	23	9	39.1	46	22	47.8	46	22	47.8
Adult	0	0	-	3	0	-	0	0	-	5	1	20.0	5	1	20.0
Total	86	0	-	69	16	23.2	81	11	13.6	152	28	18.4	238	28	11.8

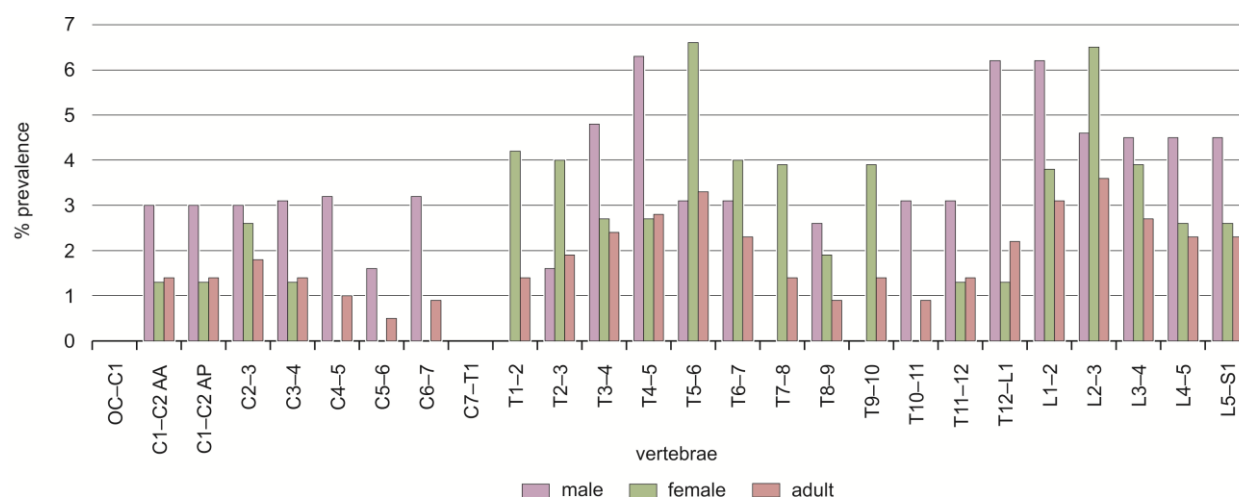


Fig 118. True prevalence of fusion by vertebral joint in adults, males and females

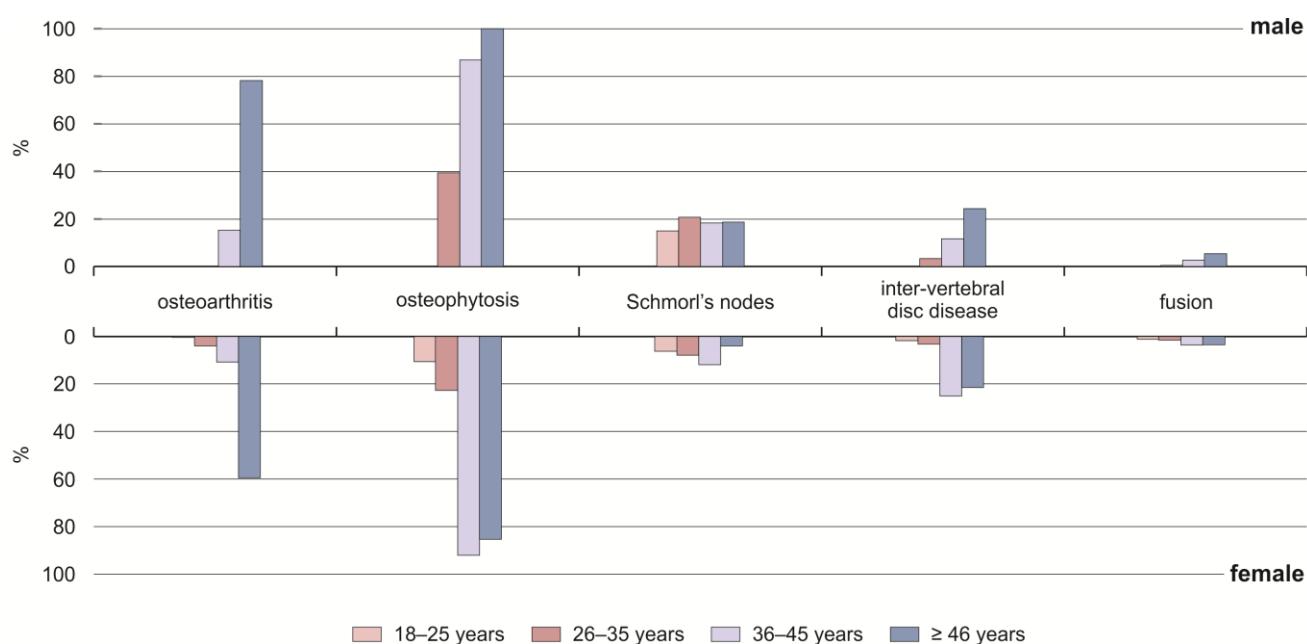


Fig 119. True prevalence of spinal joint disease by age and sex

with similar numbers of males (26/69: 37.7%) and females (27/81: 33.3%) affected. This involved 8% (441/3672) of adult vertebrae with the highest distribution in the cervical (neck) vertebrae (Fig 116).

Similar true prevalence rates were recorded at West Butt's Street, Poole (11%: 152/1409) (McKinley 2008, 81). Lower rates were recorded at Bow Baptist (4.7%: 247/4779) (Henderson *et al* 2013, 169), at Wakefield Street (5.9%:18/304) (Henderson 2012, 13), at Glasshouse Yard (3%: 5/167) (Henderson 2009, 16) and at All Saints Way, West Bromwich (4.5%:12/266) (Daly 2012, 10–1).

OSTEOARTHRITIS

Degeneration of the synovial joints at the posterior apophyseal facets and transverse process of the vertebrae may result in osteoarthritis (Rogers 2000, 166). Eburnation occurs when the articular cartilage of a joint has disappeared resulting in polishing of the joint surface through bone-on-bone contact and is considered pathognomonic of osteoarthritis in the apophyseal joints was (Rogers & Waldron 1995, 13; Burt *et al* 2013, 8–10).

Spinal osteoarthritis affected 22.4% of adults (34/152) with a higher frequency amongst females (20/81: 24.7%) compared to males (14/69: 20.3%). True prevalence also demonstrated a relatively even rate between males (484/1688: 28.7%) and females (405/1984:0.4%) with 24.2% of observable vertebral joints affected (889/3672). All levels of the spinal column were affected with the highest frequency recorded in the cervical spine and in particular the first and second cervical vertebrae of males (Fig 117).

Lower true prevalence rates were recorded at West Butt's Street, Poole (8%: 117/1409), (McKinley 2008, 81), at Bow Baptist (10.4%: 495/4779) (Henderson

et al 2013, 169), at Wakefield Street (7.9%: 24/304) (Henderson 2012, 13) and at Glasshouse Yard (10.2%: 35/167) (Henderson 2009, 16).

FUSION

Extensive new marginal bone growth and the degeneration of synovial joints between contiguous vertebrae may result in the localised fusion of one or more spinal segments preventing movement (Roberts & Manchester 2005, 14). Fusion between vertebrae affected 13.8% of adults (12/152), 17.4% of males (12/69) and 11.1% of females (9/81). This occurred in 1.7% of vertebrae (97/3672). Fusion was distributed throughout the spine with a particularly high rate on the third to sixth thoracic vertebrae and the eleventh thoracic vertebra to the third lumbar vertebra (Fig 118).

