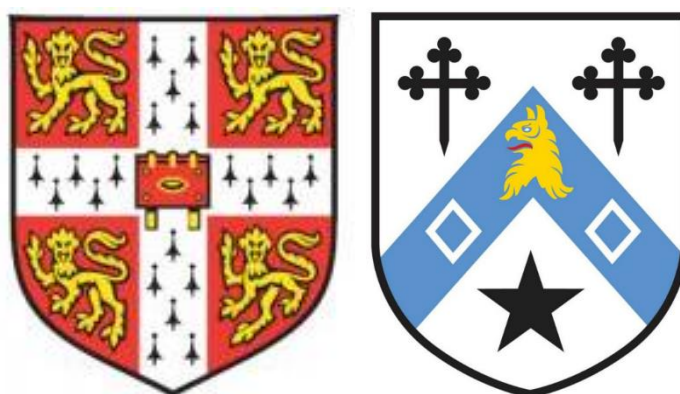


A multidisciplinary approach to reconstruct the lived-experience of people with ‘leprosy’ and Hansen’s Disease in medieval England

Appendices



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Appendices to Chapter 2

AT 1. Overview of prevalence of lesions/impairment in modern medical research

Region	Lesion/impairment	Prevalence (% of cases)	Notes	Reference
Nose	Nasal deformity	~30-50%	More common in more in (B)L-HD cases	(Anand <i>et al.</i> 2014; Kim <i>et al.</i> 2013; Kondo <i>et al.</i> 2023; Raja <i>et al.</i> 2016; Shehata <i>et al.</i> 1974; Sousa Pereira <i>et al.</i> 2013; Taheri <i>et al.</i> 2012)
	Olfactory dysfunction	40-100%	More common in more in (B)L-HD cases	(Barton 1976; Kondo <i>et al.</i> 2023; Mishra <i>et al.</i> 2009; Veyseller <i>et al.</i> 2012; Vora <i>et al.</i> 2012)
Mouth and larynx	Gingival infection	Up to 75%		(Girdhar and Desikan 1979; Kaur <i>et al.</i> 1993; Rawlani <i>et al.</i> 2011; Reichart 1976)
	Uvula and tongue nodule formation/infection	17-45%		(Girdhar and Desikan 1979; Kaur <i>et al.</i> 1993; Rawlani <i>et al.</i> 2011; Reichart 1976)
	Ageusia	10%		(Vohra <i>et al.</i> 2019)
	Lesions around maxillary incisors (bone resorption, discolouration, stunted growth)	10-15%		(Anand <i>et al.</i> 2014; Núñez-Martí <i>et al.</i> 2004; Sousa Pereira <i>et al.</i> 2013)
	Perforation of hard and soft palate	11-57%	Common in T2Rs and (B)L-HD cases	(Girdhar and Desikan 1979; Motta <i>et al.</i> 2010; Rao <i>et al.</i> 2008; Taheri <i>et al.</i> 2012; Varghese and Prakash 2011)
	Dental disease (caries, inflammation, tooth mobility, pulpitis)	Variable between populations	Also a risk factor in reversal reactions	(Costa <i>et al.</i> 2003; Motta <i>et al.</i> 2010; Motta <i>et al.</i> 2011; Motta <i>et al.</i> 2013; Raja <i>et al.</i> 2016; Rawlani <i>et al.</i> 2011; Singh <i>et al.</i> 2022)
Facial nerves	Inflammation and paralysis, impediment of mastication and speech	3-25%		(Antia 1963; Costa <i>et al.</i> 2003; Dave and Bedi 2013; Kim <i>et al.</i> 2013; Reichart 1976; Rodrigues <i>et al.</i> 2017; Wani <i>et al.</i> 2009).

Region	Lesion/impairment	Prevalence (% of cases)	Notes	Reference
Eyes	Ocular impairment	20-75%	more common in (B)L-HD	(Grzybowski <i>et al.</i> 2015; Kim <i>et al.</i> 2013; Raja <i>et al.</i> 2016; Taheri <i>et al.</i> 2012; van Brakel <i>et al.</i> 2012)
	Complete blindness in one/two eyes	10-15%/5%	more common in (B)L-HD	(Grzybowski <i>et al.</i> 2015; Kim <i>et al.</i> 2013; Raja <i>et al.</i> 2016; Taheri <i>et al.</i> 2012; van Brakel <i>et al.</i> 2012)
	Madarosis	3-60%	more common in (B)L-HD	(Anand <i>et al.</i> 2014; Antia 1963; Grzybowski <i>et al.</i> 2015; Raja <i>et al.</i> 2016; Rathod <i>et al.</i> 2019; Reichart 1976; Sousa Pereira <i>et al.</i> 2013)
	Incomplete closure of eyelids	4-50%		(Anand <i>et al.</i> 2014; Grzybowski <i>et al.</i> 2015; Raghavendra <i>et al.</i> 2017; Schipper <i>et al.</i> 1994)
Ears	Deformation	0-10% - 40-70%	Variable between populations	(Anand <i>et al.</i> 2014; Antia 1963; Kim <i>et al.</i> 2013; Raghavendra <i>et al.</i> 2017; Rathod <i>et al.</i> 2019; Reichart 1976)
	Perceived deafness	0-70%		(Enwereji and Enwereji 2008; Rawlani <i>et al.</i> 2012; Rawlani <i>et al.</i> 2013; Singh <i>et al.</i> 1982)
Hands and feet	Ulcers	10-60%		(Jagannathan and Ramamurthy 1993; Mowla <i>et al.</i> 2020; Raghavendra <i>et al.</i> 2017; Rathod <i>et al.</i> 2019; Schipper <i>et al.</i> 1994; Sow <i>et al.</i> 1999; Vohra <i>et al.</i> 2019)
	General sensory loss	36%		
	Claw hand	11-40%		
	Resorption of digits/auto-amputation	3-15% (<40%)		
	Drop foot	1-10%		
	Wrist drop	0.5%		

AT 2. Overview of skeletons from archaeological sites in the British Isles with palaeopathological or genetic signs of *M. leprae* infection.

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
Scotland	Dryburn Bridge, East Lothian, Scotland	2300- 2000BC	Prehistory		1		Cist burial	Taylor et al (2000); Brothwell (1977)	
England	Kingsmead Quarry, Horton, Berkshire	1600- 1100BC	Prehistory		1		Ditch	Roberts 2007	Redeposited skull
England	Chapel Lane, Bingham, Nottinghamshire	200-250AD	Roman		1		Top of disused well in boundary ditch; slightly separate from 51 other burials	Allen 2018	
Scotland	Hallow Hill, St Andrews, Fife	8th century	Early Medieval		1		Cist lined with stone slabs; 5 cover slabs	Lunt 1996, 2013	
Scotland	Kirk Hill, St Andrews (St Mary's Church), Fife)	5th-12th century	Early Medieval		1		Disarticulate d; re- deposited	Lunt 1997, 2013	
England	York Minster, Yorkshire	410-1050	Early Medieval	Cathedral	1		Early medieval cathedral	Manchester and Roberts 1986	
England	Wharram, Percy, Yorkshire	960-1000	Early Medieval		1	1	North churchyard	Mays, Harding, and Heighway (2007); Taylor and Donoghue	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
								(2011); Taylor et al 2021 and 2024; this thesis	
England	Norwich, St John the Baptist, Timberhill, Norfolk	980-1050	Early Medieval	Leprosarium ?	54	11	North churchyard; possibly reserved 'leprosy' hospital	Anderson (1996, 1998, 2009a); Bayliss et al. (2004); Popescu (2009)	48 palaeopath cases + 6 DNA cases: 4 without palaeopath; 2 too incomplete for palaeopath
England	St Margaret, Ormesby, Norfolk	11th-14th century	Early Medieval		1		Edge of north side of cemetery but delimited by modern road	Anderson (2009b)	
England	Thorpe, St Catherine's, Norfolk	Late Saxon	Early Medieval		1		-	Wells 1962	
England	Barrington, Edix Hill, Cambridgeshire	500AD-1st half 7th century	Early Medieval		1	1	Bed with grave goods	Duhig (1998); Inskip?; this thesis	
England	Burwell, Cambridgeshire	7th century	Early Medieval		1		Large grave	Møller-Christensen and Hughes (1962); Lethbridge (1931)	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
England	Ipswich, School Street, Suffolk	10th-11th century	Early Medieval		2	1	Pillow stones	Mays 1989; this thesis	
England	Ipswich, St Augustine, Stoke Quay, Suffolk	10-11th century	Early Medieval	Friary	5		-	Brown et al. (forthcoming)	1 definite; 4 possible casers
England	Hoxne, Suffolk	885-1015AD	Early Medieval		1		Skull only	Inskip et al 2017	From modern garden
England	Raunds, Furnells, Northamptonshire	8th-10th century	Early Medieval		2	0	Marginal in cemetery	Powel (1996); this thesis	
England	Willoughby-on-the-Wolds, Nottinghamshire	Late 5th-early 7th century	Early Medieval		1		Multiple burial, many grave goods; associated trepanned skull	Roberts (1993); Harman (1993)	
England							Pit		
	Eccles, Kent	7th century	Early Medieval		1	-		Boocock, Manchester, and Roberts (1995); this thesis	
England	Great Chesterford, Essex	450-600AD	Early Medieval		1		Grave goods	Waldron (1994b); Inskip (2008); Inskip et al. (2015)	
England	Bevis's Grave, Bedhampton, Hampshire	Late 6th to early 11th century	Early Medieval		1		-	Manchester and Roberts (1986); Shennan (1978)	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
England	Collingbourne Ducis, Wiltshire	Early 6th century AD; 5th-7th century AD	Early Medieval		2		Jewelery	Dinwiddy (2016)	
England	Beckford, Herefordshire	550AD	Early Medieval		1		2 dog skeletons; grave goods; marginal in cemetery	Wells (1962; 1996)	
England	Cannington, Park Quarry, Somerset	3rd-early 8th century AD	Early Medieval		3		Metal tool with one; Imported Eastern Mediterranean pottery at the site	Borthwell, Powel and Hirst (2000)	
England	Tean, Isles of Scilly, Cornwall	7th century AD	Early Medieval		1		-	Borthwell 1961	
Scotland	Deerness, Newark Bay, Orkney Islands	13th-14th century	Late Medieval		1	1	Chapel underground passage	Taylor et al. (2000); Brothwell (1977); Brothwell and Krzanowski (1974)	
Scotland	Aberdeen, Aberdeenshire	14th-17th century	Late Medieval		1		Carmelite friary	Cardy (1996)	
Scotland	Glasgow, Strathclyde	14th-15th century	Late Medieval		1		Cathedral	King (1994; 2002)	
England	St Giles by Brompton Bridge, Yorkshire	Mid 13th-late 14th century	Late Medieval	Hospital	3	0	Next to road and river crossing in	Dardwell (1995); this thesis	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
							general hospital		
England	Scarborough, Yorkshire	After 1066	Late Medieval		1		Graveyard associated with chapel	Little (1943); Brothwell 1958	
England	Runcorn, Norton Priory, Cheshire	Early 14th century	Late Medieval	Priory	1		Sandstone coffin in Chapterhouse of priory	Manchester and Roberts (1986); Brown and Howard-Davis (2008)	
England	York, all Saints, Fishergate, Yorkshire	11th-16th century	Late Medieval		4		-	McIntyre 2016; McIntyre and Chamberlain 2009	
England	York, Fishergate House, Yorkshire	12th-16th century	Late Medieval		1		-	Holst 2005	
England	York, St Stephen's Church, Fishergate, Yorkshire	Late 11th-mid 14th century	Late Medieval		1		Marginal; copper alloy pin	McComish 2015; Holst 2012	
England	Grantham, St Leonard's, Lincolnshire	Likely 13th century	Late Medieval	Hospital	3		General hospital	Boulter (1992); Hadley (2001); Trimble, Unsworth, and Hurley (1991)	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
England	Huntingdon, St Margaret's, Spittal's Link, Huntingdonshire	12th-14th century	Late Medieval	Leprosarium	10	5	Leprosarium	Duhig (1993); this thesis	
England	South Acre, St Bartholomew, Norfolk	1100-1350	Late Medieval	Leprosarium	7	1	Leprosarium	Wells 1967; this thesis	
England	Ipswich Blackfriars, School Street, Suffolk	1263-1538	Late Medieval	Friary	5	2	Aisle; Nave margins; nave; and 2 in south aisle	Mays (1991); Taylor et al. (2006); Taylor and Donoghue (2011)	
England	Midland Road, Peterborough, Cambridgeshire	11th-16th century	Late Medieval		29		2 phases; buried normally	McComish, Millward and Boyle (2017); Caffell 2015	
England	Newark, St Leonard's, Nottinghamshire	1133-1642	Late Medieval	Hospital	1		Southside of church general hospital	Bishop 1983; Manchester and Roberts 1986; Bayliss et al 2004	
England	High Wycombe, St Margaret's, Buckinghamshire	13th-14th century	Late Medieval	Leprosarium	16	6	Leprosarium	Farley and Manchester; this thesis	13 palaeopath cases + 3 DNA cases without palaeopath (1 no HD, 2 unob)

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
England	Oxford, St Bartholomew hospital and chapel, Oxfordshire	1126+	Late Medieval	Leprosarium	>1		Charnel deposits leprosarium	Levick (n.d.); Boylston 2012	Disarticulated material
England	Abingdon Vineyard, Oxfordshire	1300-1540	Late Medieval	Abbey	1		Abbey	Hacking and Wakely (n.d.)	
England	Ilford, St Mary and St Thomas, Essex	13th-14th century	Late Medieval	Leprosarium	3		Leprosarium	Manchester and Roberts (1986)	
England	London, St Mary Spital, Spitalfields	1250-1400AD	Late Medieval	Hospital	2		Marginal burial and one in a mass burial pit General Hospital	Connell et al 2012	
England	Stonar, Kent	-	Late Medieval		2		-	Bayley n.d.; Manchester and Roberts 1986	
England	St Martin's Field, New Romney, Kent	13th-14th century	Late Medieval		1		-	Clough and Loe n.d.	
England	Lewes, St Nicholas, Sussex	12th-16th century	Late Medieval	Hospital	2		General hospital	Barber and Sibun 1998; 2010	
England	Cuddington, Nonesuch Palace, Ewell, Surrey	1100-1538	Late Medieval		1		-	Moller-Christensen and Hughes 1962; Biddle 1959	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
England	Chichester, St James and St Mary Magdalene, Sussex	12th-17th century	Late Medieval	Leprosarium	75		Leprosarium	Magilton and Boylston 2008	
England	Winchester, St Mary Magdalen, Hampshire	1070-12th century	Late Medieval	Leprosarium	75	16	Leprosarium	Roffey and Tucker 2012; Mendum et al 2014; Schueneman et al 2013; Roffey et al 2017; Cole et al 2022; Taylor et al 2024; This thesis	
England	Glouchestershire, St Oswald's Priory, Glouchestershire	1120-1230	Late Medieval	Priory	1		Priory	Mary Lewis, pers. Comm Roberts 2012	
Ireland	Armoy, St Patrick's Church, County Antrim, Northern Ireland	1444-1636	Late Medieval		1		-	Murphy and Manchester 1998; 2002	
Ireland	Dublin, St Michael le Pole, Leinster, Republic of Ireland	11th century	Late Medieval		3		Marginal	Buckley 2008a and b	
Ireland	Ardreigh, County Kildare, Republic of Ireland	1264-1391	Late Medieval		1		-	Troy 2010	
Ireland	St Tugal's Chapel, Herm	1251-1295	Late Medieval		1		-	Cataroche 2013; De Jersey and	

Country	Site	Date	Period	Site type	n	DNA confirmation	Features	Reference	Notes
								Cataroche 2012	
England	London, St Marylebone Church	19th century	Post Medieval		1		High status; amputation	Walker 2009	
England	Norwich, St Mary Margaret Fybriggate, Norfolk	11th-14th century	Post Medieval	Gallow's Cemetery	7	2	Normal style', but gallows cemetery	Stirland 2009; this thesis	
England	Lakenheath, RAF base	390-600	Early Medieval		5	3	Normal style	Unpublished ; Cotswolds Archaeology pers comm; this thesis	
England	Cherry Hinton, Church End churchyard, Cambridgeshire	940-1170	Early Medieval	Rural parish	2	2	Normal	Inskip and Cessford pers comm.; this thesis	
England	Hereford, Hereford Cathedral, Herefordshire	676-1590	Late Medieval	Urban Parish	5	0	Normal	This thesis	
England	Cambridge, All Saints, Comet Place, Cambridgeshire	940-1150	Early Medieval	Rural parish	1	1	Normal	Inskip and Robb pers comm.; this thesis	
England	Gloucester, Gambier-Parry Lodge, Gloucester	4th-5th century	Roman		1	0	Normal	This thesis	
England	Cambridge, St John Hospital, Cambridgeshire	13th-15th century	Late Medieval	Hospital	1	1	Disarticulated bone	Inskip and Robb pers	No palaeopath signs

Country	Site	Date	Period	Site type	n	DNA confirmatio n	Features	Reference	Notes
								comm.; this thesis	
England	Dorchester, Poundbury Camp	3rd-4th century	Roman		1	-	-	Reader 1974	
England	Bristol, St Augustine the Less, Avon	Post Medieval	Post Medieval		1		-	O'Connell 1998	

AT 3. Summary of sites where osteological data (only dental data) was originally recorded with different recording methods and new data could not be collected

Site	Original recorder	Dental data	'Leprosy' data	Why not newly recorded
BSA	Calvin Wells	EH not reported	Facies leprosa changes scored according to (Møller-Christensen 1978) and could be copied as is.	All skulls were missing upon access
JTN	Sue Anderson	Periodontal disease not recorded. Enamel hypoplasia only recorded as 'some present' + age, but no type, number of lesions or severity is scored	Scoring of leprosy lesions based on descriptions.	Access to collection not possible
MMF	Ann Stirland			No data open access available

Appendices to Chapter 3

A. 3.1 Materials

A. 3.1.1 Leprosaria

A. 3.1.1.1 St John at the Castle Gate, Timberhill, Norwich (JTN)

Redevelopment for a large shopping centre in Norwich (Castle Mall) between 1987 and 1998 set off extensive archaeological research of central Norwich (Popescu *et al.* 2009). They uncovered part of the early medieval town, the great Norman and medieval phases of Norwich castle, and four cemeteries enclosed within the castle's defences, plus one outside it (NAU Archaeology 2009).⁷⁸ One of these cemeteries is the churchyard of St John (at the Castle Gate) Timberhill (Anderson 2009). The excavated section of this parish cemetery (approximately 15% of the entire cemetery), directly north of the church itself, yielded many individuals with palaeopathological lesions associated with HD infection (Popescu 2009b), leading many to consider JTN as a potential early leprosarium collection (e.g. Roberts 2016; Thompson 2002). The site is included and analysed in this study as a leprosarium.

The church of JTN was first historically documented in 1157 (Blomefield 1806), though the majority of records from/about this parish church do not become available until 1313, when the church was endowed to Norwich Cathedral priory (Popescu 2009a). No historic records refer to JTN specifically being intended for the care or burial of 'lepers' at any point during its history, and several other lazarus houses existed around Norwich. Each was located outside of one of the city gates and named after their associated gate. Additionally, there was a larger and older Magdalen Hospital and chapel a mile north-east of Norwich, where the master, brethren and sisters were themselves 'lepers' (Taylor 1821). The leprosarium of St Clement/Blessed Lady and the leprosarium of St Mary Magdalen of Fybridge did not have their own cemeteries, and thus their deceased were interred at the church of St Clement the Martyr at Fybridge (Blomefield 1806) and All-Saints in Fybridge-gate (Blomefield 1806), respectively. Potentially therefore, if JTN is not a leprosarium of itself, its cemetery accepted the burial of inmates from other early local leprosaria that did not have their own cemetery.

A total of 189 burials (MNI = 184) and 42 disarticulated contexts amounted to an MNI of 208 (Anderson 2009), dated to the early-high medieval period (890-1260AD; Popescu 2009b). Within the cemetery, graves intercut frequently, and burial pits were spaced closely together with

⁷⁸ The results from the Norwich Castle Mall excavation are largely available online as part of the project: https://archaeologydataservice.ac.uk/archives/view/castlemall_eh_2009/overview.cfm?text=cem&cems=other.

individuals fitted tightly, suggesting limited space (Popescu 2009b). Most grave outlines at St John Timberhill were elongated and oval or anthropomorphic, measuring 1.5m x 0.5m, and most individuals were likely buried in a shroud (Popescu 2009b). Evidence for coffins was found in several graves: three in the form of soil stains, five in the form of preserved nails (Popescu 2009b). Overall, approximately twenty-five broadly defined rows could be identified in the churchyard layout, following the outline of the cemetery (fan-shaped). No sex-specific distribution patterns could be recognized within the lay-out of the churchyard, though there are more females than males overall (Anderson 2009; Popescu 2009b). Several roughly east-to-west orientated rows at the southern edge of the excavated area consisted almost exclusively of 14-18-year-olds. Nevertheless, no specifically dedicated area for children was identified, nor were any other age-related layout patterns recognized (Popescu 2009b). The graves that were identified as 'lepers' are argued to show a particular grouping, or higher prevalence in certain areas of the cemetery, but the pattern is not particularly strong. Several graves showed a different burial type. Eleven individuals were buried with their heads resting between two flint blocks (which the excavators dubbed 'flint ear muffs'), one of whom was interred in a coffin with an additional flintstone placed above her head. Four other individuals were buried on a bed of pebbles or large flints (Popescu 2009b). One individual (identified later as an HD case) was buried within a flint and chalk-lined grave. Five graves contained 'shelves', supporting either the head ($n = 4$) or the feet ($n = 1$) of the deceased (Popescu 2009b). Towards the south and central area of the excavated area of the churchyard several large and intercutting pits were exposed. Some of these contained one or multiple (partially) articulated individuals and have been interpreted as either charnel pits, or 'mass burials' for those affected by disease outbreaks, including one HD case. Of the remains, ~96% was considered to have average to below average completeness, and only a small percentage was considered to represent an above-average completeness. The condition of the remains was also considered average to below average (Anderson 1995; Anderson 2009).

Ancient DNA analysis was performed to confirm HD infection in several individuals. Eleven individuals were selected with a range of pathological lesions, six of which tested positive for *M. leprae*. Unfortunately, due to labelling errors during the sampling of these ten individuals, it is retrospectively impossible to know for certain which individual tested positive or negative (*pers. comm.* Sue Anderson). New aDNA samples will be collected and tested within the current project. A total of 18 individuals had carbon and nitrogen isotopes available which will be included in the supplementary database of this thesis. A later thesis analysed 10 adolescents and young adults for strontium and oxygen isotopes (Filípek 2021). Radiocarbon dating was performed on 15 skeletons, suggesting the cemetery was in use between 980-1020 (95% confidence) to 980-1060 (95% confidence). The remains are currently stored and curated by Norwich County Museum, under supervision of Tim Pestell.

A. 3.1.1.2 St Mary Magdalen, Winchester (MMW)

The existence of the St Mary Magdalen leprosarium in Winchester was always known based on archival records. In 2000 Time Team (Channel Four) dug several evaluation trenches to explore the late hospital and later almshouse and uncovered four graves. Subsequently, in 2007, the Magdalen Hill Archaeological Research Project (abbreviated to MHARP) was set up by the archaeology department at the University of Winchester (Roffey and Tucker 2012). Since then, 123 additional individuals have been excavated and recorded, although the last 30 were never officially published (*pers. Comm. Katie Tucker and Heidi Dawson-Hobbis*)⁷⁹. The dating of the archaeological material and skeletons suggests the hospital was in use between the 11th-14th century (high medieval period).

In the *Liber Winton*, the hospital of St Mary Magdalen is mentioned to have been founded in 1148, most probably by the Bishop of Ilchester (Barlow 1979; Doubleday and Page 1903). This early date is corroborated by the Norman-style architecture depicted in a 1788 drawing of the ruins by Jacob Schnebbelie (Roffey 2013). The hospital was built on what is now called Morne Hill and was located adjacent to the road from Winchester to London – which was good for alms collection – and next to open fields – which was good for renting (Roffey 2013). The first direct mention of the hospital in historic documents comes from the register of Bishop Pontoise (dating to 1280-1304 based on the Bishop's life). In 1325 the hospital is directly referred to as 'leper' hospital that is in financial trouble (Doubleday and Page 1903). Overall, the osteoarchaeology suggests that the hospital was a specialist institute with professional knowledge, and a high level of personal and communal care. Based thereon, it is even suggested that the hospital must have had good social standing (Roffey 2020).

During the decades of the hospital's existence, several means of income are reported. The largest portion of its annual income comes from the Queen's endowment, but is complemented by rent from the property, alms, the pension of some of the inpatients, chantry foundations, testaments, and from the gains of several fairs at Winchester (Keene 1985). This money was often specifically intended for certain expenses, such as clothing and food, and gifts in kind most often included those exact items (Doubleday and Page 1903). In 1331, the hospital is recorded to have had a priest functioning as master, and to have cared for nine poor brethren and an equal number of sisters (Doubleday and Page 1903). In 1336 the hospital is recorded to be so slenderly endowed that maintenance for the master, brethren, sisters, weak and infirm residing on the hospital ground is hardly sufficient. This record (1898) additionally calls to several areas within Southampton to stop molesting and aggrieving the hospital for tithes as they can clearly not cover

⁷⁹ The summary in this section will only include those individuals whom have been published.

such costs without their own demise. At the start of the 15th century, the Bishop of Winchester appointed two commissioners to inspect the hospital and the report revealed inappropriate, criminal and excessive behavior among those living there. Consequently, the master is expelled and canonical punishments are given to the remaining inhabitants (Doubleday and Page 1903). In the following years, the hospital decreases in size and cares for fourteen inmates in the 14th century, and for just ten in the early 15th century (Doubleday and Page 1903). Around the same time as the hospital itself becomes smaller, more private forms of accommodation – six houses, seven including the master's – are available on the lands of the hospital (Doubleday and Page 1903). In 1420, in the will of a local steward, some money is gifted to the poor and leprous of St Mary Magdalene in Wynton (Doubleday and Page 1903). More than a century later, during the Valor, the hospital is still in existence and recorded as receiving a gross income of £42 16s, an income that remains relatively steady through to the Dissolutions, when the hospital still cared for nine poor men and women (Doubleday and Page 1903).

Archaeological evidence implies that the foundations may stem from the late 11th century, from shortly after the Norman Conquest (Roffey 2013; Roffey and Tucker 2012). These early foundation layers imply the existence of a small stone-built structure surrounded by post-pits and post-holes suggesting further wooded buildings and a possible tower. These structures have been interpreted as an early chapel with associated cemetery (Roffey 2013; Roffey and Tucker 2012). A feature was found that may represent a boundary ditch of the hospital, possibly including a palisade, to enclose the hospital (Roffey 2013). Overlaying these earliest structures is the stone phase of the mid-12th century hospital. This new building had a bigger hall, replacing the timber structures that preceded it. This phase also included the addition of an infirmary and formal cloister, while the chapel also underwent refurbishing (Roffey 2013; Roffey 2020; Roffey and Tucker 2012). A new cemetery area came into use to the south of the chapel, while the previously used northern extent probably fell out of use (Roffey and Tucker 2012). In the subsequent two centuries, the hospital underwent several rebuilding episodes, as did the aisles of the chapel; The master's lodge was added to the infirmary's hall (Roffey 2013; Roffey and Tucker 2012). Additionally, several latrine and rubbish pits were uncovered throughout these periods (Roffey 2013). In the 16th century a large part of the hospital had been torn down, and replaced by a number of brick almshouses (Roffey 2013; Roffey and Tucker 2012). The chapel remained, however, along with the almshouses, until their demolition in 1780.

A total of 52 burials were excavated, 49 of which represented single interments, with the other three burials containing disarticulated remains. Thirty-eight of these individuals were excavated in the northern extent of the cemetery, which is considered to be the older part (Roffey and Tucker 2012). These burials are all orientated with the head to the west, in anthropomorphically-shaped pits including a slightly narrower niche for the head (Roffey 2020;

Roffey and Tucker 2012). Such anthropoid graves are only rarely found outside of monastic burial contexts, and are thus mostly found among males. At St Mary Magdalene however, this burial ritual was identified among both sexes and all ages, even including neonate individuals. This unique monastic burial may thus support historic literary views that leprosaria function as a monastic institution, while caring for the leprous (Roffey 2020). A large portion of the graves additionally showed evidence of a ledge on the top, where a slab or wooden board may have rested on as a means to close the grave. Overall, the cemetery is organised and the low level of intercutting may indicate that the graves were marked in some way (Roffey 2013; Roffey 2020; Roffey and Tucker 2012). Five skeletons were uncovered on the south side of the chapel, believed to belong to a later phase of the hospital. A further eleven skeletons were buried within the chapel in nine graves. One remarkably prestigious grave, or rather tomb, was plaster-lined and sealed with a Purbeck marble lid. Within the tomb, a male old middle adult and a 2-3 year old child were uncovered (Roffey *et al.* 2017). These later burials do not show the earlier, characteristic anthropoid grave pits, shows less defined organisation and are frequently truncated (Roffey 2020). At least one of the burials in the chapel was interred in a shouldered coffin, evidenced by the distribution of nails in the pit (Roffey *et al.* 2017). Well over 86% of the burials in the northern extent show signs of HD, becoming much less frequent in the newer extent ($n = 5$ burials; 40% HD).

A total of 16 individuals have previously been genetically tested for *M. leprae* presence, 9 of which proved positive (Cole *et al.* 2022; Mendum *et al.* 2014; Roffey *et al.* 2017; Schuenemann *et al.* 2013; Taylor *et al.* 2021; Taylor *et al.* 2013). Radiocarbon dating across these DNA studies suggest the cemetery was in use between the late 10th and late 13th century. Moreover, a thesis from 2021 analysed 19 adolescents and young adults for strontium and oxygen isotopes, and 10 adolescents/young adults for incremental dentine values of carbon and nitrogen (Filípek 2021). A further 40 rib 12 femur samples were analysed for carbon and nitrogen isotopes (Cameron 2014a), on top of one⁸⁰ by (Taylor *et al.* 2013). The remains are currently stored and curated by The University of Winchester, School of History, Archaeology and Philosophy, under supervision of Dr. Heidi Dawson-Hobbs.

A. 3.1.1.3 St Bartholomew, South Acre, Norfolk (BSA)

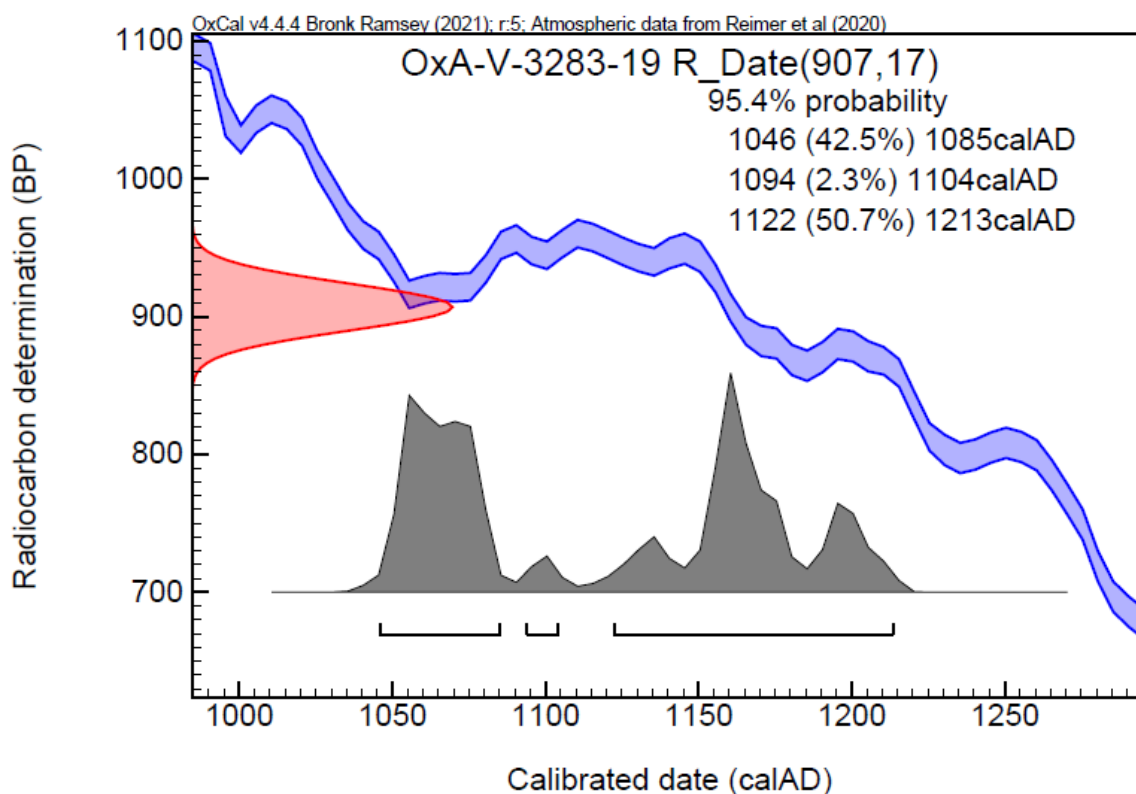
In January of 1967 the A1065 at South Acre was widened, exposing the remains of 12 individuals by machine. Historic research suggests the remains were found at the site of St Bartholomew leprosarium Racheness-in-Southacre, Norfolk. Though little is known about this leprosarium it is believed to have been erected between 1189 and 1216 (Hope 2009; Newman 1895), and have

⁸⁰ Analysed three skeletons, but two of those were re-analysed in (Cameron 2014a)

consisted of a hospital, church and chapel, subordinate to Castle Acre Priory (Blomefield 1906). There is only one (undated) record that provides more detail, discussing the gift of Herbert de South Acre to the Castle Acre Priory of the land on which the hospital and church stands, two additional acres of land and pasture for life stock to the 'lepers' that remain at the hospital (Blomefield 1906).

Due to the crude excavation 'method', the site is represented by no feet, few lower legs and only five skulls. Publication of these remains (Wells 1967) was therefore relatively brief. Based on skeletal morphology, the skeletons were dated to 1100-1350. No information on burial style (direction, coffin, position) was recorded upon excavation. Of the 12 individuals uncovered, seven are considered to show signs of HD. Rates of caries are not outstanding for the medieval period, though abscesses appear particularly common. Teeth appear relatively unworn compared to contemporary sites, suggesting perhaps a softer diet. Upon assessment of the remains, it was found that many of the pathological bone was glued to cardboard with thick lumps of glue, making assessment of the pathologies complicated. HD-related pathology scores are therefore based on the observable (non-glued) surfaces and description in the original report. Assessment also proved that none of the skulls were present anymore.⁸¹ As the original publication uses the HD-skull lesion scoring methods created by Møller-Christensen and used in this thesis, this data could be copied into the database. The isotope collagen left over from tooth 35 of UIN 220 (skeleton 10) was submitted for radiocarbon dating, which puts the leprosarium much earlier than originally believed (11th-13th century versus 14th century; see AF 1). No reanalysis of the remains, or biomolecular studies have been performed on this collection. The remains are currently stored and curated by Norwich County Museum, under supervision of Tim Pestell.

⁸¹ No records existed of a loan. Efforts were made to locate these skulls by contacting several larger skeletal collections in the UK, but were unsuccessful.



AF 1. Radiocarbon date plot for UIN220/skeleton 10, BSA.

A. 3.1.1.4 St Margaret, Spittal's Link, Huntingdon (MSL)

In 1987 several human skeletal remains were uncovered during roadworks at the A1126 Spittal's Link roundabout near Huntingdon. Archaeologists were unfortunately not called in until after most remains had been crudely salvaged (Mitchell 1993). Approximately 5 years later, in April and May, new roadworks at approximately the same location, uncovered the remains of 55-60 human burials. After the Transportation Department of Cambridgeshire County Council was tipped off about the remains by a by-passer, the Archaeological Field Unit of Cambridgeshire County Council was called in for briefing of several service trenches beside the road as a means of 'rescue excavation'. The majority of the remains were uncovered by machine works while digging trenches for gas and electricity. The speed of the archaeological excavation was entirely dependent on that of the roadworks (Mitchell 1993). Dating was done based on historic records for the site, suggesting use of the leprosarium between the High and late medieval period (12th-15th century).

The hospital was likely founded in the 12th century just outside of the borough of Huntingdon on the north side. The hospital is believed to have been set up by Malcolm IV of Scotland, in his function as Earl of Huntingdon (CPR 1898; Page 1926), and several benefactors are known, including Isabelle de Bruce and her son, Robert Lord of Annabelle (CPR 1898). The hospice was also granted a piece of land of 12 solidus, 16 shilling and two dimes *firma burgi*, 40 shilling of

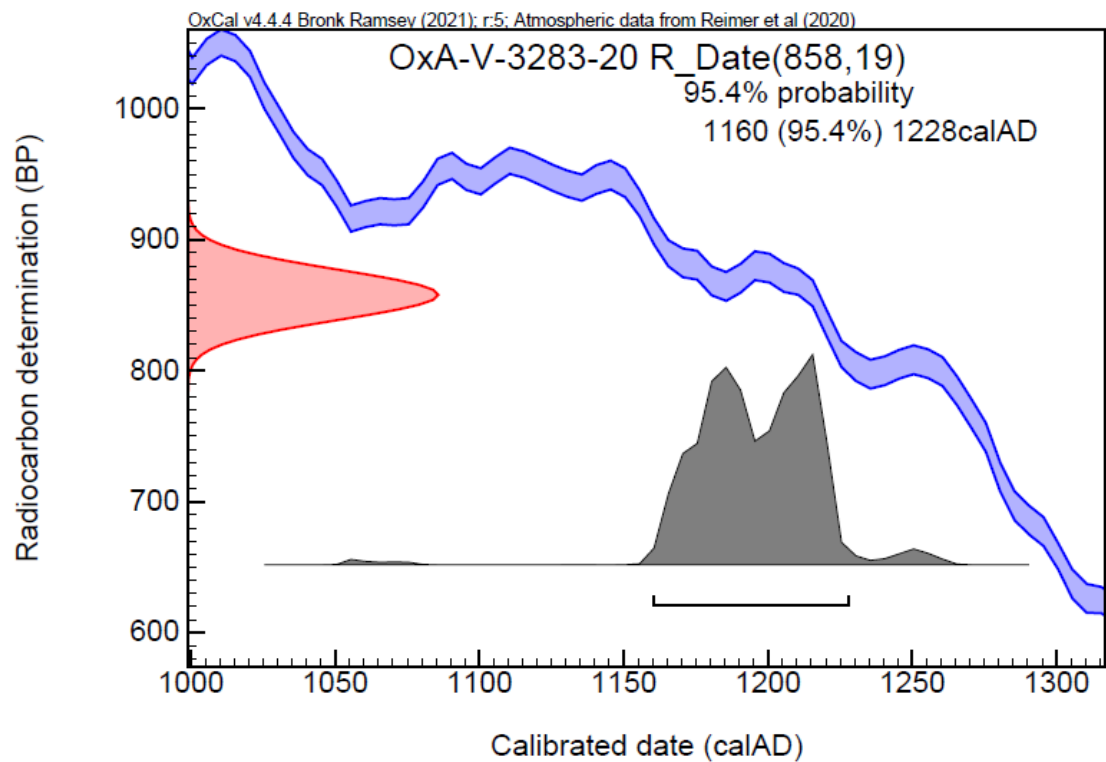
one of the other benefactors, approximately 30 acres of wood and some food (malt, barley and oats; Caley *et al.* 1846). The hospital is believed to have an “open door” policy with sick people and ‘lepers’ coming and going as they pleased, implying there was no college of brethren and sisters (Page 1932; Pike 2014). Even more so, historic records do not hint to any provision for ecclesiastical staff, which may either indicate that records were not preserved, or that the hospital served more as a shelter, than an actual site of care (Mitchell 1993).

On August 6, 1327, the King writes to the prior of ‘Huntyndon’ after communications with the St Margaret leprosarium. According to the Close Rolls, the king had written the ‘lepers’ hospital of St. Margaret in Huntington requesting the admission of one Robert de Waldeshof, clerk, who is “smitten with leprosy”. The hospital is to provide him with food, clothing and other necessities until his death. The hospital responds to this requests that they are so poor they can barely sustain their own warden and brethren and thus cannot provide for Robert, nor his wife – suffering the same infirmity. In his letter to the prior, the King asks him to visit the hospital in person and report back about its state (CCR 1896). No further records about this specific event could be traced. However, the institution was excused of tithes in August 1340, because if they continued to pay, their poor and infirm would have to disperse and seek food due to poverty (CCR 1901). In the same year, one of the wardens (John de Bassyngbourne, in the time of Edward II) is accused of selling divers corrodies, or pensions in the hospital – to people who were not poor, sick or leprous. His successor dismissed these people from the premises (Page 1932; Pike 2014). In 1341, all remaining patients were sent away. A list of clerks has been preserved, showing a continuation in the use of the hospital between at least 1312 and 1404 (Page 1926).

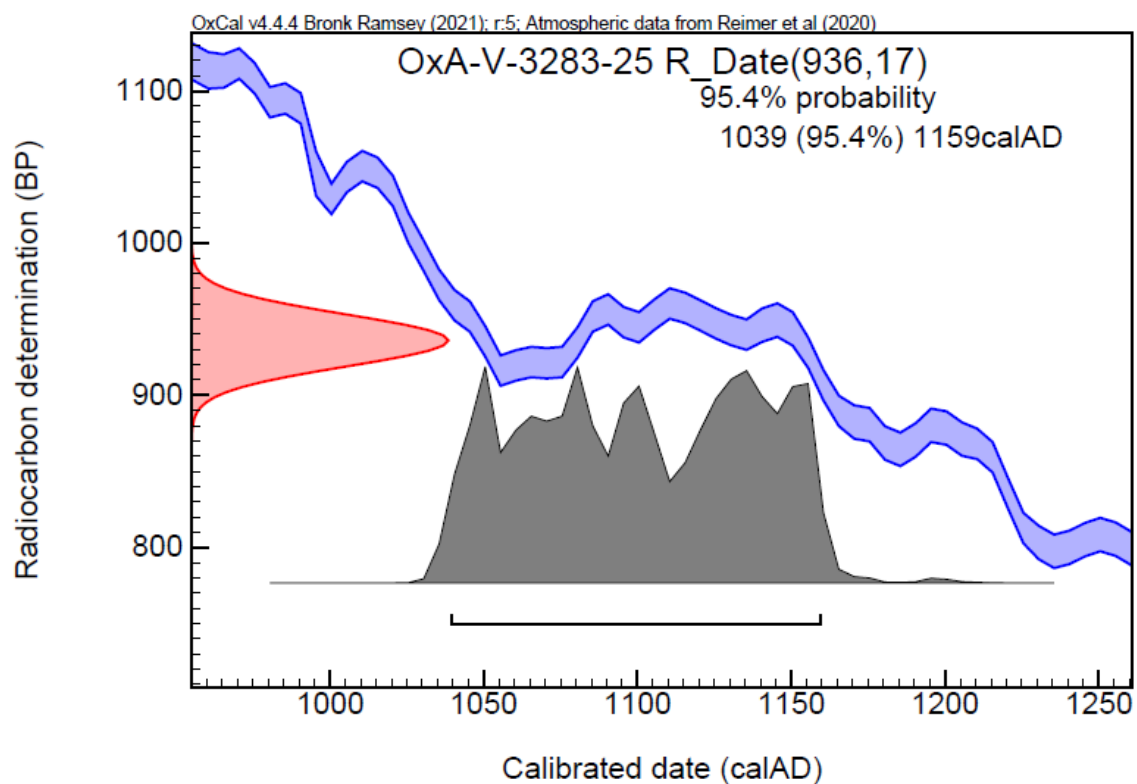
All remains uncovered in 1987 were retrieved out of context with the out-of-context pottery dating to the 16th century (Mitchell 1993); Grave orientation and depth for the majority of these individuals could only be reconstructed based on verbal accounts from the construction workers, suggesting that individuals were buried in an east to west orientation, laying in the grave face down and with hands in “odd” positions. Two graves could still be excavated and were very shallow and narrow (Mitchell 1993). A slightly more formal investigation took place at the roadworks in 1993, though it still damaged some skeletons, which were “*more lightly investigated...recorded and mostly lifted*” (Mitchell 1993). At least three, but most likely more individuals protruded into section walls, implying that the cemetery may not have been fully excavated yet. In both the northern and southern trenches two possible large “burial pits” were found. The remains of 39 individuals were uncovered in the field. During osteological analysis, it was estimated that the remains actually represent 60 individuals (Mitchell 1993). The publication mentions seven burials in east-west direction, and two in north-south direction (Mitchell 1993), but does not mention which skeleton is buried in which direction. This data in the database is retrieved from poor quality field photographs and excavation notes. No note is made, nor do site

drawings provide particular insight, into the arm positions of those buried. The suggestion is made that one large pit was dug into which the dead were laid out, followed by a covering layer of soil before interring newly deceased. A second explanation suggests that the larger pit might have frequently been partially re-excavated for the interment of new people (Mitchell 1993). This form of interment suggests a rather high death rate, which can currently not be corroborated through historical means or by dating the use of the site.

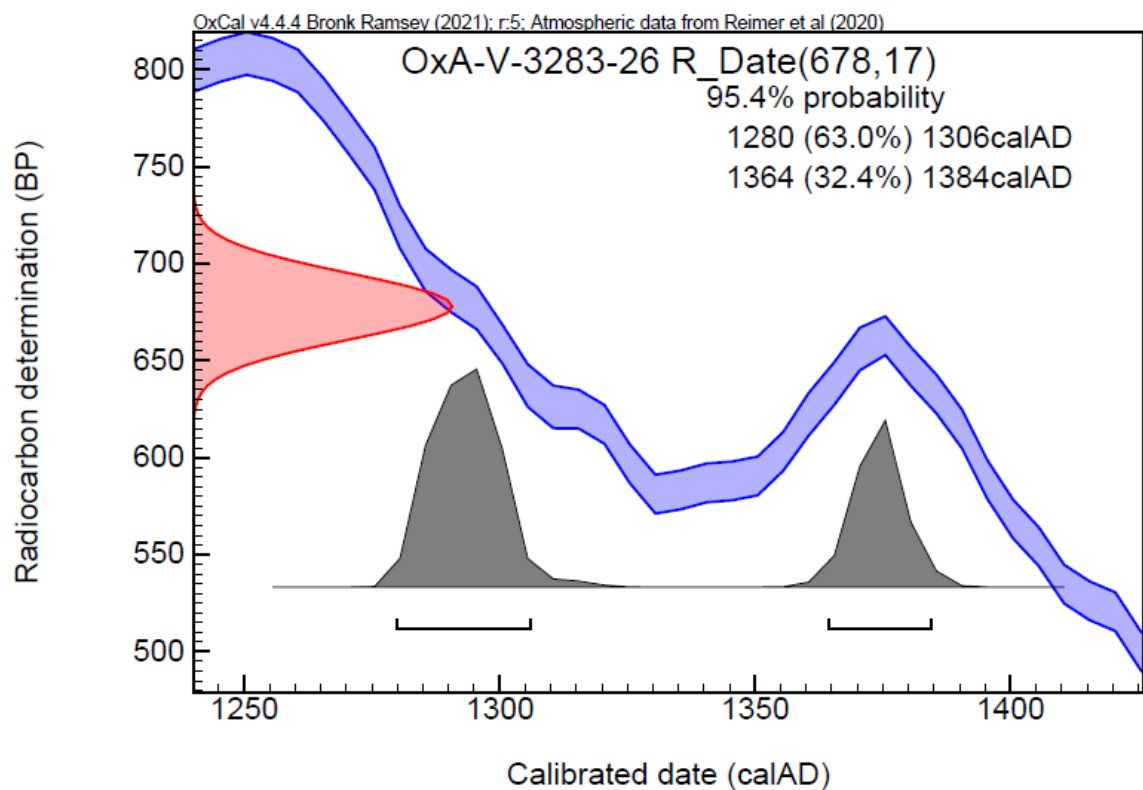
The human remains excavated in 1993 were studied by Dr. Corinne Duhig in the same year. A total of 39 badly damaged and incomplete “skeletons” were submitted for osteoarchaeological assessment. Initial analysis revealed that several of these remains consisted of multiple individuals, generally representing a single intrusive bone collected along with a more complete individual. “Refitting” and re-matching several of these commingled and spoil-heap remains could complement especially skeleton D further. The remaining individuals are combined and referred to as “skeleton 20”, containing at least seven individuals of varying ages (Duhig 1993). Assuming the cross-matches of four other spoil-heap finds to individuals are correct, the MNI sums up to 55 individuals; 60 individuals if the cross-matches are not correct. The results are discussed assuming 60 individuals (Duhig 1993). The individuals represent nine females (three probable) and ten males (four probable). Of the remaining individuals, 31 were too incomplete for sex to be estimated and ten were categorized as non-adults. The represented ages range from neonate to older adult (Duhig 1993). Twenty of the ‘individuals’ show potential signs of HD (Duhig 1993). No osteological reanalysis, or biomolecular study has been performed on these remains. The remains are currently stored and curated by the Historic Environments Team of Cambridgeshire Council, under supervision of Justin Wiles.



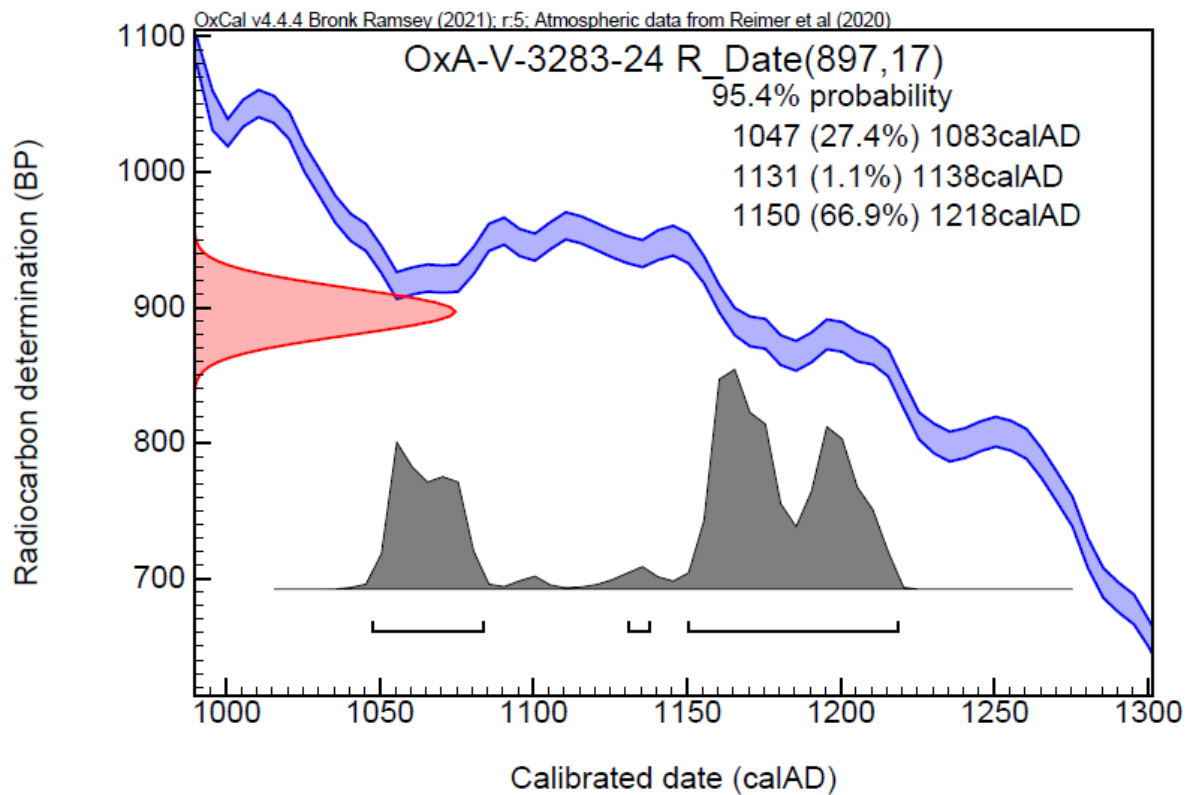
AF 2. Radiocarbon date plot for UIN156/SK15, MSL.



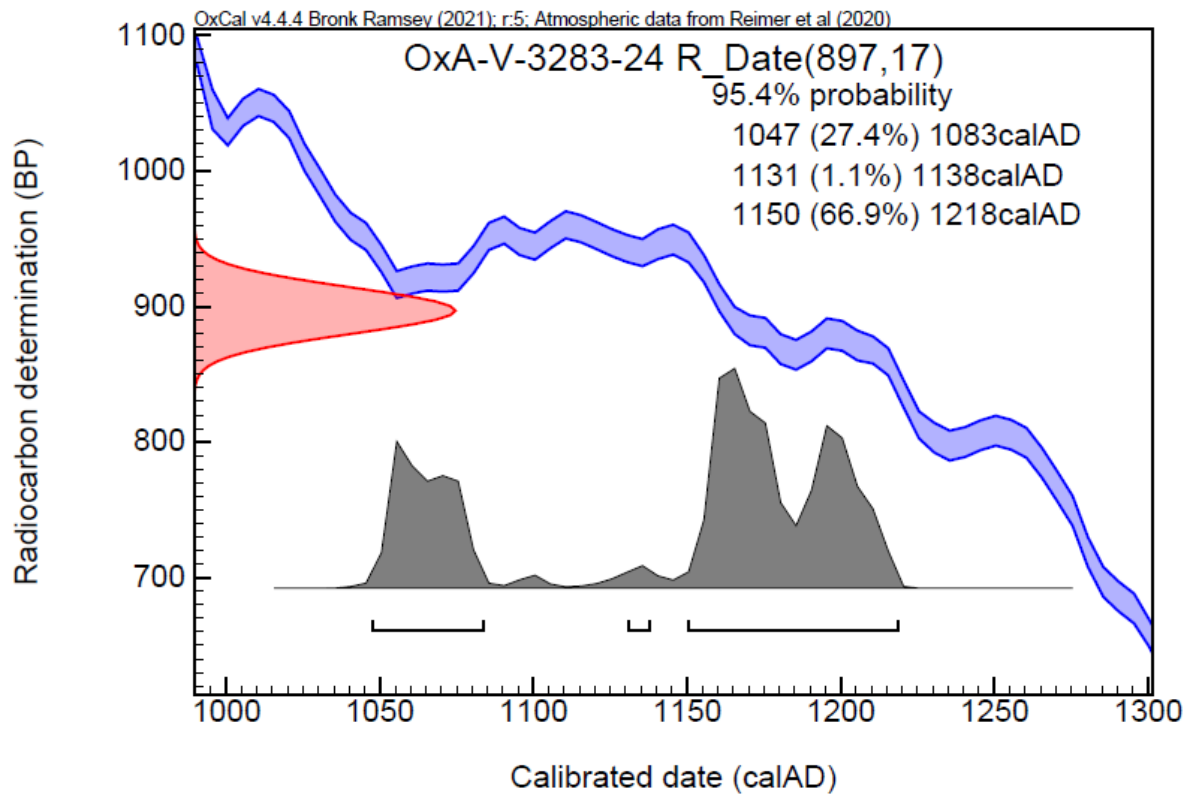
AF 3. Radiocarbon date plot for UIN129/SK19, MSL.



AF 4. Radiocarbon date plot for UIN167/SK1, MSL.



AF 5. Radiocarbon date plot for UIN61/SK X, MSL.



AF 6. Radiocarbon date plot for UIN63/SK3, MSL.

A. 3.1.1.5 St Margaret Hospital, High Wycombe (MHW)

In August 1986, when a new roundabout was built on Desborough Road in High Wycombe, Buckinghamshire, roadworkers uncovered several human bones. Although the type of roadworks and planning did not allow proper excavation of the location, the site was monitored when necessary by the Buckinghamshire County Museum with assistance of the Country Engineer Department and several members of the County Museum Archaeological Group. Their combined efforts led to the excavation of 12 fragmented and incomplete human skeletons, mostly uncovered during machine work (Farley and Manchester 1989). Very few remnants of other material culture or architecture were uncovered (Farley and Manchester 1989). The remains were uncovered at a location that is believed to have been the cemetery of a late medieval leprosarium (Farley and Manchester 1989). Several separate graves could be identified, but the majority of the individuals were heavily fragmented and incomplete due to both machine disturbance/excavation and poor overall preservation. The majority of the graves were orientated from east to west, with individuals buried on their back (supine). One individual was buried with the knees flexed and laying on their left side (Farley and Manchester 1989).

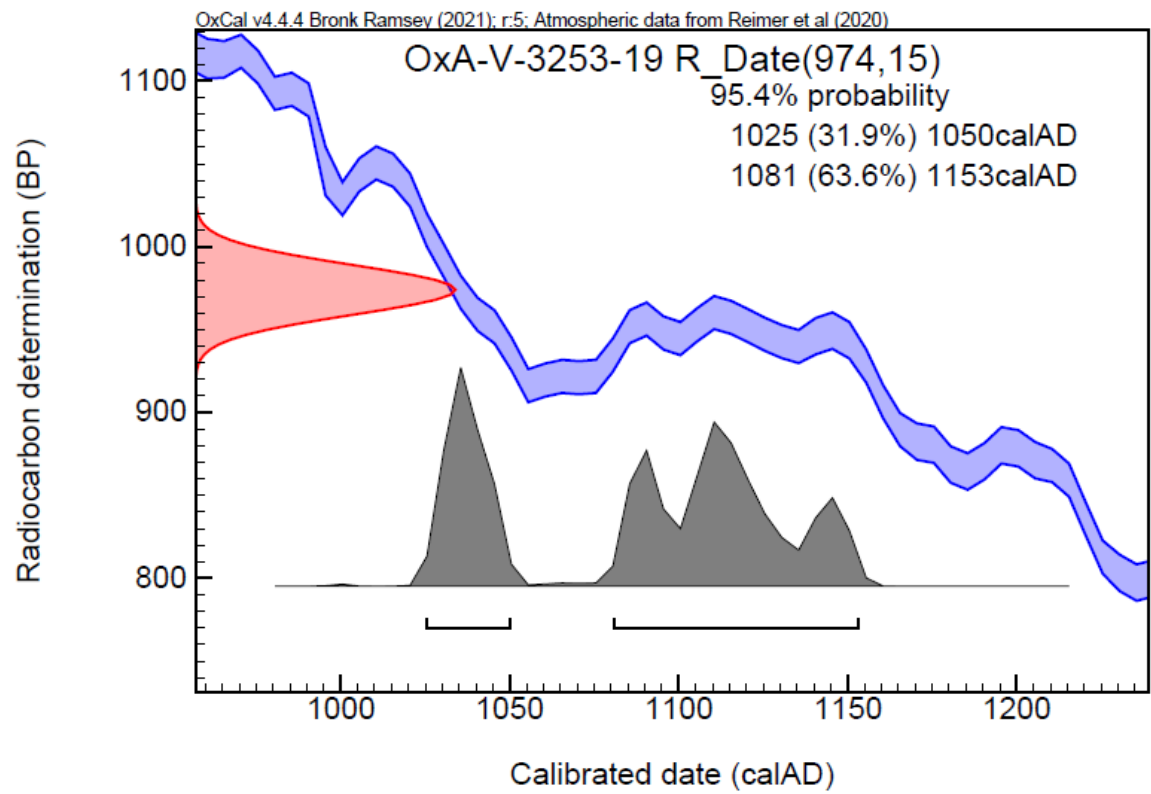
Historic records from Buckinghamshire mention a total of twelve hospitals, seven of which have at least at some point cared for 'lepers' (Sister Elspeth 1905). High Wycombe specifically

seems to have had four hospitals dedications in total, two of which – St John the Baptist and St Gilbert – probably functioned as normal hospital sites (Sister Elspeth 1905). The remaining two hospitals – St Margaret and St Giles – have both been associated with ‘leper’ care, and although historic records occasionally mention two hospitals, each with only one dedication, it has been argued that they are simply two different designations for the same institution (Ashford 1960; CPR 1905; Langley 1797). It appears, based on some sources, that the leprosarium may have consisted of a hospital (St Giles) and a chapel (St Margaret), with the names merging into one throughout the years (CCR 1905; CPR 1905; Parker 1878). St Giles was definitely functioning as hospital in 1228, when it received several letters for the protection of ‘lepers’ (1903), and was again referred to in 1233, when the hospital was given ten oak trees to make repairs to their chapel (CCR 1905). St Margaret is first mentioned on 13 May 1229, when the master and ‘leprous brethren’ are granted “*a yearly fair at the said hospital on the vigil and feast of St Margaret*” (CChR 1908; CCR 1902). The hospital is mentioned in several historic records in the 14th and 15th century regarding transfer of custody, with later sources suggesting that the hospital was dissolved between 1467 and 1597 (Langley 1797; Parker 1878). Radiocarbon dating suggests the leprosarium was in use from the late 11th to late 14th century (AF 7-AF 10).