Similar true prevalence rates of fusion were observed at Bow Baptist (0.8%:37/4779) (Henderson *et al* 2013, 169) and at Wakefield Street (0.3%: 1/304) (Henderson 2012, 13).

AGE RELATED CHANGES

In the absence of other pathological abnormalities in the skeleton the occurrence of spinal joint disease in the skeleton likely represents a normal accompaniment to ageing (Rogers & Waldron 1995, 25).

All adult spinal joint disease showed an overall increased prevalence with advancing age, with the exception of female osteophytotic and intervertebral disc disease which was higher in the 36–45 year age category and male Schmorl's nodes which were higher in the 26–35 year age category. This correlation continued when the sexes were separated with the highest prevalence of joint disease recorded in the oldest age category (Fig 119).

Table 81. True prevalence of extra-spinal osteoarthritis by adult joint

Joint	Side	Male			Female			Adult			Total		
		No. observed	Osteoarthritis	%	No. observed	Osteoarthritis	%	No. observed	Osteoarthritis	%	No. observed	Osteoarthritis	%
Acromioclavicular	left	63	0	-	71	1	1.4	134	1	0.7	158	1	0.6
	right	64	0	-	72	1	1.4	136	1	0.7	160	1	0.6
	total	127	0	-	143	2	1.4	270	2	0.7	318	2	0.6
Coxal	left	67	6	9.0	79	2	2.5	146	8	5.5	181	8	4.4
	right	68	4	5.9	80	0	-	148	4	2.7	187	4	2.1
	total	135	10	7.4	159	2	1.3	294	12	4.1	368	12	3.3
Distal radioulnar	left	62	1	1.6	70	1	1.4	132	2	1.5	141	2	1.4
	right	61	2	3.3	70	2	2.9	131	4	3.1	141	4	2.8
	total	123	3	2.4	140	3	2.1	263	6	2.3	282	6	2.1
Femoropatellar	left	62	2	3.2	75	5	6.7	138	7	5.1	173	7	4.0
	right	63	3	4.8	78	4	5.1	143	8	5.6	179	8	4.5
	total	125	5	4.0	153	9	5.9	281	15	5.3	352	15	4.3
Lateral femorotibial	left	61	3	4.9	76	0	-	138	3	2.2	174	3	1.7
	right	63	4	6.3	77	0	-	141	4	2.8	180	4	2.2
	total	124	7	5.6	153	0	-	279	7	2.5	354	7	2.0
Medial femorotibial	left	61	2	3.3	76	0	-	138	2	1.4	174	2	1.1
	right	63	4	6.3	78	0	-	142	4	2.8	181	4	2.2
	total	124	6	4.8	154	0	-	280	6	2.1	355	6	1.7
Glenohumeral	left	66	0	-	75	0	-	141	0	0.0	165	0	-
	right	65	2	3.1	76	0	-	141	2	1.4	176	2	1.1
	total	131	2	1.5	151	0	-	282	2	0.7	341	2	0.6
Humeroradial	left	64	3	4.7	76	0	-	140	3	2.1	151	3	2.0
	right	64	4	6.3	76	0	-	140	4	2.9	152	4	2.6
	total	128	7	5.5	152	0	-	280	7	2.5	303	7	2.3
Humeroulnar	left	64	3	4.7	78	0	-	142	3	2.1	154	3	1.9
	right	64	3	4.7	77	0	-	141	3	2.1	153	3	2.0
	total	128	6	4.7	155	0	-	283	6	2.1	307	6	2.0
Proximal tibiofibular	left	59	2	3.4	72	0	-	138	2	1.4	159	2	1.3
	right	60	2	3.3	75	0	-	136	2	1.5	164	2	1.2
	total	119	4	3.4	147	0	-	275	4	1.5	323	4	1.2
Radiocarpal (for lunate)	left	60	0	-	69	1	1.4	129	1	0.8	141	1	0.7
	right	58	0	-	69	1	1.4	127	1	0.8	141	1	0.7
	total	118	0	-	138	2	1.4	256	2	0.8	282	2	0.7
Radiocarpal (for scaphoid)	left	60	0	-	69	1	1.4	129	1	0.8	142	1	0.7
	right	58	0	-	69	1	1.4	127	1	0.8	142	1	0.7
	total	118	0	-	138	2	1.4	256	2	0.8	284	2	0.7
Talocrural	left	59	1	1.7	72	0	-	132	1	-	118	1	0.8
	right	59	1	1.7	73	0	-	133	1	-	133	1	0.8
	total	118	2	1.7	145	0	-	265	2	-	251	2	0.8
Temporomandibular	right	68	0	-	78	2	2.6	146	2	1.4	185	2	1.1
	total	136	0	-	155	2	1.3	291	2	0.7	368	2	0.5

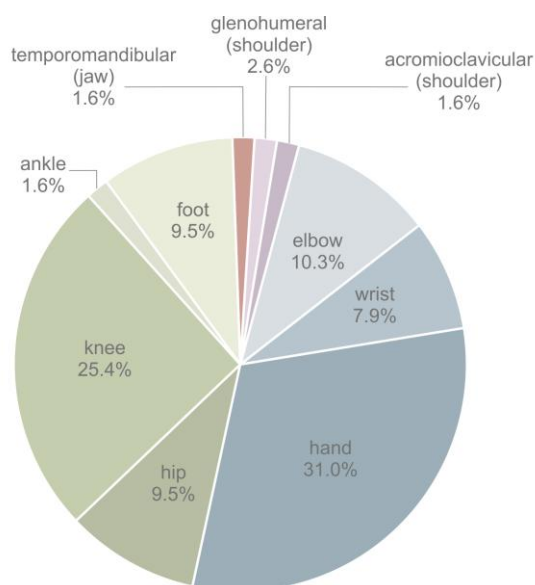


Fig 120. True prevalence of extra-spinal osteoarthritis by joint

Extra-Spinal Joint Disease

OSTEOARTHRITIS

Osteoarthritis affects the synovial joints where there is a loss of the articular cartilage and remodelling of the surrounding bone tissue (Rogers & Waldron 1995, 32). The prevalence of the disease has a correlation with advancing age but wide variations in joint involvement may also relate to various activities and occupations (*ibid.*, 32–3). Alterations of the mechanics of a joint through injury or activity, advancing age and a systemic and genetic predisposition are all likely factors in the development of the disease (Roberts & Manchester 2005, 33; Burt *et al* 2013, 13–9).

Osteoarthritis at extra-spinal joint locations affected 11.8% (28/238) of individuals: 18.4% (28/152) of adults, 23.2% (16/69) of males and 13.6% (11/81) of females. Crude prevalence rates showed as increase with advancing age for both males and females with just under a half of adults (22/46: 47.8%): 56.5% (13/23) of males and 39.1% (9/23) of females aged ≥ 46 years showing at least one osteoarthritic joint (Table 80). Joint disease secondary to fracture affected one adult male (1/69: 1.4%), context [180], an older adult male who suffered a fracture to the lateral side of the right knee with associated osteoarthritis.

When true prevalence rates were calculated for each observable adult joint, the greatest frequency of osteoarthritis was recorded in the knee (femoropatellar joint) (15/352: 4.3%) with a higher rate in the right side (8/179: 4.5%) compared to the left (7/173: 4%). When the sexes were separated, males demonstrated the highest prevalence in the left hip (coxal joint) (6/67: 9%), right knee (medial femorotibial) (4/63: 6.3%) (lateral femorotibial) (4/63: 6.3%), and right elbow (humero-radial) (4/64: 6.3%). Females had the highest rate in the left knee (femoropatellar) (5/75: 6.7%), followed by the right knee (femoropatellar) (4/78: 5.1%), and the right elbow (distal radioulnar) (2/70: 2.9%) (Table 81). When the true prevalence of all extra-

spinal joint osteoarthritis was shown by proportions of the body (as outlined by Rogers & Waldron 1995), the small joints of the hand displayed the highest prevalence (39/126: 31%) followed by the knee (32/126: 25.4%) and elbow (13/126: 10.3%) (Fig 120).

At West Butt's Street, Poole, the most commonly affected joint for extra spinal joint disease were the hip, temporomandibular joint, the shoulder and the elbow (McKinley 2008, 83). Slightly lower crude prevalence rates were recorded at Bow Baptist (11.3%: 47/416) (Henderson *et al* 2013, 175). Higher crude prevalence rates were recorded at Littlemore, Oxford (60%: 9/15) (McCarthy *et al* 2011, 47–48).

SERONEGATIVE SPONDYLOARTHRITIS

Older adult male [225] had osseous bridging at the joint margins of the right foot, leading to ankylosis of the cuneiforms and tarsals and the first to the third metatarsals. Osteoarthritis was also present at the joints between the third and fourth metatarsals and the posterior facet of the talus (Fig 14). There was also fusion between the seventh to the ninth thoracic vertebrae with large osteophytes formed along the right lateral and some anterior aspects of most of the thoracic vertebrae. Osteoarthritis also affected the apophyseal joints. The distribution of the lesions suggests a seronegative spondyloarthropathy. Reiter's syndrome has an asymmetric distribution pattern in the lower limbs and extremities with marginal erosions showing a preference for the small joints of the foot, calcaneus, ankle and knee. Periosteal new bone may also develop on the shafts of the metacarpals, metatarsals, phalanges and tibiae (Rogers & Waldron 1995, 75). Psoriatic arthropathy also favours the small joint of the hands and feet and in both conditions ankylosis may occur but is more common in psoriatic arthropathy (*ibid.*, 75).

EROSIVE ARTHROPATHIES

Three adult females (3/81: 3.7% of females) displayed erosive lesions into articular joint surfaces that were characteristic of gout. This is caused by an inflammatory response to the build-up of urate crystals in the joints and has been associated with obesity, excessive alcohol intake, renal impairment and hypertension (Rogers 2000, 172). Acute attacks may last up to three weeks and the joints may become severely painful, swollen, often red and impossible to move (Duckworth 1995, 319). The first metatarsophalangeal joint is affected in up to 90% of individuals although other sites including the hand, wrist, elbow, knee and ankle may be involved (Rogers & Waldron 1995, 78).

RHEUMATOID ARTHRITIS

Four individuals (4/238: 1.7%, 3/152: 1.9% of adults, 1/69: 1.4% of males, 2/81: 2.5% of females and 1/86: 1.2% of subadults) displayed skeletal changes consistent with rheumatoid arthritis. An adult female [703], aged 36–45 years displayed fusion, erosive lesions, and eburnation on the right apophyseal facets of all of the

Table 82 Crude prevalence of rotator cuff disease (n = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	Rotator cuff disease	%	n	Rotator cuff disease	%	n	Rotator cuff disease	%	n	Rotator cuff disease	%	n	Rotator cuff disease	%
all subadults	86	0	-	0	0	-	0	0	-	0	0	-	86	0	-
18-25	0	0	-	11	0	-	20	0	-	31	0	-	31	0	-
26-35	0	0	-	17	0	-	24	0	-	41	0	-	41	0	-
36-45	0	0	-	15	1	6.7	14	2	14.3	29	3	10.3	29	3	10.3
≥46	0	0	-	23	5	21.7	23	3	13.0	46	8	17.4	46	8	17.4
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	0	-	69	6	8.7	81	5	6.2	152	11	7.2	238	11	4.6



Fig 121. Posterior view of the hands of adult female [703], showing possible rheumatoid arthritis to both wrists (scale 1:2)

cervical vertebrae and right occipital facet. The atlas and axis had fused at the apophyseal facets. The entire joint surfaces of both distal radii were destroyed with erosive lesions and small areas eburnation. The distal ulnae had erosive lesions resulting in destruction of the entire joint surface. The carpal bones were almost unrecognisable with severe destructive, lytic lesions

affecting the internal structures. The right trapezium had fused to the right first metacarpal and both capitate and scaphoid had fused together with eburnation on the remaining patches of joint surfaces. Erosive lesions were also present on the metacarpophalangeal and proximal interphalangeal joint surfaces (Fig 121).

ROTATOR CUFF DISEASE

Eleven adults (11/152: 7.2, 6/69: 8.7% of males and 5/81: 6.2% of females) displayed bone changes at the muscle and tendon attachment points of the shoulder characteristic of rotator cuff disease, a degenerative condition that increases with age (Rogers & Waldron disease were 1.2% (5/416) and 2.3% of adults (5/214) (Henderson *et al* 2013, 180).

DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS (DISH)

Seven individuals displayed bone changes diagnostic of diffuse idiopathic skeletal hyperostosis (DISH) (7/238: 2.9%, 7/152: 4.6% of adults, 6/69: 8.7% of males and 1/81: 1.2% of females). DISH is characterised by an over-growth of osteophytes at the margins of the vertebral bodies resembling dripping candle wax and resulting from fusion of the anterior longitudinal ligament along the right side of the spine. Diagnosis is dependent on the fusion of at least four adjacent vertebrae with the facet joints not normally involved and the intervertebral disc spaces maintained (Rogers 2000, 170–1). Extra spinal enthesopathies at tendon and ligament insertions may also occur as well as at joints and other sites around the body (Rogers & Waldron 1995, 48–51). The disease is more common in males and is rarely detected before the age of 40 years (Aufderheide & Rodríguez-Martín 1998, 97). The condition may cause pain, stiffness and restricted motion (Resnick 2002). Its specific cause is unknown, but it has been related to a rich diet and a lack of exercise, which predisposes people to obesity and late-onset diabetes (Roberts & Manchester 2005, 161).

Francis Augustus Cox [650], aged 70 years, displayed para-articular ossifications at the anterior longitudinal ligament on the right lateral aspect of the thoracic centra. These resembled 'dripping candlewax' and had resulted in the fusion of the seventh to the eleventh 1995, 40) (Table 82). This can lead to pain, stiffness and weakening in the shoulder (Resnick 2002, 2087). At Bow Baptist, the crude prevalence rates of rotator cuff thoracic vertebrae, with the intervertebral joint spaces

being spared (Fig 10). There is also substantial enthesophyte formation on the iliac crests, the dens of second cervical vertebra, and the superior surfaces of both patellae. There was also evidence of the initial stages of ankylosis at the sacro-iliac joint.

At Coach Lane, North Shields, DISH was observed in 2.4% of individuals (2/82) (Proctor *et al* 2016, 61). At Bow Baptist, the crude prevalence rates of DISH were 1.4% (6/416): five males (/86: 5.8%) and one female (Henderson *et al* 2013, 174–175).

Metabolic Disease

Rickets

Thirty-six individuals (/238: 15.1%) displayed evidence of bone changes consistent with a diagnosis of vitamin D deficiency rickets. Vitamin D deficiency results from a lack of exposure to sunlight or dietary sources of the vitamin which is integral to bone strength and a deficiency in it results in bones that bow when bearing weight (Mays *et al* 2009). It is a disease of early childhood but does not directly result in death, although it can cause an increased susceptibility to infections and other illnesses. In particular, rickets can lead to increased respiratory and gastrointestinal infections and therefore may cause an increased mortality risk (Brickley & Ives 2008, 113). This affected 23.3% of subadults (20/86) and 10.5% of adults (16/152) (Table 83).