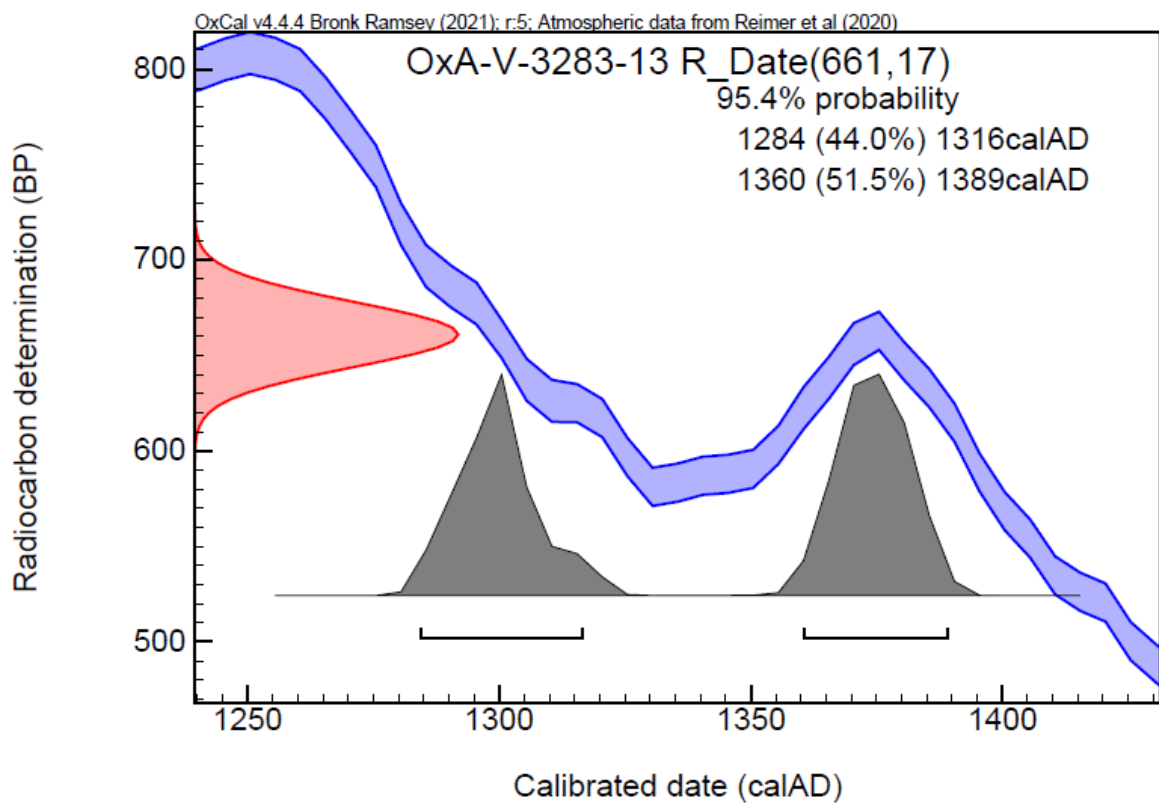
During further historic research for the site, an exhibition label was found indicating an earlier find of human remains in approximately the same location. In 1883, possibly fifty to sixty individuals were excavated when Water Lane was widened in preparation of the building of a new school. These remains were published half a century later (Colmer 1940; Farley and Manchester 1989). This newspaper article mentions that “*The bodies [...] were laid without regard to orientation and apparently side by side as closely as possible and at one time. They were probably slain in battle (some skulls shewing [sic] marks of wounds) & numbered about 45 men and 5 to 10 youths*” (Colmer 1940). A large portion of these remains were reburied in a local church and are no longer accessible. One maxillary bone, one calvaria, and several mandibles were stored and ended up in the County Council storage. A comparison of the site drawing and description by Francis Colmer to the location of the site excavated in 1986 revealed that Water Lane runs where Desborough road lies now (Farley and Manchester 1989). These additional remains were included in the osteological assessment by Farley and Manchester in 1989 and are so here.

An assessment of the minimum number of individuals permits an estimation of at least 10, possibly 12 individuals. The facial fragment/maxillary bone from the 1883 excavation shows classic rhinomaxillary syndrom. The skeletons overall show quite poor dental health, relatively young age-at-death and a high number of infections, which has been interpreted as a sign of poor hygiene and health management (Farley and Manchester 1989). It was noted by local historian Leslie Ashford (Cleaver 1986) at the time of the 1986 excavation, that both hospital names are completely absent from the historic borough’s records, and that the burgesses appear to have

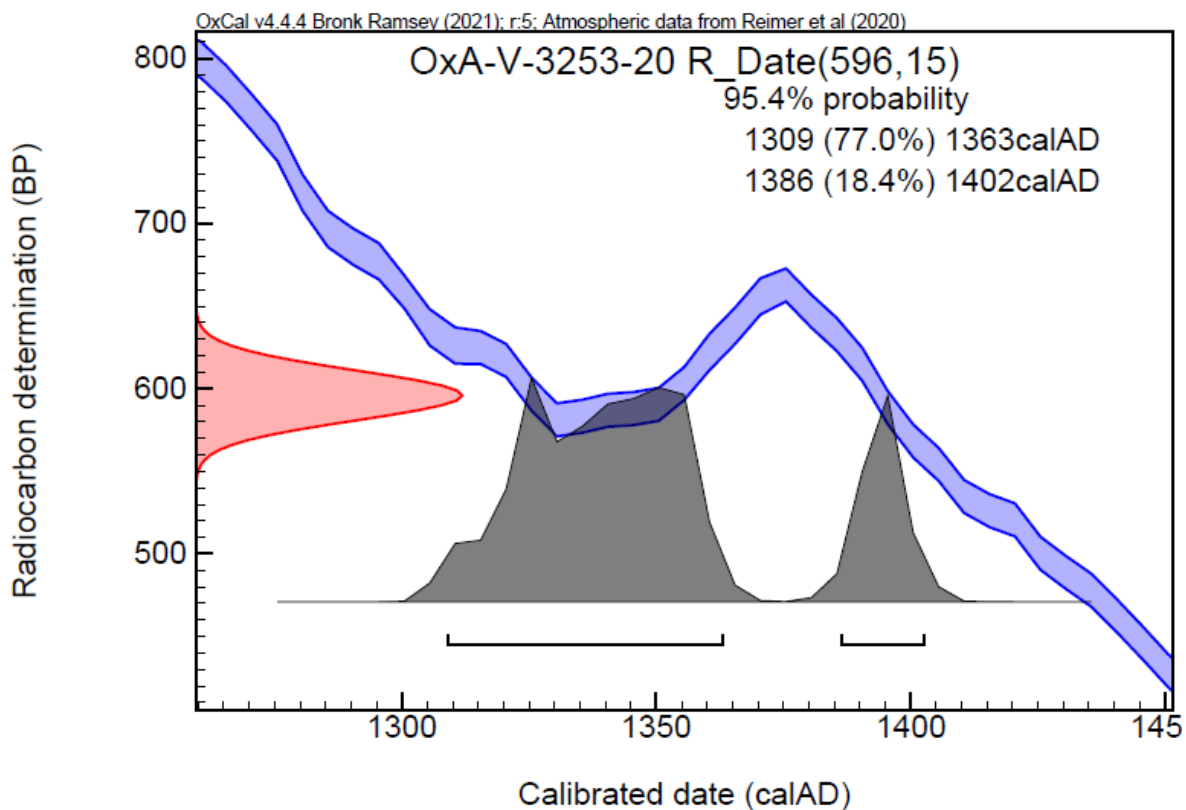
never mentioned charitable or religious boasts towards the hospital. This was accepted in the 1990s as a sign of fear and resentment for the presence of such a hospital so close to the town’s borders. This claim has not yet been supported through other means. No osteological reanalysis, or biomolecular study has been performed on these remains. The remains are currently stored and curated by Bucks Museum, under supervision of Brett Thorn.



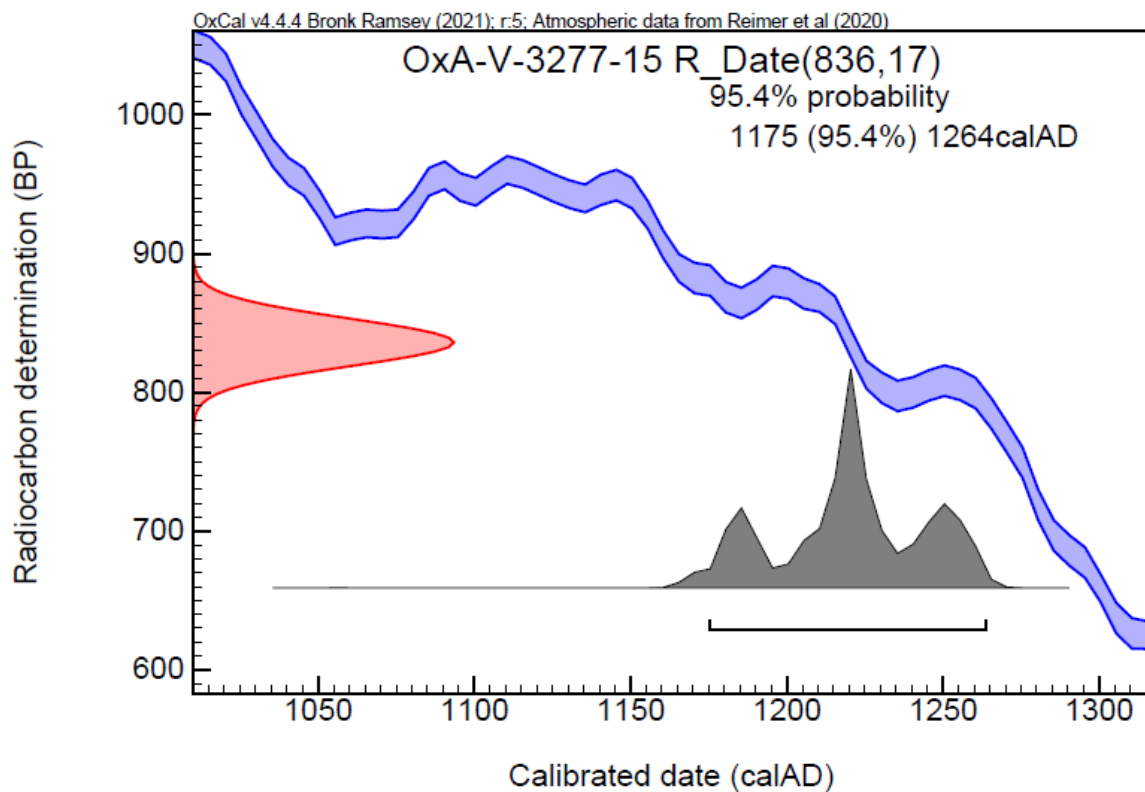
AF 7. Radiocarbon date plot for UIN25/SK1883.7, MHW.



AF 8. Radiocarbon date plot for UIN13/SK150, MHW.



AF 9. Radiocarbon date plot for UIN7/SK109, MHW.



AF 10. Radiocarbon date plot for UIN5/SK110, MHW.

A. 3.1.2 Monasteries/friaries

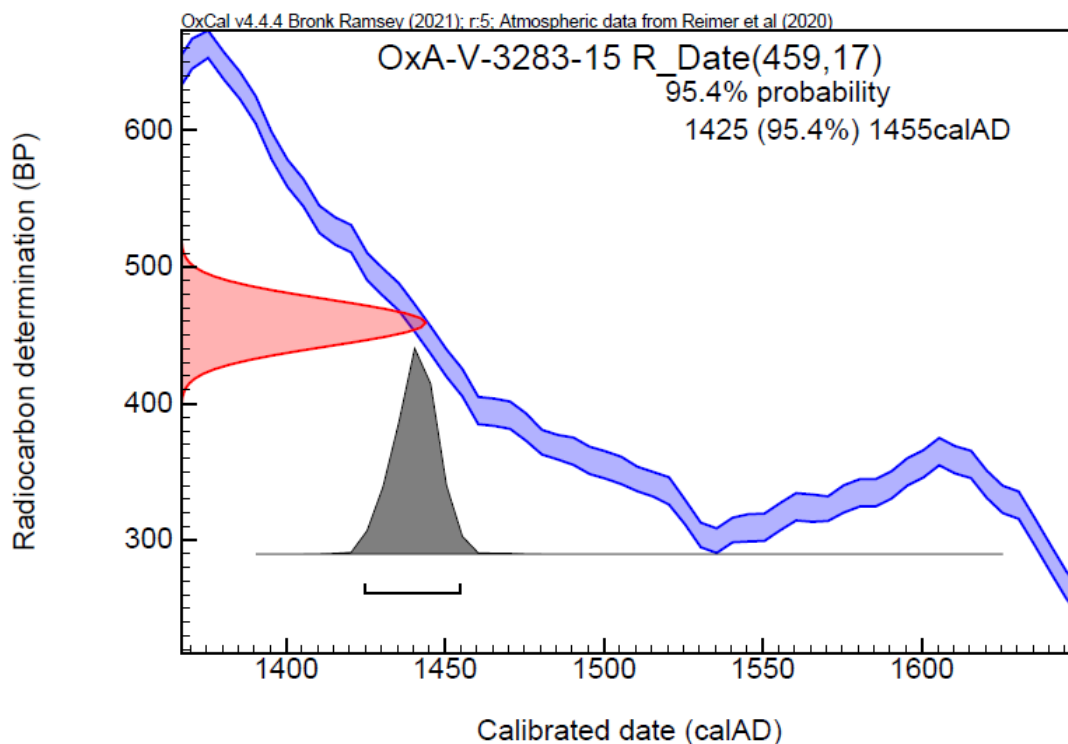
A. 3.1.2.1 Black Friars, School Street, Ipswich (IBF)

Between 1983 and 1985 redevelopment of School Street, Ipswich, triggered archaeological excavations⁸² that exposed a Dominican friary that was erected in 1263 by Henry III (Wade 2014). The friary church lay at the north end of the site and measured 54.6meter long with a 31.6meter x 15.5meter nave. A total of 265 burials were uncovered from mostly within the church, cloister walks or chapter house; the burials within the nave were densely packed and likely spanned the entire use phase of the church (Wade 2014). Female burials were found within all Friary buildings except for the Chapter house and south range of the cloister, suggesting layfolk could be buried almost anywhere (Mays 1991). The names of 15 people buried in the friary are known, though they could not be connected to specific skeletons (Palmer 1887; Palmer 1891). Rubble finds suggest some graves had elaborate slabs with bronze letters, but the majority was covered with re-laid tiled flooring and most burials showed signs of a coffin (Wade 2014). Over the course of

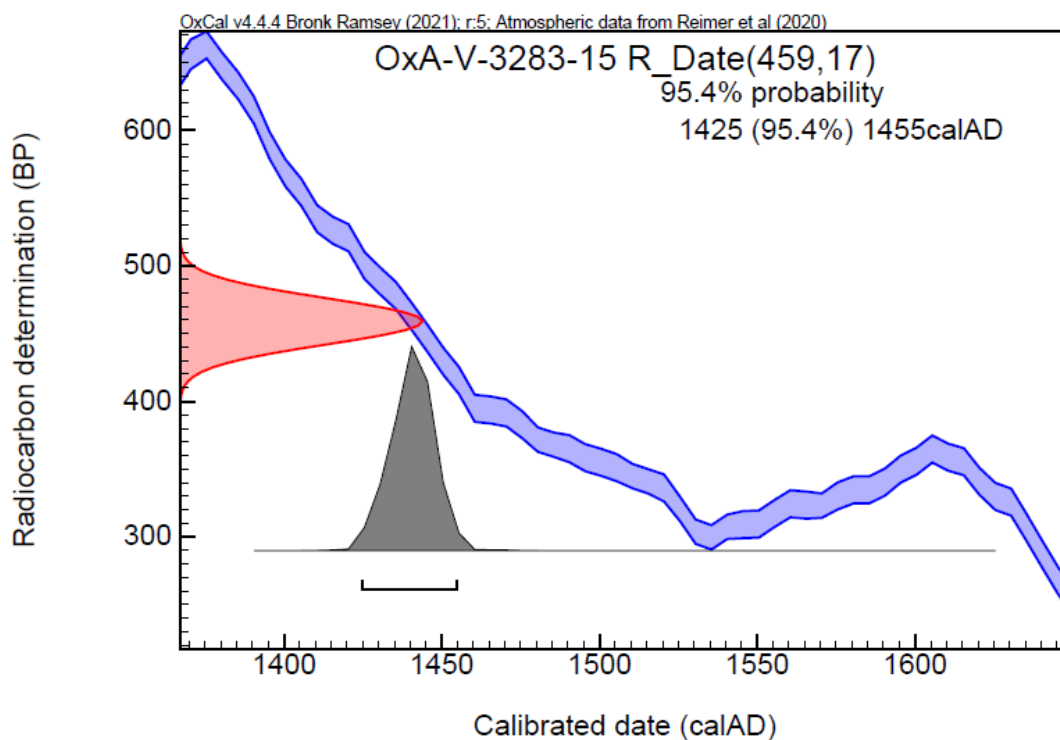
⁸² Though some reports and a site summary are available online (https://archaeologydataservice.ac.uk/archives/view/ipswich_4801_2015/index.cfm), the site has not been extensively analysed and published.

the 13th and 14th century the friary obtained increasingly more land, but changed little otherwise, and was finally dissolved in 1538 (Wade 2014).

From the 265 burials, 250 inhumations were recovered, likely representing the friars and their benefactors (Mays 1991; Wade 2014). A total of 212 adults could be sexed, representing 147 (probable) males and 64 (probable) females. Age-at-death patterns are comparable to those of other Friary sites, but, by extension, not to those of non-monastic sites (Mays 1991). Stature data is comparable to contemporary sites (Mays 1991), as are dental disease frequencies for the site's age-at-death distribution (Mays 1991). DISH is a little more frequent in this collection compared to other non-monastic sites, which is a known pattern, but other diseases show relatively comparable frequencies to contemporary sites (Mays 1991). A total of four skeletons are believed to have HD (Context 1914, 1987, 2593 and 2624; Mays 1991) though skeleton 0985 was added to the analysis in this thesis due to potential pathological lesions that could be associated with HD (Mays 1991). A leprosarium was open and running at the time of burial of these 'lepers' (<https://www.british-history.ac.uk/vch/suff/vol2/p139>). Skeleton 1914 was previously tested for *M. leprae* infection through PCR and found to be positive (Taylor *et al.* 2006), and 16 individuals have previously had C&N isotopes analysed for their ribs (Spencer 2008). The remains are currently stored and curated by Colchester and Ipswich Museum, under supervision of Isobel Keith, Anna Mercer, and Philip Wise.



AF 11. Radiocarbon date plot for UIN235/SK1914, IBF.



AF 12. Radiocarbon date plot for UIN233/SK2593, IBF.⁸³

A. 3.1.3 Hospitals

A. 3.1.3.1 St Giles by Brompton Bridge, Yorkshire (SGB)

St Giles by Brompton Bridge was uncovered between 1998-1990 in rescue excavations needed due to river erosion. The site represents a small hospital with home farm, and is believed to have

been established in the second half of the 12th century (Cardwell *et al.* 1995). Initially, the hospital only consisted of a stone chapel with a sequence of timber buildings (Cardwell *et al.* 1995), but it is believed to have expanded in the 14th century to include a hall, a guesthouse/master's lodgings, and dovecot (Cardwell *et al.* 1995). Most of its masters appear to be local men (Cardwell *et al.* 1995). The hospital was intended for its warden and sick and infirm brethren, which suits its dedication to the patron saint of cripples (Cardwell *et al.* 1995), and likely catered to both men and women (Cardwell *et al.* 1995). The hospital has been suggested to be a leprosarium, but this is based almost exclusively on its location, and no historic records or donations support this notion (Cardwell *et al.* 1995). St Giles likely stopped functioning as a hospital in the mid-15th century (Cardwell *et al.* 1995). Zooarchaeological analysis indicates the hospital was a humble and self-sufficient farming establishment with the consumption of mostly sheep, some cattle and some pig, and only very rarely, game. There may have been some skinning activities of horse, and craft based on horse and goose bones (Stallibrass 1993).

A total of 40 graves, two disarticulated burials, and disarticulated bone from other contexts was uncovered, yielding an MNI of 37 (Cardwell *et al.* 1995). This likely only represents 1/4th-1/3rd of the cemetery's burials (Cardwell *et al.* 1995). Except for one skeleton in semi-flexed position, all skeletons were buried east to west and in extended supine position (Cardwell *et al.* 1995). Three individuals represent potential HD cases, two from the late 12th-mid-13th centuries, buried close to the chapel wall (Cardwell *et al.* 1995), and one from the mid-13th-late 14th century. A total of 35 individuals could be aged (though mostly in a general 'adult' category), and 28 could be sexed (Cardwell *et al.* 1995). Periodontal disease levels were relatively low, suggesting a diet low in carbs and/or the practice of dental hygiene, though its patterns don't deviate from comparative sites (Cardwell *et al.* 1995). A number of diseases were found within the hospital, many of which would have led to difficulty in mobility (Cardwell *et al.* 1995). From this site, skeletons 1291, 1542 and 1561, all potential HD cases, will be analysed in this thesis. Nineteen individuals from this site have previously been analysed for stable dietary isotopes, and those results will be included in the comparative database (Müldner 2001). The remains are currently stored and curated by The Biological Anthropology Research Centre (BARC), under supervision of Dr. Jo Buckberry.

A. 3.1.3.2 Hospital of St John the Evangelist, Cambridge (CJH)

Renovations and building plans at St John College in Cambridge triggered a series of archaeological investigations by the Cambridge Archaeological Unit (CAU) between 2005 and 2012. Other than a dense and complex sequence of urban remains, the site of the hospital itself was uncovered (Cessford 2015). The hospital was in existence by 1204, but was potentially

established a decade earlier and was intended to care for the poor and infirm, following Augustinian rule from 1250 (Cessford 2015; Rubin 1987). It soon started to take care of poor scholars and wretched persons, but still excluded pregnant women, wounded people, 'lepers' and insane people (Rubin 1987). It appears that by the late 13th century however, it cared mostly for chantries and chaplains and a few alms people (Cessford 2015). Originally it was a relatively simple and poor complex, though it soon became a religious focal point (Cessford 2015). The hospital at least consisted of an infirmary and a chapel, which survived well into the 19th century (Cessford 2015).

Approximately 400 complete and partial burials, containing 404 individuals, were uncovered from the Hospital of St. John in Cambridge city centre, representing possibly up to 6 cemetery generations. A total of 1350 burials are likely to have taken place at this cemetery. Grave cuts appear to be rectangular in form, broadly orientated west-east, and mostly in standard sizes (Cessford 2015). Coffins appear to not have been standard, and shrouds may have been used, though not for everyone (Cessford 2015). There are fewer clothes and grave good items than can be expected on a hospital cemetery (Gilchrist and Sloane 2005), though this fits the site's uses for lay people rather than clerics (Cessford 2015). A total of 159 adults could be sexed, with 86 males and 73 females, and ages-at-death lie slightly lower than for non-hospital sites (Cessford 2015). Stature is normal for contemporary sites in the region (Cessford 2015), though stunted growth was recognized in a substantial number of non-adults (Cessford 2015). Periodontal disease and caries frequencies do not deviate substantially from comparative sites, though AMTL and abscesses are less prevalent, and calculus and EH more prevalent (Cessford 2015). Most pathological conditions found at this site are not more or less frequent than in comparative datasets (Cessford 2015).

From this site, one of the individuals that was genetically tested, came back positive for *M. leprae*, though no pathological changes were identified. Skeleton 3173.3 (skull only) is incorporated in this project. A total of 106 skeletons were analysed for carbon and nitrogen isotopes in 2013 (Price 2013), and a further 56 teeth and 114 adult ribs were analysed in the ATP project (Rose 2020; Rose 2021). A further 97 skeletons were tested for presence of *Y. pestis* aDNA, but none tested positive (Cessford *et al.* 2021).

This data is used in a comparative isotope database. Ten skeletal samples were radiocarbon dated, suggesting the cemetery started in the second half of the 12th century, and was in use until 1290-1660. The remains are currently in between storage and curation at the Cambridge Archaeological Unit and the Historic Environments Team of Cambridgeshire Council.

A. 3.1.4 ‘Other/normal’ site types

A. 3.1.4.1 Gambier-Parry Lodge, Gloucestershire (GPL)

In 1983 a mansion called Gambier Parry Lodge was demolished for the development of housing, exposing a 2nd-4th century Roman burial ground (Cameron and Roberts unpublished; Garrod 1984; Quinn 2017). A total of 94 burials were excavated, with an MNI of 78 (Cameron and Roberts unpublished; Jennings 2017), though another thesis suggests 538 remains (Quinn 2017). There is no published site report on this site; some excavation updates are available in brief reports in local archaeological society journals, but no full information on the site is available to this author. One ‘skeleton’ is considered by the curational institute to be a potential ‘leprosy’ case, consisting exclusively of a non-adult skull (named ‘Unprovinanced child skull’⁸⁴). The remains are currently stored and curated by BARC, under supervision of Dr. Jo Buckberry.

A. 3.1.4.2 RAF Lakenheath, Eriswell 2 and 3 (RAF 2 and 3)

A number of archaeological investigations have been executed within the American Air Force Base at RAF Lakenheath between 1998 and 2008, all excavated by the Suffolk County Council Archaeological Service Field Team. Most of the excavated material is still unpublished. Knowledge of the material was gained through a funding application to the Suffolk Institute of Archaeology and History, after which access was granted and the remains of one Roman and five early medieval skeletons were analysed for this thesis.

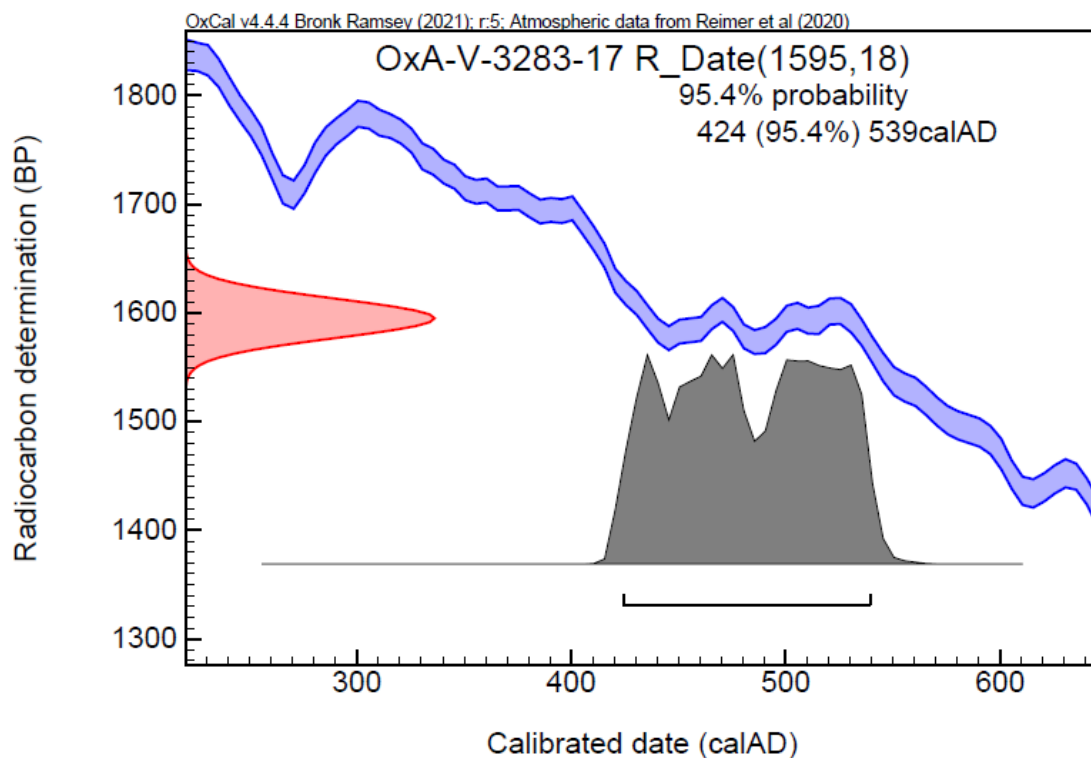
The Roman skeleton (skeleton 0007) originates from the archaeological investigation dubbed ERL112, and was radiocarbon dated to 100-199AD (*pers. comm.* Jo Caruth). No further information about the Roman part of the excavation is known to the author.

The early medieval excavations are slightly better published. Within these excavations, 450 burials dating to the 5th-8th century have been uncovered from four adjacent burial groups, dubbed ERL104 (together with ERL161), ERL046 and ERL114 (together with ERL008; Hines 2021). Excavation ERL104 has received most attention after they uncovered a ‘warrior’ buried with his horse and weaponry, though 261 graves and 17 inhumations were uncovered in total (approx. 90% of the total cemetery population; Caruth 1998; Caruth and Anderson 1999). All graves were aligned east-west, though placement becomes less organised towards the south extend, and there is some evidence for coffins through soil stains (Caruth 1998; Purcell 2012). The majority of burials date from the 6th century, though the overall range spans the 5th to 7th centuries. Males, females and children are relatively equally represented. ERL046 contains 59 graves, all aligned east-west except for one, in regular rows. Most individuals are buried supine and

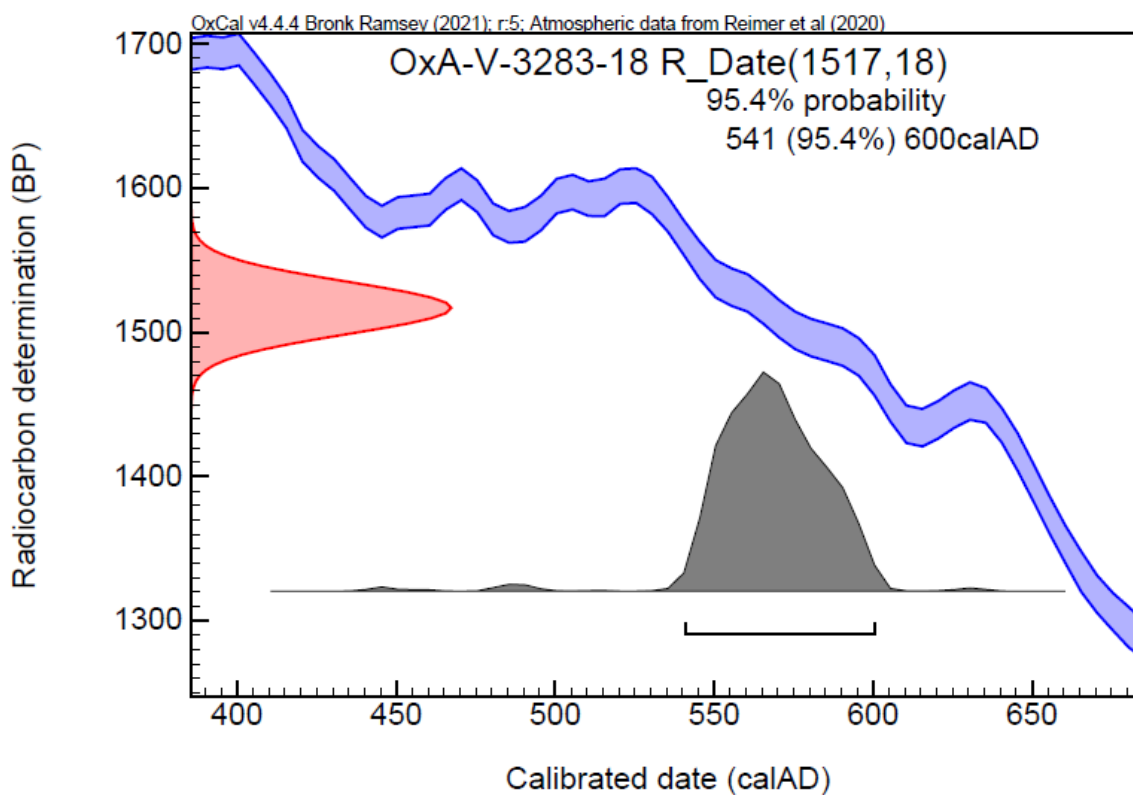
⁸⁴ Spelling copied from box with material.

extended, and bone preservation is notably lower than for ERL104 (Purcell 2012). ERL114 (reported together with ERL 008) represents 65 burials, again all supine and extended (Purcell 2012). Botanical remains from RAF Lakenheath's Early medieval assemblage suggests mostly a C3-based diet with some sloe and elderberry, while animal remains suggest some cow, sheep, horse and pig consumption, with some supplementation from hare, rabbit and fish (Caruth and Anderson 2005). The five skeletons included in this study are skeleton 130 (ERL 046), skeleton 308 (ERL 046), skeleton 301 (ERL 046), skeleton 450 (ERL 114) and skeleton 078 (ERL 104).

A large number of the remains has been subject to radiocarbon dating (Hines 2021), and exact numbers are unknown to the author, though they suggest dates ranging from 390-600AD. A number of skeletons from the site has also previously been subject to stable carbon and nitrogen analysis for an undergraduate thesis, in which five Roman and 65 early medieval individuals were included (Purcell 2012). For one individual bone collagen was analysed by (Beavan and Mays 2013), though the raw data is not published. The Purcell data is included in the comparative database. The remains are currently stored and curated by Cotswolds Archaeology in Needham Market, Suffolk, under supervision of Jo Caruth.



AF 13. Radiocarbon date plot for UIN304/SK301, RAF3.



AF 14. Radiocarbon date plot for UIN306/SK78, RAF3.

A. 3.1.4.3 Edix Hill, Cambridgeshire (EHC)

A large early medieval cemetery at Edix Hill in Cambridgeshire has been known since the 1840s, when drainage works disturbed a number of skeletons. Excavations in 1860 and 1861 uncovered 40-50 burials, with a second cemetery in 1880 revealing a further 100 burials (Malim and Hines 1998). Small metal detecting finds over the course of the 1980s led to small archaeological investigations that consistently found graves close to the surface; field surveys and excavation through open area and trenches were then planned to protect the cemetery from ploughing activity (Malim and Hines 1998). Excavation results showed occupation from the Bronze Age onwards, including several early burials (Malim and Hines 1998). One hundred and fifteen graves date the early medieval period, amounting to 148 individuals (Malim and Hines 1998). The graves are all relatively shallow but individuals overall were placed carefully into grave cuts or coffins along with personal grave goods (Malim and Hines 1998). The orientation for graves shows no particular pattern other than perhaps topographical factors, though the majority was somewhat north facing (Malim and Hines 1998). Overall, the sexes are relatively evenly represented and though subadults are underrepresented at the site, the age-at-death for adults appears normal for comparative cemeteries (Duhig 1998). Stature, dental disease and other pathologies are not notably more or less frequent in this collection than comparative ones (Duhig 1998).

The only skeleton analysed from EHC in this project is 42B (burial 18). This osteological female of 17-25 years was buried with her legs extended and her left arm over the chest together with two other skeletons (SK42A.1 and SK42A.2; Malim and Hines 1998). She represents one of two elaborate bed burials and site. She was quite tall at 170cm (Malim and Hines 1998) and shows probable signs of HD (Duhig 1998), which was genetically confirmed in the ATP project (*pers. comm.* Dr. Sarah Inskip). She was buried with a number of grave goods, including a glass bead, two knives, a comb and a fossil sea urchin (Malim and Hines 1998).

A large number of individuals has been radiocarbon dated ($n > 18$) over the years, and genetically tested for diseases, though some are not (yet) published (Bayliss *et al.* 2016; Bayliss *et al.* 2013b; Elliott *et al.* forthcoming). Incremental dentine isotope work was done for 8 individuals by (Kendall *et al.* 2020), bone collagen was analysed for 9 by (Beavan and Mays 2013; Mays and Beavan 2012), and a further 38 teeth and 38 adult rib fragments were analysed by (Rose 2021). The bulk isotope values previously obtained from this site will be included in the complementary dataset of this thesis. The remains are currently in between storage and curation at the Cambridge Archaeological Unit and the Historic Environments Team of Cambridgeshire Council, under supervision of Justin Wiles.

A. 3.1.4.4 Eccles, Kent (ECK)

An early medieval cemetery in Eccles, Kent (O.S. Grid Ref. TQ 722605) was excavated in 1970 and 1972 for the Eccles Excavation Committee (Manchester 1981). The remains were reported to be buried in haste and date to the second half of the 7th century (per. comm. with Detsikas the excavator in Manchester 1981). Not much information is available on this site other than a brief publication on the osteology of an HD case (J11/J15(i))⁸⁵, which is reported to be relatively incomplete, and represent a 25-30 year old male with a height of 172cm (Manchester 1981). No research has been performed on this skeleton since this publication. The remains are currently stored and curated by BARC, under supervision of Dr. Jo Buckberry.

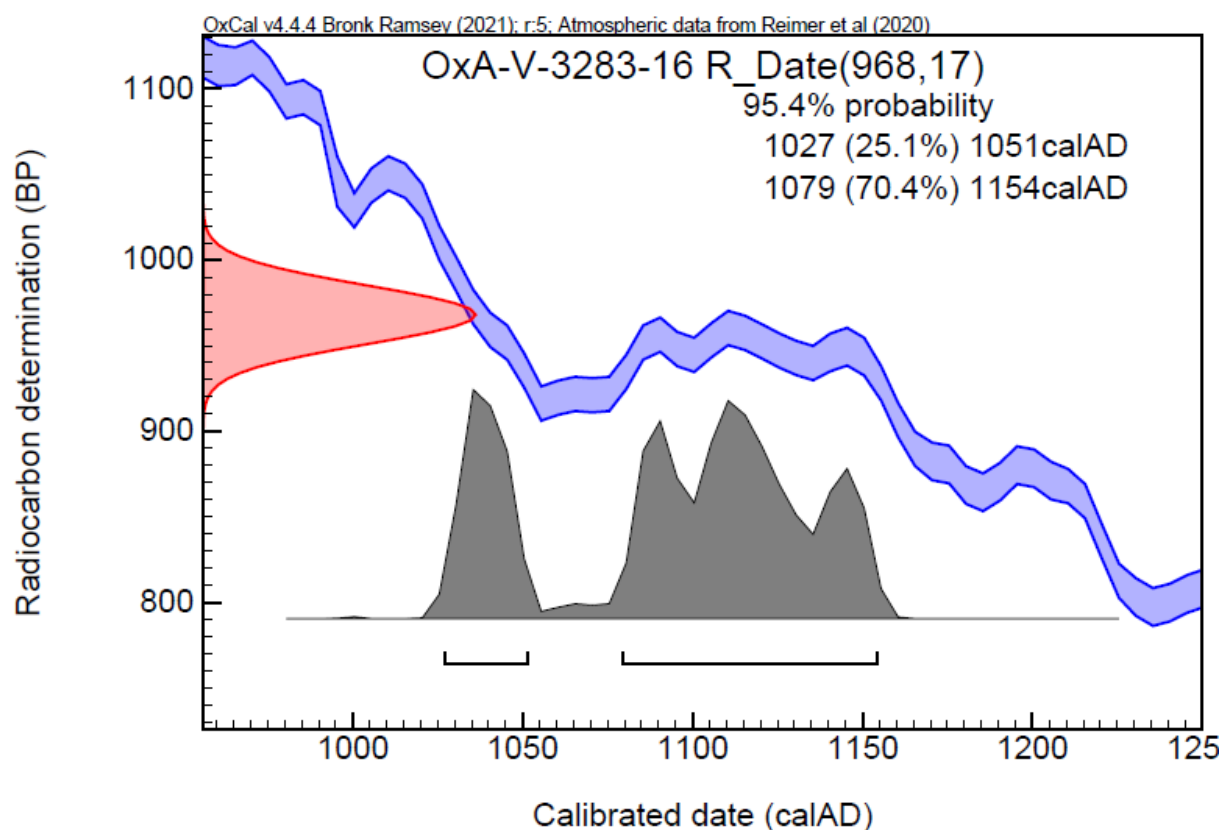
A. 3.1.4.5 Early medieval (Anglo-Saxon) cemetery, School Street, Ipswich (IAS)

The early medieval cemetery at School Street in Ipswich⁸⁶ originates from the same excavation as described above for the Blackfriars from School Street in Ipswich. No church was found during the excavation, but a cemetery was uncovered (Mays 1989). Excavation of this cemetery yielded 95 individuals from 89 discrete burials dating to the 10th-11th century (Mays 1989). The extend of the cemetery was only confirmed in one, potentially two directions, suggesting more skeletons might have originally been buried in the cemetery (Wade 2014). The majority of burials was west-east but urial direction changes gradually to northeast-southwest on the eastern edge, suggesting that the burials focused on a feature/focus rather than the north. Their density increases going north (Wade 2014). Graves overall tended to be shallow and densely packed, leading to occasional poor preservation and incompleteness of skeletons (Wade 2014). Overall preservation and completeness is, however, not bad (Mays 1989). Apart from three crouched burials, the majority were in supine position. A total of 63 individuals could be sexed, representing 35 males and 28 females, with no deviating pattern in the ages represented (Mays 1989). Statures, dental health or other pathologies are not substantially different in this collection over comparative material (Mays 1989). Two individuals (skeletons/contexts 2174 and 1392) were considered possible HD cases in the original publication. These are included in this study together with skeleton/context 1076, for who skeletal pathologies were described that could be related to HD (Mays 1989). To the knowledge of this author, no reanalysis or biomolecular research has since been performed

⁸⁵ This skeleton, along with many other Eccles cases, has been renumbered and re-boxed several times, leading to mix-ups of numbers and skeletons. The description from the original publication was compared to the remains in this box, which was numbered differently (J15(ii)) and considered to represent the correct skeleton.

⁸⁶ Though some reports and a site summary are available online (https://archaeologydataservice.ac.uk/archives/view/ipswich_4801_2015/index.cfm), the site has not been extensively analysed and published.

on these remains. The remains are currently stored and curated by Colchester and Ipswich Museum, under supervision of Isobel Keith, Anna Mercer, and Philip Wise.



AF 15. Radiocarbon date plot for UIN4/SK1392, IAS.

A. 3.1.4.6 Raunds Furnells, Northamptonshire (RFN)

The town of Raunds has seen substantial development, leading to a large number of archaeological investigations, eventually collated into the Raunds Area Project (Boddington 1987). The area has seen extensive habitation since the sixth century and the town likely had a small church from the 9th century (Boddington 1987). The church saw several expansions and likely got a proper graveyard when the chancel was added in the Late Saxon period (Boddington 1996). This early church was demolished in the Late Saxon period and replaced by a larger example (Boddington 1996). Graves were mostly placed quite orderly, though when space became limited the placement became more haphazard (Boddington 1996). There appears to be some differences in where males and females were buried (Boddington 1996). Most individuals were placed in coffins, wrapped in shrouds, or had a cover over their grave, with an orientation aligned with the axis of the church, heads mostly to the west (Boddington 1996). All individuals were buried in supine positions, and nearly all with extended legs and most with arms at the sides (Boddington 1996). The majority of burials had some form of stone arrangement in their grave, including head pillows, ear muffs, face covers or stone arrangements over the body (Boddington 1996). Some individuals

might have had organic pillows under their heads or feet, and no grave goods were identified (Boddington 1996).

A least 363 individuals are recovered from the cemetery, which likely served a population of 40 (Boddington 1996). Approximately 1/5th of the graves were intercut by later graves, though only 10% showed disturbance of bone (Boddington 1996). The preservation of bone overall was good (Boddington 1996; Powell 1996). Age and sex show no abnormal pattern, though there are slightly more males than females (Boddington 1996). Stature appears slightly low for males, but not outside of a normal range for the period (Powell 1996). Caries and abscesses were present a little less than expected, but other (dental) pathology frequencies do not show up more or less in this collection than comparative sites (Powell 1996). One case, skeleton R5046 was originally reported as a potential HD case. This 17-25 year-old male has extensive signs of infection in the right limb (femur, tibia, fibula) and the left lower limb (tibia), tarsals, metatarsals and rhinomaxillary region (Powell 1996). On other skeleton, R5029, was reported by the curator as another possible case and therefore included in this thesis.

A total of 9 samples have been radiocarbon dated, which suggest the cemetery was in use between the 10th and 11th century (978-1040AD). Incremental dentine isotope analysis for carbon and nitrogen has been performed for 18 non-adults and 5 adults from RFN (Beaumont *et al.* 2018). Bulk rib samples for carbon and nitrogen isotope analysis were taken from 60 individuals up to age 7, and 20 adult females (Haydock *et al.* 2013). Some samples were also taken by (Howcroft 2008), but this thesis nor the data is available to me. The remains are currently stored and curated by The Biological Anthropology Research Centre (BARC), under supervision of Dr. Jo Buckberry.

A. 3.1.4.7 All Saints by the Castle, Comet Place, Cambridge (CPA)

All Saints by the Castle is a small parish church in Cambridge that lies on the north side of the river Cam, and was in use from AD940-1100 to 1365. Its associated cemetery served a mix of socioeconomic classes, and both the rural and urban population from the parish (Cessford *et al.* n.d.; Rose 2020). Over 200 skeletons were recovered during excavations between the 1970s to 1990s (Cessford *et al.* n.d.; Cessford *et al.* 2021; Mulder *et al.* 2019), likely representing approximately 6-8.5% of the total burials (Cessford *et al.* n.d.). The vast majority of burials showed a practice fitting for the time period. One skeleton was identified as a potential HD case, and was buried in the only example of a wooden coffin (Cessford *et al.* n.d.). This individual (burial 183) is included in this project. Cambridge did have a 'leper' chapel (St Mary Magdalene), but it stopped supporting those with 'leprosy' in the 1250s (Cessford *et al.* n.d.). The majority of the site information is as of yet unpublished, but has been part of elaborate and detailed study in the After

the Plague project, including isotope analysis of carbon and nitrogen from dentine samples from 31 individuals and rib samples from 43 individuals, oxygen and carbon from enamel for 34 individuals and strontium enamel from 23 individuals (Rose 2020). Another 49 skeletons have been sampled for aDNA analysis in this project, with one testing positive for *Y. pestis* DNA (Cessford *et al.* 2021). Eight skeletons were radiocarbon dated suggesting the cemetery was in use between the late 10th and mid-14th century (Cessford *et al.* n.d.). The remains are currently stored and curated by the Duckworth Laboratory, under supervision of Dr. Trish Biers. The carbon and nitrogen data from these samples will be incorporated into the supplementary dataset.

A. 3.1.4.8 Church End, Cherry Hinton, Cambridgeshire (CHI)

Excavations in the village of Cherry Hinton in the late 1990s, especially around Church End road, have revealed substantial Saxo-Norman occupation, including a small timber church with an extensive cemetery (Cessford and Dickens 2005), that likely served the local rural settlement. The 670 burials, representing 980 individuals, found at this cemetery date to approximately 940/990 to 1120/1170 AD (Cessford n.d.). The majority of the grave cuts were rectangular, with rounded corners, with individuals aligned west-east in extended supine position (Cessford n.d.). Graves intercut regularly, though not extensively, with a uniform density across the site (Cessford n.d.). Burials with less standard features mostly include the incorporation of head niches, head supports, and stones around the feet, or evidence of coffins, none of which are unknown to this period (Cessford n.d.). Cattle and sheep/goat are the most prevalent species among the animal remains (Cessford and Dickens 2005). Two skeletons were considered to be potential HD cases, sk2529 and sk2012, are included in this thesis.

Several skeletons have been radiocarbon dated, suggesting a foundation date in the late 9th-late 10th century and a closure date in the early 10th-11th century (Cessford n.d.). The majority of the sites information is as of yet unpublished, but has been part of elaborate and detailed study in the After the Plague project, including isotope analysis of carbon and nitrogen of dentine samples from 40 individuals and rib samples from 47 individuals, oxygen and carbon from enamel for 40 individuals and strontium enamel from 28 individuals (Rose 2020). The carbon and nitrogen data from these samples will be incorporated into the supplementary dataset. The remains are currently in between storage and curation at the Cambridge Archaeological Unit and the Historic Environments Team of Cambridgeshire Council, under supervision of Justin Wiles.

A. 3.1.4.9 St Martin's Church, Wharram Percy, North Yorkshire (WPY)

Wharram Percy is Britain's best known deserted village from the medieval period, being subject to long term archaeological investigation between 1950 and 1990 by the Deserted Medieval Village Research Group (Wrathmell 2012). Located in North Yorkshire, this cemetery likely contains not just the villagers of Wharram Percy, but of neighbouring villages as well (Wrathmell 2012), and contains a mix of social classes (Wrathmell 2012). The cemetery was likely in use from 940-995AD (Bayliss *et al.* 2013a), but continued well after 1500 (Wrathmell 2012), and contained approximately 670 burials. Stature and (dental) pathology does not differ substantially between the Wharram Percy population and comparative rural datasets, though spinal conditions suggest they lived hard working lives (Mays 2007).

Several children from the site have previously been analysed for rib versus molar isotope values of carbon and nitrogen for dietary reconstruction (Fuller *et al.* 2003; Richards *et al.* 2002). Individual WP708 has not been part of these analyses but has been analysed for *M. leprae* presence through PCR analysis (Taylor *et al.* 2021; Taylor *et al.* 2006). This individual has been radiocarbon dated to 960-1100.

A. 3.1.4.10 Hereford Cathedral Close, Hereford (HCH)

In 1993, Hereford Cathedral wanted to erect a new building to re-house some of their treasures, triggering archaeological excavation at the building site (Stone and Appleton-Fox 1993). Desk-based assessment, borehole survey and geophysical survey all preceded the excavation (Stone and Appleton-Fox 1993). This excavation unearthed a large part of the original cemetery, among other things. The cathedral was likely founded in the late 7th, early 8th century (Stone and Appleton-Fox 1993), and after 1108, had exclusive burial rights for Hereford (Barrow 1992).

Over a thousand burials were recovered from single interment burials ($n=896$) and mass graves ($n=189$), with over 5000 individuals recovered from re-burial pits, all dating to the early medieval to medieval period (Stone and Appleton-Fox 1993). Burials were tightly packed and the large charnel pit ($n\approx 5000$) from the 12th century suggest there was pressure on space from early on (Stone and Appleton-Fox 1993). On average, preservation of the human remains was fair, though only 13% was complete (Pinter-Bellows 1993). The majority of individuals were buried west-east in supine position with the legs extended, though arm placement varied more in the later medieval period (Stone and Appleton-Fox 1993). Only few of the graves were stone-lined or had pillow stone, all likely dating to the early medieval period (Stone and Appleton-Fox 1993). The mass graves ($n=3$), containing at least 200 individuals, are considered to be 14th century plague pits. The interment of individuals in these large pits still follows standard burial practices to a large

extend (Stone and Appleton-Fox 1993). From an early, brief report based on in-situ observations, there appear to be substantially more adults ($n=618$) than non-adults ($n=233$), while the sexes are relatively equally represented (199 males: 223 females; Pinter-Bellows 1993). Stature appears slightly shorter than expected, though pathologies do not seem more or less frequent in this population than comparative ones, including signs of early life stress and/or malnutrition (Pinter-Bellows 1993; Stone and Appleton-Fox 1993). Caries are relatively uncommon in this population (Pinter-Bellows 1993). Eight individuals were considered potential HD cases by the curator and are included in this thesis (H640, H1552, H2455, H2544, H2569, H3078, H3726, and H4243).

Zooarchaeological and archaeobotanical remains suggest a diet consisting mostly of barley and oat, supplemented by fruit and vegetable, and animal protein (cow, sheep, pig and wild animal remains) (Pinter-Bellows 1993; Stone and Appleton-Fox 1993). A recent study (Franklin *et al.* 2023) has re-examined the plague pits macroscopically, and 12 individuals from these pits have previously been tested for presence of *Y. pestis* genetic material (Haensch *et al.* 2010). Pit II has also been radiocarbon dated to 1335 $\pm$ 54 years (Haensch *et al.* 2010). The remains are currently stored and curated by BARC, under supervision of Dr. Jo Buckberry.

AT 4. Overview of sites used for supplementary dataset of stature data. Site abbreviation only provided if the site is part of the current project as well.

Site	Site abbreviation	Date	Site type	Stature available for	Reference(s)
Arbury		Roman	Other	4	Duhig (Pers. Comm between Dr. Sarah Inskip (ATP) and Dr. Corinne Duhig
Fenstanton		Roman	Other	14	Pers. Comm. Dr. Sarah Inskip (ATP)
Duxford		Roman	Other	12	Pers. Comm. Dr. Sarah Inskip (ATP)
Edix Hill	EHC	Early medieval	Other	36	Pers. Comm. Dr. Sarah Inskip (ATP) and Benjamin Neil (CAU)
Rivenhall		Early-High medieval	Other	32	(O'Conner 1984)
Burwell		Early-high medieval	Other	60	(Duckworth 1927)
Gamlingay		Early-high medieval	Other	11	Pers. Comm. Dr. Sarah Inskip (ATP)
Augustinian New Museums		High-late medieval	Monastery/friary	41	Pers. Comm. Dr. Sarah Inskip (ATP) and Benjamin Neil (CAU)
Church End, Cherry Hinton	CHI	High-late medieval	Other	30	Pers. Comm. Dr. Sarah Inskip (ATP) and Benjamin Neil (CAU)
St John Hospital	CJH	High-late medieval	Hospital	88	Pers. Comm. Dr. Sarah Inskip (ATP) and Benjamin Neil (CAU)
Comet Place	CPA	High-late medieval	Other	60	Pers. Comm. Dr. Sarah Inskip (ATP) and Benjamin Neil (CAU)
Hemingford Quakers		Post medieval	Other	7	Pers. Comm. Dr. Sarah Inskip (ATP)
Holy Trinity Church		Post medieval	Other	6	Pers. Comm. Dr. Sarah Inskip (ATP)

AT 5. Overview of sites used to build a comparative dataset of isotope data.

Site	Site abbreviation	Date	Site type	n of individuals with bulk dentine C&N	N individuals with incremental dental C&N	N individuals with rib C&N	N individuals with other bone C&N	Reference(s)
Timberhill	JTN	Early-High medieval	Leprosarium	0	0	0	18	[Bayliss <i>et al.</i> 2009]
Winchester	MMW	High medieval	Leprosarium	0	10	44	12	(Cameron 2014b; Filípek 2021; Taylor <i>et al.</i> 2013)
Hospital of St James and St Mary Magdalen, Chichester	JMC	High-late medieval	Leprosarium	0	0	6	0	(Spencer 2008)
St Leonards, Peterborough	SLP	High and Late medieval	Leprosarium	30	0	30	0	Pers. Comm. Dr Sarah Inskip and Dr. Charlotte Roberts
St James Abbey, Northampton	SJA	High-Late medieval	Monastery/friary	0	0	23	0	(Spencer 2008)

Site	Site abbreviation	Date	Site type	n of individuals with bulk dentine C&N	N individuals with incremental dental C&N	N individuals with rib C&N	N individuals with other bone C&N	Reference(s)
Blackfriars, Friary, Gloucestershire	BFG	Late medieval	Monastery/friary	0	0	9	0	(Spencer 2008)
Blackfriars Friary, Ipswich	IBF	Late medieval	Monastery/friary	0	0	16	0	(Spencer 2008)
Merton (Augustinian) Priory, London	AMP	High-late medieval	Monastery/friary	0	0	6	0	(Spencer 2008)
St Giles, Brompton Bridge	SGB	High-late medieval	Hospital	0	0	17	0	(Müldner 2001)
Hospital of St John the Evangelist, Cambridge	CJH	Late medieval	Hospital	62	0	153	0	(Price 2013; Rose 2020; Rose 2021)
RAF Lakenheath 2	RAF2	Roman	Other site type	0	0	5	0	(Purcell 2012)
RAF Lakenheath 3	RAF3	Early medieval	Other site type	0	0	65	0	(Purcell 2012)
Edix Hill, Barrington A	EHC	Early medieval	Other site type	37*	0	42	0	(Rose 2020; Rose 2021)
Church End, Cherry Hinton	CHI	Early-high medieval	Other site type	39*	0	46	0	(Rose 2020; Rose 2021)

Site	Site abbreviation	Date	Site type	n of individuals with bulk dentine C&N	N individuals with incremental dental C&N	N individuals with rib C&N	N individuals with other bone C&N	Reference(s)
Comet Place	CPA	Early-high medieval	Other site type	31*	0	43	0	(Rose 2020; Rose 2021)
Hereford Cathedral, Hereford	HCH	High-late medieval	Other site type	0	0	4	0	(Spencer 2008)
Raunds Furnells	RFN	High-late medieval	Other site type	0	0	19	0	(Müldner 2001; Müldner 2013; Müldner and Richards 2006)
Wharram Percy	WPY	Late medieval	Other site type	18	38 ^b	25	0	(Fuller <i>et al.</i> 2003; Richards <i>et al.</i> 2002)

*Teeth not samples in 1mm increments, but in three sections. Individuals whose teeth are cut into two or three segments are not considered incremental (1 slice per mm in this project) and the largest section is chosen as the value incorporated into the comparative dataset.

A. 3.2 Methods

This appendix outlines, in detail, the osteological, isotopic and genetic methods applied to human remains in this thesis. For the osteological methods a laboratory manual was produced with relevant images. See A. 3.3 Laboratory manual for this information.

A. 3.2.1 Biological profile

A. 3.2.1.1 Skeletal inventory

The human skeleton consists of several bones, each referred to as an 'element'. Having an accurate record of how frequently each element is present in an archaeological assemblage allows for a better estimate of the minimum number of individuals in case of commingled or highly fragmented and poorly excavated remains, and is essential in understanding the true distribution of pathology or anomalies (crude prevalence vs true prevalence). For example, prevalence of HD lesions in the rhinomaxillary region should only be estimated based on the number of nasal aperture regions available for study. If, for instance, the entire cranium is absent, this means the rhinomaxillary region is unobservable and might or might not have displayed pathological changes. Including these individuals in prevalence rates could underestimate true prevalence. There can be several reasons why a skeleton may not consist of the expected number of elements, including individual variation, post-mortem loss, and/or commingling of elements due to the method of inhumation, taphonomic processes, excavation and storage (White *et al.* 2012).

The inventory will assess the state of completeness of all bones in the human body, including epiphyses. Each of these bones or bone segments will be recorded as either A (element absent), C (element complete, or >75% preserved), P (element partially complete, or 25-75% preserved) or F (element only represented by a fragment, or <25% preserved). Fragmentation will be scored as slight (less than 10% of skeleton fragmented), moderate (10-25% of skeleton fragmented) or severe (>25% of skeleton fragmented). These individual estimates of completeness will be arbitrarily combined to form an overall completeness estimate (Brickley 2004a; Buikstra and Ubelaker 1994). This study uses a standard inventory based on the BABA0 guidelines (Brickley 2004a; Brickley 2019), but will additionally record the presence of 'Nasal aperture left', 'Nasal aperture right', 'Maxillary alveolar bone left' and 'Maxillary alveolar bone right'. Although these sites are already included in the scoring of the presence of the maxilla as a whole, a fragment of this element might not include the piriform aperture or tooth socket sites necessary for a detailed palaeopathological assessment of Hansen's Disease.

A. 3.2.1.2 Dental inventory

As for the skeletal inventory, an accurate estimate of the number of teeth present, and which teeth are present, aids the reconstruction of true disease prevalence and can highlight which teeth are most affected by disease or dental health. For every individual, several inventories will be made with regard to dentition. Firstly, it must be recorded whether teeth are present or absent. There are a number of reasons why teeth may not be present: teeth can be lost during life (*ante-mortem* loss), after life (*post-mortem* loss), they can be unerupted or impacted at the moment of death, or be congenitally absent. A clear difference between these kinds of absence can only be made based on alveolar morphology. In case both the tooth and its socket are missing, it is not possible to ascertain the cause for its loss, and the tooth will be recorded as 'absent'.

A. 3.2.1.2.1 Dental pathology

The assessment of dental pathology comprises of a scoring of the absence/presence and, where applicable, severity of several conditions. These include dental calculus, (alveolar) bone loss (due to gingival infection), caries, granulomas and abscesses. These conditions will be recorded per tooth, following the FDI numbering system (Leatherman 1972). Recommendations from the BABAO guidelines for scoring systems (Antoine 2019; Connell 2004) were not followed for each condition because their level of complexity was not required for this study. The recording protocols used in this study will be detailed below.

Dental plaque, which is a sticky and colourless substance consisting of a biofilm of bacteria, often includes protein, food remnants and a combination of living and perished microorganisms (Hillson 2005). Although this dental condition is common in modern populations as well, it is frequently remedied by adhering to dental hygiene practices. In the past, this biofilm often persisted in the dentition long enough to mineralize (i.e. turn into calculus) and presents a rich source of information about the human microbiome and immunity (Warinner *et al.* 2014b; Warinner *et al.* 2015). Especially because levels of dental plaque are hypothesized to be higher in individuals with HD infection (Costa *et al.* 2003; Jacobson 1973; Núñez-Martí *et al.* 2004), it is essential to score the severity and location of this condition. For documenting the presence and severity of calculus deposits, the method developed by (Brothwell 1981) and recommended by BABAO (Roberts and Connell 2004) using a 5-score system will be used.

Long-term presence of dental plaque can cause irritation and eventually infection of the gums (Hillson 2005; Ogden 2008). This condition, referred to as gingivitis, can in turn lead to periodontitis: an inflammation of periodontal tissues that leads to absorption or loss of the alveolar bone (Ogden 2008). Although (Brothwell 1981; Roberts and Connell 2004) describe the recording of bone loss solely through measurement of the section of exposed tooth roots, (Ogden

2008) suggests that root exposition could be the result of compensatory eruption due to dental wear. In this study therefore, the illustrations and descriptions from (Ogden 2008) will be used. In addition, it will be recorded whether this alveolar bone loss occurred horizontally or vertically. Loss of bone in the horizontal plane signifies a loss of bone at successive or all tooth positions. Vertical alveolar bone loss describes the isolated loss of bone at one or two teeth. The scoring of horizontal bone loss will exclude the maxillary frontal incisors and canines from evaluation due to absorption of this region in Hansen's disease infection (e.g. Møller-Christensen 1961). The scoring of this pathological change will be further discussed in section A 3.2.1.6 (Pathology methods).

Caries are a demineralization of enamel, cementum and dentine caused by the fermentation of bacterial carbohydrates by bacteria present in dental plaque (Hillson 2005). Although prevalence is expected to be low prior to the industrial revolution, caries frequencies increase with agriculturalization due to the introduction of sugars and more starch in the human diet, with a particularly sharp rise around the Early medieval period (Brothwell 1981; Hillson 2008; Ogden 2008). As the occurrence of caries within a population is related to diet (high intake of sugars and starch) and dental health (Hillson 2005), analysing changes in their frequencies in this study would allow a comparison in diet between groups, and perhaps allow an assessment of the progression of leprosy. For dental caries, the location will be recorded for each inspected tooth, following (Buikstra and Ubelaker 1994) with minor adjustments (see laboratory manual 3.3 Laboratory manual). These adjustments permit an assessment of which interproximal surface is affected, and adds the option to score caries occurring on the root, rather than just the crown. The number of caries per tooth will also be recorded.

Abscesses are an infection or inflammation of the pulp chamber of a tooth, and can be identified by the presence of a drainage hole in the alveolar bone at the approximate height of the apex of the tooth root. The number and location of abscesses will be scored for each tooth position, following (Buikstra and Ubelaker 1994).

Granulomas are a response of the immune system to 'imprison' bacteria or other foreign substances and are frequently encountered throughout the body in HD sufferers. They can occur in the dentition by inflammation moving down through the root canal after the pulp has died off. Often, such a granuloma develops slowly and leads to sclerotic bone formation around the tooth apex, without swelling of the alveolar bone (Hillson 1996). In such cases, granulomas are difficult to diagnose without radiographic imagery (Hillson 1996). However, on occasion the granuloma grows close to the surface of the alveolar process, slowly thinning the bone until it is worn away by the soft-tissue growth. In such cases, the roots of teeth can be exposed by a lytic lesion with thin rims, contrary to abscesses, which leave a blunt edge (Hillson 2005). Granulomas will be scored with the same method used for the recording of abscesses.

A. 3.2.1.2.2 Enamel hypoplastic defects

Enamel hypoplasia (EH) is not part of dental pathologies because the condition is not related to dental health or hygiene, but rather reflects periods of physiological stress when the tooth enamel was still forming (up to 7 to 18 years of age; AlQahtani *et al.* 2010; Hillson 2008). The number of lesions reflect the number of episodes, and the location of lesions can indicate at what age they were experienced.

The development of tooth crowns happens gradually. Anywhere along this developmental curve an individual can suffer from physiological stress (dietary deficiency, infection, trauma, etc.; Hillson 2008). During times of severe or chronic physiological stress, energy can be redirected from growth to survival (Hochberg 2012; Hochberg and Belsky 2013; Smith and Tompkins 1995). When this redirection occurs during the development of the tooth crowns, the formation of enamel (amelogenesis) is affected. Once normal growth is restored after such a period, defects can develop. Hypoplastic defects are represented by hard and well-mineralized enamel that is laid down in a thinner layer than the surrounding enamel (Hillson 2005). This can happen in different forms, often described as linear or pitted (Hillson 2005; Hillson 2008). The width of a linear defect is related to the number of perikymata – naturally occurring incremental growth lines visible in the enamel as a result of circadian, or daily biological, rhythms - laid down during the formation, directly reflecting the duration of the period of disrupted enamel deposition (Hillson 2005). The sizes of furrows relate to the location on the tooth, with perikymata being more closely packed near the cervix for example (Hillson 2005). The defect of one tooth can occasionally be linked to defects on other teeth that were forming at the same time, hinting towards a systemic disturbance (Hillson 2005).

Hypoplastic defects are often used to deduce childhood health of a population (Hillson 2008; Larsen 1997; Miszkiewicz 2015; Roberts and Manchester 2005). As the dentition itself develops fairly parallel to calendar age – regardless of any physiological stress - the location of these defects can be related to approximate ages at which the stress must have occurred (Buikstra and Ubelaker 1994; Hillson 2008; Reid and Dean 2000; Reid and Dean 2006). However, this relationship is complex and nonlinear (Hillson 2008; Liversidge *et al.* 1993; Liversidge and Molleson 1999; Reid and Dean 2006).

During this study, hypoplastic defects will only be recorded if they can be felt with the thumbnail and/or that are visible using a hand-held loupe (Buikstra and Ubelaker 1994; Roberts and Connell 2004). More detailed methods of recording and measurement are available, for instance using microscopy and histology, but are not available to this study and the level of precision is not deemed necessary for the aims set forward therein. For each tooth, the type, location and severity of defects will be recorded as described in the BABAO guidelines (Buikstra

and Ubelaker 1994; Roberts and Connell 2004), adding 'cuspal' (i.e. pitted on the majority of the cuspal surface) as an extra hypoplastic type (Ogden *et al.* 2007). Total number of lesions and average lesion severity per dentition will be calculated, and all analyses will be based on the total number of lesions and their overall severity. This choice is made in part because some collections for which physical access was not possible do not describe lesion type, and in part because there are so many lesion types that it would split the data up in too many categories for any meaningful statistical results to be obtained.

A. 3.2.1.2.3 Means of analysis

Teeth are observed and recorded as a maximum of 32 permanent and 20 deciduous teeth. Because not every individual in an archaeological assemblage will have all their teeth or dental positions, such dental data is often statistically compared between groups based on true prevalence of individual teeth. For a comparison between HD and oral health, for example, this would require assigning each individual tooth an HD diagnosis and lesion score. This approach neglects to recognise the dentition as an environment in which the health of any one tooth is likely influenced by the health of all others. Moreover, as every individual likely has at least a few teeth that appear relatively healthy and a few teeth with e.g. carious lesions, this approach would likely underestimate any patterns between HD and oral health. In order to analyse relationships between oral health and HD, this data will therefore be analysed both by individual tooth and by dentition as a whole.

Biomedical research into oral health and HD tends to take several different approaches, including the use of the Decayed, Missing, and Filled Tooth (DMFT) index (Matos *et al.* 2018; Sousa Pereira *et al.* 2013; WHO 2013) and plaque control index/Visible plaque index (Matos *et al.* 2018). In both these approaches, the severity scores (e.g. for plaque/calculus, periodontal disease) for individual observable teeth are added together and divided by the number of observable teeth, essentially creating an average. In some studies, these averages are then categorised into an ordinal scoring system (WHO 2013). Though none of these methods can be used as is, the concept of such an average allows for the consideration of the dentition as a whole, rather than as (max) 52 individual data points per individual.

Periodontal disease scores, calculus scores and EH severity scores will be combined and averaged. These average scores will be re-categorised into severity levels (see AT 6). It is these scores that will be used for whole-dentition statistical analyses.

AT 6.Criteria for whole dentition scores for calculus, periodontal disease and EH severity.

	Calculus	Periodontal disease	EH severity
Absent	0.0	1.0	0.0
Very slight	>0.0-0.5	>1.0-2.0	>0.5-1.0
Slight	>0.5-1.0	>2.0-2.5	>0.5-1.0
Moderate	>1.0-1.5	>2.5-3.0	>1.0-1.5
Severe	>1.5-2.5	>3.0-3.5	>1.5-2.5
Very severe	>2.5-3.0	>3.5-4.0	>2.5-3.0

DMFT is normally expressed as the number of teeth lost, carious or filled, under the assumption that modern dental studies can always base this number on 28 teeth in total (third molars excluded) (WHO 2013). As archaeological samples can also have post-mortem lost teeth and absent teeth, this study calculates the percentage of lost teeth rather than the sum. However, the percentage of AMLT would be based on the number of lost teeth divided by the number of tooth positions and present teeth. The number of carious teeth would be divided by the number of observable teeth. As carious lesions cannot exist/be observed in teeth already lost, AMLT and carious teeth can be added together and divided by the sum of observable sites. The percentage DMT is therefore calculated using the following formula:

$$\%DMT = \frac{AMLT + \text{carious teeth}}{\text{The number of observable dental positions} + \text{the number of observable teeth}}$$

This value will then be analysed both as is (a percentage score), and as a categorised variable (following (WHO 2013). The categories will be as follows: scores between >0.0-0.05 = very low, >0.05-0.1 = low (1), >0.1-0.15 = moderate (2), >0.15-0.25 = high (3), >0.25-0.5 = very high (4), >0.5 = extremely high (5).

A. 3.2.1.3 Sex estimation methods

Sex estimation will only be performed on individuals aged 18 years and over, who have had the chance to develop sexual dimorphism during puberty (Brickley and Buckberry 2019). All sex estimates will result in one of five scores based on the masculinity or femininity of the expression of skeletal sites: F (hyperfeminine), PF (probable female), I (indeterminate), PM (probable male), and M (hypermasculine), adapted from the numerical scoring system in (Buikstra and Ubelaker 1994).

A. 3.2.1.3.1 Pelvic sex estimation methods

Although sexual dimorphism in humans is lower than in most other primates, there is enough morphological variation present in the pelvis, mostly due to its functional difference between females and males (Fischer and Mitteroecker 2015) to allow estimates to be made. The BABAO

guidelines refer to (Buikstra and Ubelaker 1994) for sex estimation methods. These, and other frequently used methods, are summarized and tested for accuracy using aDNA results for a medieval British collection (Inskip *et al.* 2018), and those latter methods will be used here. For all of the methods described below, comparative images indicating the location of the trait and its different expressions will be provided in the laboratory manual 3.3 Laboratory manual.

The Phenice traits represent three features on the pubic bone that have been found to estimate sex with high accuracy in individuals with known sex from archival records (MacLaughlin and Bruce 1990) and aDNA research (Inskip *et al.* 2018). The method scores three sites - the ventral arch, the subpubic concavity and the ischiopubic ramus - as either 'Female', 'Indeterminate' or 'Male'. All other methods used to estimate sex based on the pelvis and skull use the 5-score system described above. The methods include the greater sciatic notch (Buikstra and Ubelaker 1994), the subpubic angle (Ferembach *et al.* 1979), and the iliac curvature. The preauricular sulcus (MacLaughlin and Bruce 1990) and arc composé (Ferembach *et al.* 1979) are excluded based on relatively low reliability and a bias in accuracy between the sexes (Inskip *et al.* 2018). Descriptions of the application and images of male-female differences are available in the laboratory manual in 3.3 Laboratory manual.

A. 3.2.1.3.2 Cranial sex estimation methods

The second main site for sex estimation is the skull. The methods listed in (Inskip *et al.* 2018) will be applied here as well. Generally speaking, males have more robust skulls with stronger muscle attachment sites, whereas women have more gracile skulls. For all methods described below, comparative images are available in the laboratory manual 3.3 Laboratory manual.

All cranial methods score the variation in sexual dimorphism on the 5-score system described above. These methods include the supraorbital margin (Buikstra and Ubelaker 1994), the glabella aspect (Buikstra and Ubelaker 1994), the mastoid process (Buikstra and Ubelaker 1994), the zygomatic arch extension (Keen 1950), the nuchal plane (Buikstra and Ubelaker 1994), frontal bossing (Schwartz 2007) and forehead inclination (Ferembach *et al.* 1979). For the mandible, the following attributes are scored: mental eminence (Buikstra and Ubelaker 1994), overall mandibular morphology (Brickley 2004b), and gonial flaring (Ferembach *et al.* 1979).

A final sex estimate will be obtained by combining the estimates based on the pelvic and cranial methods. This combination of methods will not use a quantifiable technique, but will be done based on the experience of the author. More emphasis will be put on the estimation based on pelvic methods due to their association with a functional difference in females and males, and

their demonstrated level of accuracy (Buikstra and Ubelaker 1994; Đurić *et al.* 2005; Inskip *et al.* 2018; Meindl *et al.* 1985; Thomas *et al.* 2016b).

A. 3.2.1.4 Age-at-death estimation methods

Age-at-death estimations based on human skeletal remains aim to estimate chronological age from skeletal developmental and degenerative processes, which make up the biological age. Due to a number of intrinsic and extrinsic factors, including but not limited to genetic, hormonal, environmental, nutritional and social factors, this chronological age can deviate from biological age. Age-at-death of archaeological individuals is therefore always an estimate rather than a determination, and presented as a mean age with a standard deviation (Buckberry and Brickley 2019).

A multitude of methods exist that can help estimate age-at-death, focusing on different elements of the skeleton. In case a skeleton is (nearly) complete, a fairly precise estimate can be made. The more elements are missing, the less precise the estimate becomes. Although individual specific age estimates are preferred, less precise age categories are employed to facilitate demographic comparisons. These categories include: foetus (before birth/*in utero*), infant (0-3 years), child (4-12 years), adolescent (13-17 years), young adult (18-35 years), middle adult (35-50 years), and old adult (50+ years). The categories under 18 years old can be combined into 'non-adult' and the remaining three make up the 'adult' (18+ years) segment of the population. These two classifications can be used in case a more accurate estimate cannot be obtained (Buckberry and Brickley 2019; White and Folkens 2005).

Age-at-death estimation is most accurate for individuals who died around birth, and decreases in accuracy and precision as age increases. This is related to the influence of different intrinsic and extrinsic factors: around birth, most growth is based on genetic predisposition. Throughout non-adult life, trauma, malnutrition and chronic disease can require the body to redirect energy meant for development to ensure survival (Hochberg 2012; Hochberg and Belsky 2013; Smith and Tompkins 1995). This redistribution can impact the rate of growth (Mays 2015). Such a potential growth pause and other idiosyncratic factors can cause differences between biological and chronological age. Nonetheless, there is a reasonable parallel between these two ages, allowing for an estimation of chronological age with a margin of error. After growth is complete, much less is dependent on genetic factors. The physical changes that can be used to estimate age-at-death after growth is complete, are related to 'wear' and degeneration. This degeneration of (im)movable joints is strongly dependent on the amount of physical activity during life and other extrinsic factors. The relationship between biological age and chronological age thus becomes bigger, creating larger age categories.

A. 3.2.1.4.1 Age-at-death estimation methods non-adults

Between conception and 18-25 years of age the human body undergoes a considerable amount of growth, which can be used to estimate age-at-death. At birth, a skeleton consists of far more bony elements than an adult skeleton, with more emerging during the first months of life. Every long bone will at some point consist of at least one diaphysis and two epiphyses, which grow on their own until they fuse into one bone during the adolescent period. This allows for the estimation of age both based on the length of bones and the developmental state of the epiphyses.

Additionally, an individual is born with the deciduous dentition partially formed. These teeth will develop further and erupt during the first years of life, while the permanent teeth are simultaneously being formed within the jaws. The sequence of growth and eruption of both the deciduous and permanent dentitions can be used to estimate age-at-death. Importantly, periods of malnutrition, chronic disease or other physiological stress can cause delayed growth of bones, but are much less likely to make a significant impact on the development and eruption of teeth (Elamin and Liversedge 2013; Liversedge 2015). As it is generally accepted that in most archaeological individuals, skeletal growth lags behind compared to dental development (i.e. stunted growth), the emphasis in estimating age-at-death in juveniles will be put on dental development and eruption (Buckberry and Brickley 2019). Age-at-death estimation based on the dentition will weigh more heavily in the final age-at-estimation than skeletal development.

A. 3.2.1.4.1.1 Dental development

Both the development and eruption of teeth is strongly related to chronological age in the first years of life. For British collections, The London Dental Atlas can be used (AlQahtani *et al.* 2010), allowing age-at-death estimation from 28 weeks *in utero* to 24 years of age. This atlas was developed by analysing 704 British white and Bangladeshi individuals. These comprised both archaeological materials ($n = 176$) up to a known age-at-death of 2 years, and radiographs for known-age living individuals ($n = 528$) from 2 years onwards. In comparative tests to the 'Schour and Massler' and 'Ubelaker' methods, this British-specific atlas proved most accurate, although all three methods slightly underage older individuals (AlQahtani *et al.* 2014).

The method is applied by scoring the development of the crowns and roots of teeth. A 13-score system including images is provided, with separate tables for single-rooted and multiple-rooted teeth. For each tooth and developmental stage combination a median, minimum and maximum age is provided. The estimates for all available teeth will be combined to form one dental development age. Additionally, (AlQahtani *et al.* 2014; AlQahtani *et al.* 2010) provide an overview of dental eruption stages and their associated age range. The age estimations from dental development and dental eruption will be combined.

A. 3.2.1.4.1.2. Skeletal development

Age-at-death estimations based on skeletal remains will be mostly performed using long bone lengths, and the development and fusion of epiphyses, described and explained in (Scheuer and Black 2016), although the BABA0 guidelines briefly mention pubertal stage assessment (Buckberry and Brickley 2019), this falls outside of the scope of this study and will not be recorded.

For the ages of 3-12 years, the development and fusion of vertebral elements, sacral segments and the occipital bone, and humeral, radial, ulnar and pelvic epiphyses is used. Long bone measurements for individuals under the age of 3 will be based on (Buikstra and Ubelaker 1994), and for individuals aged 12 years or over, bone measurements will be based on the BABA0 standards (Brickley 2004c; Brothwell and Zakrzewski 2004). Measurements for individuals aged between 3 and 12 years will focus on those needed to apply the methods described in (Scheuer and Black 2016). For each measurement range, the associated ages in weeks or years are provided by (Scheuer and Black 2016). These measurements generally include the clavicle, scapula and long bones – with and/or without epiphyses. Between the age of 13 years and the ages when most long bones fuse (17-25 years), age estimates will be based on the fusion of the humerus, radius, ulna, clavicle, scapula, femur, tibia, fibula, os coxa, calcaneus and sacral segments.

The age estimates derived for all long bone development stages and measurements will be combined to form one final skeletal age. This skeletal age will be combined with dental age to form a final age estimate for non-adults. In case a large difference exists between dental and skeletal age, preference will be given to dental age. A substantial difference between these two ages will be noted as a case of stunted growth in the pathology section. Final age estimates always include an error range based on those provided by the separate estimates.

A. 3.2.1.4.3 Age-at-death estimation methods near/young adults

Human skeletal growth continues until to the late twenties and into the early thirties, when several epiphyses fuse in the vertebrae, sacrum, clavicle, pelvis and in the skull. Assessing these later stages of skeletal development make it possible to distinguish between young adults and older adults. After these sites are fused, skeletal growth is complete and deterioration becomes the only remaining avenue for age-at-death estimation. The following development points will be assessed:

Annular rings – rings of tough ligament fibres that connect the soft intervertebral disc to the body of the vertebrae – fuse onto the vertebrae between the ages of 14 and 27 years (Albert 1998; Albert and Maples 1995; Albert *et al.* 2010; Cardoso and Ríos 2011). Ages assigned to the

different stages of the fusion of these annular rings are derived from protocols outlined in (Albert and Maples 1995).

The sacrum consists of five separate vertebrae that fuse together in late adolescence. Generally speaking, if the fusion of sacral vertebrae 2-5 is not yet complete, an individual is regarded as younger than 20 years. If the space between sacral vertebrae 1 and 2 is unfused, an individual is generally 27 years of age or over. By age 25, most individuals show complete fusion of all sacral vertebrae (Cunningham *et al.* 2016). The medial end of the clavicle remains undeveloped until approximately 18 years of age, although an epiphysis can start emerging between 16-21 years of age. The epiphysis will be fully formed by 24-29 years and will fuse to the medial surface between the ages of 17-27 in females and 19-25 in males (Cardoso 2008; Cardoso and Ríos 2011). The fusion of the body of the sphenoid to the occipital bone – the spheno-occipital synchondrosis – occurs during the adolescence phase, around the same time when the permanent dentition is nearly completely erupted, at 11-16 years for females and 13-18 for males (Cunningham *et al.* 2016). Although the jugular growth plate between the petrous pyramid and occipital is discussed in the BABAO guidelines (O'Connell 2019), the method is excluded here due to the wide age range of fusion (usually 22-36 years, sometimes 50 years, sometimes never), not providing any detail to an early adult age estimation.

A. 3.2.1.4.4 Age-at-death estimation methods adults

As mentioned in section 3.1.5, once growth is complete, genetic factors play less of a role in the process of ageing and degeneration becomes the primary focus of age-at-death estimations. The joints generally assessed for degeneration are classified as cartilaginous, meaning that they allow for some movement, although not as much as for example the scapula-humerus (synovial) articulation. The low level of movement results in degeneration due to use, but the strain on the joints is low-energy and semi-continuous, such as that caused by breathing and locomotion. By using these cartilaginous joints rather than synovial, or movable, joints, the effects of interpersonal differences in activity on degeneration are limited. This enables more accurate age-at-death estimations. The sites used to estimate adult age-at-death are the pubic symphysis, the auricular surface and the sternal rib end. Most of the methods detailed below employ a stage-based system, where degenerative changes are described and clustered in a series of successive stages. Each stage corresponds to an age-at-death range.

Age-at-death estimation using the degeneration of the pubic symphysis – the midline articulation of both pubic bones – follows protocols outlined by (Brooks and Suchey 1990). Although this method was recently revised (Harnett 2010) and considered more accurate (Merritt 2013), this revision has not yet been tested on a British (medieval) collection. For this study, the

appearance of the pubic symphysis is therefore compared to the stage description and images provided by (Brooks and Suchey 1990) and (Buikstra and Ubelaker 1994). Pubic symphysis casts are not available for this study. Each stage corresponds to an age range for females and a range for males.

The auricular surface – the articulation between the posterior aspect of the os coxa with the sacrum – provides another site for age-at-death estimation. Individual traits of degeneration (transverse organization, surface texture and microporosity) are each scored individually and combined into a composite score, grouped to form seven age stages (Buckberry and Chamberlain 2002). Although a test of the method on another known-age British collection showed that these stages are best combined into three broader ones to facilitate accuracy (Falys *et al.* 2006), this latter argument has not yet been found in other collections (due to lack of trying). The method by (Buckberry and Chamberlain 2002) will therefore be applied here, but will carry less weight in the final age estimate.

The sternal end of the rib undergoes movement mostly because of breathing, thus representing a steady and constant type of movement that is not substantially influenced by difference in activity patterns or intensity. The method for scoring the degeneration of sternal rib end was originally based on the fourth rib only (İşcan and Loth 1986; İşcan *et al.* 1986; İşcan *et al.* 1984; İşcan *et al.* 1985; İşcan *et al.* 1984), but later methods showed good applicability and accuracy when applied to ribs two to nine (Yoder *et al.* 2001). This method was later revised to include new descriptions and age ranges based on an American modern sample (Hartnett 2010). As these new revisions are currently untested on British medieval collections, the (Yoder *et al.* 2001) and İşcan methods (İşcan and Loth 1986; İşcan *et al.* 1986; İşcan *et al.* 1984; İşcan *et al.* 1985; İşcan *et al.* 1984) will be applied in this study. Sternal rib end casts are not available for this study. Each stage corresponds to an age range for females and a range for males.

In addition to skeletal degeneration, dental wear is often used on archaeological material to estimate age-at-death. Especially within a population, dental wear is expected to be similarly correlated to age in different individuals (Brothwell 1981). Although notes are made of its limited use for precise age-at-death estimation (O'Connell 2004; O'Connell 2019), many of the collections used in this study do not allow the application of other ageing methods due to poor preservation and high fragmentation. However, it must be taken into account that severe cases of *M. leprae* infection can loosen maxillary incisors in early stages (Møller-Christensen 1978; Møller-Christensen *et al.* 1952), resulting in a heavier reliance on the remaining teeth (Yoder *et al.* 2001) for mastication. Moreover, the possible eventual perforation of the palate in nasal-oral infection can lead to an inability to move food around in the mouth during mastication, requiring a change to a diet of softer foods. Dental wear is bound to reflect these complications and might therefore not be reliably applicable in cases of advanced *M. leprae* infection. Dental wear will only be applied

for age-at-death estimation for those individuals who do not show such severely progressed lesions or for whom other methods are unavailable.

A. 3.2.1.4.5 Combining estimates

For combining osteological age-at-death estimates it must be assumed that the more methods are combined, the better. Any method on its own fails to reach the same accuracy and precision as a multitude of approaches combined (Bedford *et al.* 1993). This is largely because several factors can impact growth in younger individuals and even more factors play a role in the degenerative processes of adult individuals, leading to different skeletal sites going through differing development and degeneration. As a result of this, all of the described methods will be applied to an individual where the necessary skeletal sites are present and complete enough. By comparing the individual estimates, outliers can be identified. This allows for, for instance, the recognition of delayed growth based on a comparison between skeletal and dental development. Pinpointing deviations from consensus makes it possible to decrease the weight put on methods that deliver inconsistent estimates, and speculate on potential causes.

Individual estimates will not be combined using a quantitative method. Rather, age ranges from each method will be qualitatively assessed to get to a final estimate. This “experience”-based approach has shown to be at times more accurate than more quantifiable methods (Milner and Boldsen 2012). The accuracy of some methods is different between populations and can vary with age. Following (Buckberry 2015), therefore the exact way in which individual aging methods will be combined, will be based on population patterns and overall impression of age-at-death. This will eventually be combined into one range. This age range will then be associated with the age categories described in section A. 3.2.1.4 Age-at-death estimation methods.

Unfortunately, by combining the individual age estimates into one final one, and by associating this range with an ordinal category, some data about inter-individual variation may be lost (Buckberry 2015). However, it is impossible to work with several estimates per individual based on different methods when attempting a demographic study. Any differences between individual estimates which prove to be large enough to warrant re-evaluating the inclusion of a method will be noted in the pathology section.

A. 3.2.1.5 Metrics

A. 3.2.1.5.1 Stature estimation

The stature of an individual is largely dependent on their genetic framework, but is subject to environmental factors. The energy balance within an individual is essential to reach ‘genetic

potential', and poor nutrition or chronic disease can have an especially detrimental effect on longitudinal growth. Due to this, adult stature at a populational level has been used to infer health in the past (Cardoso and Gomes 2009; Maat 2005). The reconstruction of stature can therefore add important information to the biological profile of an individual, especially when compared to the average stature from the same temporal and geographical region. More specifically for this study, stature can contribute to both reconstruction of life-courses as well as help us understand possible precursors – in the form of stunted growth early in life due to physiological stress – to *M. leprae* infection.

Stature estimation in British osteoarchaeology is most frequently based on long bone measurements and regression formulae. There are no methods for stature estimation based directly on British collections, nor are there any clear reference samples. The most routinely used formulae in Britain originate from research by Trotter and Gleser (Trotter 1970; Trotter and Gleser 1952; Trotter and Gleser 1958; Trotter and Gleser 1977). These methods represent formulas based on long bone lengths from American Black males, American Black females, American White males and American White females from the US military and female civilian casualties from WWII and military casualties from the Korean War (Trotter 1970; Trotter and Gleser 1952; Trotter and Gleser 1958; Trotter and Gleser 1977). A recent study (Mays 2016) has shown that the formulae based on femoral length of the US military and female civilian “White” casualties from WWII (Trotter and Gleser 1952) show the highest level of precision and accuracy for estimating stature for the 10th-19th-century British Wharram Percy Collection. This study represents one of few that tests the applicability of these methods on a British collection.

It is often recommended that each Trotter and Gleser formula is applied to a population, and that the series that results in the smallest range of statures for the entire population, should be considered the most reliable one (Brothwell and Zakrzewski 2004; Zakrzewski 2019). However, this study focusses mostly the ‘leprosy’ and HD populations from different sites, and the total research sample cannot be considered as one ‘normal’ population. Populations from leprosarium sites on their own are an unrepresentative selection of the general population because of their admission criteria, and cannot be considered to show normal variation. This ‘test’ of which methods fits the population best, will thus not be applied.

The BABAQ guidelines for stature estimation (Brothwell and Zakrzewski 2004; Zakrzewski 2019) are based on the publications by Trotter and Gleser (Trotter 1970; Trotter and Gleser 1952; Trotter and Gleser 1958; Trotter and Gleser 1977). Based on the findings by (Mays 2016), this study will focus on femoral equations. However, because femora may not always be present, measurements will also be taken for the tibiae, ulnae, radii and humeri, which can also be used to estimate stature using formulae by Trotter and Gleser. Individual stature will be based on femoral equations preferably, but in case the femora are missing, the equation with the smallest standard

error will be applied.⁸⁷ AT 7 shows the formula recommended by the BABAO guidelines (based on Trotter and Gleser) in order of preference.

⁸⁷ It must be noted that the tibial measurements should include the medial malleolus for the formulae based on the Korean War dead (Jantz, Hunt, and Meadows 1995; Trotter and Gleser 1958), whereas this measurement should exclude the medial malleolus if the formulae based on the US military and female civilian casualties from WWII are used (Jantz, Hunt, and Meadows 1994; Trotter and Gleser 1952).

AT 7. Formulae for stature reconstruction per sex recommended by the BABAO guidelines in order of preference. Table based on Table 5 from Brickley and McKinley 2004, 33.

Males			Females		
Formula			Formula		
American whites	1.30 (XLF + LCT) + 63.29	2.99	American whites	0.68 XLH + 1.17 XLF + 1.15 LCT + 50.12	3.51
	2.38 XLF + 61.41	3.27		1.48 XLF + 1.28 LCT + 53.07	3.55
	2.68 XLG + 71.78	3.29		1.39 (XLF + LCT) + 53.20	3.55
	2.52 LCT + 78.62	3.37		2.93 XLG + 59.61	3.57
	1.31 (XLF + XLG) + 63.05	3.62		2.90 LCT + 61.53	3.66
	3.08 XLH + 70.45	4.05		1.35 XLH + 1.95 LCT + 52.77	3.67
	1.82 (XLH + XLR) + 67.97	4.31		2.47 XLF + 54.10	3.72
	3.70 XLU + 74.05	4.32		4.74 XLR + 54.93	4.24
	3.78 XLR + 79.01	4.32		4.27 XLU + 57.76	4.30
American Blacks	1.15 (XLF + LCT) + 71.04	3.53	American blacks	3.36 XLH + 57.97	4.45
	1.20 (XLF + XLG) + 67.77	3.63		0.44 XLH - 0.20 XLR + 1.46 XLF + 0.86 LCT + 56.33	3.22
	2.19 LCT + 86.02	3.78		1.53 XLF + 0.96 LCT + 58.54	3.23
	2.10 XLF + 72.22	3.91		1.26 (XLF + LCT) + 59.72	3.28
	2.34 XLG + 80.07	4.02		2.28 XLF + 59.76	3.41
	1.66 (XLH + XLR) + 73.08	4.18		2.45 LCT + 72.65	3.70
	1.65 (XLH + XLU) + 70.67	4.23		2.49 XLG + 70.90	3.80
	2.88 XLH + 75.48	4.23		3.08 XLH + 64.67	4.25
	3.42 XLR + 81.56	4.30		3.31 XLU + 75.38	4.83
	3.26 XLU + 79.29	4.42		2.75 XLR + 94.51	5.05

A. 3.2.1.6 Palaeopathology methods

Pathology research is concerned with the causes, (laboratory-based) diagnostic criteria and effects of disease. Palaeopathology is a branch of pathology that focusses on the causes, effects and diagnostic criteria of disease in ancient human and animal remains. Although palaeopathology as a field includes all ancient tissues, including mummified remains, this study focusses on signs of disease in skeletonized remains. The study of disease in the past has broad implications for many fields both within archaeology and medical sciences. Even more so, research focussing on human evolutionary adaptation to environments, growth and development curves based on disease load, social and medical responses to diseases, and/or societal beliefs and rules considering diseases is more popular now than ever (Ortner 1991). Infection, specifically, is considered to be one of the most important driving forces of natural selection (McMichael 2001). As a result of the importance of palaeopathological research, a wide range of methods exists to record palaeopathological variation in human bone. These methods vary based on research goals and technological advances. Unfortunately, the abundance of different methodologies also has a downside; the inconsistency of their usage within the palaeopathological field impedes the comparison of different populations and their 'health and disease' (Roberts and Connell 2004).

This makes it difficult, if not impossible, to compare the pattern of Hansen's Disease in ancient populations studied by different researchers. Thus, although almost all collections used in this study have been previously assessed for, or have descriptions of, Hansen's Disease lesions, the goals of this specific project require all individuals to be assessed for such lesions in a consistent manner.

The BABAO guidelines offer a template to study abnormal bone variation in a consistent way (Roberts and Connell 2004), following previously published suggestions by (Buikstra and Ubelaker 1994). This section will outline how palaeopathological lesions or abnormal variation will be recorded for HD specifically, and other conditions more generally. For each individual, a full description of palaeopathological lesions and changes will be made in detail where time and access allow such a thing, in order to allow re-evaluation by future researchers (Roberts and Connell 2004). Such detailed descriptions must make use of unambiguous terminology (<https://paleopathology-association.wildapricot.org/Nomenclature-in-Paleopathology>; Roberts 2019), start descriptions with a location on the bone/tooth and give a summary of the changes observed (Ortner 2003). For this, the steps outlined in the BABAO guidelines will be followed (Roberts and Connell 2004). As reference work to diagnose possible conditions from descriptions, this study will make use of (Ortner 2003) and (Buikstra 2019), and for non-adults specifically of the standards set by (Lewis 2018). Differential diagnosis will be provided in the same document as the descriptions. Once a diagnosis has been drawn up, it will be entered into the database as described in 'A 3.2.1.6.4 Other skeletal abnormalities'. The majority of descriptions and diagnoses will be based on macroscopic assessment alone. Some individuals will have supportive aDNA results from a shotgun approach.

A. 3.2.1.6.1 Hansen's disease in adults

As previous palaeopathological diagnoses of HD have focused primarily on qualitative descriptions rather than quantifiable means of scoring lesions, individual studies are difficult to compare to one another. This study therefore aims to complement qualitative descriptions of all pathologies with quantitative methods for scoring HD. A scoring system for the individual traits of rhinomaxillary syndrome was, for example, developed by (Møller-Christensen 1978). This scoring system appears to have been disregarded since its original publication. Although the original scores were not published as representing a possible, probable and definite diagnosis of HD, they allow an assessment of the severity of lesions. Such a system acknowledges that several

of these pathological changes progress through subsequent stages which should be scored as such, and not as separate lesions.⁸⁸

A. 3.2..1.7.1.1 Rhinomaxillary syndrome

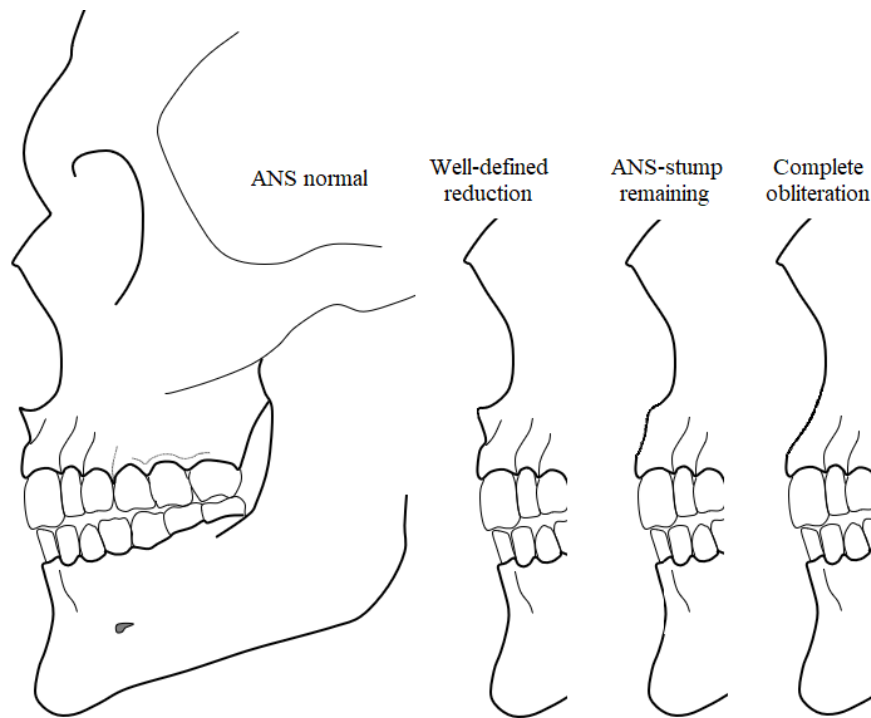
Rhinomaxillary syndrome is a term coined by (Møller-Christensen *et al.* 1952), encompassing changes that occur in the nasal and maxillary bones in advanced HD infection. These changes include: 1) Atrophy of the anterior nasal spine; 2) atrophy and absorption of the maxillary alveolar bone starting at prosthion and developing in a superior and lateral direction, with a maximum involvement of all four maxillary incisors. Eventually, this resorption can lead to loosening of the incisors, and eventual *ante-mortem* tooth loss; 3) endonasal inflammatory changes which can involve the nasal and oral surfaces of the hard palate, along with the vomer, inferior nasal conchae and turbinate bones (Møller-Christensen 1978). The individual constituents of these three pathological processes – i.e. changes in the nasal spine, maxillary alveolar process, nasal surface of hard palate, and oral surface hard palate – can all be scored using a four-to-six-score system (including ‘no change present’ as score 0). These scoring systems will be applied in this study.

The anterior nasal spine (ANS) shows three stages of advancing pathological atrophy. These include stages described by (Møller-Christensen 1978) and listed in AT 8. AF 16 shows the different stages associated with ANS-resorption.

AT 8. Pathological changes the ANS. Descriptions for stage 1-3 taken from Møller-Christenson 1978, 15.

Stage	Pathological changes ANS
Stage 0	No changes to anterior nasal spine
Stage 1	Well-defined reduction/blunting of ANS and pitting/trabecular exposure in proximity to ANS
Stage 2	Advanced ANS-atrophy although a distinct but very small ANS remains, trabeculae in proximity to ANS still exposed
Stage 3	Complete obliteration of ANS with (near-complete) remodelling of lesion with cortical bone
Score 99	Unobservable

⁸⁸ It is important to note that not all lesions that receive a score of 1 can be considered to be at the same level of progression. Very little is known about the progression of HD lesions, and lesions of fingers and toes are heavily dependent on use of hands and feet, and hygiene. These scores should only be considered as a classification of a certain lesion. Possibly, this research will highlight relationships between the scores of different lesions.

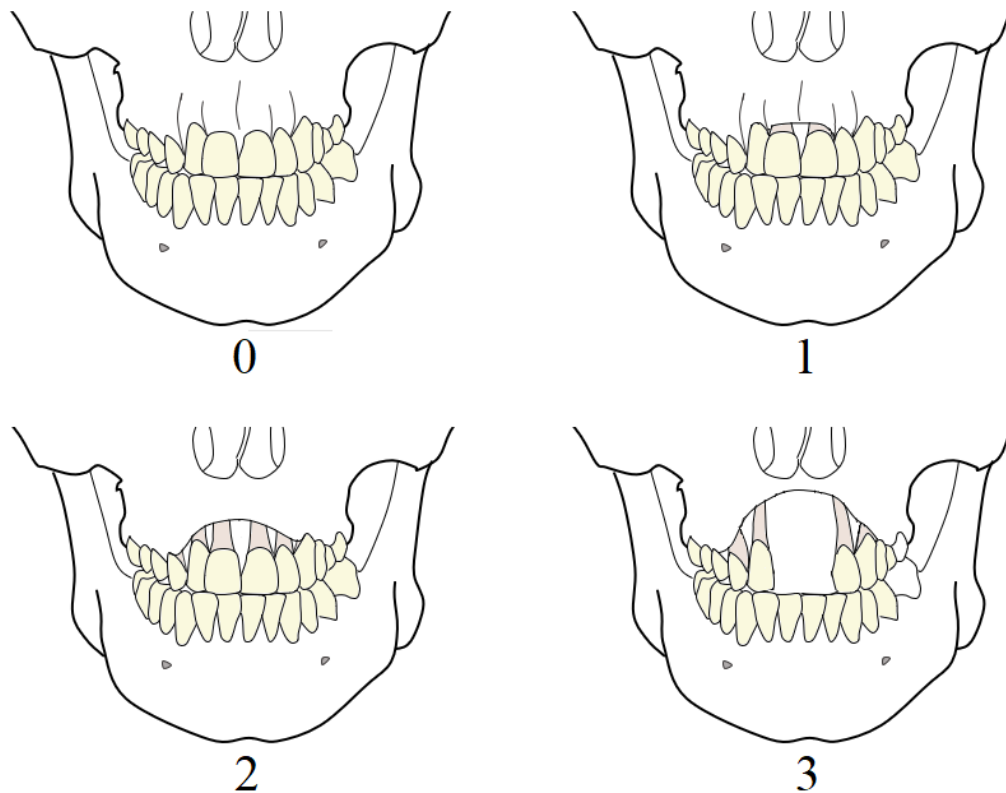


AF 16. The four different scores that can be assigned to the anterior nasal spine, based on AT 8. Lateral view skull. Image by author.

The alveolar process of the maxilla (APM) has also been divided into three stages of advancing lesions by (Møller-Christensen 1978). The different stages of this recession/absorption of prosthion are listed in AT 9 and depicted in AF 17.

AT 9. Pathological changes the maxillary alveolar process (APM). Description based on from Møller-Christenson 1978, 16.

Stage	Pathological changes APM
Stage 0	No changes to the APM
Stage 1	An unquestionable recession upwards of the prosthion and a slight exposure (0.1-3mm) of the roots of the central incisors
Stage 2	Extension, in depth and breadth, of the atrophic bone area whereby the prosthion recedes further upwards, thus exposing the roots of the central (and lateral) incisors to such a degree that looseness of one or more of these teeth may occur (3-6mm)
Stage 3	Bone atrophy is severe and at least one tooth, generally one of the central incisors, has presumably been lost antemortem, or the alveoli have been obliterated
Score 99	Unobservable



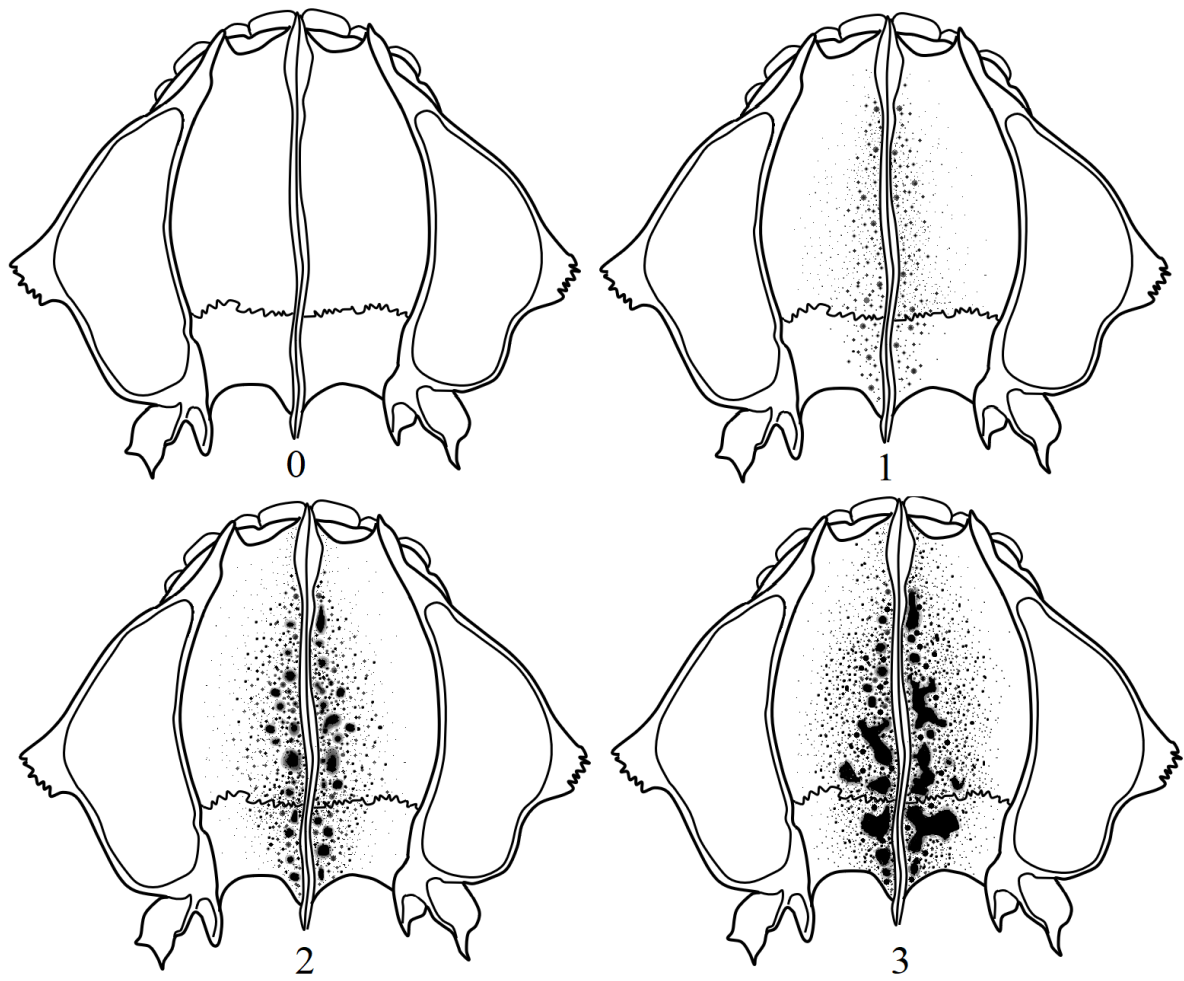
AF 17. The four different scores that can be assigned to the resorption of the maxillary alveolar bone, based on AT 9. Anterior view mandible and maxilla. Image by author.

Inflammatory changes can also occur on the nasal (*nasal surface of the processes palatinus maxillae* = PPMN) and oral surface (*oral surface of the processes palatinus maxillae* PPMO) of the hard palate, each being scored separately. Changes to the nasal surface consist of small and closely spaced pits around the transverse palatine suture and the lateral surface of the nasal crest. These changes progress into periosteal inflammation of the nasal surface, including lytic and/or proliferative lesions and can advance finally into a third stage of irregular perforations of the palate into the oral cavity (Møller-Christensen 1978). AT 10 gives the exact descriptions of each stage, which are also depicted in AF 18.

AT 10. Pathological changes the nasal surface of the hard palate (PPMN). Descriptions based on Møller-Christenson 1978, 16.

Stage	Pathological changes PPMN
Stage 0	No changes to the PPMN
Stage 1	Small, closely spaced pits ($\leq 0.3\text{mm}$), usually localized near the transverse palatal suture or at the lateral surface of the nasal crest; potential small plaques of new bone.
Stage 2	Advancement of changes with individual pores merging into larger macropores (0.3-1mm) with rounded edges that occasionally perforate to the nasal surface of the palate. This may be interpreted as reactions ascribable to the local periosteal inflammation propagating to the bone itself. These changes may be of a destructive or a proliferative nature or a combination of the two.
Stage 3	Advanced destructive changes that represent as irregular perforations of the bone (often no larger than 0.5cm). Perforations usually occur along the palatal suture and can be surrounded by sharp-edged mixed woven and lamellar new bone.
Score 99	Unobservable

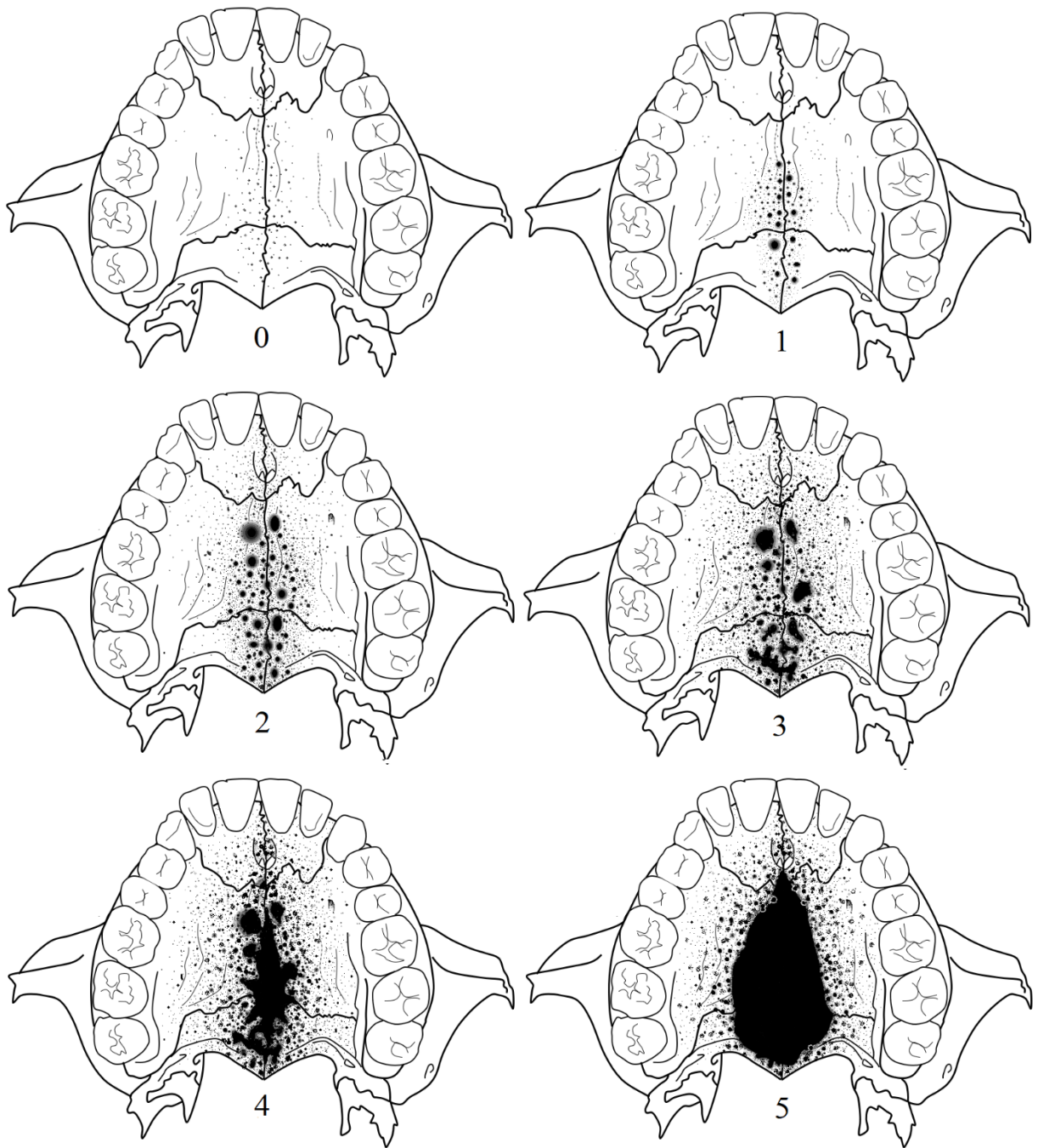
PPMO is slightly more difficult to score because the oral surface of the hard palate is already covered in pits and grooves (seats of saliva glands). The first changes of the PPMO in case of HD involves the deepening and multiplication of these pores and grooves, progressing into a more advanced second stage of changes including perforations of the palate. The last stage mentioned by (Møller-Christensen 1978) represents an even further advancement of these destructive changes. Although this scoring system originally ends there, this study also considers eventual (partial) loss of the palate (Costa *et al.* 2003; Pallagatti *et al.* 2012; Roberts and Buikstra 2019b). This full breakthrough of nasal into oral region will be scored in two stages: 1) 10-30% of the hard palate has been absorbed (stage 4), and 2) more than 30% of the hard palate has been absorbed (stage 5). AT 11 lists the stages that can be assigned to PPMO, included the ones added by the author. AF 19 proves examples of what these stages can look like.



AF 18. The four different scores that can be assigned to the pathological changes of the nasal surface of the palate (PPMN), based on AT 10. Transverse cut through nasal spine, superior view. Image by author.

AT 11. Pathological changes the oral surface of the hard palate (PPMO). Description for stage 1-3 based on Møller-Christenson (1978, 16). Other stages added by author.

Stage	Pathological changes PPMO
Stage 0	No changes to the PPMO
Stage 1	Deepening, enlargement and multiplication of the natural porosity of the oral surface of the palate: visible as increasingly <i>sponge-like texture</i> of oral surface. Porosity generally shows rounded edges and does not perforate through to the nasal surface
Stage 2	Advanced stage of changes to oral surface whereby individual pores merge into larger macropores (0.1-1mm) with rounded edges that occasionally perforate to the nasal surface of the palate. Cortical bone between pores often shows woven, and occasionally lamellar, new bone.
Stage 3	Merging of macropores into larger perforations (>1mm in diameter) into the nasal surface, accompanied by destructive perforations with mixed sharp and rounded edges. Cortical bone between pores often shows mixed woven and lamellar new bone with sharp crests.
Stage 4	10-30% of hard palate has been resorbed
Stage 5	>30% of hard palate has been resorbed
Score 99	Unobservable



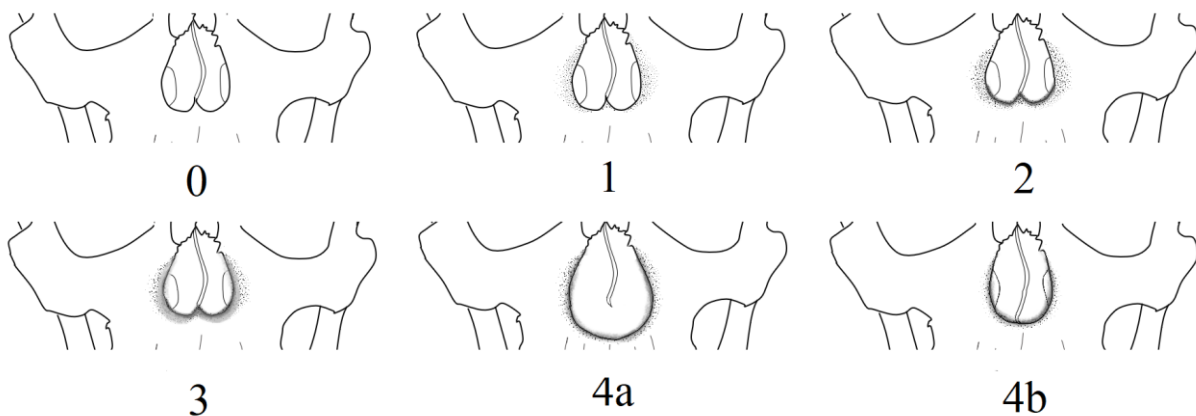
AF 19. The six different scores that can be assigned to the pathological changes of the oral surface of the palate (PPMO), based on AT 11. Inferior view of the hard palate. Image by author.

This list of changes however, does not necessarily incorporate all changes in the rhinomaxillary region that have been noted over the last seven decades of palaeopathological research into HD. To include additional observations, a scoring system for the nasal piriform opening (NPI) is added. Although Møller-Christensen (e.g. Møller-Christensen 1978; Møller-Christensen *et al.* 1952) does discuss the anterior nasal spine, he does not mention the surrounding nasal opening, which also undergoes remodelling. In most cases, this remodelling results in enlargement of the nasal

aperture, but cases have been noted of a reduced opening (Ortner 2002). The pathological changes include: 1) an increase in porosity of the piriform opening (Andersen and Manchester 1992; Ortner 2008b), followed by 2) a blunting or flattening of the lateral nasal aperture edge (Andersen and Manchester 1992; Lee and Manchester 2008; Ortner 2008b), 3) rounding of the inferior nasal piriform opening (Andersen and Manchester 1992; Lee and Manchester 2008; Ortner 2003; Roberts and Buikstra 2019b), 4a) enlargement of the nasal aperture, and 4b) reduction of the nasal aperture (Ortner 2003; Roberts and Buikstra 2019b). AT 12 lists these pathological changes associated with NPI. Each of these stages is depicted in AF 20. Each of these methods will also have the scores '0' (no changes) and '99' (unobservable) available in the database.

AT 12. Pathological changes the nasal piriform opening (NPI). Description by author.

Stage	Pathological changes NPI
Stage 0	No changes to the NPI
Stage 1	Increased porosity of piriform opening
Stage 2	A blunting/flattening of the nasal aperture edge
Stage 3	Rounding of the (inferior) nasal piriform opening
Stage 4a	Enlargement of nasal aperture
Stage 4b	Reduction of nasal aperture
Score 99	Unobservable



AF 20. The six stages of nasal aperture change as described in AT 12. Note: each stage may occur without porosity developing. Image by author.

These lesions can be summarised into the presence or absence of rhinomaxillary based on the following: when two or fewer RS sites are observable and show no lesions, RS is considered to be unobservable; when 3 to 5 RS sites are observable but show no lesions or have a score of 1 or lower in APM, PPMN or PPMO, RS is considered to not be present; cases with higher scores are considered to have RS.

A. 3.2.1.6.1.2 Extremities

Changes to the hands and feet of HD sufferers have been recorded for decades, mostly because of their visibility in living patients, and their association with loss of sensory input and motor control (Heiberg and Aarborg 1886; Møller-Christensen 1961; Møller-Christensen *et al.* 1952). Although the changes are often divided between those caused directly by *M. leprae* infection, and those caused by pyogenic bacterial infiltration (Møller-Christensen 1961), and split in acute, sub-acute/chronic and recovery stages (Møller-Christensen 1961), these differences are difficult to identify in skeletal remains only.

For each (meta)tarsal this study will record whether there is dorsal exostosis as a consequence of the collapse of the arch of the foot ('drop foot') due to loss of motor control. For the metacarpals and metatarsals, the presence of each of the following changes will be recorded: knife-edge remodelling, new periosteal bone, abscesses, distal absorption, and/or stumping (i.e. only distal, or proximal and distal ends left as a stump), and (fractures due to) concentric thinning (see AF 22 for several of these changes). For the first metatarsal, or hallux, 'osteochondritis dissecans' is added to the list, as this has been described in previous research to be a frequently encountered lesion in HD⁸⁹ (Møller-Christensen 1961; Ortner 2008b). Lastly, it will be recorded how many of the distal, intermediate and/or proximal hand or foot phalanges show signs of: the presence of concentric remodelling, new periosteal bone, volar grooving (see AF 23 for an image), notching of the dismarginal tufts, phalangeal buttoning, pen-in-cup articulations and granulomatous lesions (see AF 22 for several of these changes). This way of recording allows for more detailed results than the general 'hand and/or feet changes', while simultaneously enabling the calculation of prevalence rates of specific lesions per finger ray. For the lower limbs, periostitis and subperiosteal new bone (SPNB) on the lower one third of the tibia and fibula due to secondary pyogenic bacteria is frequently encountered (see AF 21). This will be scored as 'No SPNB', 'Some SPNB', 'Moderate SPNB', 'Severe SPNB' or 'unobservable', for the tibia and fibula separately (see AT 13 for descriptions/criteria). Overall, these lesions are based on leprosy-specific palaeopathological literature (e.g. Andersen and Manchester 1987; Andersen *et al.* 1994; Barnetson 1950; Møller-Christensen 1961; Ortner 2008b; Roberts and Buikstra 2019b; Roffey and Tucker 2012; Stone *et al.* 2009).

⁸⁹ Although this lesion has been noted for metatarsal 1 in association with HD, the same cannot be said for any other metatarsals, or metacarpals.



AF 21. Lateral side of left fibula (proximal epiphysis on the right side, distal epiphysis on the left side) from 'Skeleton 199/Grave X' from the St Margaret Hospital in High Wycombe (CAS0611). Frame A shows the entire fibula (proximal side missing) with extensive SPNB growth on the distal one third of the diaphysis. Frame B and C show further close-ups of thickness and distribution of the uneven, plague-like new bone. Photos by author.

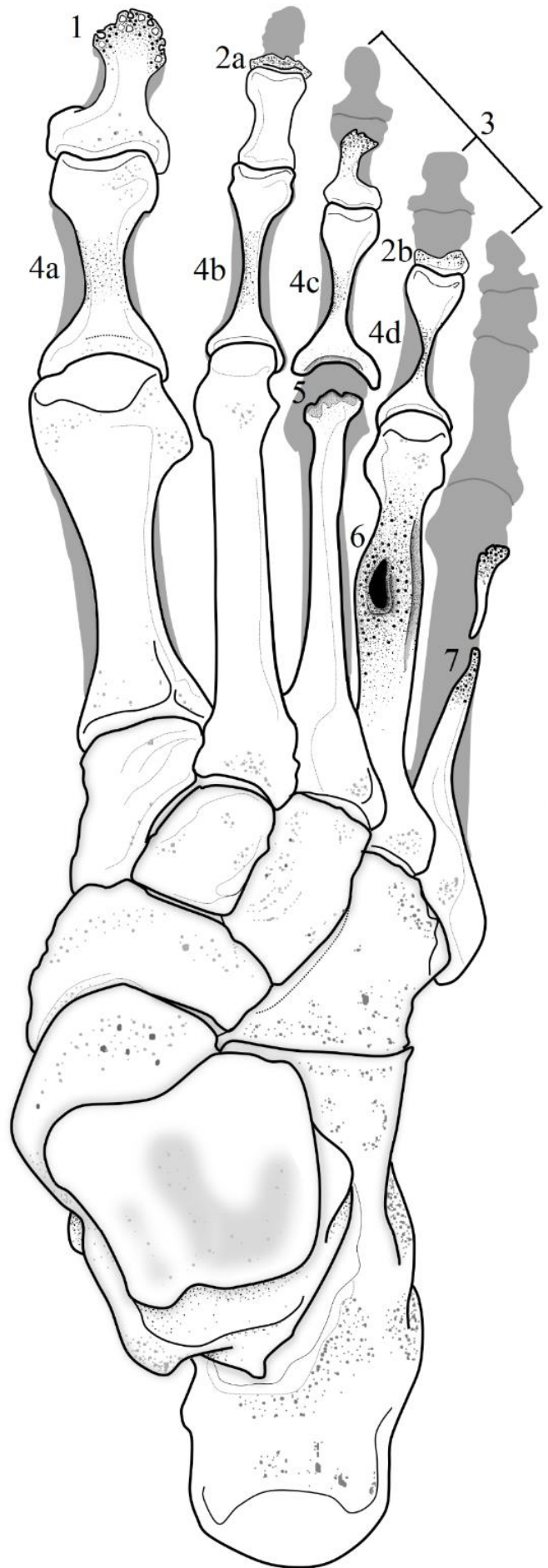
AT 13. Criteria descriptions for the different levels of new periosteal bone growth.

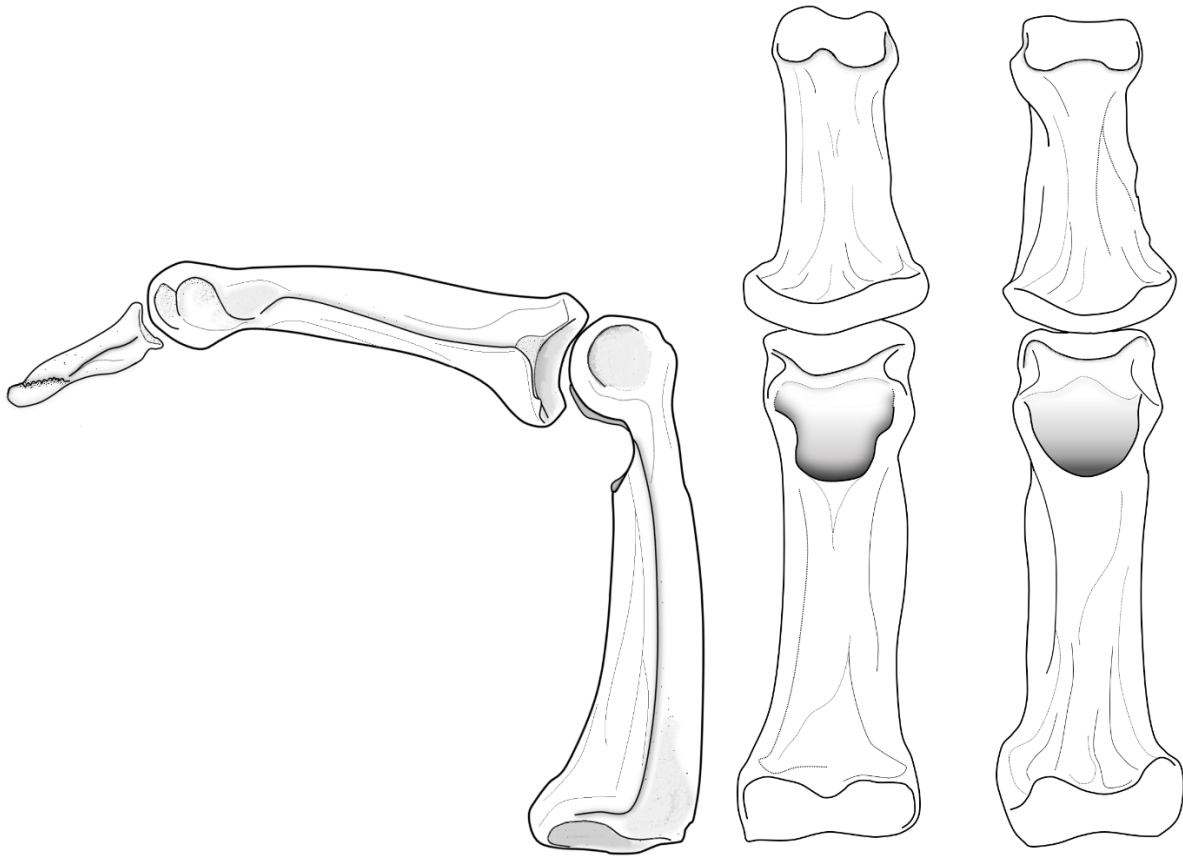
No NPBG (0)	Slight NPBG (1)	Moderate NPBG (2)	Severe NPBG (3)	Unobservable (99)
No patches of new periosteal bone growth, though superficial striations of very well healed periosteal bone deposits can be present as normal variation.	Any patch, unhealed (woven), healing (mixed) or healed (lamellar), of bone growth that can still be distinguished from normal cortical bone in appearance but generally shows little relief, covering max 25% of the non-articular bone surface and represents as a thin layer of max 0.8mm thick, possibly accompanied by <10% of thicker NPBG or <10% nodular bone formation which can hold nodules thicker than 0.8mm.	Any patch, unhealed (woven), healing (mixed) or healed (lamellar), of bone growth that can be distinguished from normal cortical bone in appearance, covering a minimum of 25% of the non-articular bone surface and appears as a thin layer of max 0.8mm thick, possibly accompanied by one of the following: a. NPBG of 0.8-2mm thickness that covers <55% of the non-articular bone surface, with a max of 5% NPBG of other thickness or with nodular bone formation; b. NPBG of >2mm thickness that covers <35%; NPBG with nodular bone formation covering 10-20% of the entire non-articular bone surface.	Any patch, unhealed (woven), healing (mixed) or healed (lamellar), of bone growth that can be distinguished from normal cortical bone in appearance, which follows at least one of the following descriptions: a. NPBG of 0.8-2mm thickness that covers a minimum of 55% of the non-articular bone surface; b. NPBG of >2mm thickness that covers a minimum of 35% of the non-articular bone surface; NPBG with nodular bone formation covering a minimum 20% of the entire non-articular bone surface.	Cortical surface is insufficiently preserved for an observation of NPBG.