There was a peak in frequency in infants aged seven to 11 months (2/6: 33.3%). Of the subadults affected,

18 (/20: 90%) had died while the disease was still active. The high rate of healed or resolved bone changes seen in the subadult and adult population may indicate that those buried at Mare Street were more likely to have weathered the illness, the deformities observed in adult lower limbs incurred during childhood remained in adulthood. Higher crude prevalence rates of subadult rickets were recorded at Mare Street than at Bow Baptist (13.9% of subadults: 28/202) (Henderson *et al* 2013, 201) and at All Saints Way, West Bromwich (15%: 3/20) (Daly 2012, 13).

Scurvy

The crude prevalence rate of vitamin C deficiency (scurvy) was 2.9% (7/238). Scurvy is the consequence of an inadequate intake of vitamin C (ascorbic acid). The osseous changes predominantly involve vascular responses to haemorrhages, usually appearing as a result of minor trauma and mechanical strains, which results in porotic and hypertrophic bone formation at the affected areas (Geber & Murphy 2012). Four subadults were affected (/86: 4.7%) and three adults (/152: 2%), two males (/69: 2.9%) and one female (/81: 1.2%) (Table 84).

Adult female [189], an adult female aged 36–45 years, had bone changes that may indicate scurvy in adulthood. The surface superior to the sphenoid pterygoid process of the skull had a large area of very fine porosity and new grey-coloured bone formation (Fig 122). This was also observed in both the orbits with

Table 83. Crude prevalence of scurvy (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	Scurvy	%	n	Scurvy	%	n	Scurvy	%	n	Scurvy	%	n	Scurvy	%
Perinatal	4	1	25.0	0	0	-	0	0	-	0	0	-	4	1	25.0
1–6 months	8	1	12.5	0	0	-	0	0	-	0	0	-	8	1	12.5
7–11 months	6	2	33.3	0	0	-	0	0	-	0	0	-	6	2	33.3
1–5	36	0	-	0	0	-	0	0	-	0	0	-	36	0	-
6–11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12–17	14	0	-	0	0	-	0	0	-	0	0	-	14	0	-
18–25	0	0	-	11	1	9.1	20	0	-	31	1	3.2	31	1	3.2
26–35	0	0	-	17	0	-	24	1	4.2	41	1	2.4	41	1	2.4
36–45	0	0	-	15	0	-	14	0	-	29	0	-	29	0	-
≥46	0	0	-	23	1	4.3	23	0	-	46	1	2.2	46	1	2.2
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	4	4.7	69	2	2.9	81	1	1.2	152	3	2.0	238	7	2.9

Table 84. Crude prevalence of rickets (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	Rickets	%	n	Rickets	%	n	Rickets	%	n	Rickets	%	n	Rickets	%
Perinatal	4	1	25.0	0	0	-	0	0	-	0	0	-	4	1	25.0
1–6 months	8	2	25.0	0	0	-	0	0	-	0	0	-	8	2	25.0
7–11 months	6	2	33.3	0	0	-	0	0	-	0	0	-	6	2	33.3
1–5	36	10	27.8	0	0	-	0	0	-	0	0	-	36	10	27.8
6–11	18	4	22.2	0	0	-	0	0	-	0	0	-	18	4	22.2
12–17	14	1	7.1	0	0	-	0	0	-	0	0	-	14	1	7.1
18–25	0	0	-	11	0	-	20	2	10.0	31	2	6.5	31	2	6.5
26–35	0	0	-	17	3	17.6	24	2	8.3	41	5	12.2	41	5	12.2
36–45	0	0	-	15	2	13.3	14	1	7.1	29	3	10.3	29	3	10.3
≥46	0	0	-	23	2	8.7	23	3	13.0	46	5	10.9	46	5	10.9
Adult	0	0	-	3	1	33.3	0	0	-	5	1	20.0	5	1	20.0
Total	86	20	23.3	69	8	11.6	81	8	9.9	152	16	10.5	238	36	15.1



Fig 122. Left lateral view of the cranium of adult female [189], showing increased porosity to the left sphenoid (arrowed) (scale 1:2)

Table 85. Crude prevalence of circulatory disease (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			All		
	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1-5	36	1	2.8	0	0	-	0	0	-	0	0	-	36	1	2.8
6-11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12-17	14	3	21.4	0	0	-	0	0	-	0	0	-	14	3	21.4
18-25	0	0	-	11	1	9.1	20	1	5.0	31	2	6.5	31	2	6.5
26-35	0	0	-	17	3	17.6	24	3	12.5	41	6	14.6	41	6	14.6
36-45	0	0	-	15	1	6.7	14	0	-	29	1	3.4	29	1	3.4
>46	0	0	-	23	2	8.7	23	2	8.7	46	4	8.7	46	4	8.7
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	4	4.7	69	7	10.1	81	6	7.4	152	13	8.6	238	17	7.1

Table 86 Crude prevalence of selected circulatory diseases (*n* = number of individuals)

Pathology	Subadult (<i>n</i> =86)		Male (<i>n</i> =69)		Female (<i>n</i> =81)		Adult (<i>n</i> =152)		All (<i>n</i> =238)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
Osteochondroses	1	1.2	0	-	0	-	0	-	1	0.4
Osteonecroses	1	1.2	0	-	0	-	0	-	1	0.4
Osteochondritis dissecans	1	1.2	6	8.7	4	4.9	10	6.6	11	4.6
Osgood-Schlatter's disease	0	-	0	-	1	1.2	1	0.7	2	0.8
Scheuermann's disease	1	1.2	1	1.4	1	1.2	2	1.3	3	1.3

scattered porosity. A plaque of greyish active new bone was also present on the right iliac blade.

Higher crude prevalence rates of subadult scurvy were recorded at Priory Yard, Norwich (22.7%: 5/24) (Caffell & Clarke 2011, 258) and at Bow Baptist (6.9%: 14/202) (Henderson et al 2013, 205).

Osteoporosis

Four individuals have skeletal changes indicative of osteoporosis (/238: 1.7%, 2.6% of adults 4/152, 3.7% of

females 3/81 and 1.4% of males 1/69). Osteoporosis occurs when there is a loss of mineral from bone mainly in the form of calcium as well as architectural loss of normal bone structure. Osteoporosis results in loss of bone strength, thus making bone more fragile and easily susceptible to fracture (Ortner 2003).

Circulatory Disease

Evidence of circulatory disease was observed in 17 individuals (/238: 7.1%), these included subadults

(4/86:4.7%) and adults (13/152: 8.6%) (Table 85). Males had slightly higher rates of circulatory disease than females. Of the circulatory diseases observed, osteochondritis dissecans was observed most frequently (Table 86).

Osteochondroses

Susanna Martin [534], aged 19 years, had bilateral erosive lesions on the anterior surface of the anterior femoral necks with smooth, rounded edges and exposed trabecular bone. Pathologic synovial processes in the hip joint can cause characteristic erosions of the femoral neck, which in extreme cases produce an ‘apple core’ appearance. This is characteristic of synovial osteochondromatosis (Resnick 2002, 4203).

Osteonecroses

Emily Smith [212], aged 18 months, had myositis ossificans traumatica to the proximal shaft of the left femur and abnormal porosity along the neck of the left femoral head. The whole neck displayed lytic activity that had penetrated into the remodelled trabecular bone structure. This is possibly related to trauma (‘Soft tissue trauma’, above).

Osteochondritis Dissecans

Osteochondritis dissecans involves the fragmentation of cartilage and subchondral bone within a joint, often as a result of trauma occurring in adolescence. It is more frequently observed in males (Ortner 2003, 351). Eleven individuals (/238: 4.6%) displayed evidence of bone changes consistent with osteochondritis dissecans. This affected 1.2% of subadults (1/86) and 6.6% of adults (10/152) (Table 87).

Osgood-Schlatter’s Disease

Avulsion of the patellar tendon from the tibial tuberosity can cause Osgood-Schlatter’s disease, resulting in the formation of bony extensions and inflammation at the tibial tuberosity. This disease occurs in younger active individuals and is sustained into adulthood with a greater prevalence in males than females (Weiler *et al* 2011). Adult female [374], aged 25–36 years, displayed bilateral vertical extensions with a thickened, irregular surface on the tibial tuberosities, possibly due to avulsion fractures of the tuberosity epiphyses.

Table 87. Crude prevalence of osteochondritis dissecans (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			All		
	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1–6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7–11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1–5	36	0	-	0	0	-	0	0	-	0	0	-	36	0	-
6–11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12–17	14	1	7.1	0	0	-	0	0	-	0	0	-	14	1	7.1
18–25	0	0	-	11	1	9.1	20	0	-	31	1	3.2	31	4	12.9
26–35	0	0	-	17	2	11.8	24	2	8.3	41	4	9.8	41	4	9.8
36–45	0	0	-	15	1	6.7	14	0	-	29	1	3.4	29	4	13.8
>46	0	0	-	23	2	8.7	23	2	8.7	46	4	8.7	46	4	8.7
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	1	1.2	69	6	8.7	81	4	4.9	152	10	6.6	238	11	4.6

Table 88. Crude prevalence Scheuermann’s disease (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			All		
	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1–6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7–11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1–5	36	0	-	0	0	-	0	0	-	0	0	-	36	0	-
6–11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12–17	14	1	7.1	0	0	-	0	0	-	0	0	-	14	1	7.1
18–25	0	0	-	11	0	-	20	1	5.0	31	1	3.2	31	1	3.2
26–35	0	0	-	17	1	5.9	24	0	-	41	1	2.4	41	1	2.4
36–45	0	0	-	15	0	-	14	0	-	29	0	-	29	0	-
>46	0	0	-	23	0	-	23	0	-	46	0	-	46	0	-
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	1	1.2	69	1	1.4	81	1	1.2	152	2	1.3	238	3	1.3

Scheuermann's Disease

Scheuermann's disease, also known as Juvenile Kyphosis occurs at a young age and predominantly in males. The disease causes anterior curvature of the thoracic spine due to the herniation of the disc cartilage into the adjacent vertebral bodies resulting in Schmorl's nodes and anterior narrowing of the affected vertebra (Ortner 2003, 463–4; Waldron 2009, 45). Three individuals were affected (Table 88).

Hypertrophic Osteoarthropathy

Hypertrophic osteoarthropathy is most commonly associated with an underlying largescale pathological process such as neoplastic disease or tuberculosis and presents as bilateral symmetrical periostitis at the diaphysis of the long bones. The periosteal reaction may vary but is often dense with thick new bone growth especially at the mid shafts (Ortner 2003, 354–5). Three individuals presented with changes that could be attributed to hypertrophic osteoarthropathy (/238: 1.3%), two subadults (/86: 2.3%) and one adult female (/81: 1.2%).

Neoplastic Disease

Neoplastic disease was observed in 19 individuals, 12.5% of adults (/152), nine females (/81: 11.1%) and ten males (/69: 6.9%) (Table 89). No subadults were affected. The distribution of those affected by neoplastic disease varied across age groupings, with more males affected in the older age categories and more females affected in young adulthood.

Table 89. Crude prevalence of neoplastic disease (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
all subadults	86	0	-	0	0	-	0	0	-	0	0	-	86	0	-
18–25	0	0	-	11	0	-	20	1	5.0	31	1	3.2	31	1	3.2
26–35	0	0	-	17	1	5.9	24	6	25.0	41	7	17.1	41	7	17.1
36–45	0	0	-	15	3	20.0	14	1	7.1	29	4	13.8	29	4	13.8
≥46	0	0	-	23	6	26.1	23	1	4.3	46	7	15.2	46	7	15.2
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	0	-	69	10	14.5	81	9	11.1	152	19	12.5	238	19	8.0

Table 90. Crude prevalence of osteoma (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	Osteoma	%	n	Osteoma	%	n	Osteoma	%	n	Osteoma	%	n	Osteoma	%
all subadults	86	0	-	0	0	-	0	0	-	0	0	-	86	0	-
18–25	0	0	-	11	0	-	20	1	5.0	31	1	3.2	31	1	3.2
26–35	0	0	-	17	1	5.9	24	4	16.7	41	5	12.2	41	5	12.2
36–45	0	0	-	15	6	40.0	14	0	-	29	1	3.4	29	1	3.4
≥46	0	0	-	23	0	-	23	2	8.7	46	6	13.0	46	6	13.0
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	0	-	69	7	10.1	81	7	8.6	152	14	9.2	238	14	5.9

Osteomas

The most commonly encountered neoplasms were button osteomas; benign tumours of dense lamellar bone, located on the surface of the ectocranium (Ortner 2003, 506). Fourteen adults were affected (Table 90).

Osteochondroma

Osteochondromas are solitary benign tumours of cartilaginous ossified tissue which project of the surface of the bone. There is no sex predilection (Ortner 2003, 508–9; Waldron 2009, 175). Context [140], an adult female aged 25–36 years, had a possible osteochondroma on the midshaft of the right tibia and there is swelling along the anterior portion (Fig 123).

Bone Cysts

A bone cyst is a benign fluid filled cavity which forms within a bone; they included unicameral bone cysts and aneurysmal bone cysts. Older adult male [284] had two possible bony cysts in the mouth, one located at the socket of the right mandibular third molar and the other at the socket of the left maxillary third molar. These lesions comprised sub-circular depressions associated with proliferative spiculated and healed new bone formation. The bone on the maxilla had a bulbous 'cauliflower-like' appearance. Radiography suggests these cysts may have had a dental infection origin (Fig 124). This individual had also undergone a thoracotomy (above, 'Surgical intervention').