A. 3.2.1.6.1.3 Other changes

Besides the specific changes in the maxillary region and the extremities, several other pathological changes have been associated with HD specifically, or are known to occur often in HD sufferers. There are several lesions associated with HD specifically, that do not fall under the above-mentioned categorization of rhinomaxillary syndrome and extremities. These include: leprogenic odontodysplasia (Danielsen 1970; Møller-Christensen 1978; Ortner 2003; Ortner 2008b; Roberts 2016); inflammatory changes (increase in bone porosity, lytic lesions and new periosteal bone deposits) of the incus, malleus and stapes (Bruintjes 1990; Roberts 2016), and granulomatous impressions of the cranium (Møller-Christensen 1978; Ortner 2003). Each of these will be scored as 'present', 'absent' or 'unobservable'. For granulomatous impressions, 'potential' will be added as an additional option.

AF 22. A (left) foot showing pathological changes that are frequently encountered in HD infection. Lesions shown: 1) notching of distal marginal tuft; 2a and b) buttoning of phalanges; 3) distal absorption; 4a-d) different examples of concentric remodelling; 5) pen-in cup-articulation; 6) abscess; and 7) fracture due to concentric thinning leaving proximal 'stump' of MT5. Grey outlines show normal shape of bones/toe rays. All of these lesions may occur in the hand as well. Image by author.





AF 23. Contracture of finger ray (lateral view) leading to impression of the proximal end intermediate phalanx into distal end of the proximal phalanx (left); and dorsal view of this 'volar' impression (highlighted with shade). Image by author.

Some of these lesions involve changes that can be assigned to other diseases as well, such as pulmonary disease or osteoporosis. The pathological changes associated with these conditions are discussed under §A.3.2.1.6.4 because they can also have other aetiologies. By recording them however, we can reconstruct if there is a higher prevalence rate in populations affected with HD than we would expect in a general medieval population. The conditions that are recorded under the heading 'HD-changes' include: (maxillary) sinusitis (Boocock *et al.* 1994; Møller-Christensen 1961; Roberts 2016; Waldron 2008); *cribra orbitalia/usura orbitae* (Møller-Christensen 1961; Ortner 2003; Ortner 2008b; Roberts and Buikstra 2019b), dental plaque/calculus (Costa *et al.* 2003; Jacobson *et al.* 1973; Núñez-Martí *et al.* 2004), septic arthritis of hands and feet with resulting osseous ankylosis (Andersen *et al.* 1994; Gibson *et al.* 1994; Lee and Manchester 2008; Møller-Christensen 1961), osteoporosis (Lee and Magilton 1989; Møller-Christensen 1961; Roberts 2016) and pulmonary infection (Hohmann and Voss-Böhme 2013; Motta *et al.* 2012; Roberts 2016; included here as tuberculosis and other lung infection). The way in which these lesions are recorded is described in §A.3.2.1.6.4.

A. 3.2.1.6.2 Hansen's Disease in children

Non-adults are particularly susceptible to HD, representing up to 12% of new cases depending on geographic location (Barreto *et al.* 2017; de Oliveira and Diniz 2016).⁹⁰ Part of this high prevalence rate in younger age groups is attributable to close contact with infected family members (Bakker *et al.* 2006b; Bratschi *et al.* 2015; van Beers *et al.* 1999). Although transplacental transmission has been suggested to be a possible cause of infantile HD (Bratschi *et al.* 2015; Duncan *et al.* 1983), this is still highly debated (Butlin and Withington 2016; Lewis 2018). It is more generally accepted that new-borns contract the infection through airborne bacilli from the mother (Butlin and Withington 2016) with the disease generally developing after the age of 5 years (Richardus *et al.* 2016). Prevalence rates in non-adults below 15 years of age are considered indicative of active foci of transmission, and thus, the higher the percentage of child infection, the more endemic the condition is (Barreto *et al.* 2014; Barreto *et al.* 2017; Richardus *et al.* 2016; WHO 2016a). As a result, lepromatous HD is diagnosed more often in children living in hyperendemic areas than those living elsewhere (Barreto *et al.* 2014). The most prevalent form of HD in children is tuberculoid HD, which causes limited (visible) deformity (Lewis 2018). Bacilli in the nasal mucous membranes are rare before the age of 13 years (Lewis 2018). The symptom most unique to HD infection during childhood is leprogenic odontodysplasia. This abnormality is the direct result of the presence of *M. leprae* bacilli in the pulp cavity of the maxillary frontal incisors – seeping in from the highly infectious mucous membrane of the nose – , concentrically stunting the growth of the roots (Danielsen 1970; Lewis 2018). This abnormality is permanent and can also be identified in adult remains (Danielsen 1970; Møller-Christensen 1978; Ortner 2003; Ortner 2008b; Roberts 2016). Other lesions that can be attributed to HD infection in children are rhinomaxillary changes; septic arthritis including bony ankylosis; tarsal and carpal disintegration; claw hand and foot deformities (volar grooving); ‘drop foot’; concentric remodelling of hand and foot phalanges,

⁹⁰ It is important to note that although 12% may not sound as much, non-adults have per definition died at pre-mature age. HD is known to have a long incubation period and recognisable lesions may not come to light until several years after initial infection (Barreto *et al.* 2014; de Oliveira and Diniz 2016). For example, one medical study has specifically shown that although changes in RMS *can* occur at 14 years of age (given that infection occurred at ~11 years of age), changes were more commonly recognised after six years of infection, and advanced RMS changes only occur after approximately 17 years of infection (Michman and Sagher 1957). Additionally, the ‘adult cohort’ represents a substantially larger portion of the natural lifespan than the group ‘non-adults’ and thus is it logical for the adult group to represent a larger number of infections. Even more so, identification of cases in children today is believed to be well below true prevalence, due to a general shortage of school surveys, household examination, a shortcoming of the health service system, and severe discrimination and stigma against infected non-adults (Barreto *et al.* 2017; Richardus *et al.* 2016; WHO 2016a).

metatarsals and metacarpals; knife-edge remodelling of metatarsals and metacarpals; and periostitis and osteomyelitis of the lower and occasionally upper limb bones (Lewis 2018). Because of the extensive overlap between adult and non-adult HD lesions, the remains of non-adults will be analysed in the same way as adults (see § A. 3.2.1.6.1).

A. 3.2.1.6.3 Final diagnosis

In many journal articles, HD diagnosis are presented at a level of certainty (possible, pathognomonic, and sometimes probable), or lesions are summarized as a yes/no binary by overall skeletal site (e.g. rhinomaxillary, hands, feet, lower limbs; e.g. (Roffey and Tucker 2012). Rarely however, is it described when the lesions are considered to possibly, probably or pathognomonically reflect an *M. leprae* infection, or when hands/feet/legs/RS are considered to have lesions. Summarising the results as such severely limits intra-individual and intra-site comparison and fails to acknowledge the range of lesions that can develop. Following suggestions from the Istanbul protocol (Appleby *et al.* 2015), this project has applied a list of criteria to estimate HD diagnosis 'severity'/certainty. These criteria are based on publications describing the association of such lesions as described above to HD and to possible other infectious processes (see AT 14).

The severity and unique distribution of lesions contribute to the possible, probable and pathognomonic diagnosis, but these levels also represent the severity of the physical impact of the disease, which is expected to be higher in lepromatous cases. Throughout this thesis, the possible/probable/pathognomonic distinction is used both as a certainty and as a severity score, though it is always specified which interpretation is used.

AT 14. A suggestion for HD severity/certainty scores and their observability and lesion criteria.

Classification	Criteria
Unobservable for HD	• All sites unobservable; • One or more of the rhinomaxillary sites (ANS, APM, PPMN, PPMO and NPI) are taphonomically damaged AND one of the following: ○ Legs and feet unobservable, arms and hands show no changes ○ Arms and hands are unobservable, legs and feet show no changes ○ Hands and feet are unobservable, arms and/or legs show no lesions
No HD (requires a minimum of the rhinomaxillary sites)	• No lesions on any of the sites; • Legs/feet may show minor changes (slight (1) NPBG, notching of distal tufts, slight concentric remodelling) and/or arms and hands show no or minor lesions (slight (1) NPBG, notching of distal tufts, slight concentric remodelling).
Possible HD (requires a minimum of either the presence of the rhinomaxillary sites, manual phalanges, or tibiae and fibulae to be present)	Possible HD can be diagnosed if one of the following is present: • Up to 2 of the rhinomaxillary elements show minor (≤ 1) lesions and all other sites unobservable/show no lesions; • Manual or pedal phalanges show one of the following and all other sites unobservable/show no lesions: ○ Phalangeal volar grooving ○ Concentric remodelling in ≥ 4 phalanges ○ New periosteal bone AND concentric remodelling ○ New periosteal bone AND knife-edge remodelling • Manual or pedal phalanges show one of the following AND tibia(e) and fibula(e) show moderate (grade 2) NPBG: ○ Notching of distal tufts

Classification	Criteria
	○ Concentric remodelling in <4 phalanges ○ New periosteal bone ○ Knife-edge remodelling ○ Distal and/or proximal absorption • Severe (grade 3) NPBG including dense nodule formation along interosseous crest of tibiae and fibulae and all other sites unobservable/show no lesions • Metatarsals and/or metacarpals show one or more of the following features and all other sites unobservable/show no lesions: ○ New periosteal bone formation, ○ Concentric remodelling, ○ Knife-edge remodelling ○ Distal and/or proximal absorption
Probable HD (requires a minimum of either the presence of the rhinomaxillary sites OR legs and hands/feet OR hands and feet)	Probable HD can be diagnosed if one of the following is present: • Rhinomaxillary region has a score of ≤ 1 for ANS, APM, NPI or PPMN AND PPMO; AND one of the following features: ○ Volar grooving ○ Slight changes in feet (concentric remodelling, new periosteal bone formation, knife-edge remodelling); • Rhinomaxillary region has a score of 2 for two of the observed sites (ANS, APM, PPMN, PPMO, NPI); • Severe new periosteal bone growth including dense nodule formation along interosseous crest of tibiae and fibulae; AND at least one of the following features in the metatarsals and/or metacarpals: ○ New periosteal bone formation

Classification	Criteria
	○ Concentric remodelling ○ Knife-edge remodelling ○ Distal absorptions; ● All of the following features in the hands and/or feet: ○ Concentric remodelling ○ New periosteal bone formation ○ Knife-edge remodelling ○ Distal and/or proximal absorption
Pathognomonic of HD (requires a minimum of the presence of the rhinomaxillary sites)	Highly indicative signs of HD can be diagnosed if one of the following is present: ● Score 2 or higher for at least three of the following rhinomaxillary sites: ANS, APM, PPMN, PPMO and NPI; ● Score 2 or higher for ANS, PPMN, PPMO or NPO and one of the following: ○ Grade 3 NPBG including dense nodule formation along interosseous crest of tibiae and fibulae ○ Grade 3 NPBG AND severe new periosteal bone formation, concentric remodelling, knife-edge remodelling or distal absorption of metatarsals.

A. 3.2.1.6.4 Other skeletal abnormalities

The sections below are dedicated to several pathological conditions that often cooccur in HD cases or can contribute to a decreased immune response (increasing the risk of HD infection). The allocation of pathological lesions to a specific diagnosis in palaeopathology is quite complex. As this research focusses on HD specifically, other diseases are recorded in a less detailed manner. Most of these other conditions will be scored as either absent, or be defined by the stage of healing they have attained (all stages of healing being, obviously, indicative of presence). As mentioned previously, palaeopathological descriptions of each individual will also be made, and description will be compared to those in standard works. Specific attention will be paid to metabolic conditions, other infectious diseases, joint diseases, trauma, and neoplastic diseases (Roberts and Connell 2004). Following the BABAO guidelines, the combination of exact inventories of skeletal elements and pathological symptoms per skeletal site can be used to reconstruct true prevalence/frequency (Roberts and Connell 2004), rather than crude prevalence rates. The individual palaeopathological descriptions (IPD) will allow for diagnosis of conditions not mentioned below, where necessary. Such conditions are not expected frequently enough to be subject to extensive statistical testing and can thus be evaluated more qualitatively. The following sections will address potential co-morbidity, looking first at metabolic conditions, followed by co-infections and remaining 'miscellaneous' conditions.

A. 3.2.1.6.4.1 Metabolic co-morbidities

Malnutrition and dietary deficiency – and especially an inadequate intake of proteins, vitamin A, D, E, B-complex and C, calcium and zinc - have been linked with decreased cell-mediated and humoral immunity ([Maggini et al. 2008](#)) and against HD specifically (Dwivedi *et al.* 2019; Furguson and Griffin 2000). Additionally, the diet of 'lepers' in the medieval period may have changed after hospitalisation (e.g. Cameron 2014b; Roffey *et al.* 2017), therewith changing the life-course of an individual after diagnosis. Dietary reconstructions are therefore a principal aspect of this study.

There are many ways in which diet in the past can be inferred. Most of these methods rely on indirect sources of evidence: one can look at zoological, botanical and material remains that may indicate food types and preparation, historic records describing specific dietary practices, isotopic ratios of carbon and nitrogen values, and/or pathological signs of malnutrition. Palaeopathological lesions of malnutrition are only informative of an inadequate diet and many of its signs could equally be an indication of general physiological stress. Even more so, many types of dietary deficiency can cooccur (Brickley and Mays 2019). Isotopic ratios, on the other hand, do not provide direct insight about the intake of vitamins and nutrients. This study therefore tackles

dietary adequacy and variation using a multitude of methods. This more holistic approach will provide puzzle pieces that can be put together to show more detail.

Malnutrition in the palaeopathological record is difficult to diagnose, largely because nearly all metabolic diseases have nutritional deficiency in common, and thus, have skeletal lesions in common. Such lesions include cribra orbitalia, cribra femora, porotic hyperostosis, and osteoporosis. As these lesions can be assigned to several conditions, each will be scored individually as 'not present', 'healed', 'healing', 'unhealed' or 'unobservable' during this study. Some of the separately assessed lesions can, in conjunction with each other, indicate the presence of a specific vitamin deficiency.

Vitamin D deficiency directly influences the ability of the small intestine to absorb calcium and phosphorus (Brickley and Mays 2019). A lack of these elements causes poor mineralization of bone protein (osteoid) which can 'soften' the skeleton (Brickley and Mays 2019; Mays 2008; Ortner 2003). In turn, the skeleton cannot bear the biomechanical stress and long bones can bend under the weight of the body (Brickley *et al.* 2005; Brickley and Mays 2019; Mays 2008; Mays *et al.* 2006). Vitamin D can be synthesised within the body, but requires the skin to be exposed to sunlight frequently (Brickley and Ives 2010; Brickley and Mays 2019), or can be obtained through the diet (Holick 2003; Mays 2008). In cases where children suffer vitamin D deficiency, the disease is referred to as rickets. Rickets is easier to recognize than the adult version, osteomalacia, largely because the mineralization of bone has an essential role during skeletal growth, and thus, the lack of mineralization has a larger impact. The disease can express itself through porous areas on especially the posterior side of the parietals and on the occipital, cribra orbitalia, deformed mandibular rami, bending and flaring of ribs, iliac concavity, 'bending' of long bones, flaring of metaphyses and thin and porous cortex of bones (especially around the metaphyses; Brickley and Mays 2019; Mays 2008; Mays *et al.* 2006; Ortner 2003; Ortner and Mays 1998). The ribs can be flattened and show increased porosity at the sternal end. In severe cases, a pigeon chest deformity can develop (Brickley and Mays 2019; Ortner 2003). The sternal ends of rib can swell leading to a 'rachitic rosary' on the thorax (Ortner 2003). When rickets progresses long enough, long bones can complete fusion at an early stage, causing shortening of limbs and stunted stature (Mays 2008; Perez-Rosello *et al.* 2012). Osteomalacia may be recognized by deformation due to osteoid accumulation, decreased bone density resulting in stress fractures (pseudo-fractures, or Looser's zones), flattened vertebra, angulated sternum, deformed scapula, flattened ribs, deformed sacrum and inward 'folding' of the pelvis (Brickley *et al.* 2005; Brickley and Mays 2019; Mays 2008; Ortner 2003).

Porotic lesions that resemble trabecular bone in appearance are thus indicative of active rickets (Mays 2008; Mays *et al.* 2006; Ortner and Mays 1998) Once sunlight and/or vitamin D is

re-introduced to the body in adequate amounts, porosity is filled in with new bone, and long bones and the cranial vault bones can increase in bone thickness (Brickley and Mays 2019). Additionally, continued remodelling throughout life may correct bending deformities, although this is not always the case (Mays 2008). Rickets is recorded in the database as 'not present', 'possible', 'healed' or 'healing'.

Another dietary deficiency that is related to HD infection is scurvy. Scurvy can occur after a prolonged shortage of vitamin C intake, and has been associated with low dietary diversity (Snoddy *et al.* 2018). This condition, like vitamin D deficiency, is most recognizable in non-adult remains (Fain 2005). Appositional growth is most active in non-adult individuals, and is more strongly affected by the disease. A lack of vitamin C results in decreased collagen production and stability, which can lead to systematic damage of the connective tissues in bone, skin and blood vessels (Hirschmann and Raugi 1999). This damage often leads to tissue haemorrhaging (Brickley and Mays 2019; Ortner 2003; Snoddy *et al.* 2018). Haemorrhaging in the gingiva can lead to alveolar bone loss, periodontal disease and *ante-mortem* tooth loss (Hirschmann and Raugi 1999), and the secondary effects of such chronic bleeding elsewhere in the body can lead to fine, abnormal cortical porosity in the long bones, cranial vault, facial bones, eye orbits (cribra orbitalia), palate, mandible, and enthesal sites (Brickley and Ives 2006; Brickley and Mays 2019; Snoddy *et al.* 2018). This haemorrhaging in bones can result in SPNB growth, but increased and fine porosity is encountered more frequently (Brickley and Mays 2019). The decreased density of bone formation in the metaphyses can additionally present as a 'radiolucent line', often referred to as a 'scurvy line' (Brickley and Mays 2019). These more poorly mineralized metaphyses may succumb to stress fractures, resulting in concavity of the growing end and/or a bony spur (Pelkan's spurs; Brickley and Mays 2019). Additionally, most non-adults develop osteopenia (Weinstein *et al.* 2001).

In adults, the development of scurvy can often be attributed to restricted access to food (Brickley and Mays 2019). Because growth has completed in adult skeletal remains, signs of scurvy may be much more subtle, including the development of osteopenia and eventually osteoporosis (Brickley and Mays 2019). Other symptoms include porosity around blood vessel sites in cranial bones, collapse of vertebral bodies, and SPNB formation on the shafts of long bones (and the lower limbs specifically; Brickley and Mays 2019; Snoddy *et al.* 2018). Due to the slow turnover rate of connective tissues in fully matured bodies, it can take adults several months to develop lesions due to vitamin C deficiency (Brickley and Ives 2006), and even when they develop, are not unique to scurvy (Brickley and Mays 2019). For both non-adults and adults however, increased porosity of the greater wings of the sphenoid, temporal bone, mandibular ramus and alveolar process is a common feature (Brickley and Mays 2019).

Despite the severity of vitamin C deficiency, the body can largely repair itself once intake is improved, even if the improvement is only of short duration (Brickley and Mays 2019; Snoddy *et al.* 2018). Such improvement can be exhibited as SPNB deposits on endocranial surfaces, the scapula, the metaphyses of especially the lower limbs and the roof of the eye orbit, and ‘swelling’ and SPNB on the zygomatic bones, maxillae, mandible, occipital and parietals (Klaus 2017; Snoddy *et al.* 2018). These pathological changes should however not be seen as a return to normal health (Klaus 2017; Stark 2014). Scurvy is recorded in the database as ‘not present’, ‘possible’, ‘healed’ or ‘healing’.

Anaemia can be caused by a variety of conditions that result in abnormalities of red blood cells and/or red blood cell count. Bacterial infection and injury can result in a loss of red blood cells, while dietary deficiencies and infectious disease might inhibit production of red blood cells (Grauer 2019). Iron-deficiency is the most common cause of anaemia (Grauer 2019; Lewis 2018), and most frequently caused by an insufficient diet (Lewis 2018). Symptoms may include osteoporosis of the skull and long bones, frontal bossing, cribra orbitalia, porotic hyperostosis, and osteoarthritis or trabecular striations in the elbow (Grauer 2019; Lewis 2018; Ortner 2003; Oxenham and Cavill 2010). Skeletal lesions are uncommon though, and those that do emerge are non-specific (Grauer 2019; Oxenham and Cavill 2010). Although other forms of anaemia exist, all occur less frequently than iron-deficiency anaemia. The IPD of each individual will highlight the presence of anaemia, and, if possible, the aetiology. Anaemia will be recorded in the database as either ‘not present’, ‘healed’, ‘healing’, ‘unhealed’ or ‘unobservable’.

A. 3.2.1.6.4.2 Co-morbidities

Infection with Hansen’s Disease, and the severity of its impact on the body is heavily reliant on immune system proficiency (Krause-Kyora *et al.* 2018; Richardus *et al.* 2016). The overall health prior to and during infection is thus highly indicative of the eventual outcome of the disease. In other words: poor health can increase the chance of infection and can expedite its progression. Any condition that can impact physiological health can therefore contribute to the likelihood of HD infection. It is thus unsurprising that a large number of other diseases have been identified in HD patients. Well-known co-infections that can be recognized in skeletal remains include tuberculosis, pneumonia (pulmonary disease) and syphilis. Additionally, hepatitis B and C, HIV, and staphylococcus infections are common co-infection that can be identified using aDNA techniques.

A. 3.2.1.6.4.2.1 Co-infections

As mentioned, several infectious diseases are known to increase the risk of HD infection, and/or are known to affect people already suffering from HD. One of the best-known diseases for which this is the case, is tuberculosis, another mycobacterial disease (Gardiner *et al.* 2016; Motta *et al.* 2012). Tuberculosis can be transmitted from cattle to humans (*Mycobacterium bovis*) or from humans to humans (*M. tuberculosis*, *M. canettii* and *M. africanum*) and shares many similarities with HD (Gardiner *et al.* 2016; Ortnier 2003). Both conditions are chronic granulomatous infections by bacteria with a long incubation period, and both have a spectrum of expressions largely dependent on host-immune response. Additionally, both conditions are strongly linked to poor diet and poverty. Human-to-human transmission of tuberculosis generally occurs through the respiratory tract, after which a primary focus can develop in the lungs along with several loci in the lymph nodes. Nowadays, this primary complex often heals due to adequate immune response and medical care, but in the past it was likely for the lung lesions to spread through the bloodstream to other organs, including the skeleton (Ortnier 2003; Roberts and Buikstra 2019b), especially in children (Lewis 2018). Of those individuals with secondary spread, only about 3-5% develop skeletal lesions (Holloway *et al.* 2013; Ortnier 2003; Roberts and Buikstra 2019b). This spread of the bacterium focusses on areas in the body with high metabolic activity, such as the metaphyses and epiphyses in adults, and in the tubular hand and foot bones, ossification centres of tarsal and carpal bones, and diaphyses, and the hip, knee and ankle joint in non-adults (Brickley and Mays 2019; Lewis 2018; Ortnier 2003). The (lumbar) vertebrae, ribs and sternum are most often affected in both adults and non-adults (Brickley and Mays 2019; Lewis 2018). Infections of the (lumbar) vertebrae may lead to abscess formation and loss of bone tissue in the vertebral bodies in the form of cavitation. Eventually, this loss of tissue can lead to collapse of the normal vertebral curvature into an angular kyphosis, known as Pott's disease (Lewis 2018; Ortnier 2003; Ortnier 2008a; Roberts and Buikstra 2019b). The vertebrae may subsequently fuse, creating an ankylosed spine. Lytic lesions may additionally develop throughout the skeleton, frequently occurring in the hip and knee joint, and in the wrist (Lewis 2018; Ortnier 2003; Roberts and Buikstra 2019b). New bone formation is rare in tuberculosis infection, except on the inside (pleural/visceral) surface of ribs, where new bone, combined with lytic lesions, can form (Lewis 2018; Ortnier 2003; Ortnier 2008a; Roberts *et al.* 1998; Roberts and Buikstra 2019b). Additionally, circular lytic lesions on the cranial vault (sometimes perforating through both tables) may develop, being more common in individuals under the age of 10 years, than those above 10 years (Lewis 2018; Ortnier 2003) and changes in the rhinomaxillary region (lupus vulgaris) can occur (Ortnier 2003; Ortnier 2008a; Roberts and Buikstra 2019b). In children, the diaphysis of metacarpals can increase in diameter due to systemic infection (tuberculous dactylitis; Lewis 2018; Ortnier 2003; Ortnier 2008a).

Healing tuberculosis can be recognized through fusing/ankylosis of the spine (one to four vertebrae in adults, up to twelve in non-adults; Lewis 2018) and wrist and ankle joints, and deposition of new bone around existing lytic lesions (Holloway *et al.* 2013). Tuberculosis will be scored as 'not present', 'possible', 'healed', 'healing', 'active', or 'unobservable'. Pott's disease is scored separately as 'not present', 'healed', 'healing', 'unhealed' or 'unobservable'.

Any skeletal changes indicative of respiratory diseases – proliferative or lytic rib lesions, new bone growth on the anterior side of vertebral bodies, and proliferative or lytic lesions on the posterior side of the manubrium – but not specifically identifiable as tuberculosis, will be recorded as 'Respiratory condition', with the following options: 'not present', 'ribs - new bone growth', 'ribs - lytic lesions', 'vertebrae ventral - new bone growth', 'vertebrae ventral - lytic lesions', or 'unobservable'.

Another potential co-infective agent in HD cases is syphilis (Motta *et al.* 2012), caused by subspecies of *Treponema pallidum*. The infectious disease is sexually or transplacentally transmitted and clinically speaking has three stages (Ortner 2003; Roberts and Buikstra 2019b). In the primary stage of venereal syphilis, a chancre lesion develops on the genitalia and the eventually involves the lymph nodes (Ortner 2003; Roberts and Buikstra 2019b). The secondary stage occurs when the first one has healed, after approximately two to eight weeks. This stage consists of dispersal of the bacterium through the blood stream, which results in a flu-like illness with a widespread rash, lesions in the mucous membranes (Ortner 2003), and, in some cases, periostitis with reactive bone formation (Ortner 2003). Syphilitic lesions of the mucous membrane can cause involvement of the facial bones, and most notably, of the nasal aperture, nasal septum, hard palate, and maxillary sinuses. These bones can be completely destroyed by infection, although this is more likely to occur during the tertiary stage (Ortner 2003; Roberts and Buikstra 2019b). Only some individuals – approximately one third – will suffer the third stage, which may happen several years after initial infection. The majority of people however linger in previous stages, or recover (Ortner 2003; Roberts and Buikstra 2019b). This later stage is when syphilis is most likely to leave marks in the skeleton: erosive granulomas, called *gumma*, can affect bone and skin, and periosteal new bone can form (Ortner 2003; Roberts and Buikstra 2019b). These *gumma* can cause necrosis of underlying bone, creating distinctive lesions on the frontal bone specifically, called *caries sicca*. These lesions can be destructive and even cause a complete breakdown of the frontal bone. Healing of individual caries may occur, creating softer and blunter edges around some of these lytic lesions and ivory-hard reactive bone (Ortner 2003; Roberts and Buikstra 2019b). This new bone is the result of chronic non-granulomatous inflammation often involving the periosteum and cortex and is sclerotic in nature (Ortner 2003; Roberts and Buikstra

2019b). This develops most frequently and prominently on bones close to the skin surface (tibiae, frontal bone, ribs, sternum, clavulae, ulnae), but can occur everywhere in the skeleton (Ortner 2003; Roberts and Buikstra 2019b). These lesions appear bilaterally as plaque-like new bone deposits or exostoses on top of cortex, while the cortex also increases in thickness (Ortner 2003). In the tibia, deposition of new bone on the anterior surface of the tibia can lead to sabre-shin deformity (Ortner 2003). Sequestra and cloaca are not common in syphilis infection (Ortner 2003), but forming *gummas* may cause impressions into the new bone resembling such 'scooped-out defects' (Ortner 2003).

In the case of congenital syphilis, the skeleton may develop differently *in utero*. This anomalous development can cause bossing of the frontal bone, depression of the nose (saddle-nose), underdevelopment of the maxilla bone, peg-shaped incisors (Hutchinson's teeth) and mulberry/Moon's molars (Lewis 2018; Ortner 2003). Early signs after birth include syphilitic osteochondritis, followed by periostitis and osteomyelitis (Lewis 2018; Ortner 2003). This syphilitic periostitis exhibits as symmetrical and circumferential deposition of SPNB on long bone shafts of the tibia, ulna, radius, femur, humerus and fibula (in order of prevalence; Lewis 2018; Ortner 2003). Cases of tertiary stage infection of congenital syphilis can eventually resemble adult lesions quite strongly (Lewis 2018; Ortner 2003). Non-gummatous periostitis can lead to sclerotic bone formation and, eventually, to the fusion of SPNB and the original cortex (as in sabre-shin deformity; Lewis 2018; Ortner 2003). In congenital cases, this sabre shin may however be accompanied by true bending of the tibiae (as in sabre-shin deformity; Lewis 2018; Ortner 2003). Syphilitic dactylitis may also occur, and is more frequent in congenital syphilis than in venereal syphilis. Dactylitis presents as bilateral widening of the diaphysis of one or more fingers or (less frequently) toes in children, and osteosclerosis in adults (Lewis 2018; Ortner 2003). The facial lesions described above are more frequent in congenital syphilis than in venereal syphilis (Lewis 2018). Syphilis will be recorded as either 'not present', 'possible', 'healed', 'healing', 'active', or 'unobservable'. Caries sicca will be scored separately as 'not present', 'healed', 'healing', 'unhealed' or 'unobservable'.

Besides infectious conditions with a known causative agent, there can be infectious lesions that are non-specific. Periostosis is an inflammation of the periosteum and can cause, or be caused by, pathological changes to the underlying bone. Periostosis is a common physiological response to any number of conditions, and thus may occur during specific or non-specific infection (Roberts 2019). This inflammatory response is the most common abnormality encountered in palaeopathology, although it is relatively uncommon in clinical research (Roberts 2019). Periostosis has also frequently been associated with various types of physiological stress (Ortner 2008a; Roberts 2019) and is one the symptoms in HD (Scollard 2016), among other diseases. The

periosteum – vascular connective tissue around bone - retains osteoblastic (bone forming) capacity throughout life (Lewis 2018; Roberts 2019), and thus, any insult or injury to either the bone or periosteum can cause periostosis. This inflammatory response can take several forms ranging from rapidly formed to more compact deposits (Lewis 2018; Ortner 2008a; Roberts 2019). Initially however, all different variations start with the deposition of woven bone on top of the cortex, which can fuse into the cortex to form lamellar bone (indicating chronic inflammation) and eventually heal (Lewis 2018; Roberts 2019). Woven bone deposits are a clear sign of active bone formation (Lewis 2018; Ortner 2008a). The chronic deposition of periosteal new bone is generally unevenly distributed, often compact and frequently limited to part of a bone (Ortner 2008a; Roberts 2019). Periostosis is often encountered in bones that are close to the skin (subcutaneous), and most frequently involve the anterior surface of the tibiae, and, in case of respiratory disease, the visceral surface of ribs (Roberts 2019). In periostosis, there is no formation of cloacae or involucrum, and the marrow cavity retains its form (Roberts 2019). A specific form of periostosis is found in the maxillary sinuses, often referred to as (chronic) maxillary sinusitis (Lewis 2018; Roberts 2019). This local inflammation is caused by inhalation of poor-quality air or a result of other pathologies such as HD (Roberts 2019). Periostosis may be found anywhere in the body, including, but not limited to, the mandible, the endocranial surface of the cranial vault and inner ear bones (Roberts 2019). The term periostosis is used both as a symptom in other diseases, and periostitis as a primary condition in and of itself. In the case of the latter, it is often the result of trauma or infection (Ortner 2008a; Roberts 2019). In the case that periostosis can be assigned to, or linked with, a specific infectious disease, it is often referred to as periostitis (Ortner 2008a; Roberts 2019). Periostosis will be recorded in the database by referring to its location, and as one of the following options: ‘not present’, ‘possible’, ‘healed’, ‘healing’, ‘active’, or ‘unobservable’. Description of the specific morphological expression (woven or lamellar bone, surface area covered, etc.) will be recorded in the IPD. Sinusitis will be recorded separately, mostly because this form of periostosis has been frequently encountered in archaeological cases of HD (Boocock *et al.* 1994; Møller-Christensen 1961; Roberts 2016; Waldron 2008). This will be scored as ‘not present’, ‘healed’, ‘healing’, ‘active’ or ‘unobservable’.

A second type of non-specific infection that frequently cooccurs with HD, and many other conditions, is osteomyelitis. This type of infection is generally caused by introduction of pyogenic bacteria into bone, but can equally be caused by infection of the bone marrow by viruses, parasites, and fungi (Ortner 2003; Roberts 2019). This introduction can happen in different ways, including direct infection through trauma, by direct contact with an adjacent soft-tissue infection – such is the case in hand and foot lesions in HD (Scollard 2016) – or through the bloodstream. Osteomyelitis tends to be localized and short-term, but can spread through the body, be acute or chronic, and involve the medullary cavity (Lewis 2018; Ortner 2003; Roberts 2019). In the case of

localized osteomyelitis, the defect often consists of new periosteal bone deposited in a small area, with or without a sequestrum, and shows some sclerotic bone formation. Although healing may occur, sclerotic bone often remains as a scar for a longer time (Ortner 2003; Ortner 2008a; Roberts 2019). Up to adolescence, the condition will mostly affect long bones, whereas in adults the axial skeleton is more frequently affected (Ortner 2003; Roberts 2019). Osteomyelitis can spread into the medullary cavity, where increasing exudate presses onto the cortical bone and causes necrosis. Once the exudate extends to under the periosteum, a new cortex will be formed around the exudate, creating a circumferential lesion. The original, dead cortex is termed 'sequestrum' and can become completely encapsulated by new, hypervascular bone, often referred to as 'involucrum'. Cloacae will often form through this involucrum to relieve pus (Lewis 2018; Ortner 2003; Ortner 2008a; Roberts 2019). In infants, the formation of sequestered bone is less likely, because the underdeveloped bone is porous enough for pus to escape without necrosis of cortex (Lewis 2018; Ortner 2003; Roberts 2019). The formation of involucrum is, conversely, more common in children (Lewis 2018). Adult osteomyelitis more often occurs as acute versions of the condition and much less frequently as hematogenous osteomyelitis (Ortner 2003; Roberts 2019). The formation of sequestered bone, involucrum and cloacae is the main distinction between periostitis and osteomyelitis (Roberts 2019). As is the case for periostosis, osteomyelitis represents both a condition in and of itself with a mortality in the past of up to 20%, but can also represent a lesion in other conditions (Ortner 2003; Ortner 2008a; Roberts 2019). Osteomyelitis will be recorded in the database by documenting its location. Description of the specific morphological expression (involvement of medullary cavity, size of lesion, layers of sequestered bone, etc.) will be recorded in the IPD.

A. 3.2.1.6.4.2.1 Miscellaneous co-morbidities

HD is a complex disease, and despite large numbers of publications on the topic, a lot about the disease remains unknown. Co-morbidities, for example, are a focus of the last few decades, when medical care and understanding had reached a close-to-modern level. The majority of publications on co-morbidities therefore focus on conditions that are of main concern today. Little can be said however about which conditions may have cooccurred in the past. Additionally, because the chance and severity of HD infection are largely dependent on immune system proficiency, any condition that may negatively impact health, can be a precursor to HD development. This section will discuss several conditions that are frequently encountered in the archaeological record, can impact health prior to HD infection or can be the effect of HD infection.

Stunted growth is not a disease, but can be an effect of a variety of conditions that impact growth during infancy (Watts 2011), such as starvation/chronic malnutrition (Lewis 2018; Ortner 2003), anaemia (Grauer 2019), rickets (Perez-Rosello *et al.* 2012; Stout *et al.* 2019), and

infection (Watts 2011). A limited amount of energy is available during childhood, and this energy is reserved for growth during optimal circumstances (Watts 2011). Malnutrition and chronic disease may require the body to invest some of its energy into fighting off physiological stress. This creates a shortage of energy for development and can thus lead to stunted growth (Hochberg 2012; Hochberg and Belsky 2013; Louis *et al.* 2008). Stunted growth on an individual level can only macroscopically be diagnosed in non-mature individuals. In such cases, dental development and eruption – which are much less dependent on physiological health and follows genetic growth triggers more acutely – can be compared to skeletal development – which is much more easily disrupted by physiological stress. On a population level, stature of different fully mature age groups can be compared. This has previously shown that individuals who die at a younger age, show shorter adult stature (Watts 2011). Stunted growth will be recorded in the database as ‘present’, ‘absent’ or ‘unobservable’. The extent of stunted growth in non-adults (difference skeletal and dental age) will be included in the IPD. Full adult stature will be recorded using the methods discussed in §A. 3.2.1.5.1.

Joint diseases are widespread and abundant in archaeological populations, accounting for up to a third of all lesions found in urban contexts (Waldron 2019). Joint disease can be induced by mechanical loading, trauma, infection, and diet (vitamin D deficiency), and increases in prevalence with old age (Johnson Bach and Hunter 2014; Waldron 2019; Weiss and Jurmain 2007). Genetic factors play an important role in age-at-onset and progression (Waldron 2019). As leprosaria sometimes required physical, agricultural labour from their inmates as a form of payment, assessing the prevalence and location of joint diseases within and outside leprosaria could provide insight into the daily lives and social treatment of ‘lepers’. Joint diseases can be divided into bone-producing conditions and erosive conditions (Waldron 2019).

Osteoarthritis⁹¹ (OA) is the most common type of bone-forming joint disease today. Only the later, more advanced stages of OA are exhibited in human skeletal remains (Ortner 2003; Waldron 2019). The synovial joints are most frequently involved. Symptoms often include 1) the breakdown of articular cartilage resulting in bone-on-bone contact, and irritation and erosion of subchondral bone; 2) the formation of new bone spurs on joint margins (osteophytes); and 3) sclerotic bone formation in the subchondral compact bone and in trabeculae. The breakdown of cartilage, bone-to-bone contact and sclerotic bone formation together may eventually result in eburnation and polishing of articular surfaces. In severe cases, grooving can be found on the

⁹¹ Although the term ‘osteoarthritis’ implies an inflammatory response, this is not inherent to OA necessarily. Some authors have suggested the use of the term ‘osteoarthrosis’ but its use never caught on (Waldron 2019; Weiss and Jurmain 2007). This study therefore continues the use of the term ‘osteoarthritis’.

eburnated surfaces, indicative of the direction of movement. Eburnation is pathognomonic for OA (Ortner 2003; Waldron 2019). OA can develop as a primary condition (the exact aetiology is not known) or as a secondary condition, being the result of another pathology such as trauma (Ortner 2003; Waldron 2019). The joints most frequently affected in archaeological remains are the acromioclavicular joints, vertebral facets (referred to as spinal OA), and hand joints (PIPs, DIPs, and the base of the pollex; Waldron 2019). Generally, OA in the palaeopathological record is diagnosed either by the presence of eburnation, or by at least two of the following lesions: osteophyte formation, new bone on or pitting of joint surfaces, and contour changes of joints (Waldron 2019). OA is documented in the database based on the affected joint(s). Details of the severity of OA and specific lesions are described in the IPD.

Another joint disease that can be encountered in the archaeological record is ankylosing spondylitis (AS). This condition initially manifests itself as stiffness of and pain in the back, and can cause the development of a kyphosis (see below; Waldron 2019). In the skeleton, this progressive inflammatory disease presents as symmetrical and bilateral erosion, and eventual fusion, of the sacroiliac joints, erosion and sclerotic bone formation on the anterior aspect of the end plates of vertebrae, and, most characteristically, the formation of bony spurs inside the spinal ligament (syndesmophytes; Ortner 2003; Waldron 2019). These syndesmophytes can grow to considerable size and bridge the intervertebral disc, eventually fusing individual vertebrae together in what is referred to as a bamboo-like appearance ('bamboo spine'). The progressive ankylosis can also involve costovertebral joints, mainly in the thoracic area (Ortner 2003; Waldron 2019). Although not as common, the disease can involve the appendicular skeleton, most commonly the hips and shoulders (Ortner 2003). The combination of complete fusion of sacroiliac joints, fusion of the spine with preservation of intervertebral disc spaces (bamboo appearance) and no skip lesions, and fusion of the ribs, is unique to AS (Ortner 2003; Waldron 2019). A possible diagnosis may be given when the sacroiliac joints show inflammatory bone response and fusion of the joint surfaces (sacroiliitis) with sclerotic bone formation (Ortner 2003). AS will be recorded as 'present', 'possible', 'absent', or 'unobservable'.

Septic arthritis is an uncommon condition clinically, but is found rather frequently in HD cases (Anderson and Manchester 1988; Chauhan *et al.* 2010; Gibson *et al.* 1994; Lee and Manchester 2008; Ortner 2008b; Roberts 2002; Roffey and Tucker 2012; Stone *et al.* 2009; Wells 1967), and a well-known symptom of TB (tuberculoid arthritis; Waldron 2019). As the name implies, septic arthritis is induced by an infectious agent infiltrating the joint cavity, often the result of hematogenous spread or due to direct introduction (Ortner 2003; Waldron 2019). Once in the joint cavity, the infectious agent prompts an inflammatory response that can destroy articular cartilage and subchondral bone. In a response to 'fix' the problem, new bone is deposited around inflammation and can cause ankylosis of the involved bones (Ortner 2003). In advanced

cases, function of the joint may be entirely, and permanently lost (Chauhan *et al.* 2010; Waldron 2019). The location of septic arthritis is noted in the database and, if present, the presence of osseous ankylosis will also be scored as 'not present', 'present' or 'unobservable'.

The curve of the spine can be abnormal due to a variety of reasons, most notably strenuous physical activity and heavy lifting (Lewis 2018). Kyphosis is the exaggerated anterior curvature of the (thoracic) spine and is common in older individuals. It can however also be the effect of a congenital defect, trauma, osteomalacia or infectious disease such as osteomyelitis and tuberculosis (Ortner 2003). Lordosis is a less common abnormal curvature where the spine has an exaggerated posterior curve resulting in a 'saddle-back' deformity (Lewis 2019; Ortner 2003). Both kyphosis and lordosis in childhood increase the risk of vertebral arch stress fractures (spondylolysis) and scoliosis (Lewis 2018). Scoliosis involves lateral deviations of the spine and can be caused by congenital maldevelopment of one or multiple vertebrae, or trauma (Lewis 2019; Ortner 2003). Scoliosis nearly always involves at least two curves: one deviating from the midsagittal plane, and one aiming to return the neck and head to the midsagittal plane. The pressure of one vertebra on another in order to achieve a curve, and the pull of ligaments and tendons can cause bone changes in the normal outline of a vertebral body (wedging) and articular facets, and deviations of the transverse and spinous processes (Lewis 2019; Ortner 2003). In long-standing and severe scoliosis, there may be fusion of especially the vertebrae between which in the disc is compressed, and between the vertebral articulations on the concave side of the curvature (Lewis 2019; Ortner 2003). Besides changes in the spine itself, lateral curvature may also influence the shape, curvature and articulation of ribs, scapulae, sternum, sacrum and os coxae (Lewis 2019; Ortner 2003). As none of these abnormal curvatures are unique to a specific disease (except for the diagnostic kyphosis of Pott's disease in TB), each will be scored individually as 'not present', 'cervical', 'thoracic', 'lumbar' or 'unobservable'.

Another condition of the spine is Diffuse Idiopathic Skeletal Hyperostosis, or DISH. DISH as a disease is often linked to obesity and type II diabetes, although genetic factors play an essential role (Waldron 2019). In the archaeological record, DISH is most often encountered at high-status sites such as monasteries and has thus become associated with a 'luxurious' lifestyle that includes little physical activity and a large contribution of meat and fish to the diet (Mays 2006; Quintelier *et al.* 2014; Rogers and Waldron 2001; Waldron 1985; Waldron 2019). As leprosaria are often run similarly to monasteries, and historic records and isotopic data indicate meat-heavier diets than outside such institutions (Richards 1977; Roffey *et al.* 2017), comparing the prevalence of DISH within and outside leprosaria could shed light on their diet and lifestyle. As its name implies however, little is known about its exact aetiology. It seems that prevalence increases with age and is higher in males than in females (Waldron 2019). Diagnosis of DISH in

the palaeopathological record involves the recognition of at least three consecutively fused vertebrae. This fusion resembles a flow of candle wax along the right side of the anterior longitudinal ligament (Kuperus *et al.* 2018a; Kuperus *et al.* 2018b; Waldron 2019). Additionally, bony spurs can develop on the patella (pointing inferiorly), on the calcaneal tuberosity (pointing superiorly), and in other locations throughout the skeleton (Ortner 2003). DISH will be scored in the database as 'present', 'absent' or 'unobservable'. In case presence is confirmed, the number of consecutively bridged vertebrae will be noted.

Different types of trauma can affect the skeleton, including (but not limited to) fractures, dislocations and amputations (Bennike 2008; Ortner 2003; Redfern and Roberts 2019). A variety of factors can influence the location and frequency of fractures within a population and individual, including economic and social circumstances, living conditions, other pathologies and cultural practices. Trauma, especially fractures of bones, similarly afflicted people now as it did in the past (Bennike 2008; Ortner 2003; Redfern and Roberts 2019). HD infection can increase the risk of especially fractures. Concentric remodelling in hand and foot bones increases the likelihood of diaphyseal fractures (Andersen *et al.* 1992; Ortner 2003; Roberts and Buikstra 2019b), and overall osteoporosis – which can be a result of HD infection (Ishikawa *et al.* 1999; Leal and Foss 2009; Roberts and Buikstra 2019b) – can increase the risk of fractures anywhere in the skeleton (Brickley and Mays 2019; Leal and Foss 2009; Ortner 2003). A massive amount of data can be obtained in regard to fractures, but this study limits itself to location, number of events and state of healing. These data will be sufficient to obtain an idea of whether fractures occur more or less often in HD cases compared to non-diagnostic cases, and whether there is a unique pattern to their distribution within the body. Additional information will be recorded in the IPD, when deemed necessary.

Neoplasms do not show a specific (known) correlation to HD infection likelihood or severity. Several benign tumours can, however, cause bony lesions which resemble HD lesions. Malignant tumours may decrease immunity to an extent that *M. leprae* can take hold, and contribute to morbidity and mortality significantly (Marques 2019). It is therefore salient to be aware of different types of tumours that can be recognized in archaeological skeletal remains. A neoplasm can disrupt the balance between osteoblastic and osteoclastic activity in order to create an ideal environment for its own growth (Marques 2019). Benign neoplasms remain in one area and do not invade adjacent tissues, including bone. Benign bone neoplasms are quite common and include osteochondromas, enchondromas, giant cell tumours, osteoid osteomas, chondroblastomas and osteoblastomas (Marques 2019). Malignant neoplasms, i.e. cancer, can infiltrate and invade surrounding tissue and spread to other body parts (the formation of

metastases). The primary malignant bone neoplasms are hematopoietic intraosseous neoplasms, osteosarcomas, chondrosarcomas, Ewing sarcomas and chordomas (Marques 2019). The list of benign and malignant neoplastic conditions that can be recognized in bone (including those that are not a neoplasm of bone) is more extensive still and a large amount of data could be gathered on the topic. In this study however, the focus rests on neoplasms that can cause lesions that may resemble those encountered in HD. An example is a carcinoma, cyst or other soft-tissue tumour of the nasal cavity (Collins Cook 2002; Ortner 2003; Ortner 2008a; Roberts and Buikstra 2019b), which can destroy the palate and enlarge the nasal aperture (Marques 2019). Advancement of these conditions may completely destroy the anterior maxilla and enlarge the nasal aperture to an extent unknown in HD cases. Additionally, it is unlikely that the pattern of pathological changes encountered as a result of neoplasms would resemble the distribution of HD lesions in the entire body (Ortner 2008a). Elsewhere, soft tissue tumours (atheromas specifically) may cause impressions onto the cranial vault, resembling leprosy granulomas (Møller-Christensen 1978). Due to the large number of different neoplastic conditions and the inherent difficulty to recognize them in (fragmentary) skeletal remains (Brothwell 2008), only their presence will be recorded in the database ('present', 'absent' or 'unobservable'). More elaborate descriptions can be found in the IPD.

A. 3.2.2 Isotope methods

Since the first studies of isotope analysis from archaeological remains, almost 40 years ago (e.g. DeNiro 1985; Lee-Thorp and Van der Merwe 1993; van der Merwe and Vogel 1978; Vogel and van der Merwe 1977), the field has matured substantially, and this knowledge can now be used for an accurate and reliable interpretation of stable isotope values from archaeological remains. On a very basic level, the isotope values that we can measure in human remains are determined by two main factors: 1) environment and plant biochemistry that lay at the base of the food chain; and 2) someone's diet, or more specifically, the ratio of plant versus animal protein within their diet. There are some caveats and problems that influence the final value on which one needs to be aware. This section will discuss why the reconstruction of diet is relevant for HD-related research in the past, before moving on to discuss the basic principles of stable carbon and nitrogen isotope analysis for dietary reconstruction. Finally, the sampling and laboratory approach used for this project will be discussed.

A. 3.2.2.1 What: stable dietary isotope basics

Isotopes are versions of elements that contain the same number of protons, but differ in the number of neutrons within their nuclei, creating a difference in their relative atomic mass/weight

(physical properties), while preserving the same chemical properties. The majority of 'light' elements have few of these variations, including carbon and nitrogen. which each having two naturally occurring stable isotopes. C¹² has six protons and six neutrons, while C¹³ has six protons and seven neutrons. N¹⁴ has seven protons and seven neutrons, and N¹⁵ has seven protons and eight neutrons (their added value being represented as a superscript to the element (Pollard *et al.* 2007). This difference in mass can be measured using mass spectrometry, and can be indicative of the processes that create varying abundances of one isotope of an element over another. These processes are referred to as 'fractionation', and describe the cycles of movement of an element in nature in which one isotope is transported preferentially over another due to the difference in weight and size (i.e. a lighter weight is more easily moved; van der Merwe 1982). A wide range of processes influence the ratio of an isotope that is available to be incorporated/ingested in to biological beings. Because these ratios differ in different environments, regions, plants, animals, etc., their differences can be used to infer human and animal behaviour, such as movement between different regions, or the relevant consumptions of these plants and animals.

These varying ratios can be enveloped into the human body through consumption, which is one such fractionation process: carbon and nitrogen are most often consumed through food, and are therefore indicative of diet. These elements are stored – i.e. incorporated – into the human skeleton during its natural remodelling process. Although they can be stored both in the inorganic (hydroxyapatite) and organic (collagen) components of the skeleton, the isotope values in collagen are considered less susceptible to diagenetic alterations. The isotopic values of carbon and nitrogen that can be extracted from human collagen can therefore reflect the corresponding carbon and nitrogen ratios in the diet (Pollard *et al.* 2007), giving rise to the use of the popular phrase 'you are what you eat'.

Light isotope values, including carbon and nitrogen, are expressed as the variation between the two isotopes of one element (C¹² to C¹³, and N¹⁴ to N¹⁵) compared to its standard, which is denoted with the delta symbol, 'δ': δ¹³C and δ¹⁵N. This value is obtained using the following equation:

$$\delta_{sample} (\text{‰}) = \left(\frac{R_{sample} - R_{standard}}{R_{standard}} - 1 \right) \times 1000$$

and reported as a 'per mil' values (‰). For carbon, we use the international standard of Pee Dee Formation (PDB), a Cretaceous belemnite rock in South Carolina (Pollard *et al.* 2007). Nitrogen uses the international standard of atmospheric nitrogen (AIR). To denote discrimination, the difference between the isotopic values in the source and the product, for example between two tissue types, the "Δ" is used.

A. 3.2.2.1.1 Isotope pathways

As mentioned above, natural fractionation processes can lead to an uneven distribution of heavier over lighter isotopes of one element, which can result in food (categories) having quite distinct $^{13}\text{C}/^{12}\text{C}$ and $^{14}\text{N}/^{15}\text{N}$ ratios. When such food categories are consumed, the growth and remodelling of bodily tissues will incorporate these $^{13}\text{C}/^{12}\text{C}$ and $^{14}\text{N}/^{15}\text{N}$ ratios, and thus subsequently reflect the isotopic composition of the diet (Van der Merwe 1991). However, as can be gleaned from §A. 3.2.2.2., the turnover of some tissues takes substantially longer than that of others, leaving stable isotope dietary reconstruction relatively insensitive to short-duration dietary changes and minor dietary components (Hedges 2004). As plants are at the base of most food chains directly relevant to human consumption, this is where our story starts.

A. 3.2.2.1.1.1 Carbon

Plants photosynthesize their own food by taking carbon dioxide (CO_2) from the atmosphere and combining it with water (H_2O) taken up by the plant's root system, in order to create sugars and cellulose. In this process, plants discriminate against $^{13}\text{CO}_2$ compared to $^{12}\text{CO}_2$ both during diffusion and carboxylation (Smith and Epstein 1971)⁹² depending on the photosynthetic process. Thus, it is their metabolic process and the isotopic composition of the atmosphere that influence the final carbon values of plants (Pollard *et al.* 2007). For (pre)historic environments, atmospheric $\delta^{13}\text{C}$ is assumed to be between -6.4‰ and -7.0‰. There are two main photosynthetic pathways that influence the ratio of $\text{C}^{12}/\text{C}^{13}$ in a plant: C3 and C4 (Pollard *et al.* 2007)⁹³. This photosynthesis, and thus the plant's carbon ratio is then further influenced by water and light availability (the canopy effect), salinity, air pollution and plant physiology (Farquhar *et al.* 1989; Lightfoot *et al.* 2020; Lightfoot *et al.* 2016; O'Leary 1981; O'Leary 1988; Tieszen 1991; van der Merwe 1982).

C3 plants are both the most abundant kind, and compose one of the most important sources of calories globally. Included in this category are wheat, barley, oats, rye and rice, among others. In these plants, an enzyme in the metabolic pathway (ribulose biphosphate carboxylase, Rubisco for short) strongly discriminates against ^{13}C during carboxylation, resulting in more negative $\delta^{13}\text{C}$ values (Farquhar *et al.* 1989; Farquhar *et al.* 1982). Moreover, environmental conditions and genetic variation (which in turn influences how a plant controls the intracellular CO_2 under

⁹² A process during which CO_2 is fixated into a stable intermediate, and represents the first step a plant takes to fix carbon from CO_2 into three-carbon sugars, which can later be turned into amino acids, nucleotides, and complex sugars such as starch.

⁹³ CAM-photosynthesis is another pathway, but as this is utilised by desert plants, it is of no interest to this thesis as they are not part of any known consumption pattern in Anglo-Saxon and Medieval England.

climatic strain), can cause intrapopulation variation in $\delta^{13}\text{C}$ (Farquhar *et al.* 1982; Heaton 1999; Smith and Epstein 1971). The $\text{C}^{12}/\text{C}^{13}$ ratio of C3 plants averages around -26.5‰ globally, but can range from -21‰ to -36‰ (Lee-Thorp 2008; O'Leary 1981; Pollard *et al.* 2007; Tieszen 1991).

The majority of aquatic plants use C3 photosynthesis, although carbon movement in aquatic plants is more complex, as the available carbon sources and fractionation factors (pH, temperature, season), along with a higher number of trophic levels, lead to a wider range of $\delta^{13}\text{C}$ values, from -11 to -39‰ (Farquhar *et al.* 1989; Katzenberg and Weber 1999; O'Leary 1981; O'Leary 1988; Van der Merwe 1991; Zohary *et al.* 1994) and a wider inter- and intraspecies range (Ervynck *et al.* 2018; Guiry 2019). Although this gives the impression of aquatic plants containing both C3 and C4 photosynthetic pathways, this is not the case (Farquhar *et al.* 1989). In marine environments, the process is different again. The main CO_2 source in the ocean is dissolved, and converted to bicarbonate; a process that favours the heavier isotope ^{13}C , creating higher $\delta^{13}\text{C}$ levels at the base of the food chain (7.0-9.0‰ higher than atmospheric CO_2). Marine plants, therefore, have less negative $\delta^{13}\text{C}$ values compared to fresh water plants (Smith and Epstein 1971). This difference echoes on into animals that consume these plants (Katzenberg and Weber 1999), and fish living in freshwater and brackish water in Belgium were found to have much lower carbon values (-28.2-20.2‰) compared to marine fish (-15.4- -13.0‰) (Fuller *et al.* 2012). These higher marine plant carbon values may also influence the carbon values of life stock, where seaweed is used as fodder (e.g. Balasse *et al.* 2009; Balasse *et al.* 2005; Blanz *et al.* 2020). Moreover, the values of C4-consumers, mixed C3/C4-consumers and marine consumers can overlap and contextual archaeological evidence can be crucial in separating these consumption patterns (Chisholm *et al.* 1982; Jones and Waldron 2003; Lewis and Sealy 2018; Nehlich *et al.* 2010).

C4 plants include mostly subtropical grasses and sedges, including species such as maize, sugarcane, millet, sago, amaranth and sorghum. This plant type tends to be influenced less by environmental fluctuations than C3 plants are (Ambrose 1993). It is modelled that very few C4 plants occur in the southern hemisphere, with <0.005% in the UK (Still *et al.* 2003), meaning that carbon isotopic values are mostly used to distinguish between marine and terrestrial-based diets (O'Connell and Hull 2012). Broomcorn and foxtail millet are the only C4 plant species consumed in Europe, although they did not form a large part of human dietary practices until the Early medieval period (Ganzarolli *et al.* 2018; Hagen 2010; Hakenbeck *et al.* 2010; Knipper *et al.* 2013; Privat and O'Connell 2002; Schutkowski *et al.* 1999). C4 plants skip photorespiration in the first step of carboxylation resulting in less discrimination against ^{13}C (Farquhar *et al.* 1989). This creates $\text{C}^{12}/\text{C}^{13}$ ratios between -9‰ and -20‰, with the global average hovering around -12.5‰ (Lee-Thorp 2008; O'Leary 1981; O'Leary 1988; Pollard *et al.* 2007; Tieszen 1991; van der Merwe

1982; Van der Merwe 1991). The most important factors influencing C4 plant inter- and intraspecies variations include light intensity, salinity, water availability, latitude and altitude (Lightfoot *et al.* 2016). Moreover, there can be slight variation in values between different elements of a plant (leaves, fruit, roots, stems, etc.; Lightfoot *et al.* 2016).

After the preferential processing of carbon by plants, carbon isotope ratios remain largely unchanged independent of treatment or consumption level, leading to a relatively direct reflection of plant carbon values in the isotopic signatures of the consumer (Pollard *et al.* 2007). Several factors do however influence this 'direct' relationship and require consideration when interpreting carbon values.

Controlled animal feeding studies showed that enrichment can vary slightly based on the tissue studied, and can increase slightly with trophic level (Rau *et al.* 1983). Such studies have shown that there can be a 5‰ increase between the plant that is consumed and the first consumer (Lee-Thorp *et al.* 1989; Tieszen and Fagre 1993) and a subsequent 0-2‰ enrichment with each trophic level (Bocherens and Drucker 2003; van der Merwe 1989). This means that if we find an offset larger than 2‰ between the local herbivorous values and that of humans, this can be indicative of the consumption of pigs or chickens with an omnivorous diet, or of marine resources. Smaller differences (<1‰) between food source (e.g. prey) and consumer cannot however not be used to distinguish trophic levels in this way, as this falls within measurement error ranges (~0.2‰) and envelops the normal variation between different plant tissues (Lightfoot *et al.* 2016).

Moreover, these animal feeding studies have found that carbon follows different fractionation patterns between diet and different tissue types (Ambrose and Norr 1993; Tieszen and Fagre 1993), likely due to differential macronutrient routing. The carbon values we extract from bone and dentine collagen reflects the protein portion of diet, while bioapatite reflects carbohydrates, fats and proteins from the diet (Ambrose and Norr 1993; Jim *et al.* 2004; Lee-Thorp *et al.* 1989; Tieszen and Fagre 1993). The combination of these two tissues has been used to improve estimates of trophic level, the quality of diet through lipid versus protein content, the contribution of C3 versus C4 plant, and the ratio of terrestrial versus marine dietary protein contributions (Ambrose and Norr 1993; Clementz *et al.* 2009; Jim *et al.* 2004; Kellner and Schoeninger 2007; Lee-Thorp *et al.* 1989), but the majority of archaeological research studies collagen alone. The processes that cause a difference between diet and tissue are not straight forward; when a diet is high in protein, amino-acid routing is relatively direct, but in low protein diets, there is comparatively more non-essential amino acid synthesis, resulting in carbon values more closely reflecting whole diet values (Jim *et al.* 2006; Webb *et al.* 2017). Though these complexities may complicate the interpretation of $\delta^{13}\text{C}$ values, especially in diets with mixed plant

and animal protein, and unknown amounts of marine resources, $\delta^{13}\text{C}$ can be considered to reflect the average carbon signature from diet with minimal trophic level effects. This allows the identification of diets primarily existing from C3 versus C4 plants, and whether marine resources were regularly consumed.