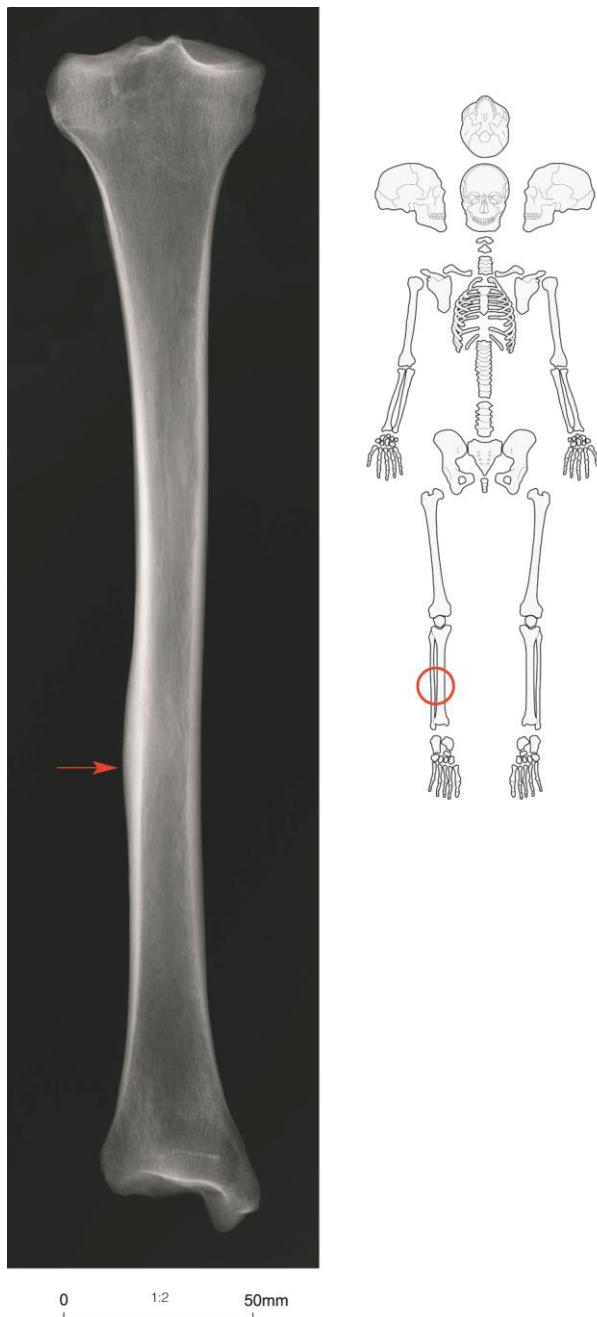


Fig 123. X-ray of the right tibia of adult female [140], showing possible osteochondroma visible (arrowed) (scale 1:2)

Metastatic Carcinoma (Osteoblastic)

Clinically metastatic bone tumours are the fastest spreading form of bone tumours; of these metastatic carcinomas are most prevalent with cancerous cells spreading through the blood to the bone. Adult male [150], aged 35–45 years, displayed extensive osteoblastic anosteoclastic lesions at the medial clavicles, manubrium, sternum, left and right ribs, vertebrae, ilia, sacrum, and both scapulae. Lesions were also present in the mandible, left and right frontal bones, sphenoid, and the temporal bones. The distribution and type of these bone changes suggests an aggressive metastatic carcinoma (Fig 125).

The largely osteoblastic changes (with some localised lytic foci in the vertebral bodies with associated pathologic fractures) suggests the rapid progression of a disease process, possibly from the spread of a metastatic carcinoma which arose possibly in the thyroid or the lungs. Metastatic bone tumours occur at particularly high rates in cancers of the breast, prostate, lung, and kidney, accounting for 75% of all patients (Sugiura *et al* 2008, 729).

Lung cancer is the third most common form of cancer to spread to bone. About 30–40% of patients with lung cancer develop bone metastases during the course of their disease; the median survival time of patients with this secondary lesion is seven months. Sites with high incidence include the rib, vertebra, and pelvis, where there is a high concentration of red marrow (Coleman 2006, 6243).

Bone metastases represent a frequent complication of thyroid cancer and severely reduce the quality of life, causing pain, fractures, and spinal cord compression (Muresan *et al* 2008, 37). One retrospective study observed that spinal cord compression occurs more frequently in thyroid cancer when compared with other bone-seeking cancers: 28% compared with prostate (10%) and breast cancers (8%) (Coleman 2006). The incidence of pathological fractures was 13%, and the incidence of both spinal cord compression and pathological fracture was 6%. (Bernier *et al* 2001).

Metastatic Carcinoma (Osteoclastic)

Charlotte Mean [118], aged 61 years, whose death certificate records cancer as the cause of death ('The Named Burials', above), displayed bone changes indicative of osteoclastic metastatic carcinoma. There were extensive predominantly osteoclastic changes in the torso (affecting medial left clavicle, fifth lumbar vertebrae, ilia, and sacrum). The left and right frontal and parietal bones of the cranium and both femora were also affected. There is a large sub-circular lesion (31.37mm x 32.78mm) that had a 'punched-out' appearance with a defined, scalloped edge. There is a smaller sub-circular lesion situated medial to the right temporal line, above the right orbit, with an ill-defined, moth-eaten edge. There are two further sub-circular, over-lapping lesions, situated along the sagittal suture along both parietals. The distribution and type of lesions suggested an aggressive (osteoclastic) metastatic carcinoma (Fig 15).

The tendency of these cancers to metastasise to bone is determined by the anatomical distribution of the blood vessels, the genetic profile of the cancer cells and the biological characteristics of the bone microenvironment that favour the growth of metastatic cells of certain cancers (Feller *et al* 2011, 1). The distribution of skeletal metastases roughly mirrors the distribution of red-marrow, reflecting increased blood flow in red-marrow compared to yellow-marrow. Thus metastases are usually observed in the spine, particularly the posterior vertebral body, extending into pedicles, the pelvis, the proximal femur, the proximal humerus and the skull.

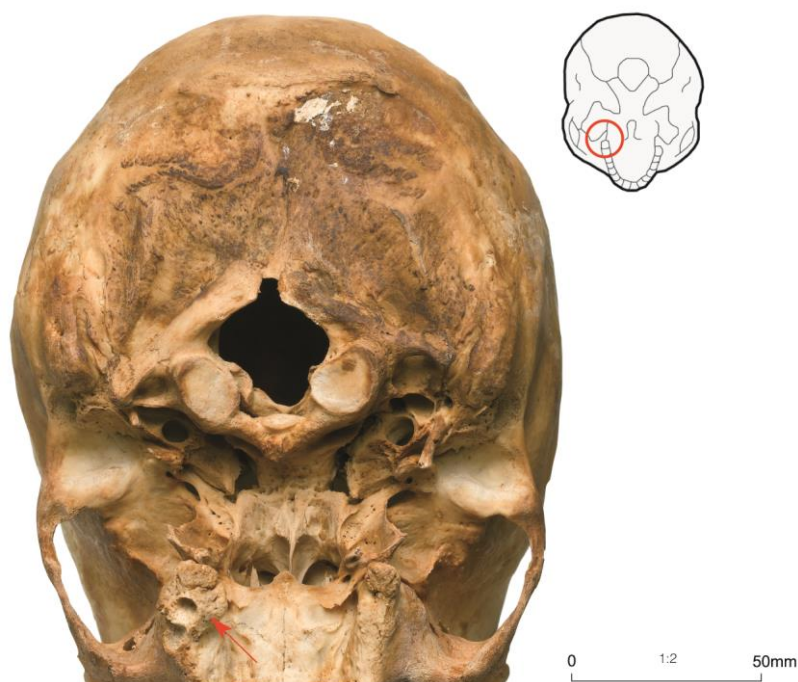


Fig 124. Inferior view of the cranium of adult male [284], with possible bone cyst at the left maxilla (arrowed) (scale 1:2)

Table 91. Crude prevalence of cribra orbitalia (n = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Perinatal	4	1	25.0	0	0	-	0	0	-	0	0	-	4	1	25.0
1-6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7-11 months	6	4	66.7	0	0	-	0	0	-	0	0	-	6	4	66.7
1-5	36	11	30.6	0	0	-	0	0	-	0	0	-	36	11	30.6
6-11	18	6	33.3	0	0	-	0	0	-	0	0	-	18	6	33.3
12-17	14	7	50.0	0	0	-	0	0	-	0	0	-	14	7	50.0
18-25	0	0	-	11	1	9.1	20	3	15.0	31	4	12.9	31	4	12.9
26-35	0	0	-	17	2	11.8	24	2	8.3	41	4	9.8	41	4	9.8
36-45	0	0	-	15	0	-	14	2	14.3	29	2	6.9	29	2	6.9
≥46	0	0	-	23	1	4.3	23	3	13.0	46	4	8.7	46	4	8.7
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	29	33.7	69	4	5.8	81	10	12.3	152	14	9.2	238	43	18.1

Table 92. True prevalence of cribra orbitalia by severity (grades 1-5; after Stuart-Macadam 1991) (n = number of orbits)

Severity	Subadult				Adult				All individuals			
	Left (n=82)		Right (n=83)		Left (n=148)		Right (n=149)		Left (n=230)		Right (n=232)	
	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%	No. affected	%
1	2	2.4	2	2.4	0	-	0	-	2	0.9	2	0.9
2	13	15.9	14	16.9	6	4.1	4	2.7	19	8.3	18	7.8
3	6	7.3	7	8.4	5	3.4	3	2.0	11	4.8	10	4.3
4	3	3.7	2	2.4	5	3.4	5	3.4	8	3.5	7	3.0
5	2	2.4	2	2.4	0	-	0	-	2	0.9	2	0.9
Total	26	31.7	27	32.5	16	10.8	12	8.1	42	18.3	39	16.8

Skeletal metastases account for 70% of all malignant bone tumours and are seen in a vast number of primary cancers, although lung cancer, breast cancer, renal cell carcinoma and prostate cancer account for approximately 80% of all skeletal metastases. Purely osteolytic lesions such as those seen in this individual typically arise from carcinoma of the thyroid, kidney, adrenal gland, uterus and gastrointestinal tract (Resnick 2002, 4284). This individual displayed evidence for both

well-circumscribed and poorly defined lesions but with the primary focus at the left frontal and left hip joint (largest lesions) but with a diffuse spread throughout the cranial and post-cranial skeleton.

Other Pathological Conditions

Cribra Orbitalia

Cribra orbitalia represents a non-specific indicator of disease that manifests itself as porous lesions into the orbital roofs of the skull. This may indicate a response to iron deficiency anaemia or an adaptive response to increased pathogen loads (Stuart-Macadam 1992).

The crude prevalence of cribra orbitalia where one or both orbits were affected was 18.1% (43/238). This affected 9.2% of adults (14/152) and 33.7% of subadults (29/86). There was a higher prevalence amongst females (10/81: 12.3%) compared to males (4/69: 5.8%) (Table 91). Of the subadults affected the highest crude prevalence was recorded in the seven to 11 month age range (4/6: 66.7%). There was little variation between the adult age ranges.

The true prevalence of cribra orbitalia out of the number of observable right orbits was 16.8% (39/232) and for the left 18.3% (42/230). The majority of lesions were recorded as grade 2, comprising scattered fine foramina on the bone surface (Stuart-Macadam 1991; Table 92). A similar high crude prevalence rate of cribra orbitalia in subadults was recorded at Priory Yard, Norwich (31.3%: 5/16) (Caffell & Clarke 2011, 260)

and at Bow Baptist (29.7%: 60/202) (Henderson *et al* 2013, 199).

Porotic Hyperostosis

Pitted lesions to the outer surfaces of the cranial vault characteristic of porotic hyperostosis were identified in 5% of individuals (12/238). This included 6.6% of adults (10/152), 10.1% of males (7/69), 3.7% (3/81) of females and 2.3% of subadults (2/86) (Table 93). Crude prevalence rates showed a peak in the 12–17 years age category with 14.3% (2/14) of those showing lesions. Lesions were most commonly observed in the left and right parietal bones (true prevalence right: 10/232: 4.3%, left 11/232: 4.7%) (Table 94).

Endocranial Lesions

Inflammation and or haemorrhage of the meninges can lead to new bone formation on the internal bone surfaces of the cranial vault. These have been linked to trauma, infection and metabolic disease (Lewis 2004, 93). Thirteen individuals had endocranial lesions (/238: 5.5%). This affected 2% of adults (3/152), 1.4% of males (1/69), 2.5% of females (2/81) and 11.6% (10/86) of subadults. The highest frequencies occurred in infants aged 7–11 months (3/6: 50%) (Table 95).

Table 93. Crude prevalence of porotic hyperostosis (*n* = number of individuals)

Age (years)	Subadult			Male			Female			Adult			Total		
	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Perinatal	4	0	-	0	0	-	0	0	-	0	0	-	4	0	-
1–6 months	8	0	-	0	0	-	0	0	-	0	0	-	8	0	-
7–11 months	6	0	-	0	0	-	0	0	-	0	0	-	6	0	-
1–5	36	0	-	0	0	-	0	0	-	0	0	-	36	0	-
6–11	18	0	-	0	0	-	0	0	-	0	0	-	18	0	-
12–17	14	2	14.3	0	0	-	0	0	-	0	0	-	14	2	14.3
18–25	0	0	-	11	0	-	20	1	5.0	31	1	3.2	31	1	3.2
26–35	0	0	-	17	3	17.6	24	1	4.2	41	4	9.8	41	4	9.8
36–45	0	0	-	15	3	20.0	14	0	-	29	3	10.3	29	3	10.3
≥46	0	0	-	23	1	4.3	23	1	4.3	46	2	4.3	46	2	4.3
Adult	0	0	-	3	0	-	0	0	-	5	0	-	5	0	-
Total	86	2	2.3	69	7	10.1	81	3	3.7	152	10	6.6	238	12	5.0

Table 94. True prevalence of porotic hyperostosis (*n* = number of elements)

Element	Side	Subadult			Male			Female			Adult			Total		
		n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Frontal	right	83	0	-	69	4	5.8	80	0	-	149	4	2.7	232	4	1.7
	left	82	1	1.2	68	4	5.9	80	1	1.3	148	5	3.4	230	6	2.6
	total	165	1	0.6	137	8	5.8	160	1	0.6	297	9	3.0	462	10	2.2
Parietal	right	83	2	2.4	69	5	7.2	80	3	3.8	149	8	5.4	232	10	4.3
	left	83	2	2.4	69	6	8.7	80	3	3.8	149	9	6.0	232	11	4.7
	total	166	4	2.4	138	11	8.0	160	6	3.8	298	17	5.7	464	21	4.5
Supraoccipital	total	70	1	1.4	69	3	4.3	87	2	2.3	147	5	3.4	224	6	2.7
Exoccipital	right	82	0	-	69	1	1.4	80	0	-	149	1	0.7	231	1	0.4
	total	163	0	-	138	1	0.7	160	0	-	298	1	0.3	461	1	0.2
Petrus temporal	right	84	0	-	69	1	1.4	80	0	-	149	1	0.7	233	1	0.4
	total	166	0	-	138	1	0.7	160	0	-	298	1	0.3	464	1	0.2

Seven individuals had fine pitted lesions to the endocranial surfaces (type 1 lesion), one displayed

plaques of white or grey new bone growth (type 2 lesion), one had capillary like impressions (type 3

lesions) and two had ‘hair-on-end’ lesions with a ‘frosted’ remodelling (type 4 lesions). Two individuals had mixed type 1 and 2 or type 1 and 3 lesions (Lewis 2004). Lesions were most commonly observed in the supraoccipital (true prevalence 8/224: 3.6%) (Table 96).

At Priory Yard, Norwich, evidence for endocranial lesions was seen in seven subadults (/24: 29.2%) (Caffell & Clarke 2011, 260). At Bow Baptist, the crude prevalence rates of endocranial lesions were 3.4% (14/416), all subadults (14/202: 6.9%) (Henderson *et al* 2013, 207). At Wakefield Street, the crude prevalence of endocranial lesions was 3.1% (2/64), all subadults (2/16: 12.5%) (Henderson 2012, 16).