A. 3.2.2.1.1.2 Nitrogen

Nitrogen values can reflect the contribution of animal protein (terrestrial or aquatic) to the diet, and offer insight in the trophic level food stuffs. Plants, at the base of this food chain, tend to reflect the $\delta^{15}\text{N}$ of their nitrogen source. Within terrestrial environments, plants can absorb nitrogen by either directly fixating nitrogen gas (N_2) from the atmosphere, or through free-living soil microbes and/or symbiotic microbes living on plant roots. In case of the former, there is close to no fractionation, but in the latter, nitrogen values of the plants are a result of the nitrogen values of soil, which can vary substantially based on water and light availability, salinity, soil properties, altitude, root depth, the type of mycorrhiza in the soil, tissue type, and morphology (Amundson *et al.* 2003; Craine *et al.* 2009; Evans 2001; Handley *et al.* 1999; Hobbie and Quimette 2009; Högborg 1997; Lightfoot *et al.* 2020; Robinson 2001). Moreover, recycling within a plant can also discriminate against ^{15}N , and ratios may differ between plant tissues (Evans 2001).

Within marine environments, nitrogen originates from decomposing organic material and can get fixated by algae and phytoplankton (Gruber 2004; Gruber 2008). Evaporation in these environments preferentially removes the lighter nitrogen isotope from ocean water, leaving the remainder enriched. This, combined with long marine food chains, leaves marine resources substantially enriched in $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ (Fuller *et al.* 2012; Lee-Thorp 2008), with a $\delta^{15}\text{N}$ range of 7.2-16.7‰ and an average of 15.6‰ (Pollard *et al.* 2007). A similar pattern has been recognised in fresh water environments, though the $\delta^{13}\text{C}$ is not expected to increase in these environments, meaning that a combination of carbon and nitrogen values could distinguish marine from freshwater from terrestrial resources (Dufour *et al.* 1999; Guiry 2019; Katzenberg and Weber 1999).

Controlled animal feeding studies have provided an abundance of information about the relationship between diet and tissue in nitrogen consumption (e.g. DeNiro and Epstein 1981; Minagawa and Wada 1984; O'Connell *et al.* 2012). Most importantly, these studies showed that a stepwise enrichment takes place with each trophic level ($3.4 \pm 1.1\text{‰}$), allowing us to distinguish herbivores, omnivores and carnivores based on their $\delta^{15}\text{N}$ in both terrestrial and marine environments (Bocherens and Drucker 2003; Pollard *et al.* 2007; Schoeninger and DeNiro 1984). In humans, diets higher in animal protein equally result in higher $\delta^{15}\text{N}$ values (Bol and Pflieger 2002; O'Connell and Hedges 1999), and, combining this with higher $\delta^{13}\text{C}$ values for marine fauna,

allows researchers to distinguish marine food contributions to human diets (Kuhnle *et al.* 2013; Patel *et al.* 2014). Humans have a different physiology and complex diet compared to animals used in feeding studies, however, and not enough is yet understood about the diet-tissue fractionation for humans (Hedges and Reynard 2007). It is known that nitrogen is more strongly fractionated during metabolic processing than carbon is, altering the ratio of $^{15}\text{N}/^{14}\text{N}$ in different tissues (Van der Merwe 1991). Altered metabolic processing, such as during pregnancy (Fuller *et al.* 2004), growth (Waters-Rist and Katzenberg 2010), nutritional stress (Canterbury *et al.* 2020; Fuller *et al.* 2005; Hughes *et al.* 2018; Mekota *et al.* 2006) and pathology (Katzenberg and Levell 1999; Olsen *et al.* 2014), then also have an effect on $^{15}\text{N}/^{14}\text{N}$ ratios (Reitsema 2013). Moreover, nitrogen discrimination during metabolic processing varies by species and protein type, depending on both quantity and quality (Caut *et al.* 2009; Florin *et al.* 2011; Robbins *et al.* 2010; Robbins *et al.* 2005). Food items such as milk, fish and meat are often considered high-quality protein sources (Florin *et al.* 2011), and can decrease $\Delta^{15}\text{N}_{\text{diet-tissue}}$ values (Robbins *et al.* 2005), though this process is again complicated by mixed diets (Florin *et al.* 2011; Robbins *et al.* 2010). The only way to understand this fractionation in humans better is to execute species-specific feeding experiments (e.g. O'Connell *et al.* 2012). Combining $\Delta^{15}\text{N}_{\text{diet-tissue}}$ estimates from (Bocherens and Drucker 2003; O'Connell *et al.* 2012) essential when reconstructing animal protein consumption. The use of $\Delta^{15}\text{N}_{\text{diet-tissue}}$ estimates to reconstruct diet can be further complicated by salt spray from the sea in coastal areas, increasing ^{15}N values (Blanz *et al.* 2020). Moreover, infants can display a higher trophic level compared to their mothers as their consumption of breast milk essentially represents consumption of maternal protein (Fuller *et al.* 2006; Reynard and Tuross 2015). One major anthropogenic influence on environmentally available nitrogen is fertilisation of agricultural soils. As animal dung is higher in ^{15}N , its use as a manure can increase $\delta^{15}\text{N}$ of the plants, potentially mimicking a trophic level effect in the plants, and subsequently in the plants consumers (Blanz *et al.* 2020; Bogaard *et al.* 2007; Fraser *et al.* 2011; Kanstrup *et al.* 2011; Treasure *et al.* 2016). Clearly, dietary reconstruction based on nitrogen isotopes is not straightforward, and archaeological reconstructions of diet (often) suffers from even more, including knowledge on exactly which foods make up the diet, and the isotopic values of, and bioavailable carbon and nitrogen in, these foods (Richards *et al.* 2006). The amount of unknowns in regard to protein quality and quantity are still enormous, and although mixing models *can* be used (e.g. Bocherens and Drucker 2003; Cheung and Szpak 2020), the results are based on too many assumption (Cheung and Szpak 2021; Richards *et al.* 2006). Dietary reconstructions using $\delta^{15}\text{N}$ values from non-pathological bone are therefore mostly useful to make generalised inferences about trophic levels, and should allow (bio)archaeologists to recognise individuals as mostly herbivorous or omnivorous and identify marine contributions to individual diets, leading

to a range of 17-20‰ for people living predominantly on marine resources and a range of 6-14‰ for terrestrial agriculturalists.

A. 3.2.2.2 Where: complicated (t)issues

Analyses of dietary isotopes in archaeology are largely based on 1) the principle 'you are what you eat' in that the components of your diet are used in the synthesis of bodily tissues, and thus the isotopes of your diet get incorporated into these tissues; and 2) on the premises that, once the relevant tissue ceases to grow or remodel (e.g. after death), these values remain largely unchanged. Although isotopic analysis can use a myriad of tissues, including hair, nails, blood, skin, etc., archaeological research often utilises the only tissues that remain preserved through time: bone and teeth. Even these tissues, however, can undergo chemical and physical alterations as a result of diagenesis, often having a larger influence the longer samples are subject to such factors. This diagenetic alteration has to be considered when we interpret isotope values obtained from such tissues (Kendall *et al.* 2018). For carbon and nitrogen, several methods exist to assess the quality of the obtained values and to evaluate the extent of potential contamination and/or diagenesis (Ambrose 1990; DeNiro 1985), limiting the effect of these changes on our interpretation.

The collagen component of bone and teeth is most often used as it is relatively abundant within these tissues, is easy to extract from the other components that make up these tissues, tends to survive diagenesis relatively well, and it has been shown to reflect the isotopic component of the original diet (Collins *et al.* 2002; DeNiro and Epstein 1978). However, the skeleton is not some static component in our body, but grows and remodels with us through life. This remodelling of our tissues is often referred to as 'turnover', and its rate is determined by the metabolic activity and composition of that specific tissue (Libby *et al.* 1964; Thompson and Ballou 1956; Tieszen *et al.* 1983). Although more research is needed, our current knowledge indicates that denser cortical bone (e.g. occipital/femoral bone) has a slower turnover rate than does spongy cancellous bone (e.g. ribs; Fahy *et al.* 2017). This has an effect on the isotope values we extract from such tissues: collagen reflects the diet of the period during which this turnover took place. Thus, dietary reconstruction from bone reflects a relatively large life-period, during which a certain diet (or an average of several diets) was consumed. The most common sample site for stable carbon and nitrogen measurements is the midshaft of the rib as this leads to little loss of morphological information and rib fragments are often readily available (Sealy *et al.* 1995). Ribs are often considered to reflect the last 5-10 years of life (Libby *et al.* 1964; Sealy *et al.* 1995). The midshaft of ribs was therefore also sampled in this study to reflect later life, have a relatively large comparative dataset from other studies and to limit loss of morphological data.

Contrary to bone, tooth enamel and primary dentine do not remodel after formation (Gage *et al.* 1989; Hedges *et al.* 2007) preserving the isotopic signature at the time of their development. Depending on the tooth, the period reflected ranges from infancy to early adulthood, and teeth are often used besides rib samples to show change throughout life (Sealy *et al.* 1995). Moreover, teeth develop from the tips of the crown down to the root in incremental layers. The growth of teeth tends to follow chronological age relatively closely and it is generally accepted that these depositional increments relate to relatively narrow ages of growth (Dean *et al.* 1993). Researchers soon started sectioning teeth into chunks in order to gain more information on variation in diet through early life (e.g. Fuller *et al.* 2003; Koch *et al.* 1989). For most teeth, however, it can be assumed that roots form at approximately 1mm a year, with a slightly higher growth rate for the dentine of crowns (Beaumont *et al.* 2013a; Beaumont and Montgomery 2015). On this premises, sampling at these increments, isotope values can reflect a year of development, and a year of diet - although adjustments are made based on the total length of the tooth and how long it takes for that specific tooth to form. Thus, if for example we are dealing with a second premolar, and we were to sample the dentine from the entire tooth, our isotope values would reflect the average diet from ages 5.5 to 11.5-12.5 years of age. If we sample the root only, excluding the dentine preserved in the crown, we can reconstruct diet for the ages 9.5 to 11.5-12.5. If we however sample the dentine from the whole tooth in, for example 1mm increments, we can reconstruct dietary change at approximately 1-year intervals between these ages. As a result of this turnover in bone, and lack thereof in teeth, we can reconstruct dietary change throughout someone's life by comparing the values of tissues with different remodelling rates (Beaumont and Montgomery 2015; Sealy *et al.* 1995). There are however some caveats in the exact sampling protocol and what the lab-created increments actually reflect (Balasse 2003; Curtis *et al.* 2022); i.e. sampling perpendicular to the root's axis, or along Andresen bands (only visible under light microscopy; Curtis *et al.* 2022). Either way, incremental sampling improves the resolution of early life dietary change compared to bulk root or whole tooth sampling (Curtis *et al.* 2022).

This study applies both bulk root and incremental whole tooth sampling. For the majority of individuals bulk root samples will be processed for stable carbon and nitrogen analysis and compared to rib values to reconstruct dietary change throughout life. For several cases, based on curatorial preferences, whole tooth lengths were sampled incrementally and compared to rib values to understand a more detailed change in diet during early life and to late life.

A. 3.2.2.2.1 Carbon and nitrogen isotope in palaeopathology

As briefly mentioned above, a number of physiological circumstances can cause variation in carbon and nitrogen isotopes, including pregnancy (Fuller *et al.* 2004), growth (Waters-Rist and

Katzenberg 2010), nutritional stress (Canterbury *et al.* 2020; Fuller *et al.* 2005; Hughes *et al.* 2018; Mekota *et al.* 2006) and pathology (Katzenberg and Levell 1999; Olsen *et al.* 2014). Many of these studies look at living individuals and can therefore identify short periods of ill health or malnutrition. In palaeopathology however, we often only have bone and teeth to sample, and generally do not know exactly which pathology may cause shifts in isotope values. Nonetheless, several studies have identified patterns in isotope variation as related to disease. Osteomyelitic sections of the bone of an AIDS patient, for example, are shown to have close to a 2‰ higher $\delta^{15}\text{N}$ than non-osteomyelitic sections of the same bone (Katzenberg and Levell 1999). This has been explained as an effect of increased catabolism and a loss of ^{14}N through urine, leaving the body with a higher proportion of ^{15}N from which to build new tissues (Katzenberg and Levell 1999). Studies assessing nutritional stress in humans due to morning sickness in pregnancy (Fuller *et al.* 2005), anorexia nervosa (Mekota *et al.* 2006), and bariatric surgery (Canterbury *et al.* 2020), counterintuitively, show that malnourishment can cause an increase of $\delta^{15}\text{N}$ values than cannot be distinguished from a high protein or marine-based diet. Upon subsequent growth during pregnancy, or recovery from malnourishment, nitrogen isotope values decrease (Fuller *et al.* 2005; Mekota *et al.* 2006)

In theory, (chronic) infectious diseases can cause nitrogen losses that cannot be replaced by dietary protein (Grossman *et al.* 1945; Paton *et al.* 2013; Powanda 1977), with such negative nitrogen balances leading to higher $\delta^{15}\text{N}$ values. This theory is so far only supported for skeletal sites directly affected by such infectious processes (Katzenberg and Levell 1999; Olsen *et al.* 2014; Strange 2006). Moreover, variations in the ratio of protein to carbohydrate have no effect of the isotopic value observed in either carbon or nitrogen (Pollard *et al.* 2007), but the way carbohydrates metabolise during infectious disease can be different (Long 1977; Mizock 1995). Due to the body's higher demand for glucose during physiological stress, the metabolic pathways that preserve and recycle carbon might become more active, leading to ^{13}C enrichment of amino acids used in collagen synthesis. This pattern has become somewhat apparent in previous studies of skeletal elements (Olsen *et al.* 2014), though more research is needed. A condition like Hansen's Disease, however, represents a chronic and systemic infection complemented by localised pyogenic infection (extremities, ears, nose, etc.), and no studies currently support that such a condition may influence skeletally-wide isotopic carbon and/or nitrogen values, though the above theoretical patterns could play a role.

A. 3.2.2.3 Who: sample selection

The main research question that would benefit from dietary reconstruction based on isotopic variability, regards the sociocultural- or biomedically-steered changes in diet due to either

institutionalisation, hospitalisation or, potentially, merely due to diagnosis with 'leprosy'. Sample selection was therefore focused on comparing early to late life samples from individuals from within one site, and from a number of different contexts, and does not require baseline isotope values as a comparative dataset. Individuals within one site that exhibit pathological signs of HD will either show a difference to their temporal and contextual site companions, or they will not.

Practically, therefore, individuals selected for stable isotope reconstruction of early and late life diet needed to have a second (pre)molar and rib fragment available. Preferably individuals are chosen that will still have an unsampled second premolar or molar available in another quadrant. As this project reconstructs several life histories/narratives, preference was given to individuals whose skeletons were complete enough to write an autobiography for (e.g. age, sex, stature, pathology descriptions), and who were also sampled for pathogen aDNA. These are not hard criteria however, and for less complete and more commingled collections (e.g. MHW and MSL) individuals that only had a rib *or* second (pre)molar present, and no aDNA data or complete osteobiography, might be selected.

A number of individuals included in this project represent isolated cases of Hansen's Disease within a larger non-HD population. The isotope values of these individuals are compared to isotope data from the wider relevant population to analyse whether individuals with HD might consume a different diet. In some cases this means the values from this project are compared to isotope values from non-HD cases from the same site (Bayliss *et al.* 2009; Beaumont *et al.* 2018; Cameron 2014a; Fuller *et al.* 2003; Haydock *et al.* 2013; Müldner 2001; Purcell 2012; Richards *et al.* 2002; Rose 2020; Rose 2021; Spencer 2008), while in others the values from this project will be compared to period- or context-specific non-HD cases as site-specific comparative data was not available (Rose 2020; Rose 2021; Spencer 2008). Additional isotopic data was also added from St Leonard's 'leper' Hospital (Inskip and Roberts unpublished) for additional leprosarium data.

A. 3.2.2.4 How: sampling and laboratory protocol

All laboratory work was performed at the Dorothy Garrod Laboratory for isotopic analysis, Department of Archaeology, University of Cambridge. Processed collagen was analysed by mass spectrometer (see §3.2.2.4.3) at the Godwin Laboratory for paleoclimate research, Department of Earth Sciences, University of Cambridge.

A. 3.2.2.4.1 Sampling protocol

As discussed above (A. 3.2.2.2), the reconstruction of dietary life histories by comparing the isotope values from tissues that reflect early and late life adds a substantial amount of information

compared to single-tissue analysis (Sealy *et al.* 1995). This is especially relevant in HD-related research on medieval individuals. As early life diet can have a substantial influence on later life susceptibility to infections, including HD, comparison of early life diet from those with pathological signs to those without pathological signs of HD could hint towards precursors to infection. Moreover, as 'leprosy' in the medieval period is potentially tied to social perceptions of the disease, and as both general hospitals and leprosaria might have provided a 'institutional' diet, the comparison of dental and rib isotopes can reveal changes in diet due to disease and/or social status, and living circumstance. Previous leprosaria-based research has also shown that using both dental and rib samples reflects potential "institutional" diet better than solely an isolated assessment of rib samples (Roffey *et al.* 2017). Following this principle, both dentine and rib samples were taken. Cutting of samples was done using a diamond cutting wheel fit into a dental drill, and samples were subsequently sandblasted to remove any external contamination following the Dorothy Garrod Laboratory protocols.

A. 3.2.2.4.1.1 Bulk samples

To ensure comparability of values obtained in this research to that of research forming part of the comparative database, dental samples were taken from second molars. Following the protocol for the Dorothy Garrod Laboratory, at least 500mg of raw material had to be obtained. To limit sample quantity to around 500mg, while easing the cutting process, only the roots of these teeth were sampled, representing 9.5 to 11.5-12.5 years of life. In the case of molars, an attempt was always made to sample only one root in the case of maxillary molars, or one-fourth of a root cluster in the case of mandibular molars. In all cases the tooth root was cut as close as possible along the cementum-enamel junction. Rib samples were always taken from readily available fragments, excluding those with morphologically relevant elements or pathology. These samples represent the last 10-15 years of life. Though 500mg was technically a laboratory-specific requirement in order to reach to amount of collagen required later (2-5mg), the sample quantity was reduced for the second round of samples when collagen preservation had proven to be good enough to obtain 2-5mg of collagen on smaller raw samples.

A. 3.2.2.4.1.2 Incremental sampling

Incremental isotope sampling was not planned for this project, but in agreement with the relevant curator, it was decided that incremental sampling provided more (comparable) data for several collections housed at Bradford University (HCH, RFN, and SGB). Moreover, to adhere to the curational guidelines, only one tooth could be sampled for both aDNA and isotope purposes. As frontal maxillary incisors are preferred for aDNA work due to their proximity to the

rhinomaxillary region, and second (pre)molars are preferred for dietary reconstruction, a consensus fell on the maxillary second premolars, which form around the same age as second molars. (Although on two occasions a second molar was sampled in agreement with the curator due to previous sampling or unavailability of second premolars). These teeth were cut in half (length-wise) and demineralised prior to sectioning into increments. Following the curatorial guidelines, the entire length of the tooth was used, contrary to the bulk dentine sampling in this project. Incremental sampling training was provided by Dr. Julia Beaumont at Bradford University. Preparation and cutting of incremental samples was executed following closely to method 2 (Beaumont *et al.* 2013b).

A.3.2.2.4.2 Laboratory protocol

After the samples were sandblasted, the bulk bone and tooth samples were prepared following a modified Longin method (Privat 1999), as is the protocol for the Dorothy Garrod Laboratory (see 3.4 Bulk dentine and bone sampling and collagen extraction protocol and 3.5 Incremental dentine sampling and extraction laboratory protocol). All samples, incremental samples included, were demineralised in 12ml pre-weighed glass tubes using approximately 8ml of cold 0.5M HCl. The acid was changed every 2 days and the samples were refrigerated in between acid changes. Using Pasteur pipettes the samples were tested for readiness (slight bendiness to sample) and when ready, the acid was decanted off. For incremental samples, it was at this stage that the teeth are rinsed in distilled water thrice, laid on a metal ruler, and sliced into 1mm increments from the root up to the crown using a scalpel. Each tooth was photographed on the ruler for later age-estimation per section. Each cut off increment was put into a 5ml Eppendorf tube. The bulk samples were then also rinsed with distilled water thrice before being placed into a pre-weighed plastic sample tube. All samples were then submerged into approximately 8ml pH3.0 water for bulk samples, and 4ml for incremental samples, and heated at 75°C for 48 hours with a plastic lid preventing evaporation. After full gelatinisation was achieved, the supernatant was filtered into pre-weighed plastic tubes using an Eze filter. These plastic tubes were subsequently covered with parafilm and placed at a sharp angle in a -20°C freezer overnight. The samples were then moved to a -80°C freezer for 4 hours before the parafilm on each tube was perforated with a knife and the samples were placed in the freeze-drier. After approximately 2 days in the freeze-drier, most samples were lyophilised. Samples that failed to fully lyophilise during the freeze-drying process (plastic-looking layer rather than white-brownish fluff) were re-gelatinized and reprocessed from that step following the above guidelines. All samples were weighed after freeze-drying to record yields of collagen.

Following successful freeze-drying, 0.8mg (± 0.1 mg) of each sample was weighed into a tin capsule. As bulk samples were run in triplicates, this process was repeated thrice for each sample. For incremental samples, the number of replicates was dependent on the amount of collagen available, ranging from one to three triplicates. For each run of samples at the mass spectrometer, a number of standards were weighed into tin capsules and distributed among the human dentine and rib collagen samples, including: EMC, nylon, alanine, caffeine, and bovine protein.

A. 3.2.2.4.3 Mass spectrometer

Samples were analysed at the Godwin Laboratory for paleoclimate research, Department of Earth Sciences, using a Costech automated elemental analyser, coupled in a continuous-flow with a Thermo Finnigan MAT253 isotope ratio mass spectrometer (IRMS). All runs were performed by laboratory technician Catherine Kneale. The basic principle of this mass spectrometer will be discussed below.

Within a IRMS, it is the atomic weight of electrically charged ions/molecules that can control their trajectory through an externally introduced electrostatic or magnetic field, and allows charged particles of different masses to be separated and measured (Pollard *et al.* 2007). In the case of light stable isotopes, the spectrometer handles gaseous samples, and the tin-foil-wrapped samples are therefore dropped into a multi-turret holder and sent into a flash combustion furnace which volatilises the tin capsule and sample, creating gasses. The gases are combusted over an oxidative surface at 800°C, creating CO₂, N₂, NO_x, and H₂O. Subsequently, NO_x is turned into N₂ by elemental copper stage, and a dryer removes the water vapour (Pollard *et al.* 2007). The gases that remain are passed through a helium stream in a separation column, which creates peaks for each gas that are later used as a quality measure. The gases then flow through a metal chamber in which electrons are passed through the gas and accelerated by a low voltage (~ 100 eV), causing ionization within the gas sample. Positive ions in this gas are then accelerated towards a series of lenses and slits using a low positive plate. These lenses and slits then focus, collimate and accelerate the ion beam into the analyzer (Brenna *et al.* 1997; O'Brian 2015; Pollard *et al.* 2007). Here, they are separated according to their mass-to-charge ratio and slammed into metal collector plates that record the amount of C¹², C¹³, N¹⁴, and N¹⁵ simultaneously by measuring the voltage that is created by the impact (Pollard *et al.* 2007). These ratios are then compared to their relevant standards (carbon VPDB and nitrogen to AIR) and converted to delta values.

The dates that labwork was undertaken, steps, sample weights, and problems were all written into a physical lab book that will remain at McDonald Institute, University of Cambridge for future reference. All raw isotope data is first processed and looked over by lab technician Catherine Kneale and provided to students in Excel spreadsheets. All data was then checked for

quality using standard approaches (Roberts *et al.* 2017; Vaiglova *et al.* 2023): standards are compared to their expected value, sample sizes are checked through alanine peaks, atomic C:N ratios should fall between 2.9-3.6 (DeNiro 1985) and %C and %N should fall >13% and >4-5%, respectively (Ambrose 1990). Accuracy – the extent to which the value of the standards deviates from the expected value – and precision – measurement differences for the standards between the separate runs (Szpak *et al.* 2017) were both be reported. All statistical analyses and production of graphs were executed in SPSS 28.0.1.1(15), using the δ isotope values or Δ isotope values.

A.3.3 Laboratory manual

Skeletal inventory

The skeletal inventory scores the completeness of each bone or bone segment based on the following classification (Buikstra and Ubelaker 1994):

Bone/site absent	A (absent)
0-25% complete	F (fragment)
25-75% complete	P (partially complete)
75-100%	C (complete)

Based on individual completeness assessment of each bone/segment, they are arbitrarily combined to get an overall completeness estimate.

Dental inventory

The dental inventory records the status of all deciduous and permanent teeth and the cause for their possible loss. Record the number of adult and deciduous teeth, number of teeth positions/sockets, ante-mortem tooth loss (AMTL), post-mortem tooth loss (PMTL), number of unerupted teeth and number of congenitally absent teeth.

Each tooth is numbered according to their quadrant number and tooth position (numbering from anterior tooth to lateral tooth; Leatherman 1972)

Image of deciduous and permanent dentition numbering system removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louise Scheuer and Angela Christie for Elsevier Academic Press.

AF 24. The deciduous (quadrant 5, 6, 7 and 8) and permanent (quadrant 1, 2, 3, and 4) dentition in labial/buccal view. Images taken from Schaefer et al. 2009, 70-71.

Calculus recording

Image of calculus formation stages removed for copyright reasons. Copyright holder is Don Brothwell for Cornell University Press.	Calculus quantification	Recorded as
	No calculus	0
	Slight amount	1
	Moderate amount	2
	Large amount	3
	Unobservable	99

AF 25. Illustrations of variations in degree of dental calculus formation in cross-sectional and external view. Image and caption taken from Buikstra and Ubelaker 1994, 56 & Borthwell 1981.

Bone loss/Periodontal disease recording

Periodontal disease is recorded as a type: horizontal versus vertical; and as a severity (see figure).

Image of periodontal disease stages removed for copyright reasons. Copyright holders are Alan Ogden, Ron Pinhasi and Simon Mays for John Wiley & Sons, Ltd.

1. Alveolar margin meets tooth at a knife-edge acute angle (no disease)	2. Alveolar margin is blunt and flat-topped with a slightly raised rim (mild periodontitis)	3. Alveolar margin is rounded and porous, with a trough of 2-4mm depth between tooth and alveolus (moderate periodontitis)	4. Alveolar margin is ragged and porous, with an irregular trough or funnel >5mm depth between tooth and alveolus (severe periodontitis)
99. Unobservable			

AF 26. System for scoring periodontal disease based on Ogden 2008, 293. Image by author based on maxillary left central incisor and Ogden 2008, 293.

Abscesses & granuloma's

Scoring system: 0 = no abscesses; 1 = buccal/labial side of dentition; 2 = lingual side of dentition; 3 = interproximal; 99 = unobservable (Buikstra and Ubelaker 1994).

Dental caries

Dental caries are scored according to their location on each tooth following a 9-stage scoring system adapted from (Buikstra and Ubelaker 1994), images from (White and Folkens 2005).

Tooth surface	Score	Description
Image of tooth removed for copyright reasons. Copyright holders are Tim White and Pieter Folkens for Elsevier Academic Press.	0	No lesion present
	1	Occlusal surface
	2	Medial interproximal surface
	3	Distal interproximal surface
	4	Libial/buccal surface
	5	Lingual surface
	6	Cemento-enamel junction
	7	Sub-CEJ surface
	8	Too large to assign location
	99	Not observable

Enamel hypoplasia

For enamel hypoplasia, the type, position and severity is scored based on (Roberts and Connell 2004). The number of defects is recorded per type: Linear horizontal groove(s) (1); Linear vertical groove(a) (2); Linear horizontal pits (3); Non-linear array of pits (4); Single pits (5); Cuspal (6); Unobservable (99); see AF 27.

Image of types of enamel hypoplasia removed for copyright reasons. Copyright holders are Alan Ogden, Ron Pinhasi and William White for the scientific journal American Journal of Biological Anthropology (Wiley).

AF 27. Variations of enamel hypoplastic defects. Image by author; adapted from Ogden et al. 2007, 964.

- EH location is scored as follows: 0 = no EH; 1 = cusp; 2 = middle section of crown; 3 = neck; 99 = unobservable.
- EH severity is scored as follows: 0 = no EH; 1 = just discernible line; 2 = clear groove; 3 = gross defects; 99 = unobservable.

Sex estimation

Sex assessment is only undertaken when an individual is considered to be over the age of 18 years old. All sex estimates will be ascribed either one of five scores based on the masculinity or femininity of the expression of the skeletal sites (Buikstra and Ubelaker 1994): F (hyperfeminine), PF (probable female), I (indeterminate), PM (probable male), and M (hypermasculine).

Pelvic methods

Phenice traits

The method scores three sites that are considered to have a clear 'presence'/'absence' distinction between females and males:

- 1) The ventral arch, on the ventral aspect of the *os pubis*, represents a bony ridge in females and is flat in males;
- 2) The ischiopubic ramus tends to be concave in females (the 'subpubic concavity') and straight or even convex in males when viewed from the posterior side;
- 3) The ischiopubic ramus can have a small ridge, or 'pinched' appearance, in females when viewed from the medial aspect. See AF 28.

Image of Phenice traits removed for copyright reasons. Copyright holder is T.W. Phenice for the scientific journal American Journal of Biological Anthropology, Wiley.

AF 28. The Phenice traits for females (left) and males (right). Image based on Buikstra and Ubelaker 1994, 17 (based on Phenice 1969).

Greater sciatic notch & Preauricular sulcus

The greater sciatic notch, or *incisura ischiadica major*, represents a notch on the postero-medial side of the pelvis which is generally wide in females and narrow in males. The notch is best scored by looking at the medial side of the pelvis and looking at the wideness: the wider the angle the more female the trait (Buikstra and Ubelaker 1994).

The preauricular sulcus is a groove that can be found inferior to the auricular surface, on the superior margin of the great sciatic notch, and is generally deep and long in females, and absent or shallow in males (MacLaughlin and Bruce 1990). The groove is best viewed by looking at the medial side of the pelvis and tilting the ilium away from you, or by feeling the presence and depth of the sulcus with a finger. See AF 29.

Image of os coxae with pre-auricular surface and greater sciatic notch details removed for copyright reasons. Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.

AF 29. The scoring systems for the pre-auricular sulcus (A) and greater sciatic notch (B) on this pelvis. Image based on Buikstra and Ubelaker 1994, 17-18.

Subpubic angle

The subpubic angle – or *angulus pubis* – refers to the triangular space that is formed by the articulation of the pubic bones and their deviation from each other towards the ischium. It is generally wide in females and narrow in males (Ferembach *et al.* 1979). This trait is best scored by either holding both pubic bones in articulation and comparing the space inferiorly of the pubic articulation to the available images, or, in case only one pelvis is available, by holding a straight object (pencil, rules, etc.) against the available pubic symphyseal surface. See AF 30.

Arch compose and iliac shape

The arc composé represents the number of imaginary arcs from the lateral side of the sacral articulation on the ilium to the inferior line of the greater sciatic notch towards the ischial spine. Males have a double arc, whereas females have a single arch (Ferembach *et al.* 1979).

Lastly, the assessment of the iliac shape evaluates the curvature of the iliac crest when viewed from above, where females have a ‘flatter’ shape and men a more curved S-shape (Ferembach *et al.* 1979). See AF 31.

Image of the os coxae with detail of subpubic angle removed for copyright reasons.
Copyright holders are D. Ferembach, I Schwidetzky and M. Stoukal for the scientific journal
Journal of Human Evolution, Elsevier.

AF 30. Range of sexual dimorphism found in the subpubic angle of the pelvis: blue line implies the width of the space between the ischiopubic ramii. Image by the author based on descriptions by Ferembach, Schwidetzky and Stloukal 1979, 518.

Image of the os coxa with detail of the arc compose removed for copyright reasons.
Copyright holders are D. Ferembach, I Schwidetzky and M. Stoukal for the scientific journal
Journal of Human Evolution, Elsevier.

AF 31. Classical female (double arched) and classical male (single arched) variation of the arm composé feature of the pelvis. And Classical female (flat/straight iliac blade) and classic male (pronounced S-curve in iliac blade) variations of the shape of the ilium. Image adapted from Ferembach, Schwidetzky and Stloukal 1979, 519.

Cranial methods

For sex estimation based on the cranium, 8 features will be scored. The supraorbital margin refers to the sharpness of the superolateral rim of the eye orbit: females have a sharper and thinner superolateral border, and males a broader and blunt/rounded margin. By palpating this edge and comparing it to AF 32, a score can be assigned (Buikstra and Ubelaker 1994).

The glabella is the bony area between the two brow ridges, superior to the nasal bones, that is often nearly flat in females and can form a marked, smooth projection in males. The glabella is best scored when viewing the frontal bone in contour from a lateral aspect (Buikstra and Ubelaker 1994); AF 32.

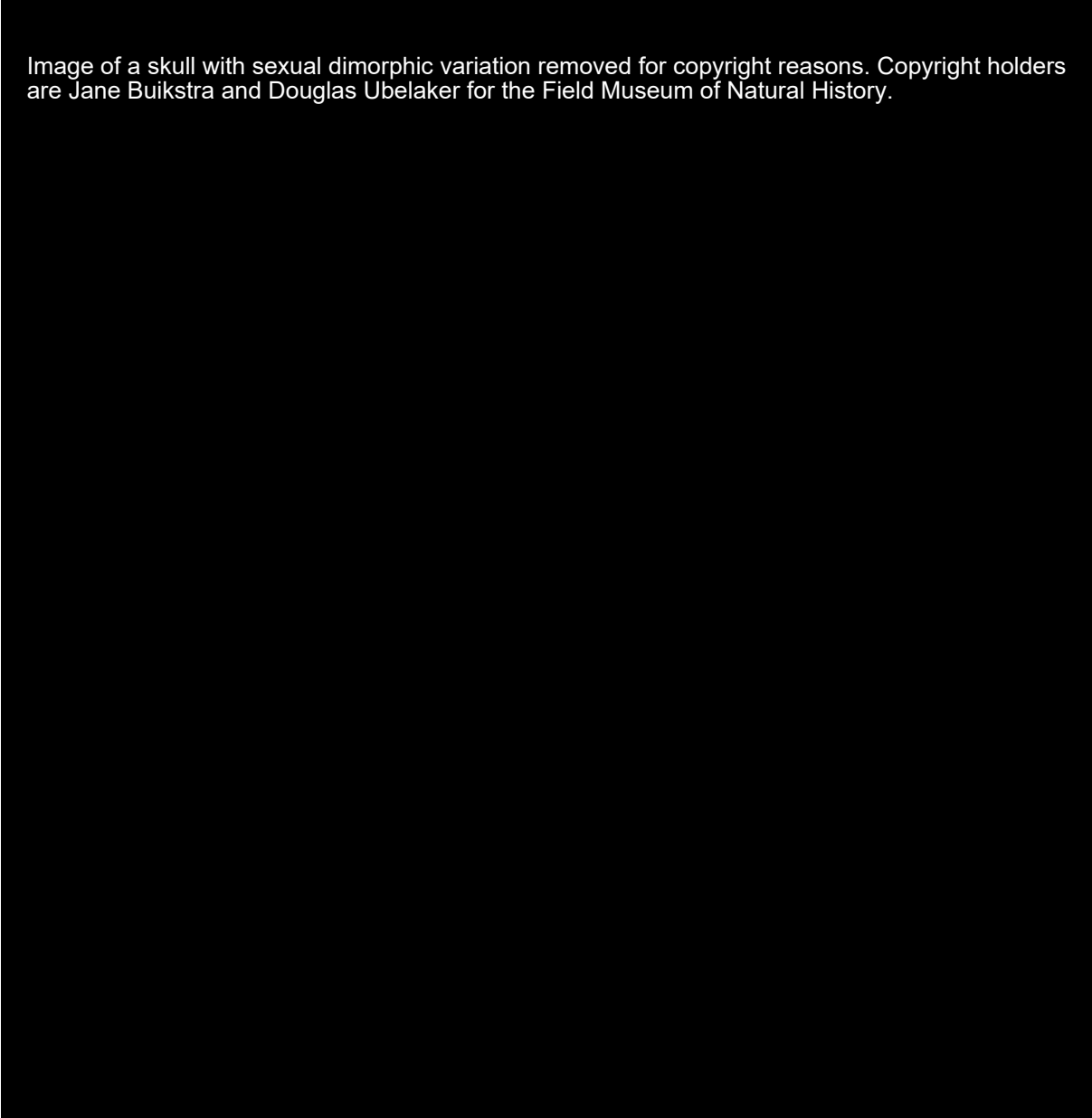
The mastoid process is the protuberance located posteroinferiorly of the external acoustic meatus, which tends to be bigger (in volume) and protrudes more inferiorly in males than in females (Buikstra and Ubelaker 1994). Additionally, in females, the zygomatic arch extension (attachment site for the temporalis muscle) ends superoanteriorly of the mastoid process, whereas in males this muscle attachment line continues beyond (i.e. posterior to) the mastoid process (Keen 1950); see AF 32.

The nuchal plane represents the inferior half of the occipital bone. When the occipital bone is viewed in lateral profile, the nuchal plane often has a smooth form in females and a hook-like protrusion or even a ridge along the entire lateral-lateral aspect in males. The size and shape of this nuchal crest can be scored by comparing the lateral profile to Figure 9 (Buikstra and Ubelaker 1994); see AF 32.

Bossing can exist in both the frontal and parietal bones. Females and non-adults tend to show bossing, or marked eminence, whereas both bones tend to be more flat in males (Schwartz 2007). Generally, only frontal bossing is scored in estimating sex (Inskip *et al.* 2018) and the same will be done here. This feature is best scored by moving the hand over the frontal bone and feeling whether there is a protrusion besides the normal inclination of the forehead. See AF 33 for a depiction.

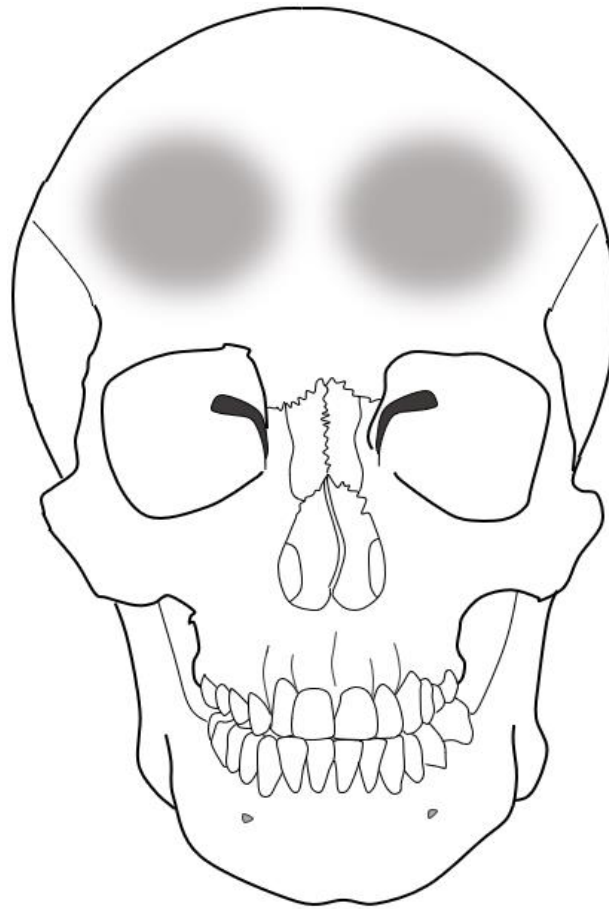
Forehead inclination is most marked in females, where the forehead approaches vertical inclination, whereas in males the forehead is more strongly inclined (Ferembach *et al.* 1979). The feature is best scored by viewing the skull from a lateral aspect and comparing the inclination to AF 34.

Image of a skull with sexual dimorphic variation removed for copyright reasons. Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.



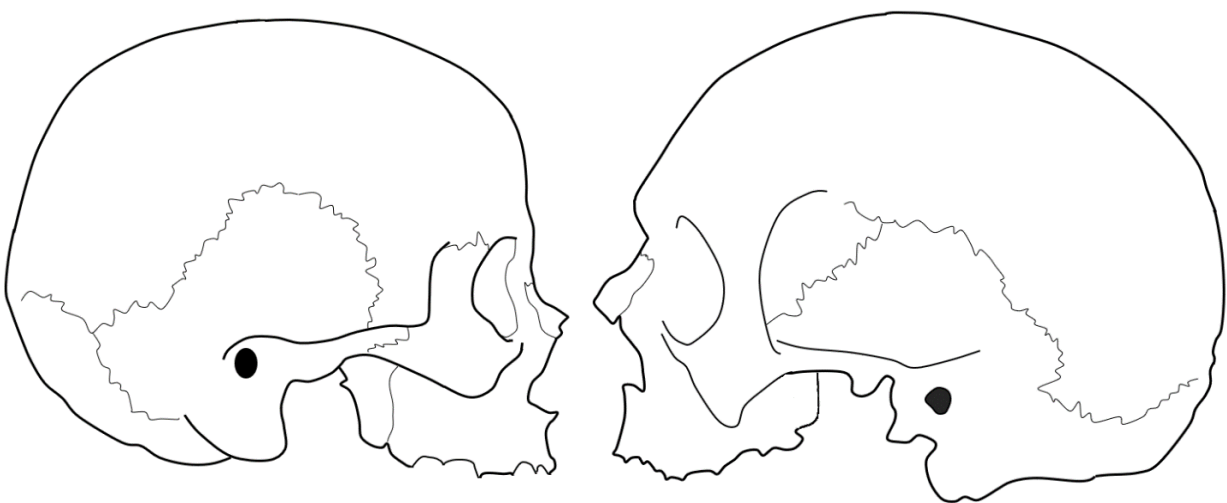
AF 32. The five-stage scoring systems for the supraorbital margin, glabella, mastoid process/zygomatic arch extension and nuchal crest. Images based on Buikstra en Ubelaker 1994, 20.

Frontal bossing



AF 33. An indication of the location of frontal bossing (grey blurred areas), mostly present and most pronounced in females. Image by author.

Forehead inclination



AF 34. An example of 'classic' female forehead shape (left) and 'classical' male forehead inclination (right). Image by author.

Mandible methods

Mental eminence

The mental eminence refers to the bony protrusion on the anterior aspect of the mandible that forms the chin in living individuals. The eminence is less pronounced in females, and forms a rough and protruding surface in males. The mental eminence is best scored by moving one's thumbs over the eminence and comparing the protrusion to AF 35 (Buikstra and Ubelaker 1994).

Image of the mandible with sexual dimorphism variation removed for copyright reasons.
Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.

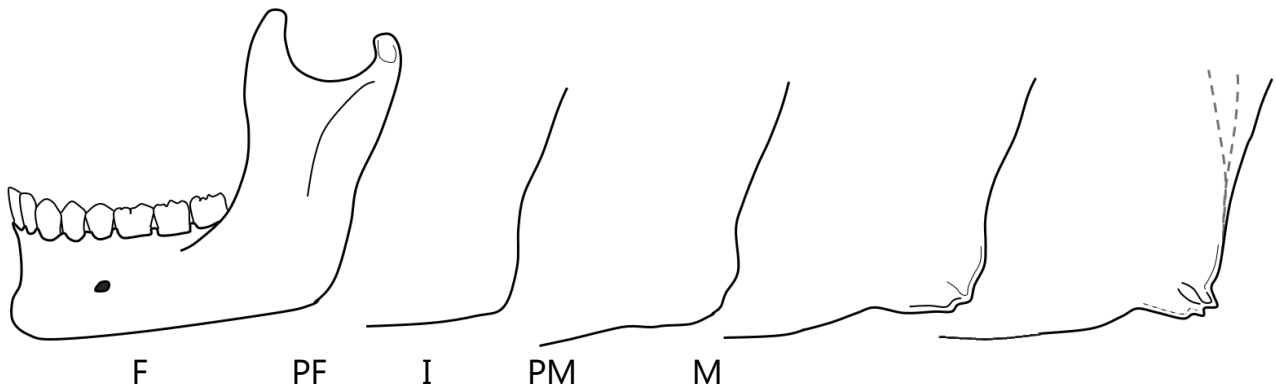
AF 35. Sexual variation in the mental eminence. Images based on Buikstra en Ubelaker 1994, 20.

Overall mandible shape & gonial flaring

The size of the mandible is generally smaller in females, the ascending ramus slimmer, the shape of the chin more pointed and the inferior margins thinner (Brickley 2004b); see AF 36. The gonial angle tends to have an angle closer to 90degrees in males and can have outward flaring of the corners in males; AF 37.

Image of the inferior portion of the mandible removed for copyright reasons. Copyright holders are Megan Brickley and J. I. McKinley for The British Association of Biological Anthropology.

AF 36. A classic male and classic female appearance of the shape of the chin when the mandible is viewed from inferior up. Image from Brickley 2004, 24.



AF 37. Expressions of gonial flaring from feminine (no flaring) to male (pronounced flaring). Image by author.

Age-at-death estimation

Non-adults

Dental age – root and crown development

Score the stage of crown/root development for each developing tooth and compare score to age-tables on following pages.

Image of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

AF 38. London Dental Atlas root formation method (Figure 1 and 2, AlQahtani et al 2010).

AT 15. Tooth development data from autopsied infantsa (combined sex). Table from AlQahtani et al. 2010, 486.

Table of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

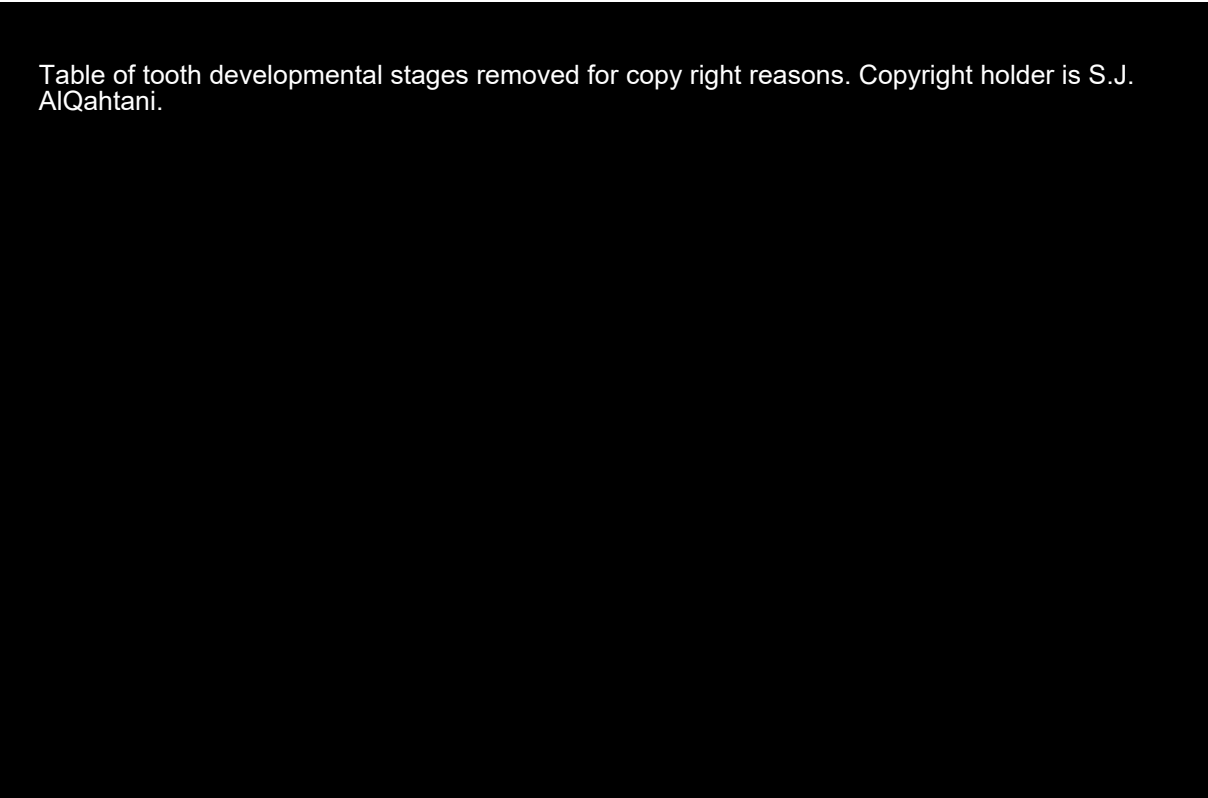
AT 16. Tooth development data from skeletal remainsa (combined sex). Table from AlQahtani et al. 2010, 486.

Table of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

AT 17. Combined sex tooth development data for ages 1.5-3.5years. Table and caption taken from AlQahtani et al. 2010, 487.



AT 18. Combined sex tooth development data for ages 4.5-6.5years. Image and caption taken from AlQahtani et al 2010, 487.



AT 19. Combined sex tooth development data for ages 7-10 years. Table and caption taken from AlQahtani et al. 2010, 488.

Table of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

AT 20. Combined sex tooth development data for ages 10-13 years. Image and caption taken from AlQahtani et al. 2010, 488.

Table of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

AT 21. Combined sex tooth development data for ages 13-18. Images and captions taken from AlQahtani et al. 2010, 489.

Table of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

Image of tooth developmental stages removed for copy right reasons. Copyright holder is S.J. AlQahtani.

Skeletal age – Epiphyseal fusion

AT 22. Perinatal to adolescence ossification of primary centres ordered by skeletal site, with associated ages. Table based on (Schaefer, et al. 2009, 353). ‘f’ stands for foetal. All ages without ‘f’ are post-natal.

Table of ossification timing removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 23. Female adolescence and postadolescence ossification of primary center ordered by skeletal site, with associated ages. Table based on (Schaefer, et al. 2009, 354). All ages in years.

Table of ossification timing removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 24. Male adolescence and postadolescence ossification of primary center ordered by skeletal site, with associated ages. Table based on (Schaefer, et al. 2009, 355). All ages in years.

Table of ossification timing removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

Skeletal age – cranial measurements

AT 25. Descriptions of the cranial measurements for nonadults aged 0-3years. Measurement descriptions taken from Buikstra and Ubelaker 1994, 45.

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Table of cranial measurements removed for copyright reasons. Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.

Image of cranial measurements removed for copyright reasons. Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.

AF 39. Cranial measurements 0-3year olds. Images from Schaefer et al 2009; measurements based on Buikstra and Ubelaker 1994

AT 26. Measurement 1a&b; length and width of the lesser wing (Schaefer et al. 2009, 29; based on Fazekas and Kósa 1978).

Table of growth timing of the lesser wing removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 27. Measurement 2a&b; length and width of the greater wing (Schaefer et al. 2009, 30; based on Fazekas and Kósa 1978).

Table of growth timing of the greater wing removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 28. Measurement 3a&b: length and width of the petrous and mastoid portions of the temporal bone (Schaefer et al. 2009, 22; based on Fazekas and Kóza).

Table of growth timing of the petrous and mastoid portions removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 29. Measurement 4a&b: length and width of the basilar part of the occipital. (Schaefer et al. 2009, 11; based on Scheuer and MacLaughlin-Black 1994).

Table of growth timing of the basilar part removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 30. Measurement 5a&b: length and width of the zygomatic bone (Schaefer et al. 2009, 52; based on Fazekas and Kósa 1978).

Table of growth timing of the zygomatic bone removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 31. Measurement 6a,b and c: maxilla length, width and oblique length (Schaefer et al. 2009, 55; based on Fazekas and Kósa 1978).

Table of growth timing of the maxilla removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 32. Measurement 7a, b and c: mandible length, width and oblique length (Schaefer et al. 2009, 63; based on Fazekas and Kósa 1978).

Table of growth timing of the mandible removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 33. Descriptions of the postcranial measurements for nonadults aged 0-12 years. Measurement description taken from Buikstra and Ubelaker 1994, 46.

Table of growth timing of the postcranial skeleton removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

*Images of the measurements see AF 40. Measurement-age tables in Schaefer *et al.* 2009.

Image of growth timing of the post cranial skeleton for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

d

AF 40. Postcranial measurements 0-3year olds. Images from Schaefer et al 2009; measurements based on Buikstra and Ubelaker 1994.

AT 34. Measurement 8a: clavicle length (Schaefer et al. 2009, 144; based on Black and Scheuer 1996).

Table of growth timing of the clavicle removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 35. Measurement 9a: scapula length (height; Schaefer et al. 2009, 157; based on Saunders et al. 1993).

Table of growth timing of the scapula removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 36. Measurement 10a&b: maximum length and width ilium (Schaefer et al. 2009, 242; based on Molleson and Cox 1993).

Table of growth timing of the ilium removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 37. Measurement 13a: humerus length (Schaefer et al. 2009, 174; based on Maresh 1970).

Table of growth timing of the humerus removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 38. Measurement 14a: ulnar length (Schaefer et al 2009, 207; based on Maresch 1970).

Table of growth timing of the ulna removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 39. Measurement 15a: radial length (Schaefer et al. 2009, 191; based on Gindhart 1973).

Table of growth timing of the radius removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 40. Measurement 16a: femoral length (Schaefer et al. 2009, 267; based on Maresh 1970).

Table of growth timing of the femur removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 41. Measurement 17a: tibial length (Schaefer et al. 2009, 286 based on Gindhart 1973).

Table of growth timing of the tibia removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

AT 42. Measurement 18a: fibular length (Schaefer et al. 2009, 302; based on Maresh 1970).

Table of growth timing of the fibula removed for copyright reasons. Copyright holders are Maureen Schaefer, Sue Black, Louis Scheuer and Angela Christie for Elsevier Academic Press.

Measurements for children aged between 12 years -fusion age, based on measurements for adults, AT 23 and AT 24.

Adults

Young adult – fusion times

Table of fusion timing removed for copyright reasons. Copyright holders are L. O'Connell, Piers Mitchell and Megan Brickley for the British Association of Biological Anthropology.

Assign a stage to both the left and right pubic symphysis based on description and images.

Image of pubic symphysis stages removed for copyright reasons. Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.

AF 41. Drawings for the six pubic symphysis stages (two examples per stage) for females, based on the Brooks and Suchey (1990) pubic symphysis ageing method. Dorsal to the left; ventral to the right. Figure copied from Buikstra and Ubelaker 1994, 23.

Image of pubic symphysis stages removed for copyright reasons. Copyright holders are S. Brooks and J.M. Suchey for the scientific journal Human Evolution.

AF 42. Drawings for the six pubic symphysis stages (two examples per stage) for males, based on the Brooks and Suchey (1990) pubic symphysis ageing method. Dorsal to the left; ventral to the right. Figure copied from Buikstra and Ubelaker 1994, 24.

AT 43. Pubic symphysis degeneration stage descriptions as developed by Brooks and Suchey (1990). Text and stages from Buikstra and Ubelaker 1994.

Table of pubic symphysis degeneration descriptions removed for copyright reasons. Copyright holders are Jane Buikstra and Douglas Ubelaker for the Field Museum of Natural History.

Auricular surface

Assign individual scores for each trait and add up to obtain a composite score. Compare the composite score to AT 46 for an age estimate.

Image of auricular surface anatomy removed for copyright reasons. Copyright holders are C.O. Lovejoy, R.S. Meindl, T.R. Pryzbeck, R.P. Mensforth for the American Journal of Biological Anthropology, Wiley.

AF 43. Region and terminology used for the auricular surface method. Image from Lovejoy et al. 1985, 18.

AT 44. Definitions used to describe auricular surface (after Buikstra and Ubelaker 1994). Table copied from Buckberry and Chamberlain 2002.

Table of carnial measurements removed for copyright reasons. Copyright holders are J.L. Buckberry and A.T. Chamberlain for the American Journal of Biological Anthropology, Wiley.

AT 45. Tables with different scores and their descriptions for transverse organisation, surface texture, microporosity, macroporosity and apical changes.

Table of carnial measurements removed for copyright reasons. Copyright holders are J.L. Buckberry and A.T. Chamberlain for the American Journal of Biological Anthropology, Wiley.

AT 46. Age estimates from composite scores and age stages.

Table of carnial measurements removed for copyright reasons. Copyright holders are J.L. Buckberry and A.T. Chamberlain for the American Journal of Biological Anthropology, Wiley.

Sternal end of rib

Assign a stage to both the left and right 4th to 9th rib based on description and images below (preferably left and right are the same, e.g. both rib 4 or both rib 5).

AT 47. Description of degenerative changes in the sternal rib end from Yoder et al. 2001. Age ranges derived from Işcan, Loth, and Wright 1984, 1984, 1985; Işcan, Loth, and Scheuerman 1986; Işcan and Loth 1986.

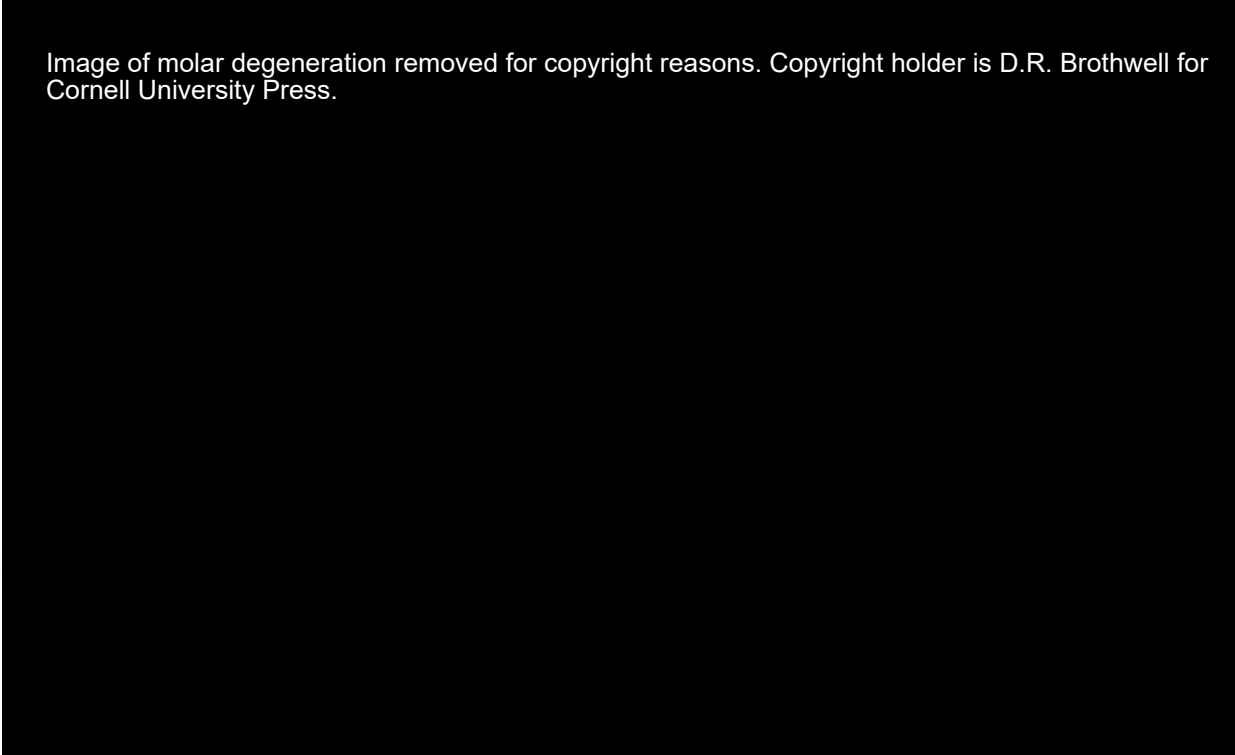
Table of degenertive stages of ribs removed for copyright reasons. Copyright holders are C. Yoder, D.H. Ubelaker, and F. Powell for the Journal of Forensic Sciences, Wiley.

Image of degenertive stages of ribs removed for copyright reasons. Copyright holders are C. Yoder, D.H. Ubelaker, and F. Powell for the Journal of Forensic Sciences, Wiley.

AF 44. Drawings of the different sternal rib end stages described in Işcan et al. 1984&1985 and Yoder et al. 2001. Stages 1 and 2, 3 and 4, 5 and 6, and 7 and 8 are grouped together because these stages show a similar degenerative pattern, except the process has progressed further in the later stage. Image based on Yoder et al. 2001.

Dental attrition

Image of molar degeneration removed for copyright reasons. Copyright holder is D.R. Brothwell for Cornell University Press.



AF 45. Numerical classification system of dental molar attrition. Image and caption taken from Brothwell 1981, 72.

Metrics

Metrics are exclusively done on the long bones as cranial measurements were not necessary for any of the analyses planned. Measurements are mostly used for stature estimation and therefore regard long bone length measurements taken as described in AT 48 and shown in AF 46. These measurements can then be used to estimate stature based on the formulas shown in AT 49.