Hyperostosis Frontalis Interna

Sarah Munday [740], aged 38 years, displayed slight nodular thickening and a ‘grain of rice’ appearance surrounding the internal surfaces of the cranial frontal crest reflecting a mild expression of hyperostosis frontalis interna. This bilateral and symmetrical endocranial growth of bone surrounding the sagittal sulcus of the frontal bone is normally restricted to

females aged over 30 years and is asymptomatic during life (Aufderheide & Rodríguez-Martín 1998, 419).

Dysplasia

An adult female [173], aged 36–45 years, had malformations at the distal right radius, carpal bones: hamate, trapezoid, trapezium, and the distal joint surfaces of the right metacarpals. The joint surface of the distal radius joint surface was uneven and had a bumpy with irregular surface with macroporosity. The joint surfaces of the fourth metacarpal and hamate were uneven with marginal lipping and porosity and the articulation with the fifth metacarpal was also slightly irregular. The palmar surface of the trapezoid was altered and the capitate/scaphoid boundary. The trapezium was completely altered and elongated. The distal metacarpophalangeal joint surfaces, particularly of the third, fourth, and fifth metacarpals, were altered and narrowed (Fig 126). These changes could be associated with Madelung’s deformity of the wrist, which is characterised by a growth disturbance in the volar-ulnar distal radial physis that results in a volar and ulnar tilted distal radial articular surface, volar translation of

Table 95. Crude prevalence of endocranial lesions (*n* = number of individuals)

Age (years)	Subadult				Male				Female				Adult				Total			
	n	No. affected	%		n	No. affected	%		n	No. affected	%		n	No. affected	%		n	No. affected	%	
Perinatal	4	0	-		0	0	-		0	0	-		0	0	-		4	0	-	
1–6 months	8	1	12.5		0	0	-		0	0	-		0	0	-		8	1	12.5	
7–11 months	6	3	50.0		0	0	-		0	0	-		0	0	-		6	3	50.0	
1–5 years	36	5	13.9		0	0	-		0	0	-		0	0	-		36	5	13.9	
6–11	18	0	-		0	0	-		0	0	-		0	0	-		18	0	-	
12–17	14	1	7.1		0	0	-		0	0	-		0	0	-		14	1	7.1	
18–25	0	0	-		11	1	9.1		20	2	10.0		31	3	9.7		31	3	9.7	
26–35	0	0	-		17	0	-		24	0	-		41	0	-		41	0	-	
36–45	0	0	-		15	0	-		14	0	-		29	0	-		29	0	-	
≥46	0	0	-		23	0	-		23	0	-		46	0	-		46	0	-	
Adult	0	0	-		3	0	-		0	0	-		5	0	-		5	0	-	
Total	86	10	11.6		69	1	1.4		81	2	2.5		152	3	2.0		238	13	5.5	

Table 96. True prevalence of endocranial lesions (*n* = number of elements)

Element	Side	Subadult			Male			Female			Adult			Total		
		n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%	n	No. affected	%
Frontal	right	83	1	1.2	69	0	-	80	1	1.3	149	1	0.7	232	2	0.9
	left	82	1	1.2	68	0	-	80	1	1.3	148	1	0.7	230	2	0.9
	total	165	2	1.2	137	0	-	160	2	1.3	297	2	0.7	462	4	0.9
Parietal	right	83	2	2.4	69	0	-	80	2	2.5	149	3	2.0	232	5	2.2
	left	83	1	1.2	69	0	-	80	2	2.5	149	3	2.0	232	4	1.7
	total	166	3	1.8	138	0	-	160	4	2.5	298	5	1.7	464	9	1.9
Supraoccipital	total	70	5	7.1	69	1	1.4	87	2	2.3	147	3	2.0	224	8	3.6
Exoccipital	right	82	6	7.3	69	0	-	80	2	2.5	149	2	1.3	231	8	3.5
	left	81	6	7.4	69	0	-	80	2	2.5	149	2	1.3	230	8	3.5
	total	163	12	7.4	138	0	-	160	4	2.5	298	4	1.3	461	16	3.5

Table 97. Crude prevalence of rib deformity (*n* = number of individuals)

	Female	Adult	Total
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Age (years)	n	No. affected	%	n	No. affected	%	n	No. affected	%
all subadults	0	0	-	0	0	-	86	0	-
18-25	20	2	10.0	31	2	6.5	31	2	6.5
26-35	24	10	41.7	41	10	24.4	41	10	24.4
36-45	14	3	21.4	29	3	10.3	29	3	10.3
≥46	23	3	13.0	46	3	6.5	46	3	6.5
Adult	0	0	-	5	0	-	5	0	-
Total	81	18	22.2	152	18	11.8	238	18	7.6

Table 98. True prevalence of rib deformity (*n* = number observed)

Body area	Female			Adult			Total		
	n	No. affected	%	n	No. affected	%	n	No. affected	%
Ribcage	78	18	23.1	142	18	12.7	225	18	8.0

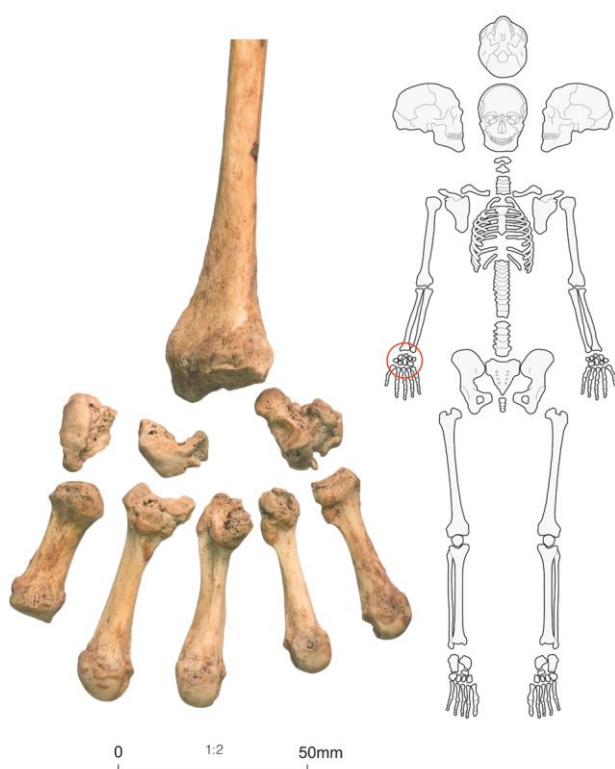


Fig 126. Anterior view of the right wrist of adult female [173], showing dysplasia, with malformation of the distal right radius, hamate, trapezoid, trapezium, and the distal joint surfaces of the right metacarpals (scale 1:2)

the hand and wrist, and a dorsally prominent distal ulna. It occurs predominantly in adolescent females who present with pain, decreased range of motion, and deformity (Staub & Weissman 1992).

Rib Deformity

Eighteen adults (/238: 7.6%), all female (18/81: 22.2%), displayed abnormal deformities to the ribs (Table 97) – tapering and flattening – as a result of prolonged constriction on the ribcage by long-term corset or stay wear (Walker 2012, 275). There was a peak in crude prevalence in the 26–35 year age category (10/24: 41.7%) (Table 97) and an equal distribution of

the true prevalence between right and left ribcages with 8% (18/225) of observable rib ages affected (Table 98).

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