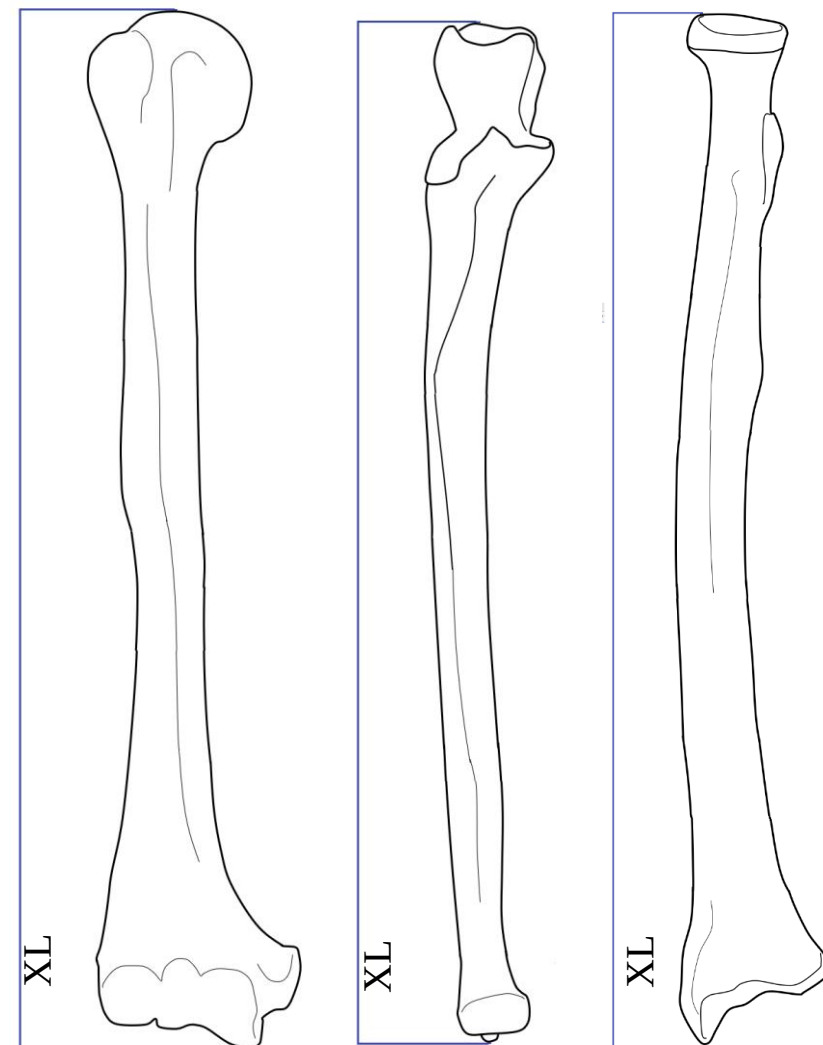
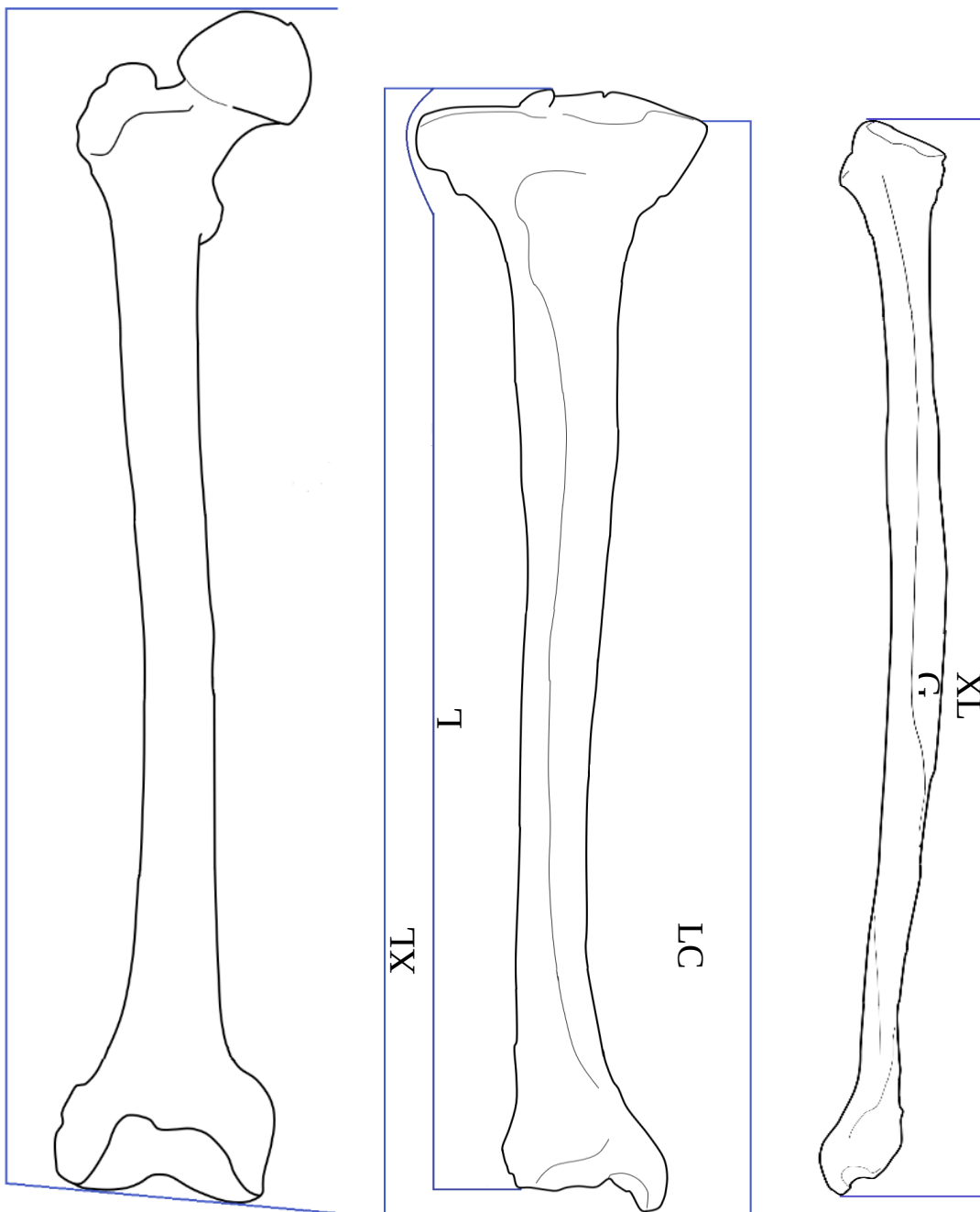
AT 48. Measurement descriptions for long bone measurements needed for stature estimation. See AF 46 for images of how to take these measurements.

Code	Description (Brothwell and Zakrzewski 2005)
XLF	Maximum femoral length, distance from the most superior point on the femoral head to the most inferior point on the distal condyles
LCT	Complete tibial length, from the superior articular facet of lateral condyle to the most distal points of the medial malleolus
XLT	Maximum tibial length, from the superior point on the intercondylar eminence to the most distal point of the medial malleolus
LT	Tibial length, from the superior point on the intercondylar eminence to the distal aspect, excluding the medial malleolus
XLG	Maximum fibula length, distance from the most superior point on the fibula head to the most inferior point on the lateral malleolus
XLH	Maximum humeral length, direct distance from the most superior point on the humeral head to the most inferior point on the trochlea
XLU	Maximum ulna length, direct distance from the most superior point on the olecranon to the most inferior point on the styloid process
XLR	Maximum radius length, distance from the most proximal point on the head to the tip of the styloid process.

* For images of measurements see next page.

AT 49. Overview of stature estimation formulas for American white males and females, and American black males and females. Formula taken from Brothwell and Zwakrzewski 2004.

Males			Females		
	Formula	σ		Formula	σ
American whites	$1.30 (XLF + LCT) + 63.29$	2.99	American whites	$0.68 XLH + 1.17 XLF + 1.15 LCT + 50.12$	3.51
	$2.38 XLF + 61.41$	3.27		$1.48 XLF + 1.28 LCT + 53.07$	3.55
	$2.68 XLG + 71.78$	3.29		$1.39 (XLF + LCT) + 53.20$	3.55
	$2.52 LCT + 78.62$	3.37		$2.93 XLG + 59.61$	3.57
	$1.31 (XLF + XLG) + 63.05$	3.62		$2.90 LCT + 61.53$	3.66
	$3.08 XLH + 70.45$	4.05		$1.35 XLH + 1.95 LCT + 52.77$	3.67
	$1.82 (XLH + XLR) + 67.97$	4.31		$2.47 XLF + 54.10$	3.72
	$3.70 XLU + 74.05$	4.32		$4.74 XLR + 54.93$	4.24
	$3.78 XLR + 79.01$	4.32		$4.27 XLU + 57.76$	4.30
				$3.36 XLH + 57.97$	4.45
American Blacks	$1.15 (XLF + LCT) + 71.04$	3.53	American blacks	$0.44 XLH - 0.20 XLR + 1.46 XLF + 0.86 LCT + 56.33$	3.22
	$1.20 (XLF + XLG) + 67.77$	3.63		$1.53 XLF + 0.96 LCT + 58.54$	3.23
	$2.19 LCT + 86.02$	3.78		$1.26 (XLF + LCT) + 59.72$	3.28
	$2.10 XLF + 72.22$	3.91		$2.28 XLF + 59.76$	3.41
	$2.34 XLG + 80.07$	4.02		$2.45 LCT + 72.65$	3.70
	$1.66 (XLH + XLR) + 73.08$	4.18		$2.49 XLG + 70.90$	3.80
	$1.65 (XLH + XLU) + 70.67$	4.23		$3.08 XLH + 64.67$	4.25
	$2.88 XLH + 75.48$	4.23		$3.31 XLU + 75.38$	4.83
	$3.42 XLR + 81.56$	4.30		$2.75 XLR + 94.51$	5.05
	$3.26 XLU + 79.29$	4.42			



AF 46. Measurements to be taken from adult long bones for stature estimation. Drawings of bones not in relative accurate size. Image by author.

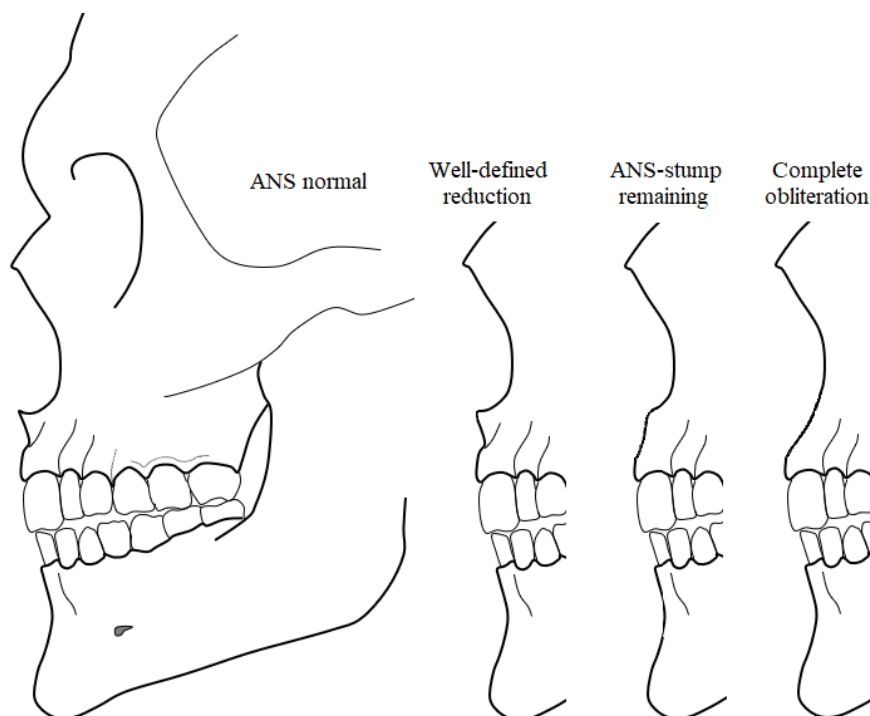
Pathology

Pathological lesions will be described in full detail in separate Word-Documents that will be linked to each individual where there was enough time available to create qualitative descriptions.

HD

A number of individual lesions at different sites are scored and entered into the database.

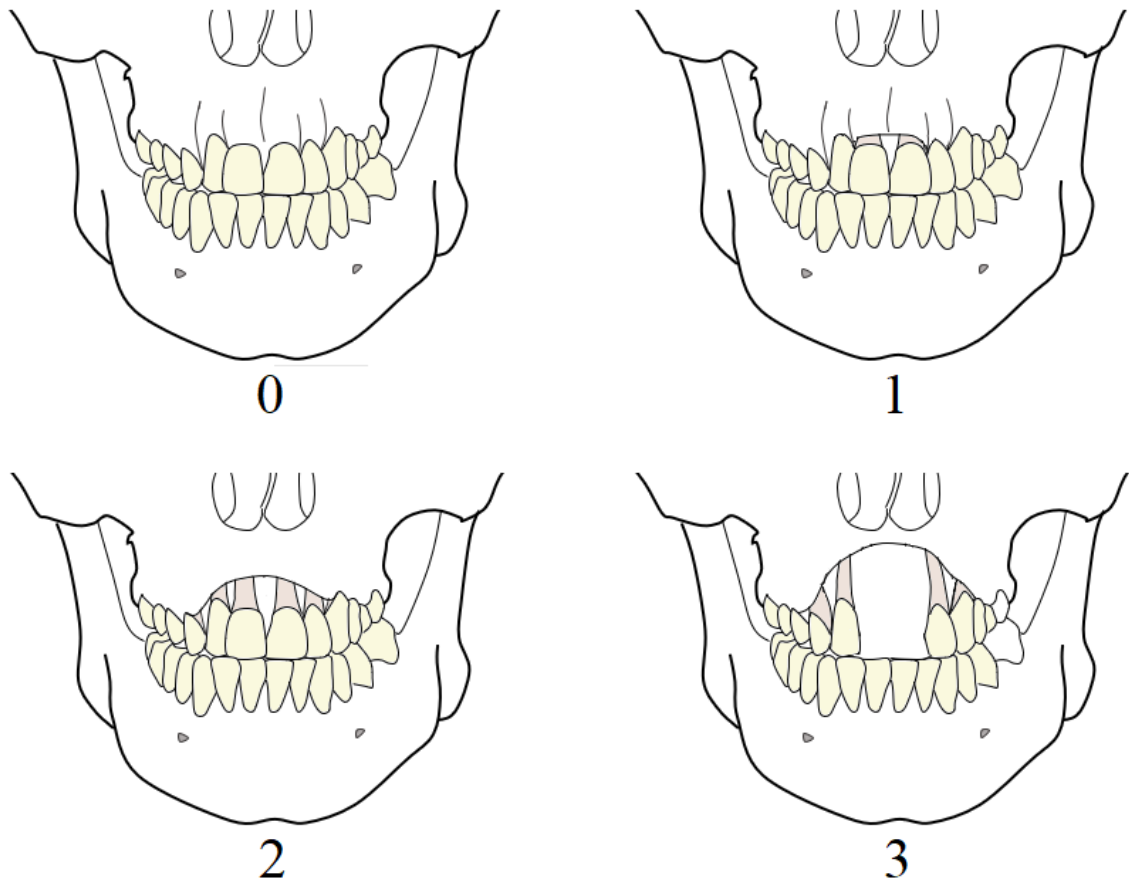
Rhinomaxillary syndrome



AF 47. The four different scores that can be assigned to the anterior nasal spine, based on AT 50. Lateral view skull. Image by author.

AT 50. Pathological changes the anterior nasal spine (ANS). Description taken from Møller-Christenson 1978, 15 up to stage 3.

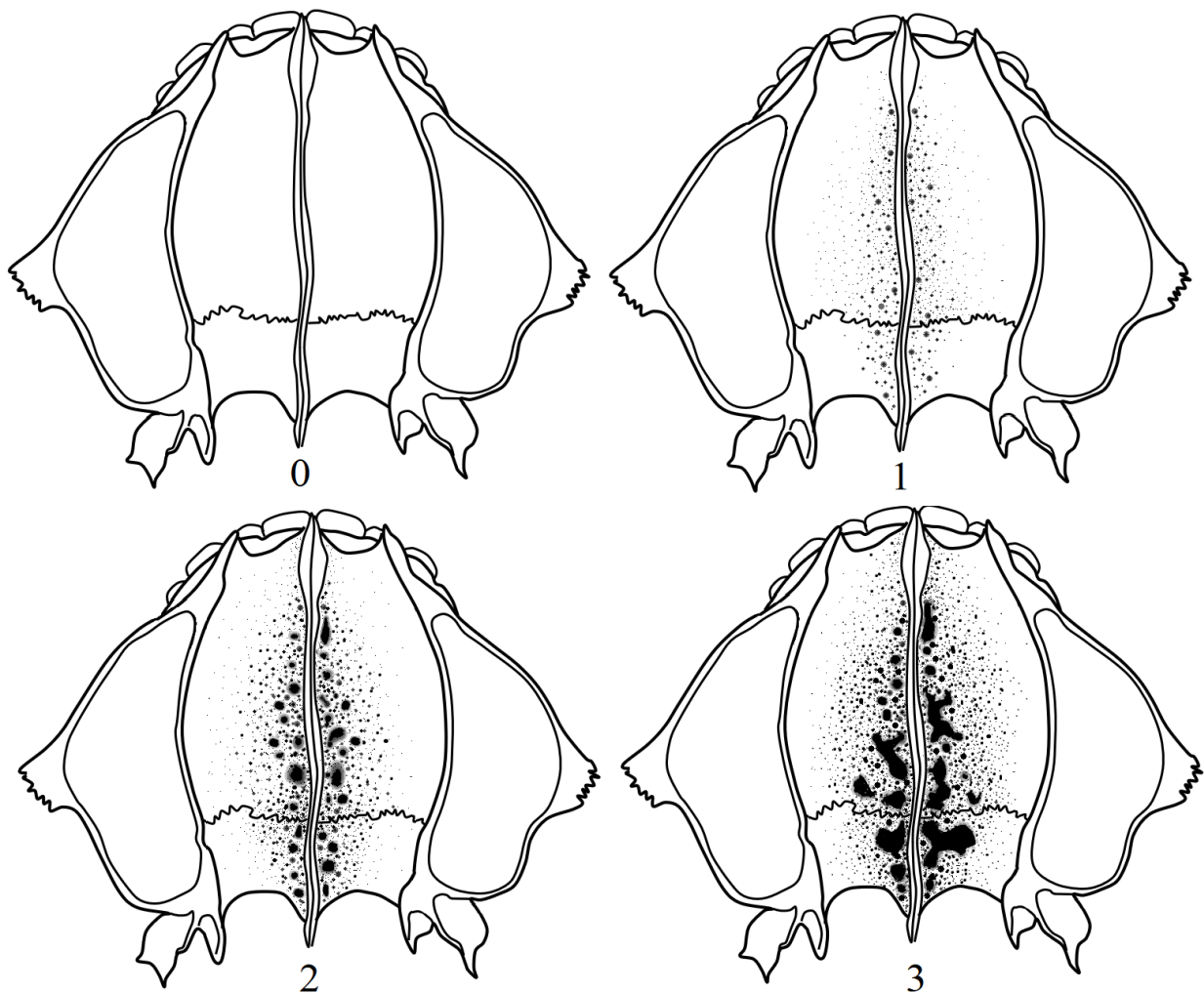
Stage	Pathological changes ANS
Stage 0	No changes to anterior nasal spine
Stage 1	Well-defined reduction/blunting of ANS and pitting/trabecular exposure in proximity to ANS
Stage 2	Advanced ANS-atrophy although a distinct but very small ANS remains, trabeculae in proximity to ANS still exposed
Stage 3	Complete obliteration of ANS with (near-complete) remodelling of lesion with cortical bone
Score 99	Unobservable



AF 48. The four different scores that can be assigned to the resorption of the maxillary alveolar bone, based on AT 51. Anterior view mandible and maxilla. Image by author.

AT 51. Pathological changes the maxillary alveolar process (APM). Description taken from Møller-Christenson 1978, 16.

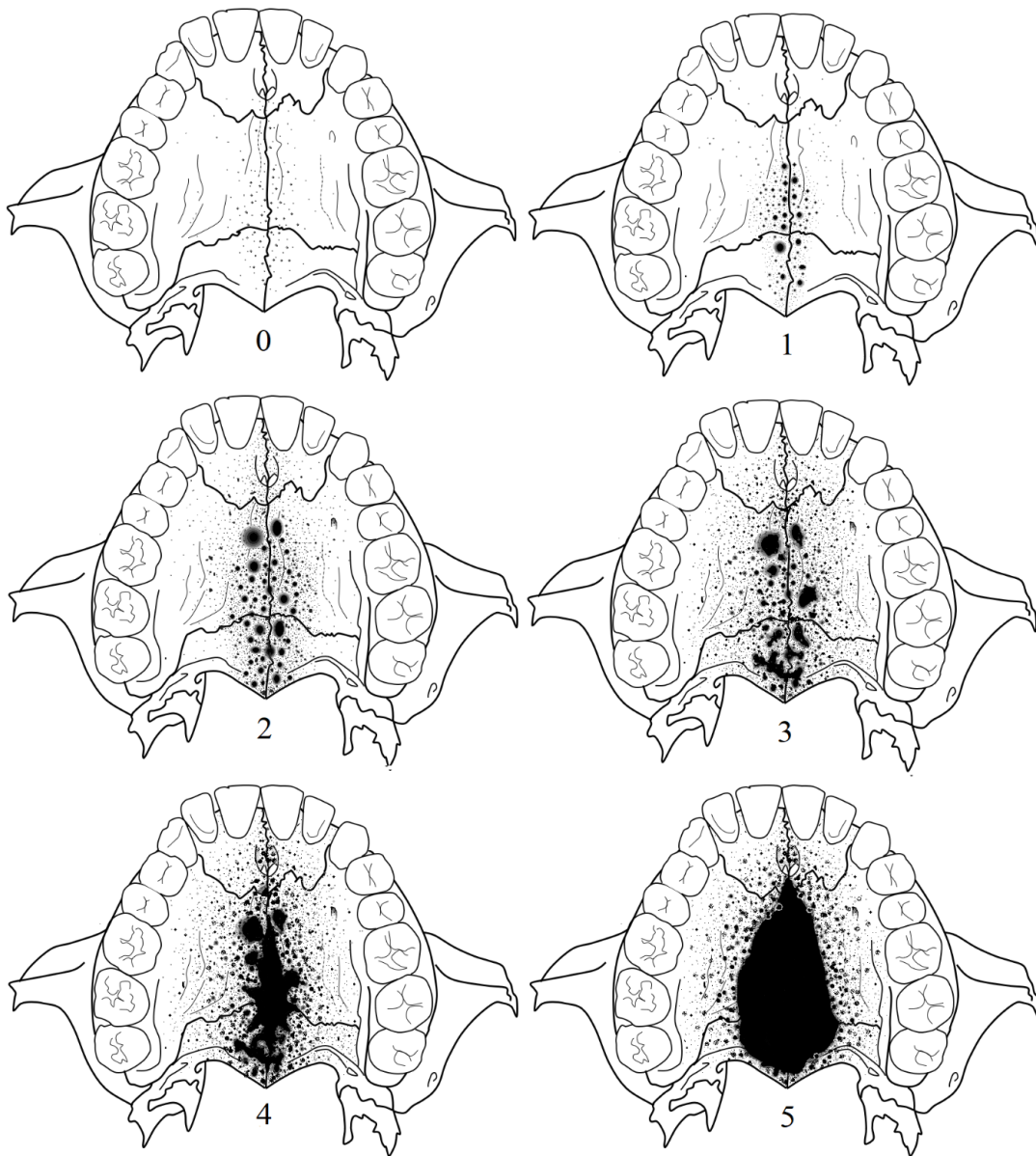
Stage	Pathological changes APM
Stage 0	No changes to the APM
Stage 1	An unquestionable recession upwards of the prosthion and a slight exposure (0.1-3mm) of the roots of the central incisors
Stage 2	Extension, in depth and breadth, of the atrophic bone area whereby the prosthion recedes further upwards, thus exposing the roots of the central (and lateral) incisors to such a degree that looseness of one or more of these teeth may occur (3-6mm)
Stage 3	Bone atrophy is severe and at least one tooth, generally one of the central incisors, has presumably been lost antemortem, or the alveoli have been obliterated
Score 99	Unobservable



AF 49. The four different scores that can be assigned to the pathological changes of the nasal surface of the palate (PPMN), based on AT 52. Transverse cut through nasal spine, superior view. Image by author.

AT 52. Pathological changes the nasal surface of the hard palate (PPMN). Description taken from Møller-Christenson 1978, 16.

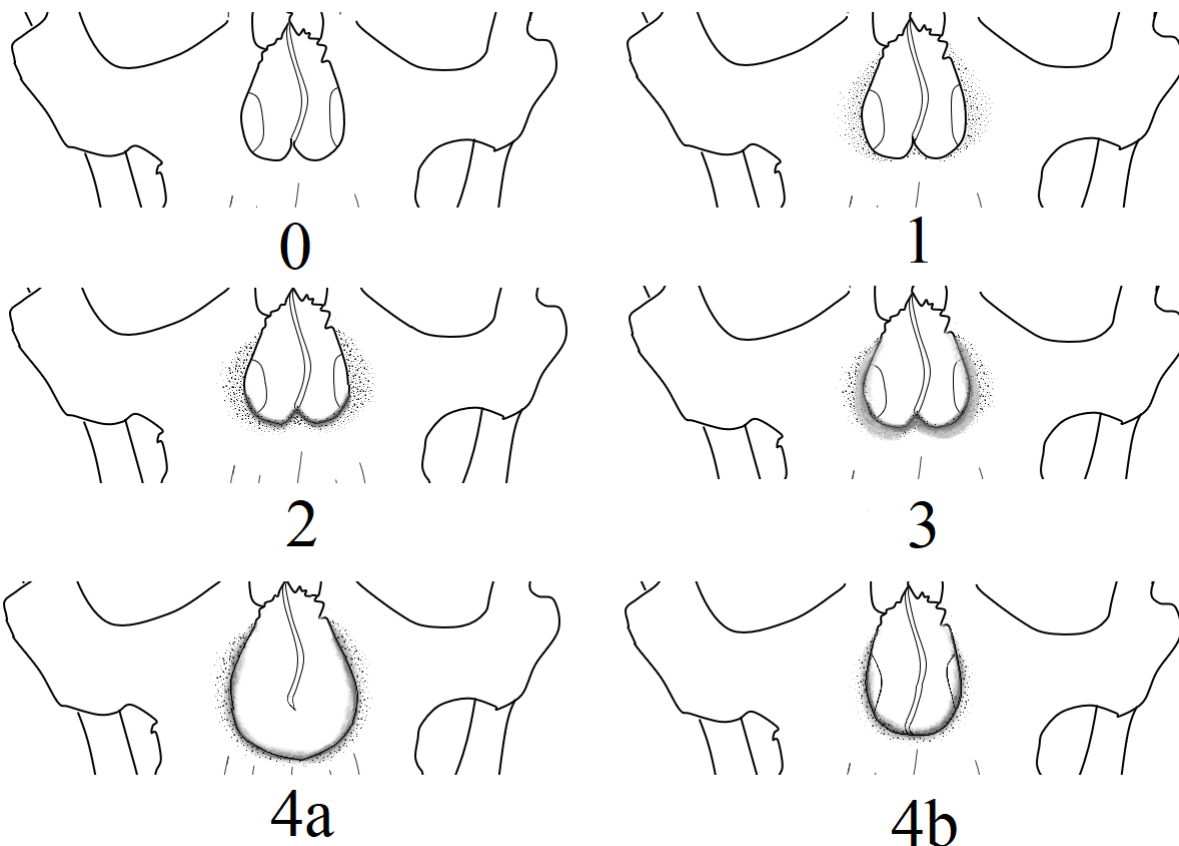
Stage	Pathological changes PPMN
Stage 0	No changes to the PPMN
Stage 1	Small, closely spaced pits ($\leq 0.3\text{mm}$), usually localized near the transverse palatal suture or at the lateral surface of the nasal crest; potential small plaques of new bone.
Stage 2	Advancement of changes with individual pores merging into larger macropores ($0.3\text{-}1\text{mm}$) with rounded edges that occasionally perforate to the nasal surface of the palate. This may be interpreted as reactions ascribable to the local periosteal inflammation propagating to the bone itself. These changes may be of a destructive or a proliferative nature or a combination of the two.
Stage 3	Advanced destructive changes that represent as irregular perforations of the bone (often no larger than 0.5cm). Perforations usually occur along the palatal suture and can be surrounded by sharp-edged mixed woven and lamellar new bone.
Score 99	Unobservable



AF 50. The six different scores that can be assigned to the pathological changes of the oral surface of the palate (PPMO), based on AT 53. Inferior view of the hard palate. Image by author.

AT 53. Pathological changes the oral surface of the hard palate (PPMO). Description taken from Møller-Christenson (1978, 16) for stage 1-3. Other stages added by author.

Stage	Pathological changes PPMO
Stage 0	No changes to the PPMO;
Stage 1	Deepening, enlargement and multiplication of the natural porosity of the oral surface of the palate: visible as increasingly <i>sponge-like texture</i> of oral surface. Porosity generally shows rounded edges and does not perforate through to the nasal surface;
Stage 2	Advanced stage of changes to oral surface whereby individual pores merge into larger macropores (0.1-1mm) with rounded edges that occasionally perforate to the nasal surface of the palate. Cortical bone between pores often shows woven, and occasionally lamellar, new bone;
Stage 3	Merging of macropores into larger perforations (>1mm in diameter) into the nasal surface, accompanied by destructive perforations with mixed sharp and rounded edges. Cortical bone between pores often shows mixed woven and lamellar new bone with sharp crests;
Stage 4	10-30% of hard palate has been resorbed;
Stage 5	>30% of hard palate has been resorbed
Score 99	Unobservable



AF 51. The six stages of nasal aperture change as described in AT 54. Note: each stage may occur without porosity developing. Image by author.

AT 54. Pathological changes the nasal piriform opening (NPI). Description by author.

Stage	Pathological changes NPI
Stage 0	No changes to the NPI
Stage 1	Increased porosity of piriform opening
Stage 2	A blunting/flattening of the nasal aperture edge
Stage 3	Rounding of the (inferior) nasal piriform opening
Stage 4	Enlargement of nasal aperture
Stage 5	Reduction of nasal aperture
Score 99	Unobservable

A.3.4 Bulk dentine and bone sampling and collagen extraction protocol

Sampling archaeological bone/teeth

Equipment

1. Appropriate drill & drill-bits
2. Extraction hood 1
3. Sandblaster
4. Pliers, hacksaw if necessary
5. Cutting block
6. Jeweller's small scales

Consumables

1. Glass test tubes
2. Tube racks
3. Plastic bags
4. Aluminium foil
5. Marker pens & biros

Personal Protective Equipment

Wear gloves and lab specs.

Protocol

This should all be carried out in the Wet Lab, basement of the Courtyard Building.

For combustion in the isotope mass spec, there must be at least 2-5mg of protein. To ensure sufficient protein after extraction, use approx 500 mg of bone, use more for older / worse-preserved bones.

Cutting bone pieces

ALL DRILLING AND CUTTING OF BONE TO BE DONE IN EXTRACTION HOOD

Choose a long bone if possible. Aim to sample mid-shaft.

Label small plastic bag with sample code of the bone you are cutting.

Fix diamond cutting wheel into drill, following instructions on the wall of the lab.

Put bone onto wooden chopping block in the extraction hood.

Cut off a piece using several cuts from each side.

Weigh on small scales to check that you have cut approx 0.5g. If not sufficient, cut off more.

Put sample into plastic bag.

Sandblasting

Sandblast bone following instructions on the wall beside the equipment.

Hold bone sample tightly in tweezers in non-dominant hand. Hold sandblaster nozzle in dominant hand, and work sand spray over the surface of the bone, ensuring that you take off any surface dirt from whole bone surface.

Crushing bone (if necessary)

Label glass test tube with sample code of the bone you are cutting.

Weigh labelled test tube to mg level (3dpl on balance) and record weight in lab book.

Crush bone using a percussion mortar, or hammer, aluminium foil and plastic bag.

Tip pieces into the test tube.

Weigh test tube + sample and record weight in lab book. [If you write down sample codes in yr lab book in a long list, and have 3 columns next to it, then you can have one column for empty test tube, one for tube + bone, then subtract one from the other, and record bone weight.]
Leave test tube rack covered with aluminium foil on the bench top.

The sample is now ready for acid treatment.

Collagen extraction from archaeological bone/teeth (bulk)

Equipment

6. Sandblaster (if bone not powdered)
7. Centrifuge (if bone powdered)
8. Fridge
9. Oven @75°C
10. Freezers: -20°C & -80°C
11. Freeze-dryer

Chemicals

12. 0.5M aq. HCl (stored in fridge)
13. Distilled / Milli-Q water
14. pH 3 water

Consumables

Consumables

15. Glass test tubes
16. Tube racks
17. Ezee filters
18. Plastic pop-on lids for test tubes
19. Pasteur pipettes
20. Plastic test tubes
21. 200ml glass beakers for pouring acid

Personal Protective Equipment

Wear lab coat and lab specs at all times.
Wear gloves when making up 0.5M acid.

Personal Protective Equipment

Wear lab coat and lab specs at all times.
Wear gloves when making up 0.5M acids.

Protocol

For combustion in the isotope mass spec, there must be **at least** 2-5mg of protein. To ensure sufficient protein after extraction, use approx 500 mg of bone, more for older / worse-preserved bones.

1. Cleaning:

If the sample is not powdered clean bones by sandblasting, ensuring that all ink is removed. Sandblast bone following instructions beside equipment.

Hold bone sample tightly in tweezers in non-dominant hand. Hold sandblaster nozzle in dominant hand, and work sand spray over the surface of the bone, ensuring that you take off any surface dirt from whole bone surface.

If necessary, crush bone using a percussion mortar, or hammer, aluminium foil and plastic bag.

2. Demineralisation:

Put bone chunks/powder into labelled & weighed 12ml glass test tubes. Record weights of bone used (i.e. weigh tube + sample after putting sample in tube).

For bone chunks, add approx. 8ml cold 0.5M HCl to test tube and cover over whole test tube rack with aluminium foil. Leave in the fridge for several days. Shake once/twice daily. Change acid every 2-4 days, by decanting off acid very slowly into waste beaker, being careful not to pour off

bone pieces. If the bone is very fragmented, an ezee filter can be used, as shown by the supervisor. When sample is soft or floats, it is done: test by poking with Pasteur pipette. Decant off the supernatant liquor into a waste beaker, and discard it down the sink with excess water. Rinse in distilled water x3 (can use Ezee filters here).

For bone powder, add approx. 8ml cold 0.5M HCl to test tube and cover over whole test tube rack with aluminium foil. Leave on the bench top for 3hrs, shaking every half an hour. Change the acid, and leave on the benchtop overnight. In the morning, rinse in water x3 by the following method: centrifuge at 2000rpm for 10mins, then using Ezee filter, decant off & discard supernate (down the sink with excess water), then add water, then repeat x2.

3. Gelatinisation:

Gelatinise the remaining collagen pellet by heating in pH 3.0 water (about 8ml) at 75°C for 48 hours, by the following method. Add 8ml of pH 3 water to each tube. Put a plastic lid on each tube, and then cover over all tops of tubes with tin foil, as demonstrated by the supervisor before placing in the oven at 75°C. Ensure that the lids stay on as they have a tendency to 'pop off' when heated – use a pencil to push the lid down into the tube properly. Do not force it as you may crack the top of the tube. Check lids every morning/evening or when passing the lab. After 48hrs, all the collagen should have dissolved, leaving behind all acid insoluble material. Using an Ezee filter, filter off the supernatant liquor into labelled *pre-weighed* plastic test tubes. This solution contains the collagen.

4. Freeze-drying:

Freeze the plastic tubes overnight at -20°C at a sharp angle (put racks at angle in the freezer) to increase surface area of the frozen solution. Transfer to -80°C freezer for 4hrs, then into the freeze-drier, following instructions given by Tamsin and as labelled on the freeze-drier. Leave for between 1& 4 days until dry. The freeze-dried material contains collagen and possibly some acid salts. Weigh tube+sample after drying and this will give you the yields of collagen.

A.3.5 Incremental dentine sampling and extraction laboratory protocol

Sampling archaeological bone/teeth

Equipment	Consumables
1. Diamond saw	1. Glass test tubes
2. Motor-driven dental hand piece	2. Eppendorf tubes
3. Extraction hood 1	3. Tube racks
4. Sandblaster	4. Plastic bags
5. Pliers, hacksaw if necessary	5. Aluminium foil
6. Cutting block	6. Marker pens & biro
7. Jeweller's small scales	

Personal Protective Equipment

Wear gloves and lab specs.

Protocol

This should all be carried out in the Wet Lab, basement of the Courtyard Building.

1. Cutting teeth

ALL CUTTING OF BONE TO BE DONE IN EXTRACTION HOOD 1

1. Choose a (maxillary) molar or premolar if available (if this fits the age-range you are interested in). Molars are bigger and therefore have more material left after sampling and provide you with larger increments for analysis. Pre-label and pre-weigh 12ml glass test tubes for each tooth you are sectioning.
2. Fix diamond cutting wheel into motor-driven dental hand piece, following instructions on the wall of the lab.
3. Hold the tooth between your finger in the extraction hood. It helps to switch between holding the root apex and occlusal surface between your thumb and index finger, and holding the sides of the tooth between your thumb and index finger to get two angles at which to cut.
4. Cut off a piece of the tooth using several cuts from two sides. If you are sampling a premolar or smaller tooth, sample a longitudinal half. If you are sampling a molar, cut a quarter (one cusp) from the whole tooth.
5. Remove enamel using dental burs and saws, and store in a pre-labelled Eppendorf tube.
6. Put sample into the pre-labelled 12ml glass test tube.

2. Cleaning tooth section.

Pick any visible calculus off the tooth and store in an pre-labelled Eppendorf tube.

3. Sandblasting

Sandblast the tooth section following instructions on the wall beside the equipment.
Hold tooth sample tightly in tweezers in non-dominant hand. Hold sandblaster nozzle in dominant hand, and work sand spray over the surface of the bone, ensuring that you take off any surface dirt from whole bone surface.

The sample is now ready for acid treatment.

Collagen extraction from archaeological teeth (incremental)

Equipment

7. Fridge
8. Oven @75°C
9. Freezers: -20°C & -80°C
10. Freeze-dryer

Chemicals

1. 0.5M aq. HCl (stored in fridge)
2. Distilled / Milli-Q water
3. pH 3 water

Personal Protective Equipment

Wear lab coat and lab specs at all times.
Wear gloves when making up 0.5M acid.

Consumables

4. Glass test tubes
5. 2ml Eppendorf tubes
6. Tube racks
7. Ezee filters
8. Plastic pop-on lids for test tubes
9. Pasteur pipettes
10. Plastic test tubes
11. 200ml glass beakers for pouring acid
12. Parafilm
13. Plastic or silicone cutting board
14. Sharp scalpel
15. Metal ruler

Protocol

For combustion in the isotope mass spec, there must be at least 2-5mg of protein. To ensure sufficient protein after extraction, use at least 2.5mg of increment/slice per sample after demineralisation. If a particular increment is too light, combine it with the increment above (towards to crown).

1. Demineralisation:

Add approx. 8ml cold 0.5M HCl to each 12ml glass test tube with a tooth sample in it, and cover over the whole test tube rack with aluminium foil. Leave in the fridge for several days. Shake once/twice daily. Change acid every 2-4 days, by decanting off acid very slowly into waste beaker. When the sample is soft or floats, it is done: test by poking with Pasteur pipette to see if it bends under the pressure. Decant off the supernatant liquor into a waste beaker, and discard it down the sink with excess water. Rinse in distilled water x3.

2. Incremental sampling:

Place each demineralized tooth on a plastic or silicone cutting board, next to a metal ruler. Photograph the tooth on top or next to the ruler as a record of its length. The tooth's length is an indication of the number of increments that will be cut. Pre-label and pre-weigh the appropriate

number of 12ml glass test tubes (one for each estimated increment). Line the tooth up next to the metal ruler, and slice 1mm or 2mm increments (depending on your chosen level of detail), starting from the apex of the root and moving up. Place each increment into its corresponding glass test tube (the lowest sample number represents the latest developed dentine). Weigh the test tubes and assure that you have at least 2.5mg of material per slice. ***If not, combine the increment with one increment up*** (earlier forming dentine).

3. Gelatinisation:

Gelatinise the collagen by heating in pH 3.0 water (about 1.5ml) at 75°C for 24 hours, by the following method. Add 1.5ml (using a pipette) of pH 3 water to each tube. Make sure that the dental increments are actually in the liquid. If not, use a Pasteur pipette to push the sample into the water. Put a plastic lid on each tube, and then cover over all tops of tubes with tin foil, as demonstrated by the supervisor before placing in the oven at 75°C. Ensure that the lids stay on as they have a tendency to 'pop off' when heated – use a pencil to push the lid down into the tube properly. Do not force it as you may crack the top of the tube. Check lids every 2-3hours. After 24hrs, all the collagen should have dissolved, leaving behind all acid insoluble material. Using an Ezee filter, filter off the supernatant liquor into labelled pre-weighed 2ml Eppendorf tubes. This solution contains the collagen.

4. Freeze-drying:

Add parafilm over the top of each open Eppendorf tube. Freeze the plastic tubes overnight at -20°C at a sharp angle (put racks at angle in the freezer) to increase surface area of the frozen solution. Poke a small hole through the parafilm on each sample. Transfer the sample racks to -80°C freezer for 2hrs, then into the freeze-drier, following instructions given by Tamsin and as labelled on the freeze-drier. Leave for between 1& 4 days until dry. The freeze-dried material contains collagen and possibly some acid salts. Weigh tube+sample after drying and this will give you the yields of collagen.

A.4.1 Appendices Chapter 4

These supplementary files are organised per paragraph heading as in the results chapter, with the prefix 'A'.

A.4.1. Demographic data

AT 55. Overview table of all UINs in this project. 'Analysed by AAB' indicates whether I recorded all skeletal data; where 'No' the data is based on skeletal catalogues. 'Skeleton/Loose bone' indicates whether the individual is considered a whole skeleton from an identifiable context or loose bone from the spoil heap, commingled into another individual, or loose in storage boxes. 'Sample C14', 'Sample isotopes – teeth', 'Sample isotopes – ribs' indicates new samples taken in this project. 'leprosy' aDNA' indicates whether the individuals has tested positive for *M. leprae* aDNA both within this study and in previous/later studies: 'No'=tested but negative; 'Yes'=tested and positive; '-'=not tested/sampled.

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes teeth	Sample isotopes ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
1	Yes	Skeleton	2174	IAS	No	Yes	Yes	60-79%	Slight	Good	Adolescent	NA	Possible	No
2	Yes	Skeleton	0985	IBF	No	Yes	No	40-59%	Slight	Good	Middle Adult	M	Probable	No
3	Yes	Skeleton	1076	IAS	No	No	No	20-39%	Slight	Good	Adult	U	No	-
4	Yes	Skeleton	1392	IAS	Yes	Yes	Yes	80-100%	Slight	Good	Young Adult	PF	Pathognomonic	Yes
5	Yes	Skeleton	Skeleton 110	MHW	Yes	Yes	Yes	60-79%	Severe	Good	Adult	PM	Possible	Yes
6	Yes	Skeleton	Skeleton 107	MHW	No	Yes	Yes	60-79%	Slight	Good	Middle Adult	M	Probable	No

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
7	Yes	Skeleton	Skeleton 109	MHW	No	No	No	20-39%	Severe	Good	Adult	PF	Unobservable	Yes
8	Yes	Skeleton	Skeleton 103	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
9	Yes	Skeleton	Skeleton 106	MHW	No	No	No	20-39%	Slight	Good	Adult	U	Possible	Yes
10	Yes	Skeleton	Skeleton 111	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
11	Yes	Skeleton	Skeleton 108	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
12	Yes	Skeleton	Skeleton 112	MHW	No	No	No	20-39%	Severe	Fair	Adult	U	Possible	-
13	Yes	Skeleton	Skeleton 150	MHW	Yes	Yes	Yes	60-79%	Slight	Good	Old Adult	PF	No	Yes
14	Yes	Skeleton	Skeleton 199	MHW	No	No	No	40-59%	Slight	Good	Middle Adult	I	Possible	No

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
15	Yes	Skeleton	Skeleton 114	MHW	No	No	No	0-19%	Severe	Good	Adult	U	Possible	-
16	Yes	Skeleton	Skeleton 113	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	Yes
17	Yes	Skeleton	Skeleton 113 Commingled	MHW	No	No	No	0-19%	Slight	Good	Non-Adult	NA	Unobservable	-
18	Yes	Skeleton	Unnumbered from Grave 4/7	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Possible	-
19	Yes	Loose bone	1883.1	MHW	Yes	No	No	0-19%	Slight	Good	Adult	U	Pathognomonic	Yes
20	Yes	Loose bone	1883.2	MHW	No	No	No	0-19%	Slight	Good	Adult	PF	Unobservable	-
21	Yes	Loose bone	1883.3	MHW	No	No	No	0-19%	Slight	Good	Adult	PM	Unobservable	-
22	Yes	Loose Bone	1883.4	MHW	Yes	No	No	0-19%	Slight	Good	Adult	PM	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
23	Yes	Loose Bone	1883.5	MHW	No	No	No	0-19%	Slight	Good	Middle Adult	I	Unobservable	-
24	Yes	Loose bone	1883.6	MHW	No	No	No	0-19%	Slight	Good	Middle Adult	I	Unobservable	-
25	Yes	Loose bone	1883.7	MHW	No	No	No	0-19%	Slight	Good	Adult	I	Unobservable	-
26	Yes	Loose bone	Skeleton 112 Commingled1	MHW	No	No	No	0-19%	Severe	Good	Adult	U	Possible	-
27	Yes	Loose bone	Skeleton 112 Commingled2	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
28	Yes	Loose bone	Context 200 / Stray finds 1	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
29	Yes	Loose bone	Context 200 / Stray finds 2	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
30	Yes	Loose bone	Context 200 / Stray finds 3	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
31	Yes	Loose bone	Context 200 / Stray finds 4	MHW	No	No	No	0-19%	None	Good	Adult	U	Unobservable	-
32	Yes	Loose bone	Box 2051 unnumbered 1	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
33	Yes	Loose bone	Box 2051 unnumbered 2	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
34	Yes	Loose bone	Box 2051 unnumbered 3	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
35	Yes	Loose bone	Box 2051 unnumbered 4	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
36	Yes	Loose bone	Box 2051 unnumbered 5	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
37	Yes	Loose bone	Box 2051 unnumbered 6	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
38	Yes	Loose bone	Grave 1 unnumbered 1	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	No	-
39	Yes	Loose bone	Grave 1 unnumbered 2	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	No	-
40	Yes	Loose bone	Grave 1 unnumbered 3	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
41	Yes	Loose bone	Grave 1 unnumbered 4	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
42	Yes	Loose bone	Grave 1 unnumbered 5	MHW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
43	Yes	Loose bone	Grave 1 unnumbered 6	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Possible	-
44	Yes	Loose bone	Grave 1 unnumbered 7	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Possible	-
45	Yes	Loose bone	Grave 1 unnumbered 8	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Possible	-
46	Yes	Loose bone	Grave 1 unnumbered 9	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Possible	-
47	Yes	Loose bone	Grave 1 unnumbered 9	MHW	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
48	Yes	Skeleton	Skeleton 7.1	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
49	Yes	Skeleton	Skeleton 7.2	MSL	No	No	No	0-19%	None	Good	Adult	U	Unobservable	-
50	Yes	Skeleton	Skeleton 7.3	MSL	No	No	No	0-19%	Slight	Good	Infant	NA	Unobservable	-
51	Yes	Skeleton	Skeleton 6	MSL	No	Yes	Yes	20-39%	Slight	Good	Adolescent	NA	Unobservable	No
52	Yes	Skeleton	Skeleton 6 Commingled	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
53	Yes	Loose bone	'Surface finds' 1	MSL	No	No	No	0-19%	None	Good	Adult	U	Unobservable	-
54	Yes	Loose bone	'Surface finds' 2	MSL	No	No	No	0-19%	None	Good	Adult	U	Unobservable	-
55	Yes	Loose bone	'Surface finds' 3	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
56	Yes	Loose bone	'Surface finds' 4	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
57	Yes	Loose bone	'Surface finds' 5	MSL	No	No	No	0-19%	None	Good	Adult	U	Unobservable	-
58	Yes	Loose bone	'Surface finds' 6	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
59	Yes	Loose bone	'Surface finds' 7	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
60	Yes	Loose bone	'Surface finds' 8	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Possible	-
61	Yes	Skeleton	Skeleton X	MSL	Yes	No	No	20-39%	Slight	Good	Adult	M	Pathognomonic	Yes
62	Yes	Skeleton	Skeleton 2	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
63	Yes	Skeleton	Skeleton 3	MSL	Yes	Yes	Yes	20-39%	Slight	Good	Adult	I	Probable	Yes
64	Yes	Skeleton	Skeleton STK-A (Godmanc	MSL	No	No	No	0-19%	Slight	Good	Adult	PM	Probable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
			hester 1989)											
65	Yes	Skeleton	Skeleton J	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
66	Yes	Skeleton	Skeleton 20.5	MSL	No	No	No	20-39%	Slight	Good	Child	NA	No	-
67	Yes	Skeleton	Skeleton 18	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
68	Yes	Loose bone	Skeleton 17.1a	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
69	Yes	Loose bone	Skeleton 17/20 Right femur	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
70	Yes	Loose bone	Skeleton 20.1-3a Ulna	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
71	Yes	Loose bone	Skeleton 20.1-3b Ulna	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
72	Yes	Loose bone	Skeleton 20.1-3c Ulna	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
73	Yes	Loose bone	Skeleton 20.1-3d Ulna	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
74	Yes	Loose bone	Skeleton 17.1b Commingled os coxa	MSL	No	No	No	0-19%	Slight	Good	Middle Adult	PM	Unobservable	-
75	Yes	Loose bone	Skeleton 20 Right femur	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
76	Yes	Loose bone	Skeleton 20.5 Left femur	MSL	No	No	No	0-19%	Slight	Good	Adolescent	U	Unobservable	-
77	Yes	Loose bone	Skeleton 20.6 Left humerus	MSL	No	No	No	0-19%	Slight	Good	Adolescent	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
78	Yes	Loose bone	Skeleton 20.1-3e Left humerus	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
79	Yes	Loose bone	Skeleton 20.1-3f Right humerus	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
80	Yes	Loose bone	Skeleton 20.1-3g Left humerus	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
81	Yes	Loose bone	Skeleton 20.1-3h Midshaft (left?) humerus fragment	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
82	Yes	Loose bone	Skeleton 17.1c Tibia shaft fragment	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
83	Yes	Skeleton	Skeleton 17.2 + Skeleton 20.7	MSL	No	No	No	40-59%	Slight	Good	Infant	NA	Unobservable	No
84	Yes	Loose bone	Skeleton 17.3	MSL	No	No	No	0-19%	Slight	Good	Non-Adult	NA	Unobservable	-
85	Yes	Loose bone	Skeleton 20.1-3i Left Ulna	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
86	Yes	Loose bone	Skeleton 20.1-3j Left femur	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
87	Yes	Loose bone	Skeleton 20.1-3k Right femur	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
88	Yes	Loose bone	Skeleton 20.1-3l left radius	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
89	Yes	Loose bone	Skeleton 20.1-3m Right clavicle	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
90	Yes	Loose bone	Skeleton 20.1-3n Left humerus	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
91	Yes	Loose bone	Skeleton 20.1-3o Right Radius	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
92	Yes	Loose bone	Skeleton 20.1-3p Left humerus	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
93	Yes	Loose bone	Skeleton 20.1-3q Left radius	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
94	Yes	Loose bone	Skeleton 20.1-3r Left femur	MSL	No	No	No	0-19%	Slight	Good	Non-Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
95	Yes	Loose bone	Skeleton 20.1-3s Right femur	MSL	No	No	No	0-19%	Slight	Good	Non-Adult	U	Unobservable	-
96	Yes	Loose bone	Skeleton 20.1-3t Left fibula	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
97	Yes	Loose bone	Skeleton 20.1-3u Right fibula	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
98	Yes	Loose bone	Skeleton 20.1-3v Right(?) fibula	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
99	Yes	Loose bone	Skeleton 20.1-3w Right hand	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
100	Yes	Loose bone	Skeleton 20.1-3x Left hand	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
101	Yes	Loose bone	Skeleton 20.1-3y Right MT5	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
102	Yes	Loose bone	Skeleton 20.1-3z L vertebrae	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
103	Yes	Loose bone	Skeleton 20.1-3aa Manubrium	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
104	Yes	Loose bone	Skeleton 20.1-2ab Right clavicle	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
105	Yes	Loose bone	Skeleton 20.1-3ac Right ulna	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
106	Yes	Loose bone	Skeleton 20.1-3ad Left radius	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
107	Yes	Loose bone	Skeleton 20.1-3ae Radius	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
108	Yes	Loose bone	Skeleton 20.1-3af C1+C2	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
109	Yes	Loose bone	Skeleton 20.1-3ag Ribs1	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
110	Yes	Loose bone	Skeleton 20.1-3ah Ribs2	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
111	Yes	Loose bone	Skeleton 20.1-3ai Ribs 3	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
112	Yes	Loose bone	Skeleton 20.1-3aj Right Patella	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
113	Yes	Loose bone	Skeleton 20.1-3ak	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
			Scapula fragment											
114	Yes	Loose bone	Skeleton 20.1-3al Skull fragments	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
115	Yes	Loose bone	Skeleton 20.1-3am Os coxa fragment	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
116	Yes	Loose bone	Skeleton 20.1-3an Right tibia	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
117	Yes	Loose bone	Skeleton 20.1-3ao Left tibia	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
118	Yes	Loose bone	Skeleton 20.1-3ap Right tibia	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
119	Yes	Loose bone	Skeleton 20.1-3aq Right tibia	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
120	Yes	Loose bone	Skeleton 20.1-3ar Left humerus	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
121	Yes	Loose bone	Skeleton 20.1-3as Fibula	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
122	Yes	Skeleton	Skeleton 25	MSL	No	No	No	0-19%	Slight	Good	Adult	PF	Unobservable	-
123	Yes	Skeleton	Skeleton 23	MSL	No	No	No	20-39%	Slight	Good	Adult	U	No	-
124	Yes	Loose bone	Skeleton 23 - Commingled 1	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
125	Yes	Loose bone	Skeleton 23 -	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
			Commingled 2											
126	Yes	Skeleton	Skeleton 24	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
127	Yes	Skeleton	Skeleton 22	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
128	Yes	Skeleton	Skeleton 21	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
129	Yes	Skeleton	Skeleton 19	MSL	No	Yes	Yes	60-79%	Slight	Good	Young Adult	M	Possible	No
130	Yes	Loose bone	Skeleton 19 - Commingled	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
131	Yes	Skeleton	Skeleton 16	MSL	Yes	No	No	20-39%	Slight	Good	Adult	U	Possible	Yes
132	Yes	Loose bone	Skeleton 17 -	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
			Commingled 1											
133	Yes	Loose bone	Skeleton 17 - Commingled 2	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
134	Yes	Loose bone	Skeleton 17 - Commingled 3	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
135	Yes	Loose bone	Skeleton 17 - Commingled 4	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
136	Yes	Loose bone	Skeleton 17 - Commingled 5	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
137	Yes	Loose bone	Skeleton 17 - Commingled 6	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
138	Yes	Loose bone	Skeleton 17 - Commingled 6	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
139	Yes	Skeleton	Body E	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Possible	-
140	Yes	Loose bone	Commingling Body E	MSL	No	No	No	0-19%	Severe	Good	Adult	U	Unobservable	-
141	Yes	Skeleton	Body A.1	MSL	No	No	No	0-19%	Slight	Good	Adult	PF	Unobservable	-
142	Yes	Skeleton	Drain surface finds near Body A (1)	MSL	No	No	No	0-19%	Slight	Good	Adult	PM	Unobservable	-
143	Yes	Loose bone	Drain surface finds near Body A (2)	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
144	Yes	Loose bone	Drain surface finds near Body A (3)	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
145	Yes	Loose bone	Drain surface finds near Body A (4)	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
146	Yes	Loose bone	Drain surface finds near Body A (5)	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
147	Yes	Skeleton	Body B	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
148	Yes	Skeleton	Body D	MSL	No	Yes	Yes	20-39%	Slight	Good	Young Adult	M	Unobservable	No
149	Yes	Skeleton	Finds above B&C	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
150	Yes	Loose bone	Spoil above B, C, D	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
151	Yes	Skeleton	Skeleton 8	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
152	Yes	Skeleton	Skeleton 11.1	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
153	Yes	Loose bone	Skeleton 11.2	MSL	No	No	No	0-19%	Slight	Good	Child	NA	Unobservable	-
154	Yes	Loose bone	Skeleton 11.3	MSL	No	No	No	0-19%	Slight	Good	Fetus	NA	Unobservable	-
155	Yes	Skeleton	Skeleton 10	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
156	Yes	Skeleton	Skeleton 15	MSL	Yes	No	No	0-19%	Severe	Good	Young Adult	F	Possible	Yes
157	Yes	Skeleton	Skeleton 12	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
158	Yes	Skeleton	Skeleton 9.1	MSL	No	No	No	0-19%	Slight	Good	Young Adult	PF	Unobservable	-
159	Yes	skeleton	Skeleton 9.2	MSL	No	No	No	0-19%	Slight	Good	Non-Adult	NA	Unobservable	-
160	Yes	Loose bone	Skeleton 9.3	MSL	No	No	No	20-39%	Slight	Good	Unobservable	U	Unobservable	-
161	Yes	Loose bone	Skeleton 9.4	MSL	No	No	No	40-59%	Slight	Good	Unobservable	U	Unobservable	-
162	Yes	Loose Bone	Skeleton 9.5	MSL	No	No	No	40-59%	Slight	Good	Unobservable	U	Unobservable	-
163	Yes	Skeleton	Skeleton 13.1 + 'Above body 13'	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
164	Yes	Loose bone	'Above body 13' immature	MSL	No	No	No	40-59%	Slight	Good	Non-Adult	NA	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
165	Yes	Loose bone	'Trench 3 - surface finds' - Left calcaneus	MSL	No	No	No	0-19%	None	Good	Adult	U	Unobservable	-
166	Yes	Loose bone	'Trench 3 - surface finds' - MC1	MSL	No	No	No	0-19%	Slight	Good	Unobservable	U	Unobservable	-
167	Yes	Skeleton	Skeleton I	MSL	Yes	Yes	Yes	20-39%	Slight	Good	Adult	F	Possible	Yes
168	Yes	Skeleton	Skeleton F	MSL	No	No	No	0-19%	Slight	Good	Adolescent	U	Unobservable	-
169	Yes	Skeleton	Skeleton G.1	MSL	No	No	No	0-19%	Slight	Good	Non-Adult	NA	Unobservable	-
170	Yes	Skeleton	Skeleton G.2	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
171	Yes	Skeleton	Skeleton H	MSL	No	No	No	20-39%	Slight	Good	Old Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
172	Yes	Skeleton	Skeleton 4	MSL	No	No	No	20-39%	Slight	Good	Young Adult	F	Possible	-
173	Yes	Skeleton	Skeleton 5.1	MSL	No	No	No	20-39%	Slight	Good	Middle Adult	F	Unobservable	-
174	Yes	Loose bone	Skeleton 5.2	MSL	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
175	Yes	Skeleton	42B	EHC	No	Yes	Yes	60-79%	Slight	Good	Middle Adult	F	Probable	Yes
176	No	Skeleton	Burial 183	CPA	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	Yes
177	No	Skeleton	Skeleton 10026	JTN	No	No	No	0-19%	Moderate	Fair	Young-Middle Adult	F	Unobservable	-
178	No	Skeleton	Skeleton 10027	JTN	No	No	No	0-19%	Moderate	Fair	Young Adult	PM	Unobservable	-
179	No	Skeleton	Skeleton 10031	JTN	No	No	No	0-19%	Moderate	Fair	Young-Middle Adult	PM	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
180	No	Skeleton	Skeleton 10038	JTN	No	No	No	0-19%	Moderate	Fair	Middle Adult	M	No	-
181	No	Skeleton	Skeleton 10069	JTN	No	No	No	20-39%	Moderate	Poor	Old Adult	M	Unobservable	-
182	No	Skeleton	Skeleton 10087	JTN	No	No	No	60-79%	Slight	Fair	Middle Adult	M	Probable	-
183	No	Skeleton	Skeleton 10184	JTN	No	No	No	0-19%	Slight	Fair	Old Adult	PM	Unobservable	-
184	No	Skeleton	Skeleton 10186	JTN	No	No	No	0-19%	Slight	Fair	Young-Middle Adult	M	Unobservable	-
185	No	Skeleton	Skeleton 10189/11440	JTN	No	No	No	80-100%	Slight	Fair	Middle Adult	F	Possible	-
186	No	Skeleton	Skeleton 10224	JTN	No	No	No	20-39%	Slight	Fair	Young Adult	M	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
187	No	Skeleton	Skeleton 10228	JTN	No	No	No	0-19%	Slight	Poor	Adult	F	Unobservable	-
188	No	Skeleton	Skeleton 10229	JTN	No	No	No	0-19%	Slight	Poor	Adult	PM	Unobservable	-
189	No	Skeleton	Skeleton 10230	JTN	No	No	No	20-39%	Slight	Fair	Young Adult	PM	No	-
190	No	Skeleton	Skeleton 10264	JTN	No	No	No	20-39%	Slight	Fair	Young Adult	M	No	-
191	No	Skeleton	Skeleton 10451	JTN	No	No	No	20-39%	Slight	Poor	Middle Adult	F	No	-
192	No	Skeleton	Skeleton 10492/11441	JTN	No	No	No	80-100%	Slight	Poor	Young Adult	PM	Possible	-
193	No	Skeleton	Skeleton 10640	JTN	No	No	No	0-19%	Slight	Fair	Old Adult	U	Unobservable	-
194	No	Skeleton	Skeleton 10666	JTN	No	No	No	0-19%	Severe	Fair	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
195	No	Skeleton	Skeleton 10723	JTN	No	No	No	20-39%	Moderate	Poor	Old Adult	PM	Unobservable	-
196	No	Skeleton	Skeleton 10858	JTN	No	No	No	0-19%	Moderate	Poor	Adult	U	Possible	-
197	No	Skeleton	Skeleton 10958	JTN	No	No	No	40-59%	Slight	Fair	Middle Adult	PF	No	-
198	No	Skeleton	Skeleton 11031	JTN	No	No	No	0-19%	Moderate	Poor	Adult	U	Unobservable	-
199	No	Skeleton	Skeleton 11034	JTN	No	No	No	20-39%	Moderate	Fair	Middle Adult	PM	Unobservable	-
201	Yes	Skeleton	Sk2529	CHI	No	Yes	Yes	80-100%	None	Fair	Young Adult	F	Pathognomonic	Yes
202	Yes	Skeleton	SK2012	CHI	No	Yes	Yes	80-100%	Slight	Fair	Adolescent	M	Pathognomonic	Yes
203	No	Loose bone	SK3173.3	CJH	No	No	No	20-39%	Slight	Good	Adult	F	No	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
204	No	Skeleton	Skeleton 252	MMF	No	No	No	-	Slight	Good	Young Adult	M	Pathognomonic	-
205	No	Skeleton	Skeleton 386	MMF	No	Yes	Yes	-	Slight	Good	Young Adult	F	Possible	No
206	No	Skeleton	Skeleton 396	MMF	No	Yes	Yes	-	Slight	Good	Adult	F	Pathognomonic	Yes
207	No	Skeleton	Skeleton 597	MMF	No	Yes	Yes	-	Slight	Good	Adult	PM	Probable	Yes
208	No	Skeleton	Skeleton 618	MMF	No	Yes	Yes	-	Slight	Good	Old Adult	M	Pathognomonic	No
209	No	Skeleton	Skeleton 633	MMF	No	Yes	Yes	-	Slight	Good	Middle Adult	F	Pathognomonic	No
210	No	Skeleton	Skeleton 637	MMF	No	No	No	-	Slight	Good	Old Adult	F	Pathognomonic	-
211	No	Skeleton	Inhumation 1	BSA	No	No	Yes	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	No
212	No	Skeleton	Inhumation 2	BSA	No	No	No	20-39%	Slight	Good	Young Adult	PM	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
213	No	Skeleton	Inhumation 3	BSA	No	No	No	60-79%	Severe	Good	Adult	PF	Possible	-
214	No	Skeleton	Inhumation 4	BSA	No	No	No	20-39%	Severe	Good	Young Adult	F	Probable	-
215	No	Skeleton	Inhumation 5	BSA	No	No	No	0-19%	Severe	Good	Adult	U	Unobservable	-
216	No	Skeleton	Inhumation 6	BSA	No	No	No	20-39%	Severe	Good	Adult	F	Unobservable	-
217	No	Skeleton	Inhumation 7	BSA	No	No	No	0-19%	Severe	Good	Unobservable	U	Unobservable	-
218	No	Skeleton	Inhumation 8	BSA	No	No	Yes	80-100%	Slight	Good	Young Adult	F	Pathognomonic	No
219	No	Skeleton	Inhumation 9	BSA	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	No
220	No	Skeleton	Inhumation 10	BSA	Yes	Yes	Yes	80-100%	Severe	Good	Middle Adult	F	Possible	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
221	No	Skeleton	Inhumation 11	BSA	No	No	No	80-100%	Slight	Good	Middle Adult	M	No	-
222	No	Skeleton	Inhumation 12	BSA	No	No	No	80-100%	Slight	Good	Middle Adult	M	Probable	-
223	No	Skeleton	Skeleton 11261	JTN	No	Yes	Yes	80-100%	Slight	Fair	Old Adult	F	Probable	No
224	No	Skeleton	Skeleton 11518	JTN	No	Yes	Yes	80-100%	Slight	Fair	Child	NA	Probable	Yes
225	No	Skeleton	Skeleton 13035	JTN	No	Yes	Yes	80-100%	Slight	Fair	Young Adult	F	No	No
226	No	Skeleton	Skeleton 13044	JTN	No	Yes	Yes	80-100%	Slight	Fair	Young Adult	M	Probable	No
227	No	Skeleton	Skeleton 13055	JTN	No	Yes	Yes	80-100%	Moderate	Poor	Adolescent	NA	Pathognomonic	No
228	No	Skeleton	Skeleton 13101	JTN	No	Yes	Yes	60-79%	Slight	Fair	Child	NA	Pathognomonic	No
229	No	Skeleton	Skeleton 13119	JTN	No	Yes	Yes	80-100%	Slight	Fair	Young Adult	PF	Probable	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
230	No	Skeleton	Skeleton 13181	JTN	No	Yes	Yes	80-100%	Moderate	Poor	Old Adult	M	Pathognomonic	No
231	No	Skeleton	Skeleton 13199	JTN	No	Yes	Yes	80-100%	Slight	Fair	Middle Adult	PF	Pathognomonic	No
232	No	Skeleton	Skeleton 13201/13088/13236	JTN	No	Yes	Yes	80-100%	Slight	Fair	Middle Adult	PM	Possible	No
233	Yes	Skeleton	Context 2593	IBF	Yes	Yes	Yes	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	Yes
234	No	Skeleton	Context 1987	IBF	Yes	No	No	80-100%	Slight	Fair	Old Adult	F	Probable	No
235	Yes	Skeleton	Context 1914	IBF	Yes	Yes	Yes	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	Yes
236	No	Skeleton	Context 2624	IBF	No	No	No	80-100%	Slight	Good	Young Adult	M	Pathognomonic	-
237	Yes	Skeleton	H640	HCH	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	M	No	No
238	Yes	Skeleton	H1552	HCH	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	F	Probable	No

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
239	Yes	Skeleton	H2455	HCH	No	No	No	60-79%	Slight	Fair	Middle Adult	M	Probable	No
240	Yes	Skeleton	H2544	HCH	No	No	No	0-19%	Slight	Good	Adult	PM	Possible	No
241	Yes	Skeleton	H2569	HCH	No	No	No	60-79%	Slight	Good	Old Adult	PF	Possible	-
242	Yes	Skeleton	H3078	HCH	No	No	No	20-39%	Slight	Fair	Middle Adult	M	No	-
243	No	Skeleton	Skeleton 11396	JTN	No	No	No	0-19%	Slight	Poor	Adult	U	Unobservable	-
244	Yes	Skeleton	H3726	HCH	No	Yes	Yes	60-79%	Slight	Fair	Middle Adult	M	Pathognomonic	No
246	Yes	Skeleton	H4243	HCH	No	Yes	Yes	40-59%	Slight	Good	Old Adult	M	No	No
247	Yes	Skeleton	R5029	RFN	No	Yes	Yes	60-79%	Slight	Good	Middle Adult	PM	Probable	No
248	Yes	Skeleton	R5046	RFN	No	Yes	Yes	-	Slight	Good	Young Adult	M	Pathognomonic	No

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
249	Yes	Skeleton	Skeleton 1291	SGB	No	Yes	Yes	40-59%	Slight	Good	Middle Adult	PM	Probable	No
250	Yes	Skeleton	Skeleton 1542	SGB	No	Yes	Yes	60-79%	Severe	Good	Adult	PM	Pathognomonic	No
251	Yes	Skeleton	Skeleton 1561	SGB	No	Yes	No	60-79%	Moderate	Good	Young Adult	PM	Pathognomonic	No
252	Yes	Skeleton	J11/J15(i)	ECK	No	No	No	0-19%	Moderate	Fair	Adult	M	Pathognomonic	-
253	Yes	Skeleton	Unprovenanced child skull	GPL	No	Yes	No	20-39%	Slight	Good	Child	NA	Pathognomonic	No
254	No	Skeleton	Skeleton 11042	JTN	No	No	No	0-19%	Severe	Poor	Adult	F	Possible	-
255	No	Skeleton	Skeleton 11050	JTN	No	No	No	0-19%	Moderate	Fair	Child	NA	No	-
256	No	Skeleton	Skeleton 11053	JTN	No	No	No	40-59%	Slight	Fair	Young Adult	F	Possible	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
257	No	Skeleton	Skeleton 11055	JTN	No	No	No	80-100%	Slight	Fair	Middle-Old Adult	M	No	-
258	No	Skeleton	Skeleton 11084	JTN	No	No	No	60-79%	Slight	Fair	Middle Adult	F	No	-
259	No	Skeleton	Skeleton 11087	JTN	No	No	No	60-79%	Slight	Fair	Child	NA	No	-
260	No	Skeleton	Skeleton 11092	JTN	No	No	No	60-79%	Slight	Fair	Young-Middle Adult	PF	Possible	-
261	No	Skeleton	Skeleton 11103	JTN	No	No	No	80-100%	Slight	Fair	Young Adult	F	Pathognomonic	Yes
262	No	Skeleton	Skeleton 11114	JTN	No	No	No	20-39%	Moderate	Fair	Middle Adult	F	Unobservable	-
263	No	Skeleton	Skeleton 11115	JTN	No	No	No	20-39%	Moderate	Fair	Middle Adult	M	Unobservable	-
264	No	Skeleton	Skeleton 11116	JTN	No	No	No	40-59%	Slight	Fair	Young Adult	F	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
265	No	Skeleton	Skeleton 11117	JTN	No	No	No	80-100%	Slight	Fair	Adolescent-Young Adult	PM	Probable	Yes
266	No	Skeleton	Skeleton 11118	JTN	No	No	No	20-39%	Slight	Fair	Young-Middle Adult	PM	No	-
267	No	Skeleton	Skeleton 11163/11165	JTN	No	No	No	20-39%	Severe	Fair	Middle-Old Adult	F	Possible	-
268	No	Skeleton	Skeleton 11164	JTN	No	No	No	0-19%	Severe	Poor	Adult	U	Unobservable	-
269	No	Skeleton	Skeleton 11168	JTN	No	No	No	40-59%	Severe	Poor	Infant	NA	Unobservable	-
270	No	Skeleton	Skeleton 11175	JTN	No	No	No	20-39%	Severe	Poor	Adult	F	Unobservable	-
271	No	Skeleton	Skeleton 11182	JTN	No	No	No	0-19%	Severe	Poor	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
272	No	Skeleton	Skeleton 11184	JTN	No	No	No	80-100%	Moderate	Poor	Middle Adult	PF	No	-
273	No	Skeleton	Skeleton 11187	JTN	No	No	No	80-100%	Slight	Fair	Child	NA	Possible	-
274	No	Skeleton	Skeleton 11187? (Commingle)	JTN	No	No	No	0-19%	Slight	Fair	Old Adult	M	Unobservable	-
275	No	Skeleton	Skeleton 11194	JTN	No	No	No	80-100%	Slight	Fair	Infant	NA	No	-
276	No	Skeleton	Skeleton 11203	JTN	No	No	No	20-39%	Slight	Fair	Middle Adult	M	Unobservable	-
277	No	Skeleton	Skeleton 11206	JTN	No	No	No	0-19%	Severe	Poor	Middle Adult	PF	Unobservable	Yes
278	No	Skeleton	Skeleton 11214	JTN	No	No	No	0-19%	Slight	Fair	Young Adult	PF	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
279	No	Skeleton	Skeleton 11220	JTN	No	No	No	0-19%	Severe	Poor	Middle-Old Adult	F	Unobservable	-
280	No	Skeleton	Skeleton 11223	JTN	No	No	No	0-19%	Severe	Poor	Adolescent-Young Adult	NA	Unobservable	-
281	No	Skeleton	Skeleton 11232	JTN	No	No	No	0-19%	Slight	Fair	Adult	PM	Unobservable	-
282	No	Skeleton	Skeleton 11235	JTN	No	No	No	60-79%	Slight	Fair	Adolescent-Young Adult	F	Possible	Yes
283	No	Skeleton	Skeleton 11245	JTN	No	No	No	80-100%	Slight	Fair	Young-Middle Adult	F	No	-
284	No	Skeleton	Skeleton 11250	JTN	No	No	No	80-100%	Slight	Fair	Child	NA	No	-
285	No	Skeleton	Skeleton 11290/13008	JTN	No	No	No	60-79%	Slight	Fair	Middle Adult	F	Possible	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
286	No	Skeleton	Skeleton 11263	JTN	No	No	No	40-59%	Moderate	Poor	Middle-Old Adult	F	No	-
287	No	Skeleton	Skeleton 11276	JTN	No	No	No	0-19%	Severe	Poor	Old Adult	PF	Unobservable	-
288	No	Skeleton	Skeleton 11279	JTN	No	No	No	40-59%	Slight	Poor	Young-Middle Adult	F	No	-
289	No	Skeleton	Skeleton 11287	JTN	No	No	No	60-79%	Slight	Fair	Young Adult	PM	Pathognomonic	Yes
290	No	Skeleton	Skeleton 11298	JTN	No	No	No	20-39%	Slight	Fair	Middle-Old Adult	F	Unobservable	-
291	No	Skeleton	Skeleton 11303	JTN	No	No	No	0-19%	Slight	Poor	Adult	PM	Unobservable	-
292	No	Skeleton	Skeleton 11328/13009	JTN	No	No	No	80-100%	Slight	Good	Adolescent	NA	Pathognomonic	No
293	No	Skeleton	Skeleton 11332	JTN	No	No	No	40-59%	Slight	Fair	Middle Adult	M	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
294	No	Skeleton	Skeleton 11344	JTN	No	No	No	40-59%	Slight	Poor	Old Adult	F	Unobservable	-
295	No	Skeleton	Skeleton 11370	JTN	No	No	No	40-59%	Slight	Fair	Young-Middle Adult	F	Unobservable	-
296	No	Skeleton	Skeleton 11373	JTN	No	No	No	0-19%	Severe	Fair	Child	NA	Unobservable	-
297	No	Skeleton	Skeleton 11383	JTN	No	No	No	0-19%	Severe	Poor	Adult	PM	Unobservable	-
298	No	Skeleton	Skeleton 11389	JTN	No	No	No	0-19%	Slight	Fair	Middle Adult	PM	Possible	-
299	No	Skeleton	Skeleton 11394	JTN	No	No	No	0-19%	Slight	Good	Middle Adult	PM	No	-
300	Yes	Skeleton	Skeleton 708	WPY	No	Yes	Yes	80-100%	Slight	Fair	Child	NA	Probable	Yes
301	Yes	Skeleton	Skeleton 130 (ERL 046)	RAF3	No	Yes	Yes	80-100%	Slight	Fair	Child	NA	Probable	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
302	Yes	Skeleton	Skeleton 308 (ERL 046)	RAF3	No	Yes	Yes	80-100%	Slight	Fair	Child	NA	Possible	No
303	Yes	Skeleton	Skeleton 450 (ERL 114)	RAF3	No	Yes	Yes	80-100%	Slight	Fair	Young Adult	PF	Possible	No
304	Yes	Skeleton	Skeleton 0301 (ERL 046)	RAF3	Yes	Yes	Yes	80-100%	Slight	Fair	Adolescent	NA	Pathognomonic	Yes
305	Yes	Skeleton	Skeleton 0007 (ERL 112)	RAF2	No	Yes	Yes	80-100%	Slight	Fair	Old Adult	PM	No	No
306	Yes	Skeleton	Skeleton 0078 (ERL 104)	RAF3	Yes	Yes	Yes	80-100%	Severe	Poor	Adolescent	PM	Possible	Yes
308	Yes	Skeleton	Skeleton 1	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	No	No
309	Yes	Skeleton	Skeleton 2	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
310	Yes	Skeleton	Skeleton 3	MMW	No	No	No	80-100%	Slight	Good	Old Adult	M	No	-
311	Yes	Skeleton	Skeleton 4	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
312	Yes	Skeleton	Skeleton 5	MMW	No	No	No	80-100%	None	Good	Middle Adult	M	Possible	-
313	Yes	Skeleton	Skeleton 6	MMW	No	No	No	80-100%	Slight	Good	Old Adult	PM	No	-
314	Yes	Skeleton	Skeleton 7	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Probable	Yes
315	Yes	Skeleton	Skeleton 8	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	Yes
316	Yes	Skeleton	Skeleton 9	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	Probable
317	Yes	Skeleton	Skeleton 10	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
318	Yes	Skeleton	Skeleton 11	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
319	Yes	Skeleton	Skeleton 12	MMW	No	No	No	60-79%	Slight	Fair	Middle Adult	M	No	No
320	Yes	Skeleton	Skeleton 13	MMW	No	No	No	80-100%	Slight	Fair	Child	NA	No	-
321	Yes	Skeleton	Skeleton 14	MMW	No	No	No	80-100%	Slight	Good	Adolescent	PF	Possible	Yes
322	Yes	Skeleton	Skeleton 15	MMW	No	No	No	80-100%	Slight	Good	Young Adult	M	Probable	Possible
323	Yes	Skeleton	Skeleton 16	MMW	No	No	No	80-100%	Slight	Fair	Young Adult	M	Probable	-
324	Yes	Skeleton	Skeleton 17	MMW	No	No	No	80-100%	Slight	Good	Young Adult	F	No	-
325	Yes	Skeleton	Skeleton 18	MMW	No	No	No	80-100%	Slight	Good	Adolescent	PM	Pathognomonic	Possible
326	Yes	Skeleton	Skeleton 19	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	PM	Pathognomonic	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
327	Yes	Skeleton	Skeleton 20	MMW	No	No	No	80-100%	Slight	Good	Old Adult	F	Possible	-
328	Yes	Skeleton	Skeleton 21	MMW	No	No	No	80-100%	Slight	Good	Adolescent	PF	Probable	-
329	Yes	Skeleton	Skeleton 22	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Possible	-
330	Yes	Skeleton	Skeleton 23	MMW	No	No	No	60-79%	Slight	Good	Middle Adult	M	Probable	Possible
331	Yes	Skeleton	Skeleton 24	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	-
332	Yes	Skeleton	Skeleton 25	MMW	No	No	No	80-100%	None	Good	Adolescent	M	Pathognomonic	-
333	Yes	Skeleton	Skeleton 26	MMW	No	No	No	80-100%	Slight	Good	Young Adult	M	Possible	-
334	Yes	Skeleton	Skeleton 27	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	PM	Possible	Yes

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
335	Yes	Skeleton	Skeleton 28	MMW	No	No	No	80-100%	Slight	Good	Adolescent	NA	Pathognomonic	-
336	Yes	Skeleton	Skeleton 29	MMW	No	No	No	80-100%	Slight	Good	Young Adult	M	Probable	-
337	Yes	Skeleton	Skeleton 30	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Possible	-
338	Yes	Skeleton	Skeleton 31	MMW	No	No	No	80-100%	Slight	Good	Old Adult	F	Probable	-
339	Yes	Skeleton	Skeleton 32	MMW	No	No	No	20-39%	Slight	Good	Adult	U	Possible	-
340	Yes	Skeleton	Skeleton 33	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
341	Yes	Skeleton	Skeleton 34	MMW	No	No	No	60-79%	Slight	Good	Old Adult	M	No	-
342	Yes	Skeleton	Skeleton 35	MMW	No	No	No	80-100%	Slight	Good	Infant	NA	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
343	Yes	Skeleton	Skeleton 36	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	I	Pathognomonic	-
344	Yes	Skeleton	Skeleton 37	MMW	No	No	No	0-19%	Slight	Good	Adolescent	NA	Possible	-
345	Yes	Skeleton	Skeleton 38	MMW	No	No	No	80-100%	Slight	Good	Young Adult	PF	Possible	-
346	Yes	Skeleton	Skeleton 39	MMW	No	No	No	80-100%	Slight	Good	Young Adult	M	Probable	-
347	Yes	Skeleton	Skeleton 40	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	-
348	Yes	Skeleton	Skeleton 41	MMW	No	No	No	80-100%	Slight	Good	Adolescent	NA	Pathognomonic	-
349	Yes	Skeleton	Skeleton 42	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	-
350	Yes	Skeleton	Skeleton 43	MMW	No	No	No	80-100%	Slight	Good	Old Adult	F	Possible	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
351	Yes	Skeleton	Skeleton 44	MMW	No	No	No	0-19%	Slight	Good	Adult	U	Unobservable	-
352	Yes	Skeleton	Skeleton 45	MMW	No	No	No	80-100%	Slight	Good	Adolescent	NA	Probable	-
353	Yes	Skeleton	Skeleton 46	MMW	No	No	No	80-100%	Slight	Good	Adolescent	M	Probable	-
354	Yes	Skeleton	Skeleton 47	MMW	No	No	No	80-100%	Slight	Good	Young Adult	PM	No	-
355	Yes	Skeleton	Skeleton 48	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	-
356	Yes	Skeleton	Skeleton 49	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	-
357	Yes	Skeleton	Skeleton 50	MMW	No	Yes	Yes	60-79%	Slight	Fair	Middle Adult	M	Probable	Yes
358	Yes	Skeleton	Skeleton 51	MMW	No	No	No	60-79%	Slight	Good	Infant	NA	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
359	Yes	Skeleton	Skeleton 52	MMW	No	No	No	80-100%	Slight	Good	Adolescent	NA	Pathognomonic	-
360	Yes	Skeleton	Skeleton 53	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Probable	-
361	Yes	Skeleton	Skeleton 54	MMW	No	No	No	80-100%	Slight	Good	Adolescent	NA	Pathognomonic	-
362	Yes	Skeleton	Skeleton 55	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	-
363	Yes	Skeleton	Skeleton 56	MMW	No	No	No	80-100%	Slight	Good	Adolescent	PM	Pathognomonic	-
364	No	Skeleton	Skeleton 11402	JTN	No	No	No	20-39%	Moderate	Poor	Young Adult	M	Unobservable	-
365	Yes	Skeleton	Skeleton 58	MMW	No	No	No	40-59%	Slight	Good	Child	NA	No	-
366	Yes	Skeleton	Skeleton 59	MMW	No	No	No	80-100%	Slight	Good	Old Adult	F	Possible	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
367	Yes	Skeleton	Skeleton 60	MMW	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	PF	Pathognomonic	No
368	Yes	Skeleton	Skeleton 61	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	-
369	Yes	Skeleton	Skeleton 62	MMW	No	No	No	80-100%	Slight	Good	Old Adult	M	Possible	-
370	Yes	Skeleton	Skeleton 63	MMW	No	Yes	Yes	80-100%	Slight	Good	Old Adult	F	Possible	No
371	Yes	Skeleton	Skeleton 64	MMW	No	Yes	Yes	80-100%	Slight	Good	Old Adult	F	Possible	No
372	Yes	Skeleton	Skeleton 65	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	-
373	Yes	Skeleton	Skeleton 66	MMW	No	No	No	0-19%	Slight	Good	Adult	U	No	-
374	Yes	Skeleton	Skeleton 67	MMW	No	No	No	80-100%	Slight	Good	Young Adult	M	Possible	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
375	Yes	Skeleton	Skeleton 68	MMW	No	No	No	80-100%	Slight	Good	Young Adult	M	Possible	-
376	Yes	Skeleton	Skeleton 69	MMW	No	No	No	80-100%	Slight	Good	Child	NA	Possible	-
377	Yes	Skeleton	Skeleton 70	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	-
378	Yes	Skeleton	Skeleton 71	MMW	No	No	No	80-100%	Slight	Good	Old Adult	M	No	-
379	Yes	Skeleton	Skeleton 72	MMW	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	M	Possible	No
380	Yes	Skeleton	Skeleton 73	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	No	-
381	Yes	Skeleton	Skeleton 74	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	-
382	Yes	Skeleton	Skeleton 75	MMW	No	No	No	80-100%	Slight	Fair	Infant	NA	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
383	Yes	Skeleton	Skeleton 76	MMW	No	No	No	60-79%	Slight	Fair	Infant	NA	No	-
384	Yes	Skeleton	Skeleton 77	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	-
385	Yes	Skeleton	Skeleton 78	MMW	No	No	No	80-100%	None	Good	Infant	NA	No	-
386	Yes	Skeleton	Skeleton 79	MMW	No	No	No	40-59%	Slight	Good	Middle Adult	M	Possible	-
387	Yes	Skeleton	Skeleton 80	MMW	No	Yes	Yes	80-100%	Slight	Good	Young Adult	PM	Probable	Yes
388	Yes	Skeleton	Skeleton 81	MMW	No	Yes	Yes	80-100%	Slight	Good	Middle Adult	M	No	No
389	Yes	Skeleton	Skeleton 82	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	-
390	Yes	Skeleton	Skeleton 83	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Probable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
391	Yes	Skeleton	Skeleton 84	MMW	No	No	No	80-100%	Slight	Good	Young Adult	PM	Possible	-
392	Yes	Skeleton	Skeleton 85	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	No	-
393	Yes	Skeleton	Skeleton 86	MMW	No	No	No	80-100%	Slight	Fair	Adolescent	NA	No	-
394	Yes	Skeleton	Skeleton 87	MMW	No	No	No	80-100%	Slight	Good	Old Adult	M	No	No
395	Yes	Skeleton	Skeleton 88	MMW	No	No	No	80-100%	Slight	Good	Old Adult	PF	No	-
396	Yes	Skeleton	Skeleton 89	MMW	No	No	No	60-79%	Slight	Fair	Infant	NA	No	-
397	Yes	Skeleton	Skeleton 90	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	-
398	Yes	Skeleton	Skeleton 91	MMW	No	No	No	80-100%	Slight	Fair	Middle Adult	PF	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
399	Yes	Skeleton	Skeleton 92	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	-
400	Yes	Skeleton	Skeleton 93	MMW	No	No	No	60-79%	Slight	Fair	Child	NA	No	-
401	Yes	Skeleton	Skeleton 94	MMW	No	Yes	Yes	80-100%	Slight	Good	Young Adult	M	Possible	Yes
402	Yes	Skeleton	Skeleton 95	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	No	-
403	Yes	Skeleton	Skeleton 96	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Probable	-
404	Yes	Skeleton	Skeleton 97	MMW	No	No	No	40-59%	Slight	Good	Old Adult	F	Possible	-
405	Yes	Skeleton	Skeleton 98	MMW	No	No	No	80-100%	Slight	Fair	Middle Adult	M	Probable	-
406	Yes	Skeleton	Skeleton 99	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Probable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
407	Yes	Skeleton	Skeleton 100	MMW	No	No	No	80-100%	Slight	Good	Young Adult	PF	Pathognomonic	-
408	Yes	skeleton	Skeleton 101	MMW	No	Yes	Yes	80-100%	None	Good	Child	NA	No	No
409	Yes	Skeleton	Skeleton 102	MMW	No	No	No	80-100%	Slight	Good	Infant	NA	No	-
410	Yes	Skeleton	Skeleton 103	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	-
411	Yes	Skeleton	Skeleton 104	MMW	No	No	No	80-100%	Slight	Good	Old Adult	M	Probable	-
412	Yes	Skeleton	Skeleton 105	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Possible	-
413	Yes	Skeleton	Skeleton 106	MMW	No	No	No	60-79%	Slight	Good	Middle Adult	M	No	-
414	Yes	Skeleton	Skeleton 107	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	PF	Pathognomonic	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
415	Yes	Skeleton	Skeleton 108	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	-
416	Yes	Skeleton	Skeleton 109	MMW	No	No	No	60-79%	Slight	Fair	Child	NA	No	-
417	Yes	Skeleton	Skeleton 110	MMW	No	No	No	80-100%	Slight	Good	Child	NA	No	-
418	Yes	Skeleton	Skeleton 111	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	-
419	Yes	Skeleton	Skeleton 112	MMW	No	No	No	20-39%	Slight	Good	Child	U	Possible	-
420	Yes	Skeleton	Skeleton 113	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	-
421	Yes	Skeleton	Skeleton 114	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	PM	No	-
422	Yes	Skeleton	Skeleton 115	MMW	No	No	No	20-39%	Slight	Good	Adult	F	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
423	Yes	Skeleton	Skeleton 116	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	F	Pathognomonic	-
424	Yes	Skeleton	Skeleton 117	MMW	No	Yes	Yes	80-100%	Slight	Good	Adolescent	M	Probable	No
425	Yes	Skeleton	Skeleton 118	MMW	No	No	No	20-39%	Slight	Poor	Infant	NA	Unobservable	-
426	Yes	Skeleton	Skeleton 119	MMW	No	No	No	20-39%	Slight	Good	Infant	NA	No	-
427	Yes	Skeleton	Skeleton 120	MMW	No	No	No	20-39%	Slight	Good	Fetus	NA	Unobservable	-
428	Yes	Skeleton	Skeleton 121	MMW	No	No	No	20-39%	Slight	Good	Adolescent	NA	No	-
429	Yes	Skeleton	Skeleton 122	MMW	No	No	No	20-39%	Slight	Good	Child	NA	No	-
430	No	Skeleton	AY352 (192)	MMW	No	No	No	20-39%	Slight	Good	Adult	PM	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
431	No	Skeleton	AY30 (511)	MMW	No	No	No	80-100%	Slight	Good	Adolescent	PM	Possible	-
432	No	Skeleton	AY30 (512)	MMW	No	No	No	40-59%	Slight	Good	Adult	U	Possible	-
433	No	Skeleton	AY30 (524)	MMW	No	No	No	60-79%	Slight	Good	Middle Adult	PM	No	-
434	No	Skeleton	AY30 (604)	MMW	No	No	No	80-100%	Slight	Good	Middle Adult	M	Pathognomonic	Yes
436	No	Skeleton	Skeleton 11405	JTN	No	No	No	60-79%	Slight	Poor	Young-Middle Adult	F	No	-
437	No	Skeleton	Skeleton 11411	JTN	No	No	No	20-39%	Slight	Fair	Adolescent-Young Adult	U	Probable	-
438	No	Skeleton	Skeleton 11420	JTN	No	No	No	60-79%	Slight	Fair	Child	NA	No	-
439	No	Skeleton	Skeleton 11423	JTN	No	No	No	20-39%	Moderate	Fair	Adolescent	PF	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
440	No	Skeleton	Skeleton 11428	JTN	No	No	No	20-39%	Moderate	Poor	Adult	PM	Possible	-
441	No	Skeleton	Skeleton 11429	JTN	No	No	No	0-19%	Moderate	Poor	Adult	I	Unobservable	-
442	No	Skeleton	Skeleton 11431	JTN	No	No	No	0-19%	Severe	Poor	Child	NA	Unobservable	-
443	No	Skeleton	Skeleton 11433	JTN	No	No	No	60-79%	Moderate	Poor	Young Adult	PM	No	-
444	No	Skeleton	Skeleton 11438	JTN	No	No	No	80-100%	Slight	Fair	Young-Middle Adult	M	No	-
445	No	Skeleton	Skeleton 11443	JTN	No	No	No	0-19%	Moderate	Poor	Adult	U	Unobservable	-
446	No	Skeleton	Skeleton 11445	JTN	No	No	No	0-19%	Moderate	Fair	Adult	U	Unobservable	-
447	No	Skeleton	Skeleton 11446	JTN	No	No	No	0-19%	Moderate	Poor	Adolescent	M	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
448	No	Skeleton	Skeleton 11448	JTN	No	No	No	0-19%	Moderate	Fair	Adolescent	U	Unobservable	-
449	No	Skeleton	Skeleton 11453	JTN	No	No	No	60-79%	Slight	Fair	Old Adult	M	No	-
450	No	Skeleton	Skeleton 11456	JTN	No	No	No	20-39%	Severe	Poor	Adult	PF	Unobservable	-
451	No	Skeleton	Skeleton 11459	JTN	No	No	No	80-100%	Slight	Good	Old Adult	F	No	-
452	No	Skeleton	Skeleton 11471	JTN	No	No	No	40-59%	Moderate	Poor	Middle-Old Adult	F	Unobservable	-
453	No	Skeleton	Skeleton 11473	JTN	No	No	No	0-19%	Severe	Poor	Adult	PF	Unobservable	-
454	No	Skeleton	Skeleton 11474	JTN	No	No	No	0-19%	Severe	Poor	Adult	U	Unobservable	-
455	No	Skeleton	Skeleton 11475	JTN	No	No	No	40-59%	Moderate	Fair	Infant	NA	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
456	No	Skeleton	Skeleton 11477	JTN	No	No	No	60-79%	Severe	Poor	Middle Adult	F	No	-
457	No	Skeleton	Skeleton 11483	JTN	No	No	No	0-19%	Severe	Poor	Infant	NA	Unobservable	-
458	No	Skeleton	Skeleton 11458	JTN	No	No	No	0-19%	Severe	Poor	Adult	U	Possible	-
459	No	Skeleton	Skeleton 11487	JTN	No	No	No	0-19%	Slight	Fair	Young Adult	PM	Unobservable	-
460	No	Skeleton	Skeleton 11488	JTN	No	No	No	0-19%	Slight	Fair	Young-Middle Adult	F	Unobservable	-
461	No	Skeleton	Skeleton 11491	JTN	No	No	No	20-39%	Severe	Poor	Adult	F	Unobservable	-
462	No	Skeleton	Skeleton 11493	JTN	No	No	No	40-59%	Severe	Poor	Adult	M	No	-
463	No	Skeleton	Skeleton 11495	JTN	No	No	No	0-19%	Severe	Poor	Adolescent	U	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
464	No	Skeleton	Skeleton 11497	JTN	No	No	No	80-100%	Moderate	Poor	Middle Adult	M	Possible	-
465	No	Skeleton	Skeleton 11498	JTN	No	No	No	20-39%	Slight	Fair	Young Adult	F	No	-
466	No	Skeleton	Skeleton 11499	JTN	No	No	No	20-39%	Slight	Fair	Child	NA	Unobservable	-
467	No	Skeleton	Skeleton 11500	JTN	No	No	No	20-39%	Severe	Poor	Adolescent	NA	Unobservable	Yes
468	No	Skeleton	Skeleton 11501	JTN	No	No	No	40-59%	Severe	Poor	Adult	PM	Unobservable	-
469	No	Skeleton	Skeleton 11502	JTN	No	No	No	60-79%	Slight	Good	Old Adult	M	No	-
470	No	Skeleton	Skeleton 11503	JTN	No	No	No	20-39%	Severe	Poor	Young Adult	F	Unobservable	-
471	No	Skeleton	Skeleton 11504	JTN	No	No	No	80-100%	Moderate	Fair	Middle Adult	F	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
472	No	Skeleton	Skeleton 11505	JTN	No	No	No	40-59%	Severe	Poor	Middle Adult	PF	Unobservable	-
473	No	Skeleton	Skeleton 11506	JTN	No	No	No	20-39%	Severe	Poor	Adolescent	PM	Unobservable	-
474	No	Skeleton	Skeleton 11507	JTN	No	No	No	40-59%	Moderate	Fair	Adult	PM	No	-
475	No	Skeleton	Skeleton 11508	JTN	No	No	No	0-19%	Severe	Poor	Adult	PF	Unobservable	-
476	No	Skeleton	Skeleton 11509	JTN	No	No	No	20-39%	Moderate	Fair	Middle-Old Adult	PM	No	Yes
477	No	Skeleton	Skeleton 11510	JTN	No	No	No	60-79%	Slight	Fair	Young Adult	PM	Probable	-
478	No	Skeleton	Skeleton 11511	JTN	No	No	No	20-39%	Slight	Fair	Young-Middle Adult	F	Unobservable	-
479	No	Skeleton	Skeleton 11512	JTN	No	No	No	40-59%	Moderate	Fair	Child	NA	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
480	No	Skeleton	Skeleton 11513	JTN	No	No	No	0-19%	Moderate	Fair	Adult	U	Unobservable	-
481	No	Skeleton	Skeleton 11514	JTN	No	No	No	40-59%	Moderate	Fair	Adult	F	No	-
482	No	Skeleton	Skeleton 11515	JTN	No	No	No	0-19%	Moderate	Fair	Old Adult	PF	Unobservable	-
483	No	Skeleton	Skeleton 11516	JTN	No	No	No	60-79%	Moderate	Poor	Young Adult	F	Unobservable	-
484	No	Skeleton	Skeleton 11519	JTN	No	No	No	20-39%	Moderate	Fair	Adult	F	Possible	-
485	No	Skeleton	Skeleton 11520	JTN	No	No	No	20-39%	Severe	Poor	Adult	M	Probable	-
486	No	Skeleton	Skeleton 11526	JTN	No	No	No	40-59%	Moderate	Poor	Adolescent	NA	Probable	-
487	No	Skeleton	Skeleton 11529	JTN	No	No	No	20-39%	Moderate	Poor	Adult	M	Possible	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
488	No	Skeleton	Skeleton 11530	JTN	No	No	No	20-39%	Severe	Poor	Adolescent-Young Adult	U	Possible	-
489	No	Skeleton	Skeleton 11531	JTN	No	No	No	20-39%	Moderate	Poor	Adult	M	No	-
490	No	Skeleton	Skeleton 13017	JTN	No	No	No	80-100%	Moderate	Poor	Old Adult	M	No	-
491	No	Skeleton	Skeleton 13019	JTN	No	No	No	0-19%	Moderate	Poor	Adolescent	NA	Possible	-
492	No	Skeleton	Skeleton 13025	JTN	No	No	No	80-100%	Slight	Fair	Middle-Old Adult	F	No	-
493	No	Skeleton	Skeleton 13026	JTN	No	No	No	0-19%	Slight	Fair	Infant	NA	Unobservable	-
494	No	Skeleton	Skeleton 13028	JTN	No	No	No	80-100%	Severe	Fair	Young Adult	F	No	-
495	No	Skeleton	Skeleton 13029	JTN	No	No	No	20-39%	Slight	Poor	Young Adult	PM	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
496	No	Skeleton	Skeleton 13029b	JTN	No	No	No	0-19%	Moderate	Poor	Old Adult	M	Unobservable	-
497	No	Skeleton	Skeleton 13038	JTN	No	No	No	60-79%	Severe	Fair	Adolescent-Young Adult	PM	Possible	-
498	No	Skeleton	Skeleton 13049	JTN	No	No	No	60-79%	Slight	Fair	Middle-Old Adult	F	No	-
499	No	Skeleton	Skeleton 13046	JTN	No	No	No	40-59%	Slight	Fair	Young Adult	F	No	-
500	No	Skeleton	Skeleton 13047	JTN	No	No	No	0-19%	Severe	Poor	Non-Adult	U	Unobservable	-
501	No	Skeleton	Skeleton 13049	JTN	No	No	No	0-19%	Slight	Good	Adult	PF	Unobservable	-
502	No	Skeleton	Skeleton 13051	JTN	No	No	No	80-100%	Slight	Fair	Middle-Old Adult	F	No	-
503	No	Skeleton	Skeleton 13054	JTN	No	No	No	0-19%	Slight	Fair	Young Adult	F	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
504	No	Skeleton	Skeleton 13056/13057	JTN	No	No	No	0-19%	Severe	Fair	Infant	NA	Unobservable	-
505	No	Skeleton	Skeleton 13060	JTN	No	No	No	60-79%	Slight	Fair	Infant	NA	No	-
506	No	Skeleton	Skeleton 13067	JTN	No	No	No	0-19%	Slight	Fair	Adult	PM	No	-
507	No	Skeleton	Skeleton 13071	JTN	No	No	No	40-59%	Slight	Fair	Adolescent	U	No	-
508	No	Skeleton	Skeleton 13072	JTN	No	No	No	80-100%	Slight	Fair	Adolescent	PM	No	-
509	No	Skeleton	Skeleton 13073	JTN	No	No	No	80-100%	Slight	Fair	Infant	NA	No	-
510	No	Skeleton	Skeleton 13078	JTN	No	No	No	0-19%	Slight	Fair	Middle Adult	F	Unobservable	-
511	No	Skeleton	Skeleton 13081	JTN	No	No	No	40-59%	Slight	Fair	Middle-Old Adult	F	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
512	No	Skeleton	Skeleton 13082	JTN	No	No	No	60-79%	Slight	Fair	Young Adult	PF	Unobservable	-
513	No	Skeleton	Skeleton 13091	JTN	No	No	No	40-59%	Slight	Fair	Adolescent	NA	Probable	-
514	No	Skeleton	Skeleton 13092	JTN	No	No	No	0-19%	Slight	Fair	Middle-Old Adult	I	Unobservable	-
515	No	Skeleton	Skeleton 13093	JTN	No	No	No	20-39%	Slight	Fair	Young Adult	PF	No	-
516	No	Skeleton	Skeleton 13094	JTN	No	No	No	0-19%	Slight	Fair	Young Adult	PF	No	-
517	No	Skeleton	Skeleton 13095	JTN	No	No	No	0-19%	Slight	Poor	Non-Adult	NA	Possible	-
518	No	Skeleton	Skeleton 13097	JTN	No	No	No	80-100%	Severe	Poor	Young Adult	F	Possible	-
519	No	Skeleton	Skeleton 13105	JTN	No	No	No	80-100%	Moderate	Fair	Adolescent	PF	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
520	No	Skeleton	Skeleton 13111	JTN	No	No	No	20-39%	Moderate	Fair	Young-Middle Adult	F	Possible	-
521	No	Skeleton	Skeleton 13113	JTN	No	No	No	0-19%	Severe	Poor	Adult	PM	Unobservable	-
522	No	Skeleton	Skeleton 13115	JTN	No	No	No	40-59%	Severe	Poor	Adolescent	NA	Unobservable	-
523	No	Skeleton	Skeleton 13121	JTN	No	No	No	0-19%	Slight	Fair	Young-Middle Adult	F	Probable	-
524	No	Skeleton	Skeleton 13122	JTN	No	No	No	0-19%	Slight	Fair	Young Adult	F	No	-
525	No	Skeleton	Skeleton 12123	JTN	No	No	No	0-19%	None	Fair	Adolescent	NA	Unobservable	-
526	No	Skeleton	Skeleton 13125	JTN	No	No	No	20-39%	Moderate	Poor	Old Adult	PF	Unobservable	-

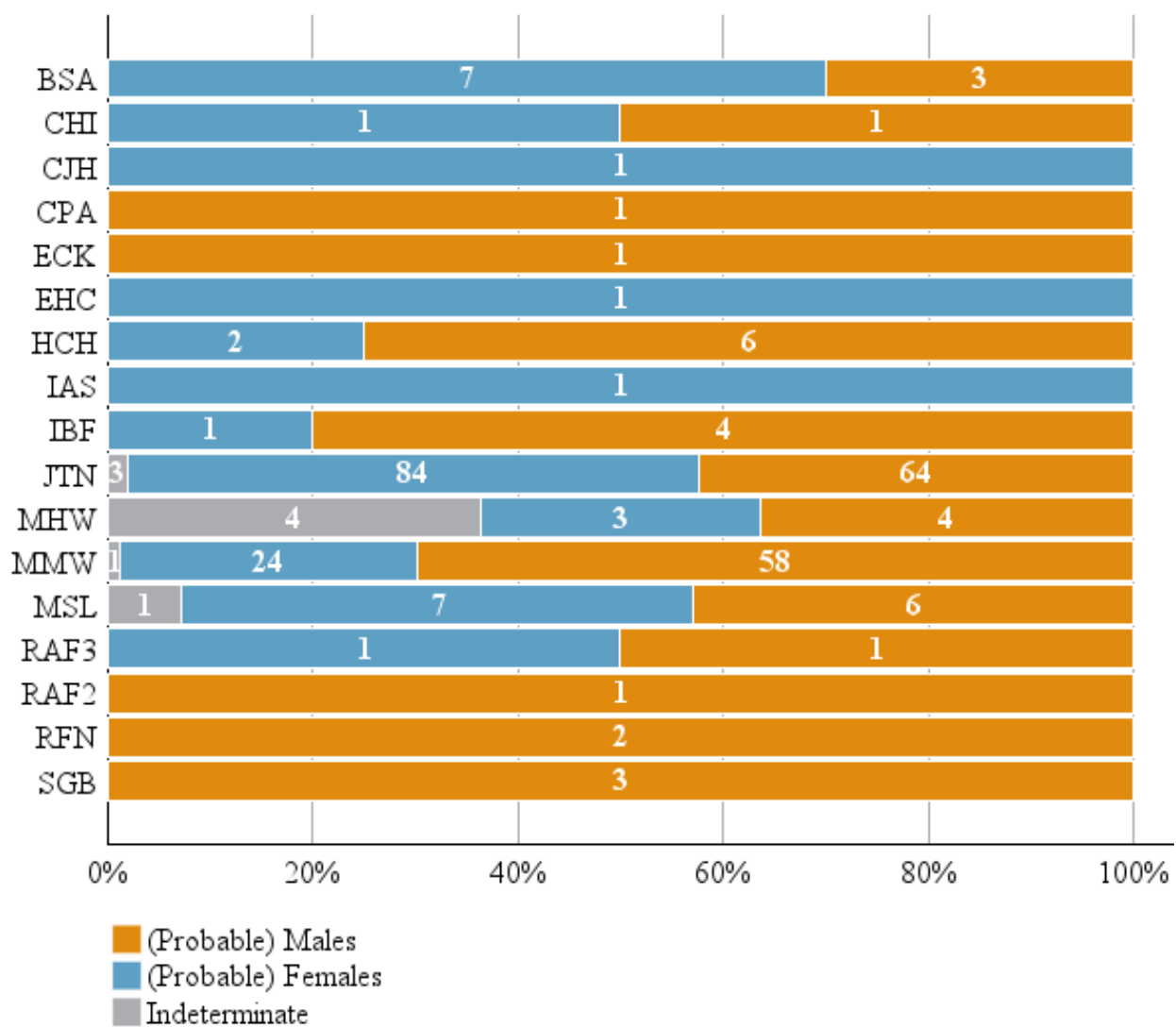
UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
527	No	Skeleton	Skeleton 13127	JTN	No	No	No	20-39%	Slight	Poor	Adult	PM	Unobservable	-
528	No	Skeleton	Skeleton 13130	JTN	No	No	No	80-100%	Slight	Fair	Middle Adult	F	Probable	-
529	No	Skeleton	Skeleton 13132	JTN	No	No	No	0-19%	Slight	Fair	Adult	PM	No	-
530	No	Skeleton	Skeleton 13133	JTN	No	No	No	0-19%	Moderate	Poor	Adolescent-Young Adult	U	Possible	-
531	No	Skeleton	Skeleton 13136	JTN	No	No	No	20-39%	Moderate	Poor	Child	NA	Unobservable	-
532	No	Skeleton	Skeleton 13146	JTN	No	No	No	80-100%	Slight	Fair	Young Adult	PM	Probable	-
533	No	Skeleton	Skeleton 13152	JTN	No	No	No	60-79%	Slight	Fair	Young Adult	M	No	-
534	No	Skeleton	Skeleton 13156	JTN	No	No	No	80-100%	Slight	Fair	Child	NA	No	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
535	No	Skeleton	Skeleton 13158	JTN	No	No	No	60-79%	Moderate	Poor	Middle-Old Adult	F	Unobservable	-
536	No	Skeleton	Skeleton 13160	JTN	No	No	No	60-79%	Severe	Poor	Young-Middle Adult	F	No	-
537	No	Skeleton	Skeleton 13163	JTN	No	No	No	60-79%	Moderate	Fair	Child	NA	No	-
538	No	Skeleton	Skeleton 13169	JTN	No	No	No	80-100%	Slight	Good	Young-Middle Adult	F	No	-
539	No	Skeleton	Skeleton 13171/13174	JTN	No	No	No	0-19%	Severe	Poor	Child	NA	Unobservable	-
540	No	Skeleton	Skeleton 13173	JTN	No	No	No	40-59%	Slight	Fair	Middle-Old Adult	F	No	-
541	No	Skeleton	Skeleton 13175	JTN	No	No	No	0-19%	Slight	Fair	Middle Adult	PM	No	-

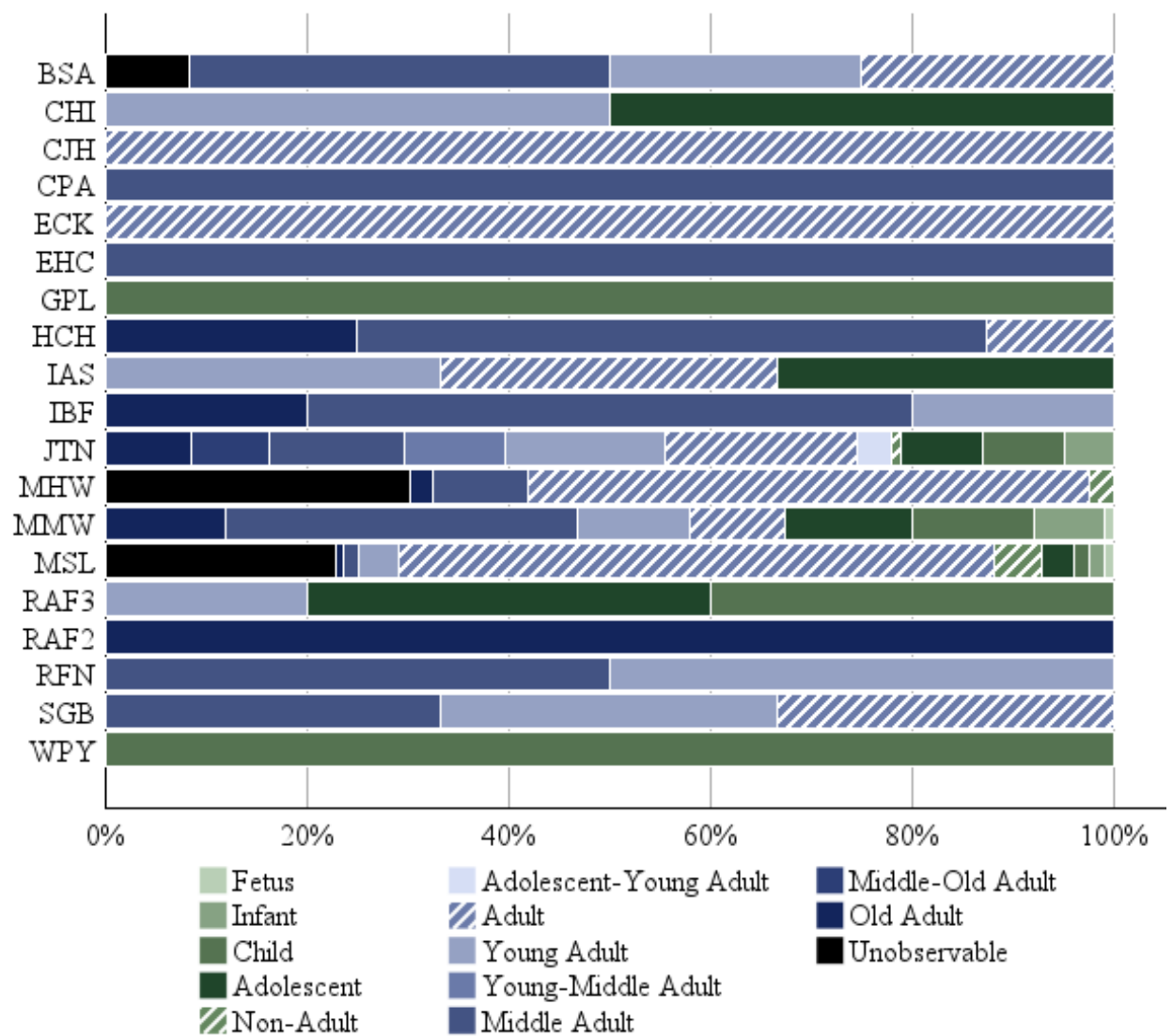
UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
542	No	Skeleton	Skeleton 13177	JTN	No	No	No	0-19%	Slight	Fair	Middle-Old Adult	F	Unobservable	-
543	No	Skeleton	Skeleton 13178	JTN	No	No	No	40-59%	Severe	Fair	Infant	NA	No	-
544	No	Skeleton	Skeleton 13189	JTN	No	No	No	0-19%	Slight	Fair	Infant	NA	Unobservable	-
545	No	Skeleton	Skeleton 13191	JTN	No	No	No	80-100%	Slight	Fair	Adolescent	NA	No	-
546	No	Skeleton	Skeleton 13200	JTN	No	No	No	0-19%	Severe	Fair	Child	NA	Unobservable	-
547	No	Skeleton	Skeleton 13121	JTN	No	No	No	60-79%	Moderate	Poor	Middle Adult	M	No	-
548	No	Skeleton	Skeleton 13216	JTN	No	No	No	80-100%	Moderate	Fair	Middle Adult	M	No	-
549	No	Skeleton	Skeleton 13237	JTN	No	No	No	40-59%	Severe	Poor	Young Adult	PF	Probable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	<i>M. leprae</i> aDNA
550	No	Skeleton	Skeleton 13242	JTN	No	No	No	20-39%	Slight	Fair	Child	NA	Unobservable	-
551	No	Skeleton	Skeleton 13257	JTN	No	No	No	60-79%	Moderate	Poor	Old Adult	F	No	-
552	No	Skeleton	Skeleton 13258	JTN	No	No	No	0-19%	Slight	Good	Old Adult	M	No	-
553	No	Skeleton	Skeleton 13259	JTN	No	No	No	60-79%	Slight	Fair	Middle-Old Adult	F	No	-
554	No	Skeleton	Skeleton 13260/13256	JTN	No	No	No	60-79%	Slight	Fair	Young-Middle Adult	F	No	-
555	No	Skeleton	Skeleton 13261	JTN	No	No	No	40-59%	Moderate	Fair	Young Adult	F	Unobservable	-
556	No	Skeleton	Skeleton 13262	JTN	No	No	No	0-19%	Slight	Fair	Young-Middle Adult	F	Unobservable	-

UIN	Analysed by AAB	Skeleton/Loose Bone	Original skeleton number	Site	Sample C14	Sample isotopes - teeth	Sample isotopes - ribs	Completeness	Fragmentation overall	Preservation	Final age category	Final sex	'leprosy' diagnosis osteo	M. leprae aDNA
557	No	Skeleton	Skeleton 13263	JTN	No	No	No	20-39%	Slight	Fair	Young-Middle Adult	PF	Unobservable	-
558	No	Skeleton	Skeleton 13266	JTN	No	No	No	40-59%	Slight	Fair	Young-Middle Adult	PM	Possible	-
559	No	Skeleton	Skeleton 13267	JTN	No	No	No	0-19%	Moderate	Poor	Adult	PF	Unobservable	-
560	No	Skeleton	Skeleton 13272	JTN	No	No	No	0-19%	Moderate	Poor	Adult	U	Unobservable	-
561	No	Skeleton	Skeleton 13273	JTN	No	No	No	0-19%	Moderate	Fair	Middle Adult	I	Probable	-
562	No	Skeleton	Skeleton 13279	JTN	No	No	No	60-79%	Moderate	Fair	Young-Middle Adult	PF	No	-
563	No	Skeleton	Skeleton 13280	JTN	No	No	No	0-19%	Moderate	Fair	Adult	PF	Unobservable	-



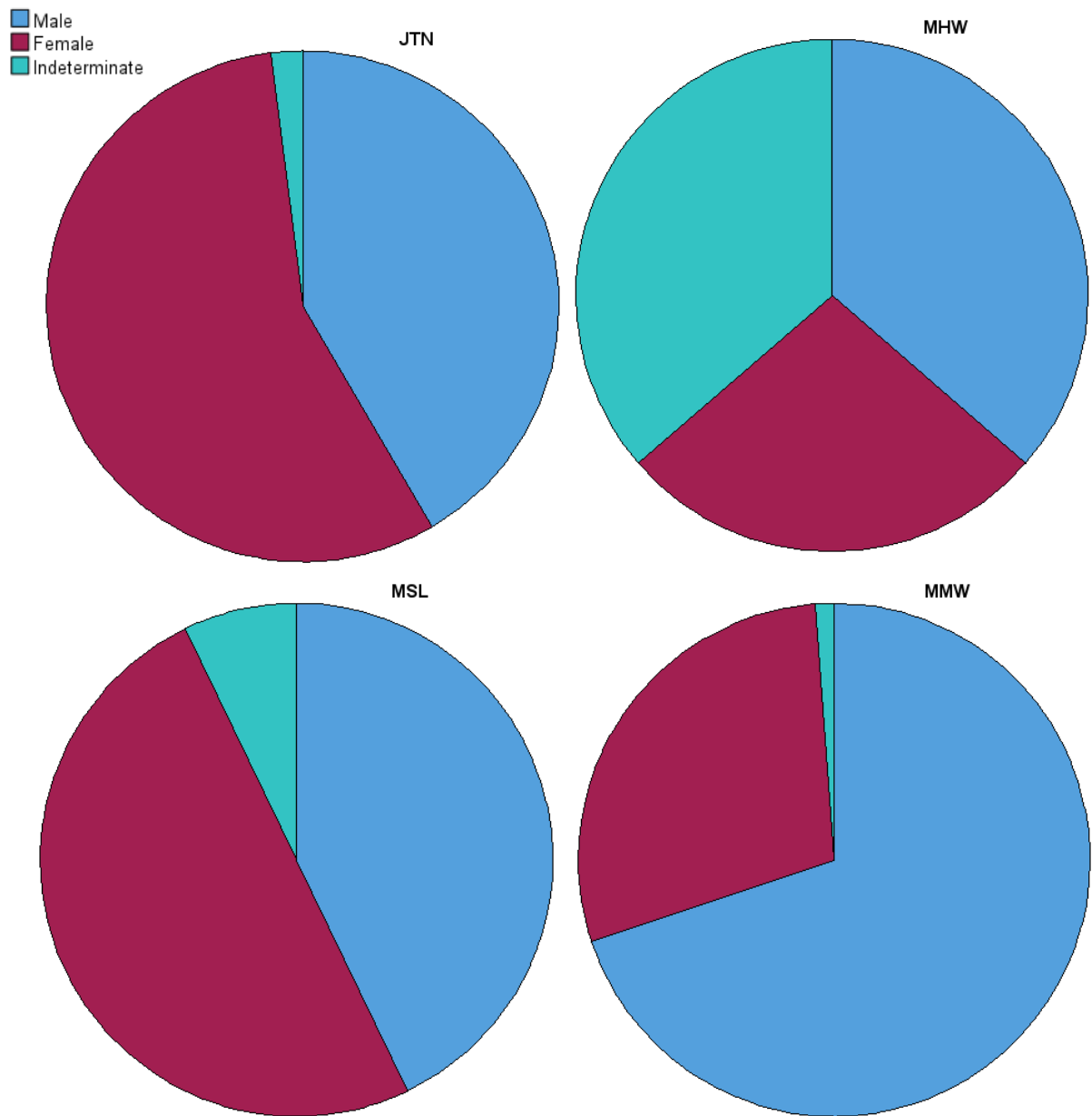
AF 52. Cumulative percentages of male, female and indeterminate cases across the sites included in this study. Numbers in graph represents counts.



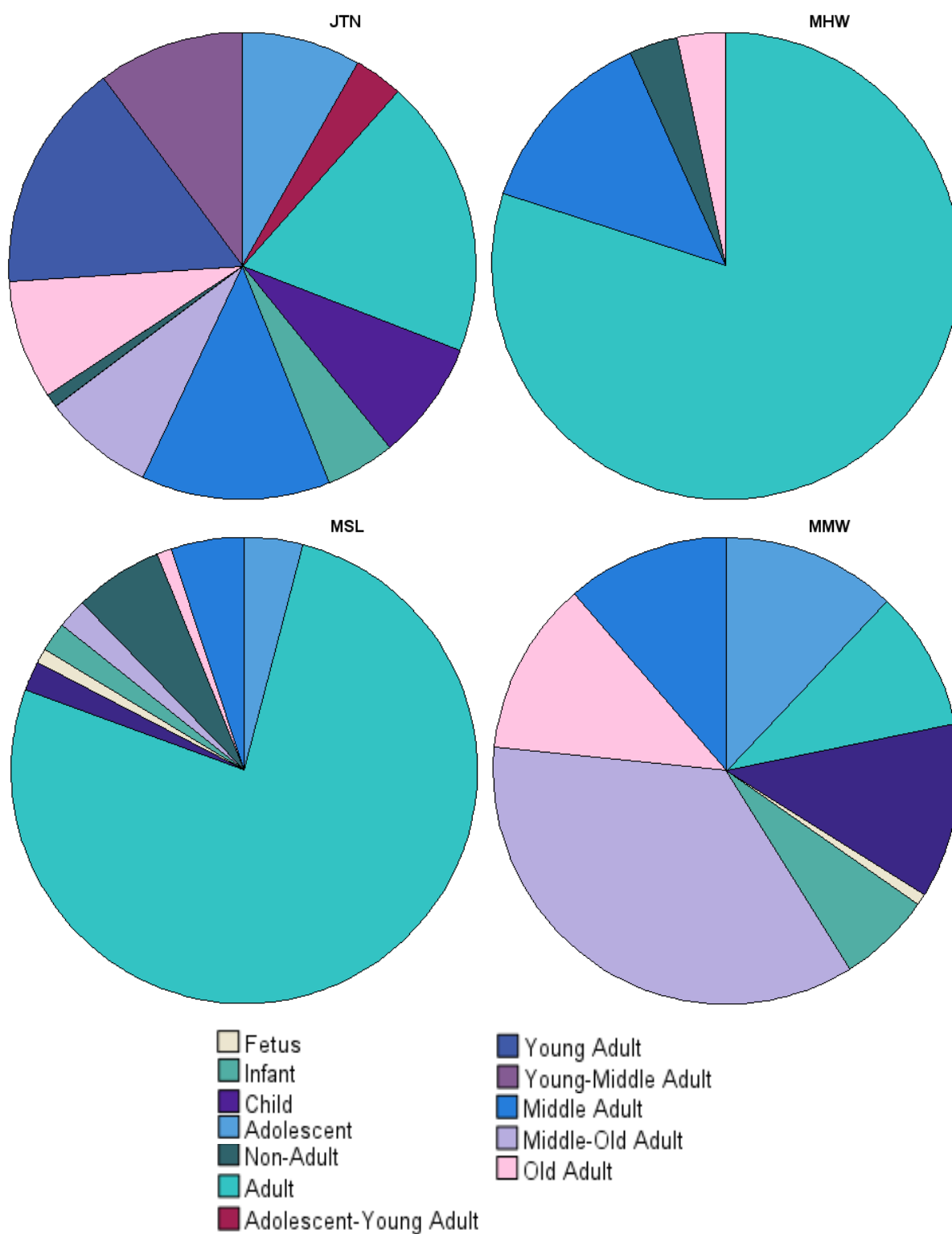
AF 53. Cumulative percentages of the number of cases in each age category across the sites included in this study.

AT 56. Total number of individuals, number of males, females, unsexed, and non-adults per site. Orange marked site represent leprosaria; green hospitals and blue monastic sites.

Site	<i>Total n of individuals</i>	<i>n of males</i>	<i>n of females</i>	<i>n of unsexed</i>	<i>n of non-adults</i>
BSA	12	3	7	2	?
CHI	980	?	?	?	?
CJH	404	87	74	180	63
CPA	210	?	?	?	?
ECK	?	?	?	?	?
GPL	78	?	?	?	?
HCH	1085	?	?	?	?
IAS	95	35	28	16	16
IBF	250	148	64	14	24
JTN	207	62	84	23	38
MHW individual	43	4	3	35	1
MHW all	14	2	2	9	1
MSL individual	41	5	7	23	6
MSL all	127	6	7	104	10
MMW	124	58	24	12	30
RAF2	?	?	?	?	?
RAF3	402	?	?	?	?
RFN	370	103	80	14	171
SGB	37	?	?	?	?
WPY	670	?	?	?	?



AF 54. Pie charts showing the distribution of osteological sex across the four largest leprosaria in this project.



AF 55. Pie charts showing the distribution of osteological age category across the four largest leprosaria in this project.

A.4.2. HD - palaeopathology

AT 57. Sex distribution between HD diagnosis severity/certainty levels, statistically insignificant: $n=212$; $\chi^2=4.551$, $df=3$, $p=0.208$.

		HD diagnosis				<i>Total</i>
		No HD	Possible HD	Probable HD	Pathognomonic HD	
Male	Count	44	30	28	22	124
	z-score	-1.0	-.7	2.1	-.1	
Female	Count	37	25	10	16	88
	z-score	1.0	0.7	-2.1	.1	
<i>Total</i>		81	55	38	38	212

A. 4.2.1 Rhinomaxillary changes

AT 58. Percentage of rhinomaxillary sites with a pathology score above 0 (= pathology present). 'Unsexed'=indeterminable and unobservable combined. ' n_{obs} '=number of relevant site available for observation. '%'=percentage of observable sites with lesions.

	Female		Male		Unsexed		Non-adult	
	n_{obs}	%	n_{obs}	%	n_{obs}	%	n_{obs}	%
ANS	72	33.33%	84	54.76%	4	75.00%	42	26.19%
APM	74	31.08%	83	45.78%	4	75.00%	43	27.91%
PPMN	76	32.89%	94	36.17%	4	100.00%	43	39.53%
PPMO	77	37.66%	95	52.63%	4	75.00%	43	53.49%
NPI	65	32.31%	89	55.06%	5	40.00%	41	36.59%
RS	83	36.14%	97	51.55%	7	57.14%	49	32.65%

AT 59. Sex distribution between rhinomaxillary scores, statistically insignificant; $n=180$; $\chi^2=4.880$, $df=1$, $p=0.027$.

		No rhinomaxillary syndrome	Rhinomaxillary syndrome	Total
Male	Count	46	51	97
	z-score	-2.2	2.2	
Female	Count	53	30	83
	z-score	2.2	-2.2	83
Total		99	81	180

AT 60. Sex distribution between ANS scores, statistically insignificant; $n=156$; $\chi^2=12.053$, $df=3$, $p=0.007$.

		ANS				Total
		0	1	2	3	
Male	Count	38	18	20	8	84
	z-score	-2.7	2.5	1.8	-.9	
Female	Count	48	5	9	10	72
	z-score	2.7	-2.5	-1.8	.9	
Total		86	23	29	18	156

AT 61. Sex distribution between APM scores, statistically insignificant; $n=157$; $\chi^2=6.073$, $df=4$, $p=0.194$.

		APM					Total
		0	1	2	3	4	
Male	Count	45	24	10	3	1	83
	z-score	-1.9	2.1	.2	-.5	.9	
Female	Count	51	11	8	4	0	74
	z-score	1.9	-2.1	-.2	.5	-.9	
Total		96	35	18	7	1	157

AT 62. Sex distribution between PPMN scores, statistically insignificant; $n=170$; $\chi^2=2.363$, $df=4$, $p=0.669$.

		PPMN					Total
		0	1	2	3	4	
Male	Count	60	16	14	3	1	94
	z-score	-.4	.5	.6	-1.0	.9	
Female	Count	51	11	9	5	0	76
	z-score	.4	-.5	-.6	1.0	-.9	
Total		111	27	23	8	1	170

AT 63. Sex distribution between PPMO scores, statistically insignificant; $n=172$; $\chi^2=11.144$, $df=6$, $p=0.084$.

		PPMO							Total
		0	1	2	3	4	5	6	
Male	Count	45	33	9	6	0	1	1	95
	z-score	-2.0	2.2	-.2	1.2	-1.9	-.1	.9	
Female	Count	48	15	8	2	3	1	0	77
	z-score	2.0	-2.2	.2	-1.2	1.9	1	-.9	
Total		93	48	17	8	3	2	1	172

AT 64. Sex distribution between NPI scores, statistically insignificant; $n=154$; $\chi^2=9.620$, $df=6$, $p=0.087$.

		NPI						Total
		0	1	2	3	4	5	
Male	Count	40	16	14	11	4	4	89
	z-score	-2.8	2.2	1.2	.9	.0	.0	
Female	Count	44	4	6	5	3	3	65
	z-score	2.8	-2.2	-1.2	-.9	.0	.0	
Total		84	20	20	16	7	7	154

AT 65. Pearson Correlation correlation between HD diagnosis levels (no, possible, probably and pathognomonic) and individual lesions used for HD diagnosis.

	ANS	APM	PPMN	PPMO	NPI
Pearson Correlation	0.790	0.708	0.646	0.613	0.721
Sig. (2-tailed)	<.001 8.8472E-41	<.001 5.8197E-30	<.001 9.4495E-25	<.001 6.4586E-22	<.001 8.4619E-31
<i>n</i>	185	188	198	199	184

A.4.2.2. Lesions in the limbs and extremities

AT 66. Pearson Correlation between HD diagnosis levels (no, possible, probably and pathognomonic) and individual limb and extremity lesions used for HD diagnosis.

	NSPB left ulna	NSPB right ulna	NSBP left radius	NSPB right radius	NSPB left tibia	NSPB right tibia	NSPB left fibula	NSPB right fibula	Hand changes	Foot changes
Pearon Correlation	0.169	0.198	0.104	0.224	0.547	0.502	0.575	0.539	0.396	0.686
Sig. (2-tailed)	.014	.003	0.134	<.001 0.0009	<.001 8.8414E-20	<.001 3.1521E-16	<.001 5.2452E-21	<.001 3.7419E-18	<0.001 5.1706E-10	<0.001 3.6699E-31
<i>n</i>	212	217	210	215	236	232	223	222	229	214

A. 4.2.3. aDNA confirmation

AT 67. Overview of individuals sampled for ancient DNA analysis. Zurich sample numbers are the sample numbers assigned in the ancient DNA lab at the University of Zurich, Switzerland. Positive cases in cursive.

UIN	Zurich sample number	Sample type	Sampled element	Sample weight	Positive/ whole genome
1	ZH1436	Bone	Right fifth metatarsal	0	No
	ZH1437	Tooth	Upper left central incisor (2.1)	0	No
2	ZH1431	Tooth	Left upper canine (2.3)	0	No
	ZH1432	Bone	Right fifth metatarsal	0	No
	ZH1433	Tooth	Right upper central incisor (1.1)	0	No
4	<i>ZH1441</i>	<i>Bone</i>	<i>Distal right fibula</i>	<i>0</i>	<i>No</i>
	<i>ZH1442</i>	<i>Tooth</i>	<i>Left upper central incisor (2.1)</i>	<i>0</i>	<i>Yes</i>
	ZH1458	Calculus	Calculus from upper left central incisor (2.1)	0	No
5	<i>ZH1045</i>	<i>Tooth</i>	<i>Upper left central incisor (2.1)</i>	<i>0</i>	<i>Yes</i>
	ZH1584	Bone	Fibula shaft	0	No
6	ZH1043	Tooth	Upper right central incisor (1.1)	0	No
7	<i>ZH1048</i>	<i>Tooth</i>	<i>Upper right central incisor (1.1)</i>	<i>0</i>	<i>Yes</i>
	ZH1582	Bone	Interproximal hand phalanx	0	No
9	<i>ZH1049</i>	<i>Bone</i>	<i>Fibula fragment</i>	<i>0</i>	<i>Yes</i>
	ZH1583	Bone	Left MT4	0	No
13	ZH1439	Bone	Fibula fragment	0	No
	<i>ZH1440</i>	<i>Tooth</i>	<i>Lower left canine (3.3)</i>	<i>0</i>	<i>Yes</i>
	ZH1457	Calculus	Calculus from lower left canine (3.3)	0	No
14	ZH1443	Bone	Left fibula	0	no
16	<i>ZH1444</i>	<i>Bone</i>	<i>Left fibula</i>	<i>0</i>	<i>Yes</i>
19	<i>ZH1046</i>	<i>Tooth</i>	<i>Upper left lateral incisor (2.2)</i>	<i>0</i>	<i>Yes</i>
51	ZH1438	Tooth	Upper right central incisor (1.1)	0	No
61	<i>ZH1051</i>	<i>Bone</i>	<i>Vomer fragment</i>	<i>0</i>	<i>Yes</i>
	ZH1589	Tooth	Upper right central incisor (1.1)	0	No
63	<i>ZH1047</i>	<i>Tooth</i>	<i>Upper right canine (1.3)</i>	<i>0</i>	<i>Yes</i>
	ZH1588	Bone	Right fifth metacarpal	0	No
	<i>ZH1632</i>	<i>Tooth</i>	<i>Lower right central incisor (4.1)</i>	<i>0</i>	<i>Yes</i>
	ZH1633	Calculus	Calculus from lower right central incisor (4.1)	0	No
	<i>ZH1634</i>	<i>Tooth</i>	<i>Upper left second premolar (2.5)</i>	<i>0</i>	<i>Yes</i>
83	ZH1044	Bone	Left distal femur	0	No
129	ZH1050	Bone	Right frontal process	0	No
	ZH1434	Tooth	Upper left central incisor (2.1)	0	No
	ZH1435	Bone	Right interproximal hand phalanx	0	No
	ZH1586	Tooth	Upper right central incisor (1.1)	0	No

UIN	Zurich sample number	Sample type	Sampled element	Sample weight	Positive/ whole genome
	ZH1587	Bone	Left interproximal hand phalanx	0	No
131	ZH1032	Tooth	Lower right canine (4.3)	0	No
	ZH1072	Calculus	Calculus from lower right canine (4.3)	0	No
	ZH1585	Bone	Right distal fibula fragment	0	Yes
148	ZH1620	Tooth	Lower right central incisor (4.1)	0	No
	ZH1621	Calculus	Calculus from lower right central incisor (4.1)	0	No
156	ZH1623	Tooth	Lower right lateral incisor (4.2)	0	Yes
	ZH1624	Calculus	Calculus from lower right lateral incisor (4.2)	0	No
	ZH1625	Bone	Inferior nasal concha fragment	0	No
167	ZH1042	Tooth	Upper left central incisor (2.1)	0	Yes
	ZH1071	Calculus	Calculus from upper left central incisor (2.1)	0	No
205	ZH1736	Bone	Right inferior nasal concha fragment	64,9	No
206	ZH1744	Tooth	Upper left first premolar (2.4)	60,9	No
207	ZH1747	Tooth	Upper right canine (1.3)	64,6	Yes
208	ZH1745	Tooth	Upper right central incisor (1.1)	60,6	No
209	ZH1759	Tooth	Upper right second premolar (1.4)	51,5	No
211	ZH1746	Tooth	Lower right canine (4.3)	50,5	No
218	ZH1733	Tooth	Intermediate hand phalanx	57,7	No
219	ZH1757	Tooth	Upper right central incisor (1.1)	56,8	No
220	ZH1760	Tooth	Upper right lateral incisor (1.2)	75,3	Yes
223	ZH1758	Tooth	Upper left canine (2.3)	81,2	No
224	ZH1741	Tooth	Upper right central incisor (1.1)	95,7	Yes
225	ZH1754	Tooth	Upper left central incisor (2.1)	55,8	No
226	ZH1743	Tooth	Upper right central incisor (1.1)	59,3	No
227	ZH1749	Tooth	Upper right central incisor (1.1)	56,3	Yes
228	ZH1748	Tooth	Upper right central incisor (1.1)	58,9	No
229	ZH1756	Tooth	Upper right lateral incisor (1.2)	59,2	Yes
230	ZH1742	Tooth	Upper right canine (1.3)	54	No
231	ZH1751	Tooth	Upper right central incisor (1.1)	51,7	No
232	ZH1752	Tooth	Upper right central incisor (1.1)	56,4	No
233	ZH1740	Tooth	Lower left canine (3.3)	53,7	Yes
	ZH1753	Tooth	Upper left canine (2.3)	0	Yes
234	ZH1734	Bone	Right frontal process	64,4	No
235	ZH1750	Tooth	Upper left central incisor (2.1)	92,5	No
237	ZH1764	Tooth	Upper right second premolar (1.5)	51,4	No

UIN	Zurich sample number	Sample type	Sampled element	Sample weight	Positive/ whole genome
238	ZH1765	Tooth	Upper left second premolar (2.5)	50	No
239	ZH1761	Bone	Nasal concha fragment	76,5	No
240	ZH1762	Bone	Nasal concha fragment	81,1	No
244	ZH1766	Tooth	Upper right second premolar (1.5)	66,1	No
246	ZH1763	Tooth	Upper right second molar (1.7) isotope sample	53,4	No
246	ZH1767	Bone	Nasal concha fragment	58,3	No
247	ZH1768	Tooth	Upper right second premolar (1.5)	42,7	No
248	ZH1769	Tooth	Upper right second premolar (1.5)	61,5	No
249	ZH1755	Tooth	Upper right central incisor (1.1)	58,5	No
250	ZH1770	Tooth	Upper left second premolar (2.5)	54,5	No
251	ZH1771	Tooth	Upper right second premolar (1.5)	55,2	No
253	ZH1772	Tooth	Deciduous upper right second molar (55)	54,3	No
301	ZH1637	Tooth	Upper right central incisor (1.1)	0	Yes
	ZH1638	Calculus	Calculus of upper right central incisor (1.1)	0	No
302	ZH1616	Tooth	Upper left central incisor (2.1)	0	No
303	ZH1617	Tooth	Upper right central incisor (1.1)	0	No
304	ZH1635	Tooth	Upper right central incisor (1.1)	0	Yes
	ZH1636	Calculus	Calculus of upper right central incisor (1.1)	0	No
305	ZH1626	Bone	Interproximal phalanx, unsided	0	No
	ZH1627	Bone	Left fifth metatarsal	0	No
	ZH1628	Bone	Left first metatarsal	0	No
306	ZH1622	Tooth	Upper right central incisor (1.1)	0	Yes
357	ZH1036	Tooth	Upper left canine (2.3)	63	Yes
	ZH1073	Calculus	Calculus from upper left canine (2.3)	20	No
	ZH1579	Bone	Right fifth metatarsal	78	No
367	ZH1039	Tooth	Upper left central incisor (2.1)	51	No
	ZH1577	Bone	Left third metacarpal	84	No
370	ZH1035	Tooth	Upper right central incisor (1.1)	55	No
	ZH1574	Bone	Left fifth metatarsal	140	No
371	ZH1037	Tooth	Upper right central incisor (1.1)	55	No
	ZH1053	Bone	Interproximal foot phalanx	50	No
379	ZH1033	Tooth	Upper left canine (2.3)	55	No
	ZH1573	Bone	Proximal foot phalanx, unsided	71	No

UIN	Zurich sample number	Sample type	Sampled element	Sample weight	Positive/ whole genome
387	ZH1034	Tooth	Upper left central incisor (2.1)	72	Yes
	ZH1580	Bone	Distal hand phalanx (unsided)	55	No
388	ZH1040	Bone	Ethmoid fragment	105	No
	ZH1576	Tooth	Upper left central incisor (2.1)	48	No
394	ZH1052	Bone	Fragment of nasal aperture (left)	90	No
	ZH1581	Bone	Distal hand phalanx (unsided)	63	No
401	ZH1041	Tooth	Upper right central incisor (1.1)	54	Yes
401	ZH1578	Bone	Left fifth metacarpals	74	No
408	ZH1038	Tooth	Upper left lateral incisor (2.2) (old notes say tooth 1.1)	45	No
	ZH1575	Bone	Right distal fibular epiphysis	112	No
424	ZH1629	Tooth	Upper left central incisor (2.1)	60	No
	ZH1630	Bone	Proximal hand phalanx, unsided	56	No
	ZH1631	Bone	Thoracic vertebrae 6	92	No
	ZH1649	Calculus	Calculus from upper left central incisor (2.1)	12	No

A. 4.4. Differences and similarities in health and disease

A. 4.4.1. Early life stress and health

A. 4.4.1.1. Stature data

AT 68. Overview of long bone measurements, and stature estimates and standard deviations for the entire project collection. Several non-adults are included in the table to display measurements of their growth progress, but these measurements are not used for stature estimation. For individuals from JTN, EHC and CPA final stature estimates were copied from skeletal reports and original long bone measurements were not available. All measurements and estimates are in cm. Final sex code: NA=non-adult; U=unobservable; F=Female; PF=Probable female; I=Indeterminate; PM=Probable male; M=Male.

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
1	NA	IAS	Skeleton	-	21.70	22.90	-	-	-	-	-	-
2	M	IBF	Skeleton	-	-	-	-	36.20	35.00	34.60	164.510	3.29
3	U	IAS	Skeleton	31.60	-	25.60	-	-	-	-	-	-
4	PF	IAS	Skeleton	30.90	24.70	25.70	-	-	-	34.90	161.867	3.57
13	PF	MHW	Skeleton	-	-	26.00	-	-	-	-	168.780	4.30
14	I	MHW	Skeleton	-	24.90	-	-	37.60	38.20	-	-	-
18	U	MHW	Skeleton	30.60	-	24.00	-	-	-	-	-	-
53	U	MSL	Loose bone	-	-	-	44.10	-	-	-	-	-
54	U	MSL	Loose bone	-	24.20	-	-	-	-	-	-	-
66	NA	MSL	Skeleton	21.70	15.90	-	-	-	-	-	-	-

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
68	U	MSL	Loose bone	-	-	-	44.20	-	-	-	-	-
69	U	MSL	Loose bone	-	-	-	45.00	-	-	-	-	-
70	U	MSL	Loose bone	-	-	25.15	-	-	-	-	-	-
77	U	MSL	Loose bone	27.40	-	-	-	-	-	-	-	-
83	NA	MSL	Skeleton	6.61	-	6.10	-	-	-	-	-	-
88	U	MSL	Loose bone	-	24.50	-	-	-	-	-	-	-
123	U	MSL	Skeleton	-	-	-	-	35.40	36.10	-	-	-
129	M	MSL	Skeleton	30.60	25.40	27.40	-	-	-	-	164.698	4.05
131	U	MSL	Skeleton	-	-	-	44.70	35.40	34.50	35.30	-	-
139	U	MSL	Skeleton	-	-	-	-	35.30	37.60	-	-	-
148	M	MSL	Skeleton	33.30	-	-	-	-	-	-	173.014	4.05
151	U	MSL	Skeleton	-	-	-	-	-	-	35.00	-	-
175	F	EHC	Skeleton	-	-	-	-	-	-	-	172.279	0.00
176	M	CPA	Skeleton	-	-	-	-	-	-	-	174.460	0.00
177	F	JTN	Skeleton	-	-	-	-	-	-	-	151.912	3.72
178	PM	JTN	Skeleton	-	-	-	-	-	-	-	176.912	4.32
181	M	JTN	Skeleton	-	-	-	-	-	-	-	171.710	2.99

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
182	M	JTN	Skeleton	-	-	-	-	-	-	-	166.380	2.99
185	F	JTN	Skeleton	-	-	-	-	-	-	-	154.004	3.55
186	M	JTN	Skeleton	-	-	-	-	-	-	-	160.656	3.27
188	PM	JTN	Skeleton	-	-	-	-	-	-	-	171.813	4.05
189	PM	JTN	Skeleton	-	-	-	-	-	-	-	171.813	4.05
192	PM	JTN	Skeleton	-	-	-	-	-	-	-	172.816	3.29
197	PF	JTN	Skeleton	-	-	-	-	-	-	-	157.810	3.66
199	PM	JTN	Skeleton	-	-	-	-	-	-	-	154.592	3.29
201	F	CHI	Skeleton	28.95	22.35	23.90	41.95	33.10	33.50	32.20	156.370	3.51
202	M	CHI	Skeleton	29.30	-	-	-	-	-	-	160.694	4.05
205	F	MMF	Skeleton	-	-	-	39.90	-	-	-	152.653	3.72
206	F	MMF	Skeleton	-	-	-	40.00	-	-	-	152.900	3.72
207	PM	MMF	Skeleton	-	-	-	45.00	-	-	-	168.510	3.27
208	M	MMF	Skeleton	34.00	-	-	-	-	-	-	175.170	4.05
209	F	MMF	Skeleton	-	22.80	-	-	-	-	-	163.002	4.24
211	F	BSA	Skeleton	-	-	-	-	-	-	-	154.300	0.00
218	F	BSA	Skeleton	-	-	-	-	-	-	-	160.600	0.00

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
219	F	BSA	Skeleton	-	-	-	-	-	-	-	152.200	0.00
220	F	BSA	Skeleton	-	-	-	-	-	-	-	157.300	0.00
222	M	BSA	Skeleton	-	-	-	-	-	-	-	168.400	0.00
223	F	JTN	Skeleton	-	-	-	-	-	-	-	160.384	3.72
225	F	JTN	Skeleton	-	-	-	-	-	-	-	158.334	3.72
226	M	JTN	Skeleton	-	-	-	-	-	-	-	165.496	4.32
229	PF	JTN	Skeleton	-	-	-	-	-	-	-	162.300	3.55
230	M	JTN	Skeleton	-	-	-	-	-	-	-	175.519	2.99
231	PF	JTN	Skeleton	-	-	-	-	-	-	-	168.014	3.55
232	PM	JTN	Skeleton	-	-	-	-	-	-	-	169.700	3.27
234	F	IBF	Skeleton	-	-	23.55	41.25	-	31.70	-	154.696	3.55
235	M	IBF	Skeleton	35.40	27.50	29.25	48.75	-	38.90	-	177.235	2.99
236	M	IBF	Skeleton	32.35	24.20	26.20	45.30	-	36.50	-	169.630	2.99
237	M	HCH	Skeleton	34.00	26.00	28.00	45.80	37.70	38.30	37.30	172.620	2.99
238	F	HCH	Skeleton	33.00	23.50	-	45.00	38.00	38.50	-	168.250	3.51
239	M	HCH	Skeleton	-	23.90	26.85	45.00	-	-	-	168.510	3.27
241	PF	HCH	Skeleton	-	-	26.40	-	-	-	-	170.488	4.30

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
242	M	HCH	Skeleton	-	22.51	25.45	-	-	-	-	164.098	4.32
244	M	HCH	Skeleton	-	-	-	-	34.10	34.95	34.35	163.838	3.29
246	M	HCH	Skeleton	34.50	25.00	26.95	46.30	-	-	-	171.604	3.27
247	PM	RFN	Skeleton	33.50	25.80	27.50	46.10	-	-	-	171.128	3.27
248	M	RFN	Skeleton	35.10	-	-	47.10	37.80	38.50	-	174.570	2.99
249	PM	SGB	Skeleton	34.30	-	-	-	-	-	-	176.094	4.05
250	PM	SGB	Skeleton	-	-	-	45.10	-	-	-	168.748	3.27
251	PM	SGB	Skeleton	-	-	-	47.75	-	-	-	175.055	3.27
252	M	ECK	Skeleton	-	-	-	-	37.50	38.70	-	176.144	3.37
256	F	JTN	Skeleton	-	-	-	-	-	-	-	162.030	3.55
257	M	JTN	Skeleton	-	-	-	-	-	-	-	158.100	3.55
258	F	JTN	Skeleton	-	-	-	-	-	-	-	159.408	4.45
260	PF	JTN	Skeleton	-	-	-	-	-	-	-	174.378	4.24
261	F	JTN	Skeleton	-	-	-	-	-	-	-	160.010	3.55
264	F	JTN	Skeleton	-	-	-	-	-	-	-	156.013	4.30
265	PM	JTN	Skeleton	-	-	-	-	-	-	-	170.499	3.37
266	PM	JTN	Skeleton	-	-	-	-	-	-	-	171.104	3.37

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
267	F	JTN	Skeleton	-	-	-	-	-	-	-	158.736	4.24
272	PF	JTN	Skeleton	-	-	-	-	-	-	-	164.314	4.45
281	PM	JTN	Skeleton	-	-	-	-	-	-	-	171.910	3.37
282	F	JTN	Skeleton	-	-	-	-	-	-	-	150.417	4.24
283	F	JTN	Skeleton	-	-	-	-	-	-	-	150.598	3.55
285	F	JTN	Skeleton	-	-	-	-	-	-	-	152.209	3.55
286	F	JTN	Skeleton	-	-	-	-	-	-	-	154.308	3.57
287	PF	JTN	Skeleton	-	-	-	-	-	-	-	160.606	3.72
289	PM	JTN	Skeleton	-	-	-	-	-	-	-	173.032	3.27
291	PM	JTN	Skeleton	-	-	-	-	-	-	-	179.180	4.32
295	F	JTN	Skeleton	-	-	-	-	-	-	-	167.708	4.45
299	PM	JTN	Skeleton	-	-	-	-	-	-	-	167.022	3.37
300	NA	WPY	Skeleton	-	-	-	31.60	-	-	-	-	-
303	PF	RAF3	Skeleton	-	-	24.29	-	-	-	-	161.478	4.30
304	NA	RAF3	Skeleton	30.00	23.30	25.20	41.60	-	35.40	-	-	-
305	PM	RAF2	Skeleton	33.50	25.50	28.00	-	37.10	38.10	36.20	168.796	3.29
308	M	MMW	Skeleton	33.00	24.10	26.10	42.25	36.95	-	-	161.965	3.27

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
309	M	MMW	Skeleton	31.05	23.05	24.90	43.25	34.05	-	-	164.345	3.27
310	M	MMW	Skeleton	32.55	23.15	25.00	45.00	36.30	-	-	168.510	3.27
312	M	MMW	Skeleton	30.20	22.55	25.00	41.85	34.40	-	-	161.013	3.27
313	PM	MMW	Skeleton	30.20	21.70	-	42.60	34.25	-	-	162.798	3.27
314	M	MMW	Skeleton	33.60	24.70	26.70	45.95	36.10	-	-	170.771	3.27
315	NA	MMW	Skeleton	21.30	15.50	17.60	30.65	24.55	-	23.40	-	-
316	M	MMW	Skeleton	32.95	25.85	27.60	45.45	37.20	-	-	169.581	3.27
318	U	MMW	Skeleton	32.50	-	-	-	-	-	-	-	-
319	M	MMW	Skeleton	33.10	24.60	-	45.60	36.95	-	-	169.938	3.27
320	NA	MMW	Skeleton	-	-	-	21.10	16.80	-	-	-	-
321	PF	MMW	Skeleton	31.55	22.45	23.80	43.15	34.90	-	-	161.564	3.51
322	M	MMW	Skeleton	36.50	27.10	29.30	49.40	42.20	-	-	178.982	3.27
323	M	MMW	Skeleton	34.10	25.70	27.20	46.50	39.00	-	-	172.080	3.27
324	F	MMW	Skeleton	28.60	21.00	22.85	40.35	33.90	-	-	155.195	3.51
325	PM	MMW	Skeleton	29.40	21.90	23.50	42.00	32.90	-	-	161.370	3.27
326	PM	MMW	Skeleton	33.60	23.60	25.40	45.30	35.60	-	-	169.224	3.27
327	F	MMW	Skeleton	31.50	22.15	24.10	41.10	34.65	-	-	158.845	3.51

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
328	PF	MMW	Skeleton	30.40	22.45	24.45	43.50	35.05	-	-	161.387	3.51
329	U	MMW	Skeleton	-	-	-	-	33.70	33.70	-	-	-
330	M	MMW	Skeleton	30.10	22.80	24.60	43.10	35.40	-	-	163.988	3.27
331	F	MMW	Skeleton	29.65	21.75	24.00	41.70	35.15	-	-	158.901	3.51
332	M	MMW	Skeleton	31.60	23.90	25.40	45.30	37.90	-	-	169.224	3.27
333	M	MMW	Skeleton	29.00	21.10	23.10	40.95	33.30	-	-	158.871	3.27
334	PM	MMW	Skeleton	32.65	24.50	26.45	44.65	36.35	-	-	167.677	3.27
335	NA	MMW	Skeleton	26.05	19.05	21.60	36.55	-	-	29.00	-	-
336	M	MMW	Skeleton	34.35	25.10	27.00	47.45	38.65	-	-	174.341	3.27
338	F	MMW	Skeleton	33.45	25.20	27.35	45.85	38.75	-	-	170.404	3.51
339	U	MMW	Skeleton	32.30	-	-	-	-	-	38.00	-	-
340	U	MMW	Skeleton	31.00	-	-	-	-	-	-	-	-
341	M	MMW	Skeleton	32.95	24.95	-	47.40	-	-	-	174.222	3.27
342	NA	MMW	Skeleton	6.99	5.52	6.34	7.98	6.96	-	-	-	-
343	I	MMW	Skeleton	29.20	20.85	22.60	40.65	33.20	-	-	-	-
345	PF	MMW	Skeleton	29.75	21.80	23.60	43.15	35.05	-	-	160.548	3.51
346	M	MMW	Skeleton	32.70	23.95	25.40	46.55	36.60	-	-	172.199	3.27

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
347	M	MMW	Skeleton	31.30	24.90	27.00	44.25	38.50	-	-	166.725	3.27
348	NA	MMW	Skeleton	23.90	18.10	19.80	33.30	26.25	-	-	-	-
349	M	MMW	Skeleton	33.10	25.25	27.80	47.10	39.35	-	-	173.508	3.27
350	F	MMW	Skeleton	30.25	21.70	23.75	41.10	33.45	-	-	156.640	3.51
352	NA	MMW	Skeleton	28.65	19.50	21.50	37.55	29.50	-	28.20	-	-
353	M	MMW	Skeleton	28.50	21.20	23.40	42.70	35.20	-	-	163.036	3.27
354	PM	MMW	Skeleton	34.10	24.30	25.80	48.25	38.15	-	-	176.245	3.27
355	M	MMW	Skeleton	32.35	24.80	27.10	44.50	36.20	-	-	167.320	3.27
356	M	MMW	Skeleton	32.00	23.10	24.90	44.55	35.35	-	-	167.439	3.27
357	M	MMW	Skeleton	34.55	25.30	-	47.90	38.20	-	-	175.412	3.27
358	NA	MMW	Skeleton	7.22	5.65	6.32	-	-	-	-	-	-
359	NA	MMW	Skeleton	24.60	17.65	19.75	34.65	27.85	-	27.15	-	-
360	M	MMW	Skeleton	28.75	22.05	24.15	40.25	33.10	-	-	157.205	3.27
361	NA	MMW	Skeleton	24.80	18.50	20.55	34.45	27.35	-	-	-	-
362	M	MMW	Skeleton	32.55	24.20	26.05	45.25	36.35	-	-	169.105	3.27
363	NA	MMW	Skeleton	27.35	18.80	20.75	39.00	32.70	-	-	-	-
364	M	JTN	Skeleton	-	-	-	-	-	-	-	172.100	4.32

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
365	NA	MMW	Skeleton	-	-	-	-	12.32	-	-	-	-
366	F	MMW	Skeleton	31.60	22.30	12.87	-	-	-	-	160.632	4.24
367	PF	MMW	Skeleton	30.75	-	25.35	42.60	34.55	34.55	-	159.990	3.51
368	NA	MMW	Skeleton	-	16.40	18.30	-	-	-	23.10	-	-
369	M	MMW	Skeleton	-	22.95	-	43.35	34.10	-	-	164.583	3.27
370	F	MMW	Skeleton	30.10	21.70	22.80	-	-	-	-	157.788	4.24
371	F	MMW	Skeleton	-	-	-	46.30	-	-	35.10	162.453	3.57
372	M	MMW	Skeleton	34.10	26.30	27.50	45.10	38.10	-	36.70	168.748	3.27
374	M	MMW	Skeleton	31.80	23.95	25.15	44.60	37.90	-	36.10	167.558	3.27
375	M	MMW	Skeleton	-	-	-	45.90	35.30	-	34.30	170.652	3.27
376	NA	MMW	Skeleton	23.20	16.50	18.10	31.95	25.90	-	25.45	-	-
377	NA	MMW	Skeleton	16.10	11.13	12.57	20.50	15.95	16.00	-	-	-
378	M	MMW	Skeleton	31.55	23.10	25.40	43.20	35.50	-	34.45	164.226	3.27
379	M	MMW	Skeleton	32.45	24.00	25.75	44.60	35.95	-	-	167.558	3.27
380	M	MMW	Skeleton	34.15	25.50	27.55	46.00	-	39.30	38.65	174.180	2.99
381	M	MMW	Skeleton	-	25.20	27.20	47.10	38.40	-	-	173.508	3.27
382	NA	MMW	Skeleton	-	-	6.23	-	-	-	-	-	-

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
383	NA	MMW	Skeleton	9.99	7.52	-	12.67	9.92	-	-	-	-
384	F	MMW	Skeleton	30.85	23.30	25.00	45.90	37.50	-	-	167.309	3.51
385	NA	MMW	Skeleton	14.10	10.34	11.21	18.15	14.75	-	14.50	-	-
386	M	MMW	Skeleton	-	-	-	44.90	37.55	-	35.60	168.272	3.27
387	PM	MMW	Skeleton	32.70	24.05	25.60	45.40	36.60	36.10	-	169.240	2.99
388	M	MMW	Skeleton	33.50	24.70	26.60	46.10	39.05	-	-	171.128	3.27
389	F	MMW	Skeleton	29.70	21.65	23.05	42.40	33.30	-	31.85	157.625	3.51
390	M	MMW	Skeleton	35.30	-	27.40	47.40	37.75	-	36.80	174.222	3.27
391	PM	MMW	Skeleton	28.35	21.05	23.40	40.50	34.05	-	32.35	157.800	3.27
392	M	MMW	Skeleton	35.30	27.00	29.10	51.50	-	-	-	183.980	3.27
393	NA	MMW	Skeleton	28.50	-	-	-	34.55	-	-	-	-
394	M	MMW	Skeleton	32.55	23.75	25.95	44.00	35.80	34.70	-	165.600	2.99
395	PF	MMW	Skeleton	29.30	20.90	234.00	-	33.20	32.60	-	156.070	3.66
396	NA	MMW	Skeleton	-	-	-	-	7.21	-	6.92	-	-
397	NA	MMW	Skeleton	21.65	15.90	17.50	29.20	22.60	-	21.70	-	-
398	PF	MMW	Skeleton	30.10	20.40	22.45	39.70	-	-	-	152.159	3.72
399	F	MMW	Skeleton	30.95	24.45	26.10	44.70	37.35	-	35.90	165.799	3.51

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
400	NA	MMW	Skeleton	-	-	-	21.40	17.60	-	17.30	-	-
401	M	MMW	Skeleton	31.30	22.90	24.95	45.25	36.45	-	-	169.105	3.27
402	F	MMW	Skeleton	31.20	22.80	24.75	40.25	33.65	-	32.90	156.502	3.51
403	M	MMW	Skeleton	31.95	24.85	26.90	44.90	37.40	-	35.10	168.272	3.27
404	F	MMW	Skeleton	-	-	-	37.20	31.55	-	30.25	148.243	3.57
405	M	MMW	Skeleton	31.80	22.80	24.50	-	36.30	-	-	168.394	4.05
406	M	MMW	Skeleton	31.20	23.00	25.80	-	-	-	-	166.546	4.05
407	PF	MMW	Skeleton	31.05	23.25	-	-	-	-	-	165.135	4.24
408	NA	MMW	skeleton	23.20	17.50	19.60	32.80	27.20	-	25.70	-	-
409	NA	MMW	Skeleton	-	7.51	8.34	-	-	-	-	-	-
410	NA	MMW	Skeleton	16.10	-	-	-	16.50	-	-	-	-
411	M	MMW	Skeleton	33.10	25.30	27.60	46.90	37.30	-	36.40	173.032	3.27
412	M	MMW	Skeleton	-	-	-	45.50	36.10	-	-	169.700	3.27
413	M	MMW	Skeleton	33.70	24.00	-	44.85	36.40	-	-	168.153	3.27
414	PF	MMW	Skeleton	31.50	22.65	24.30	42.50	34.65	-	33.10	160.483	3.51
415	NA	MMW	Skeleton	-	10.82	-	-	-	-	-	-	-
417	NA	MMW	Skeleton	23.90	16.60	18.60	33.20	26.00	-	25.20	-	-

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418	F	MMW	Skeleton	32.25	23.40	24.70	43.40	35.35	-	35.00	162.836	3.51
420	M	MMW	Skeleton	34.70	25.25	27.10	48.35	37.90	-	-	176.483	3.27
421	PM	MMW	Skeleton	34.60	24.10	25.20	48.80	-	-	-	177.554	3.27
423	F	MMW	Skeleton	30.45	22.20	24.35	41.60	33.75	-	-	157.702	3.51
424	M	MMW	Skeleton	32.40	24.30	27.20	47.20	39.00	-	-	173.746	3.27
426	NA	MMW	Skeleton	-	6.24	6.86	-	-	-	-	-	-
427	NA	MMW	Skeleton	-	5.27	-	7.77	6.48	-	-	-	-
431	NA	MMW	Skeleton	28.10	18.90	21.00	37.60	31.95	-	-	-	-
432	U	MMW	Skeleton	-	-	-	-	-	35.70	-	-	-
433	PM	MMW	Skeleton	30.20	23.10	-	45.85	34.50	-	-	170.533	3.27
434	M	MMW	Skeleton	33.50	24.10	26.20	45.45	-	35.80	-	168.915	2.99
440	PM	JTN	Skeleton	-	-	-	-	-	-	-	163.015	3.37
443	PM	JTN	Skeleton	-	-	-	-	-	-	-	167.615	2.99
444	M	JTN	Skeleton	-	-	-	-	-	-	-	172.604	3.27
449	M	JTN	Skeleton	-	-	-	-	-	-	-	179.790	4.05
451	F	JTN	Skeleton	-	-	-	-	-	-	-	159.428	3.55
456	F	JTN	Skeleton	-	-	-	-	-	-	-	162.212	3.72

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469	M	JTN	Skeleton	-	-	-	-	-	-	-	173.111	3.29
471	F	JTN	Skeleton	-	-	-	-	-	-	-	171.404	3.55
472	PF	JTN	Skeleton	-	-	-	-	-	-	-	156.788	4.45
474	PM	JTN	Skeleton	-	-	-	-	-	-	-	176.094	4.05
476	PM	JTN	Skeleton	-	-	-	-	-	-	-	171.860	3.37
477	PM	JTN	Skeleton	-	-	-	-	-	-	-	165.899	2.99
481	F	JTN	Skeleton	-	-	-	-	-	-	-	162.508	3.66
482	PF	JTN	Skeleton	-	-	-	-	-	-	-	153.394	3.72
483	F	JTN	Skeleton	-	-	-	-	-	-	-	170.314	3.72
484	F	JTN	Skeleton	-	-	-	-	-	-	-	150.405	3.72
492	F	JTN	Skeleton	-	-	-	-	-	-	-	144.104	3.55
494	F	JTN	Skeleton	-	-	-	-	-	-	-	163.713	4.24
498	F	JTN	Skeleton	-	-	-	-	-	-	-	154.611	3.55
499	F	JTN	Skeleton	-	-	-	-	-	-	-	158.615	3.57
501	PF	JTN	Skeleton	-	-	-	-	-	-	-	154.513	3.57
502	F	JTN	Skeleton	-	-	-	-	-	-	-	175.498	3.55
511	F	JTN	Skeleton	-	-	-	-	-	-	-	160.042	3.55

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
512	PF	JTN	Skeleton	-	-	-	-	-	-	-	159.106	4.45
515	PF	JTN	Skeleton	-	-	-	-	-	-	-	160.130	3.66
518	F	JTN	Skeleton	-	-	-	-	-	-	-	150.208	3.72
521	PM	JTN	Skeleton	-	-	-	-	-	-	-	178.714	3.37
528	F	JTN	Skeleton	-	-	-	-	-	-	-	156.605	3.72
532	PM	JTN	Skeleton	-	-	-	-	-	-	-	177.820	2.99
533	M	JTN	Skeleton	-	-	-	-	-	-	-	167.602	2.99
535	F	JTN	Skeleton	-	-	-	-	-	-	-	165.396	4.24
536	F	JTN	Skeleton	-	-	-	-	-	-	-	153.122	3.72
538	F	JTN	Skeleton	-	-	-	-	-	-	-	160.230	3.55
547	M	JTN	Skeleton	-	-	-	-	-	-	-	173.140	2.99
548	M	JTN	Skeleton	-	-	-	-	-	-	-	156.903	2.99
549	PF	JTN	Skeleton	-	-	-	-	-	-	-	156.418	4.45
551	F	JTN	Skeleton	-	-	-	-	-	-	-	159.010	3.55
553	F	JTN	Skeleton	-	-	-	-	-	-	-	155.518	3.72
554	F	JTN	Skeleton	-	-	-	-	-	-	-	160.114	4.45
555	F	JTN	Skeleton	-	-	-	-	-	-	-	164.818	4.45

<i>UIN</i>	<i>Final sex</i>	<i>Site</i>	<i>Skeleton/ Loose Bone</i>	<i>XLH</i>	<i>XLR</i>	<i>XLU</i>	<i>XLF</i>	<i>LCT</i>	<i>XLT</i>	<i>XLG</i>	<i>Final stature estimate</i>	<i>SD</i>
557	PF	JTN	Skeleton	-	-	-	-	-	-	-	158.703	4.45
558	PM	JTN	Skeleton	-	-	-	-	-	-	-	170.020	3.37
562	PF	JTN	Skeleton	-	-	-	-	-	-	-	160.606	3.72
563	PF	JTN	Skeleton	-	-	-	-	-	-	-	165.930	3.66

A. 4.4.1.1.1. Variation within stature

AT 69. Descriptive statistics and normality test for stature estimates for the supplemented dataset, categorised by time period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov/Shapiro-Wilk ^a		
	sex	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	W	df	<i>p</i>
Roman	Female	12	157.903	158.327	2.879	153.829	163.461	0.424	-0.248	0.957	12	0.733
	Male	19	169.593	169.022	3.00	163.750	173.551	-0.189	-1.131	0.934	19	0.203
Early medieval	Female	23	163.152	162.399	4.965	152.200	172.279	0.413	-0.086	0.965	23	0.577
	Male	21	174..027	173.984	4.449	161.418	180.648	-01.093	2.121	0.925	21	0.112
Early-high medieval	Female	79	160.040	160.042	6.035	144.104	175.498	0.261	0.245	0.088	79	0.200*
	Male	104	171.726	171.836	5.9627	154.592	184.468	-0.239	0.272	0.060	104	0.200*
High medieval	Female	23	159.748	159.789	4.860	148.243	170.404	-0.050	0.849	0.982	23	0.931
	Male	55	169.069	169.105	5.285	157.205	183.980	0.053	0,497	0.098	55	0.200*
High-Late medieval	Female	96	161.134	161.473	5.906	146.591	174.626	-0.137	-0.108	0.042	96	0.200*
	Male	143	170.808	170.414	4.876	159.109	184.575	0.089	-0.172	0.049	143	0.200*
Post medieval	Female	11	163.518	162.163	7.877	147.960	174.883	-0.290	0.179	0.955	11	0.704
	Male	13	168.029	167.796	4.351	161.727	176.602	0.406	-0.275	0.968	13	0.874

a. Lilliefors significance correction

* This is a lower bound of the true significance

AT 70. Homogeneity and Kruskal-Wallis/ANOVA results for the supplemented dataset, categorised by time period.

	sex	Levene's test			Kruskal-Wallis/ANOVA					
		F	df	<i>p</i>	χ^2/F	df	<i>p</i>	η^2	ε^2	ω^2
Stature per period	Female	1.694	5	0.137	2.348	5	0.042	0.047	0.027	0.005
	Male	1.790	5	0.114	4.487	5	0.0006	0.060	0.047	0.010

AT 71. Tukey HSD and Bonferroni results of stature comparison between time periods for all females. Rows in *curse* show significant results.

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Roman	Early medieval	-5.249619	2.055288	.113	-11.15464	.65540
		Early-high medieval	-2.137432	1.788174	.839	-7.27501	3.00015
		High medieval	-1.845178	2.055288	.947	-7.75020	4.05984
		High-late medieval	-3.231549	1.767172	.449	-8.30879	1.84569
		Post medieval	-5.615292	2.409185	.186	-12.53709	1.30650
	Early medieval	Roman	5.249619	2.055288	.113	-.65540	11.15464
		Early-high medieval	3.112187	1.367464	.208	-.81665	7.04103
		High medieval	3.404441	1.701940	.345	-1.48538	8.29426
		High-late medieval	2.018070	1.339884	.661	-1.83153	5.86767
		Post medieval	-.365673	2.115789	1.000	-6.44452	5.71317
	Early-high medieval	Roman	2.137432	1.788174	.839	-3.00015	7.27501
		Early medieval	-3.112187	1.367464	.208	-7.04103	.81665
		High medieval	.292254	1.367464	1.000	-3.63659	4.22110

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		High-late medieval	-1.094117	.876724	.813	-3.61302	1.42479
		Post medieval	-3.477860	1.857396	.422	-8.81432	1.85860
	High medieval	Roman	1.845178	2.055288	.947	-4.05984	7.75020
		Early medieval	-3.404441	1.701940	.345	-8.29426	1.48538
		Early-high medieval	-.292254	1.367464	1.000	-4.22110	3.63659
		High-late medieval	-1.386371	1.339884	.906	-5.23597	2.46323
		Post medieval	-3.770115	2.115789	.479	-9.84896	2.30873
	High-late medieval	Roman	3.231549	1.767172	.449	-1.84569	8.30879
		Early medieval	-2.018070	1.339884	.661	-5.86767	1.83153
		Early-high medieval	1.094117	.876724	.813	-1.42479	3.61302
		High medieval	1.386371	1.339884	.906	-2.46323	5.23597
		Post medieval	-2.383744	1.837186	.786	-7.66214	2.89465
	Post medieval	Roman	5.615292	2.409185	.186	-1.30650	12.53709
		Early medieval	.365673	2.115789	1.000	-5.71317	6.44452
		Early-high medieval	3.477860	1.857396	.422	-1.85860	8.81432
		High medieval	3.770115	2.115789	.479	-2.30873	9.84896
		High-late medieval	2.383744	1.837186	.786	-2.89465	7.66214
Bonferroni	Roman	Early medieval	-5.249619	2.055288	.169	-11.34380	.84456
		Early-high medieval	-2.137432	1.788174	1.000	-7.43959	3.16472
		High medieval	-1.845178	2.055288	1.000	-7.93936	4.24901

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		High-late medieval	-3.231549	1.767172	1.000	-8.47143	2.00834
		Post medieval	-5.615292	2.409185	.309	-12.75882	1.52824
	Early medieval	Roman	5.249619	2.055288	.169	-.84456	11.34380
		Early-high medieval	3.112187	1.367464	.356	-.94251	7.16689
		High medieval	3.404441	1.701940	.699	-1.64202	8.45090
		High-late medieval	2.018070	1.339884	1.000	-1.95485	5.99099
		Post medieval	-.365673	2.115789	1.000	-6.63925	5.90790
	Early-high medieval	Roman	2.137432	1.788174	1.000	-3.16472	7.43959
		Early medieval	-3.112187	1.367464	.356	-7.16689	.94251
		High medieval	.292254	1.367464	1.000	-3.76245	4.34695
		High-late medieval	-1.094117	.876724	1.000	-3.69371	1.50548
		Post medieval	-3.477860	1.857396	.936	-8.98527	2.02955
	High medieval	Roman	1.845178	2.055288	1.000	-4.24901	7.93936
		Early medieval	-3.404441	1.701940	.699	-8.45090	1.64202
		Early-high medieval	-.292254	1.367464	1.000	-4.34695	3.76245
		High-late medieval	-1.386371	1.339884	1.000	-5.35929	2.58655
		Post medieval	-3.770115	2.115789	1.000	-10.04369	2.50346
	High-late medieval	Roman	3.231549	1.767172	1.000	-2.00834	8.47143
		Early medieval	-2.018070	1.339884	1.000	-5.99099	1.95485
		Early-high medieval	1.094117	.876724	1.000	-1.50548	3.69371

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		High medieval	1.386371	1.339884	1.000	-2.58655	5.35929
		Post medieval	-2.383744	1.837186	1.000	-7.83123	3.06374
	Post medieval	Roman	5.615292	2.409185	.309	-1.52824	12.75882
		Early medieval	.365673	2.115789	1.000	-5.90790	6.63925
		Early-high medieval	3.477860	1.857396	.936	-2.02955	8.98527
		High medieval	3.770115	2.115789	1.000	-2.50346	10.04369
		High-late medieval	2.383744	1.837186	1.000	-3.06374	7.83123

AT 72. Tukey HSD and Bonferroni results of stature comparison between time periods for all males. Rows in *cursive* show significant results.

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Roman	Early medieval	-4.433305	1.637219	.076	-9.12496	.25835
		Early-high medieval	-2.132595	1.290097	.564	-5.82953	1.56434
		High medieval	.524583	1.376008	.999	-3.41854	4.46771
		High-late medieval	-1.215121	1.262629	.929	-4.83334	2.40310
		Post medieval	1.564748	1.861186	.960	-3.76871	6.89821
	<i>Early medieval</i>	Roman	4.433305	1.637219	.076	-.25835	9.12496
		Early-high medieval	2.300710	1.237063	.429	-1.24425	5.84567
		<i>High medieval</i>	<i>4.957889</i>	<i>1.326414</i>	<i>.003</i>	<i>1.15688</i>	<i>8.75889</i>
		High-late medieval	3.218185	1.208391	.085	-.24461	6.68098

(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
	<i>Post medieval</i>	<i>5.998053</i>	<i>1.824825</i>	<i>.014</i>	<i>.76879</i>	<i>11.22732</i>
<i>Early-high medieval</i>	Roman	2.132595	1.290097	.564	-1.56434	5.82953
	Early medieval	-2.300710	1.237063	.429	-5.84567	1.24425
	<i>High medieval</i>	<i>2.657179</i>	<i>.862112</i>	<i>.027</i>	<i>.18669</i>	<i>5.12767</i>
	High-late medieval	.917475	.666388	.741	-.99214	2.82709
	Post medieval	3.697343	1.521135	.149	-.66166	8.05635
<i>High medieval</i>	Roman	-.524583	1.376008	.999	-4.46771	3.41854
	<i>Early medieval</i>	<i>-4.957889</i>	<i>1.326414</i>	<i>.003</i>	<i>-8.75889</i>	<i>-1.15688</i>
	<i>Early-high medieval</i>	<i>-2.657179</i>	<i>.862112</i>	<i>.027</i>	<i>-5.12767</i>	<i>-.18669</i>
	High-late medieval	-1.739704	.820439	.279	-4.09078	.61137
	Post medieval	1.040164	1.594647	.987	-3.52950	5.60983
High-late medieval	Roman	1.215121	1.262629	.929	-2.40310	4.83334
	Early medieval	-3.218185	1.208391	.085	-6.68098	.24461
	Early-high medieval	-.917475	.666388	.741	-2.82709	.99214
	High medieval	1.739704	.820439	.279	-.61137	4.09078
	Post medieval	2.779868	1.497910	.431	-1.51258	7.07232
<i>Post medieval</i>	Roman	-1.564748	1.861186	.960	-6.89821	3.76871
	<i>Early medieval</i>	<i>-5.998053</i>	<i>1.824825</i>	<i>.014</i>	<i>-11.22732</i>	<i>-.76879</i>
	Early-high medieval	-3.697343	1.521135	.149	-8.05635	.66166
	High medieval	-1.040164	1.594647	.987	-5.60983	3.52950

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	Roman	High-late medieval	-2.779868	1.497910	.431	-7.07232	1.51258
		Early medieval	-4.433305	1.637219	.107	-9.27218	.40557
		Early-high medieval	-2.132595	1.290097	1.000	-5.94554	1.68034
		High medieval	.524583	1.376008	1.000	-3.54227	4.59144
		High-late medieval	-1.215121	1.262629	1.000	-4.94688	2.51664
		Post medieval	1.564748	1.861186	1.000	-3.93607	7.06557
	<i>Early medieval</i>	Roman	4.433305	1.637219	.107	-.40557	9.27218
		Early-high medieval	2.300710	1.237063	.956	-1.35549	5.95691
		<i>High medieval</i>	<i>4.957889</i>	<i>1.326414</i>	<i>.003</i>	<i>1.03761</i>	<i>8.87817</i>
		High-late medieval	3.218185	1.208391	.121	-.35327	6.78964
		<i>Post medieval</i>	<i>5.998053</i>	<i>1.824825</i>	<i>.017</i>	<i>.60470</i>	<i>11.39141</i>
	<i>Early-high medieval</i>	Roman	2.132595	1.290097	1.000	-1.68034	5.94554
		Early medieval	-2.300710	1.237063	.956	-5.95691	1.35549
		<i>High medieval</i>	<i>2.657179*</i>	<i>.862112</i>	<i>.033</i>	<i>.10917</i>	<i>5.20519</i>
		High-late medieval	.917475	.666388	1.000	-1.05206	2.88701
		Post medieval	3.697343	1.521135	.234	-.79844	8.19313
	<i>High medieval</i>	Roman	-.524583	1.376008	1.000	-4.59144	3.54227
		<i>Early medieval</i>	<i>-4.957889</i>	<i>1.326414</i>	<i>.003</i>	<i>-8.87817</i>	<i>-1.03761</i>
		<i>Early-high medieval</i>	<i>-2.657179</i>	<i>.862112</i>	<i>.033</i>	<i>-5.20519</i>	<i>-.10917</i>
		High-late medieval	-1.739704	.820439	.520	-4.16455	.68514

	(I) Period	(J) Period	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		Post medieval	1.040164	1.594647	1.000	-3.67289	5.75322
	High-late medieval	Roman	1.215121	1.262629	1.000	-2.51664	4.94688
		Early medieval	-3.218185	1.208391	.121	-6.78964	.35327
		Early-high medieval	-.917475	.666388	1.000	-2.88701	1.05206
		High medieval	1.739704	.820439	.520	-.68514	4.16455
		Post medieval	2.779868	1.497910	.965	-1.64727	7.20701
	Post medieval	Roman	-1.564748	1.861186	1.000	-7.06557	3.93607
		<i>Early medieval</i>	<i>-5.998053</i>	<i>1.824825</i>	<i>.017</i>	<i>-11.39141</i>	<i>-.60470</i>
		Early-high medieval	-3.697343	1.521135	.234	-8.19313	.79844
		High medieval	-1.040164	1.594647	1.000	-5.75322	3.67289
		High-late medieval	-2.779868	1.497910	.965	-7.20701	1.64727

A. 4.4.1.1.2. Stature and HD

AT 73. Descriptive statistics and normality test for stature estimates for the supplemented dataset for the different HD diagnosis levels. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	sex	Descriptive statistics								Kolmogorov-Smirnov/Shapiro-Wilk ^a		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	W	df	<i>p</i>
No HD	Female	184	161.056	160.979	5.810	144.104	175.498	0.003	0.183	0.044	184	0.200*
	Male	276	171.222	170.961	5.234	156.903	184.575	0.101	-0.027	0.034	279	0.200*
Possible HD	Female	20	158.373	158.262	7.019	148.243	174.378	0.649	0.100	0.947	20	0.321
	Male	22	166.940	167.558	4.638	157.800	178.982	0.239	1.382	0.956	22	0.411
Probable HD	Female	9	162.525	161.387	6.418	154.696	172.279	0.412	-1.355	0.916	9	0.361
	Male	26	169.666	169.410	4.533	157.205	177.820	-0.572	0.952	0.973	26	0.690
Pathognomonic HD	Female	18	159.922	160.246	4.242	152.200	167.309	-0.207	-0.431	0.975	18	0.889
	Male	21	171.111	173.032	4.868	160.694	177.235	-0.814	-0.141	0.902	21	0.039

*This is a lower bound of the true significance

a. Lilliefors Significance corrections

AT 74. Homogeneity and Kruskal-Wallis results for the supplemented dataset for the different diagnosis levels.

	sex	Levene's test			Kruskal-Wallis/ANOVA					
		F	df	<i>p</i>	χ^2/F	df	<i>p</i>	η^2	ε^2	ω^2
Stature per site type	Female	1.185	3	0.316	1.665	3	0.175	0.022	0.009	0.003
	Male	0.779	3	0.507	5.221	3	0.002	0.044	0.036	0.012

AT 75. Tukey HSD and Bonferroni results of stature comparison between HD certainty/severity levels for all males. Rows in *cursive* show significant results.

	(I) HDlevel	(J) HDlevel	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	<i>No HD</i>	<i>Possible HD</i>	<i>4.282016</i>	<i>1.136458</i>	<i>.001</i>	<i>1.34797</i>	<i>7.21606</i>
		Probable HD	1.555278	1.052382	.452	-1.16170	4.27226
		Pathognomonic HD	.109809	1.161248	1.000	-2.88824	3.10785
	<i>Possible HD</i>	<i>No HD</i>	<i>-4.282016</i>	<i>1.136458</i>	<i>.001</i>	<i>-7.21606</i>	<i>-1.34797</i>
		Probable HD	-2.726738	1.486051	.259	-6.56334	1.10987
		<i>Pathognomonic HD</i>	<i>-4.172207</i>	<i>1.565036</i>	<i>.040</i>	<i>-8.21273</i>	<i>-.13169</i>
	Probable HD	No HD	-1.555278	1.052382	.452	-4.27226	1.16170
		Possible HD	2.726738	1.486051	.259	-1.10987	6.56334
		Pathognomonic HD	-1.445470	1.505094	.772	-5.33124	2.44030
	<i>Pathognomonic HD</i>	No HD	<i>-.109809</i>	<i>1.161248</i>	<i>1.000</i>	<i>-3.10785</i>	<i>2.88824</i>
		<i>Possible HD</i>	<i>4.172207</i>	<i>1.565036</i>	<i>.040</i>	<i>.13169</i>	<i>8.21273</i>
		Probable HD	1.445470	1.505094	.772	-2.44030	5.33124
Bonferroni	<i>No HD</i>	<i>Possible HD</i>	<i>4.282016</i>	<i>1.136458</i>	<i>.001</i>	<i>1.26615</i>	<i>7.29788</i>
		Probable HD	1.555278	1.052382	.842	-1.23747	4.34803
		Pathognomonic HD	.109809	1.161248	1.000	-2.97184	3.19146
	<i>Possible HD</i>	<i>No HD</i>	<i>-4.282016*</i>	<i>1.136458</i>	<i>.001</i>	<i>-7.29788</i>	<i>-1.26615</i>
		Probable HD	-2.726738	1.486051	.404	-6.67033	1.21685
		<i>Pathognomonic HD</i>	<i>-4.172207</i>	<i>1.565036</i>	<i>.048</i>	<i>-8.32540</i>	<i>-.01901</i>
	Probable HD	No HD	-1.555278	1.052382	.842	-4.34803	1.23747
		Possible HD	2.726738	1.486051	.404	-1.21685	6.67033

	(I) HDlevel	(J) HDlevel	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		Pathognomonic HD	-1.445470	1.505094	1.000	-5.43960	2.54866
		No HD	-.109809	1.161248	1.000	-3.19146	2.97184
	<i>Pathognomonic HD</i>	<i>Possible HD</i>	<i>4.172207</i>	<i>1.565036</i>	<i>.048</i>	<i>.01901</i>	<i>8.32540</i>
		Probable HD	1.445470	1.505094	1.000	-2.54866	5.43960

A. 4.4.1.1.3 Stature and leprosaria

AT 76. Descriptive statistics and normality test for stature estimates for the supplemented dataset, categorised by the different site types. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	sex	Descriptive statistics								Kolmogorov-Smirnov/Shapiro-Wilk ^a		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	W	df	<i>p</i>
Monastery/friary	Female	4	163.479	162.893	2.935	160.794	167.39	.0852	-0.699	0.932	4	0.609
	Male	37	171.993	170.652	4.759	163.512	181.362	0.279	-0.878	0.961	37	0.220
Leprosarium	Female	78	159.415	159.257	5.891	144.104	175.498	0.321	0.516	0.984	78	0.427
	Male	91	169.444	169.581	5.601	154.592	183.980	-0.292	0.253	0.078	91	0.200*
Hospital	Female	41	19.697	159.682	5.756	146.591	169.562	-0.369	-0.336	0.965	41	0.236
	Male	50	169.739	169.046	4.383	160.894	177.078	-0.036	-0.912	0.093	50	0.200*
Other	Female	121	161.954	161.67	5.706	147.960	174.883	0.113	-0.179	0.065	121	0.200*
	Male	177	171.610	171.723	5.308	159.109	184.575	0.096	-0.070	0.032	177	0.200*

*This is a lower bound of the true significance

a. Lilliefors Significance corrections

AT 77. Homogeneity and Kruskal-Wallis results for the supplemented dataset, categorised by the different site types per sex.

	sex	Levene's test			Kruskal-Wallis/ANOVA					
		F	df	<i>p</i>	χ^2/F	df	<i>p</i>	η^2	ε^2	ω^2
Stature per site type	Female	0.486	3	0.692	3.930	3	0.009	0.047	0.035	0.012
	Male	0.476	3	.0699	4.808	3	0.003	0.039	0.031	0.011

AT 78. Tukey HSD and Bonferroni results of stature comparison between site types for all females. Rows in *cursive* show significant results.

	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Monestary/Friary	Leprosarium	4.065013	2.946772	.513	-3.55864	11.68867
		Hospital	3.782564	3.010934	.592	-4.00709	11.57221
		Other	1.525157	2.921119	.954	-6.03213	9.08244
	<i>Leprosarium</i>	Monestary/Friary	-4.065013	2.946772	.513	-11.68867	3.55864
		Hospital	-.282449	1.108795	.994	-3.15104	2.58614
		<i>Other</i>	<i>-2.539856</i>	<i>.834648</i>	<i>.014</i>	<i>-4.69919</i>	<i>-.38052</i>
	Hospital	Monestary/Friary	-3.782564	3.010934	.592	-11.57221	4.00709
		Leprosarium	.282449	1.108795	.994	-2.58614	3.15104
		Other	-2.257407	1.038699	.134	-4.94465	.42983
	<i>Other</i>	Monestary/Friary	-1.525157	2.921119	.954	-9.08244	6.03213
		<i>Leprosarium</i>	<i>2.539856</i>	<i>.834648</i>	<i>.014</i>	<i>.38052</i>	<i>4.69919</i>
		Hospital	2.257407	1.038699	.134	-.42983	4.94465
Bonferroni	Monestary/Friary	Leprosarium	4.065013	2.946772	1.000	-3.77430	11.90433
		Hospital	3.782564	3.010934	1.000	-4.22744	11.79257
		Other	1.525157	2.921119	1.000	-6.24591	9.29622
	<i>Leprosarium</i>	Monestary/Friary	-4.065013	2.946772	1.000	-11.90433	3.77430
		Hospital	-.282449	1.108795	1.000	-3.23218	2.66728
		<i>Other</i>	<i>-2.539856</i>	<i>.834648</i>	<i>.016</i>	<i>-4.76027</i>	<i>-.31944</i>
	Hospital	Monestary/Friary	-3.782564	3.010934	1.000	-11.79257	4.22744
		Leprosarium	.282449	1.108795	1.000	-2.66728	3.23218

	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		Other	-2.257407	1.038699	.184	-5.02066	.50585
	<i>Other</i>	Monestary/Friary	-1.525157	2.921119	1.000	-9.29622	6.24591
		<i>Leprosarium</i>	<i>2.539856</i>	<i>.834648</i>	<i>.016</i>	<i>.31944</i>	<i>4.76027</i>
		Hospital	2.257407	1.038699	.184	-.50585	5.02066

AT 79. Tukey HSD and Bonferroni results of stature comparison between site types for all males. Rows in *cursive* show significant results.

	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Monestary/Friary	Leprosarium	2.548824	1.016454	.060	-.07503	5.17268
		Hospital	2.254532	1.130520	.192	-.66377	5.17283
		Other	.383091	.942375	.977	-2.04954	2.81572
	<i>Leprosarium</i>	Monestary/Friary	-2.548824	1.016454	.060	-5.17268	.07503
		Hospital	-.294292	.917716	.989	-2.66327	2.07468
		<i>Other</i>	<i>-2.165733</i>	<i>.672457</i>	<i>.008</i>	<i>-3.90160</i>	<i>-.42987</i>
	Hospital	Monestary/Friary	-2.254532	1.130520	.192	-5.17283	.66377
		Leprosarium	.294292	.917716	.989	-2.07468	2.66327
		Other	-1.871441	.834922	.114	-4.02669	.28381
	<i>Other</i>	Monestary/Friary	-.383091	.942375	.977	-2.81572	2.04954
		<i>Leprosarium</i>	<i>2.165733</i>	<i>.672457</i>	<i>.008</i>	<i>.42987</i>	<i>3.90160</i>
		Hospital	1.871441	.834922	.114	-.28381	4.02669

	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	Monestary/Friary	Leprosarium	2.548824	1.016454	.076	-.14813	5.24578
		Hospital	2.254532	1.130520	.281	-.74507	5.25414
		Other	.383091	.942375	1.000	-2.11731	2.88349
	<i>Leprosarium</i>	Monestary/Friary	-2.548824	1.016454	.076	-5.24578	.14813
		Hospital	-.294292	.917716	1.000	-2.72926	2.14068
		<i>Other</i>	-2.165733	.672457	.008	-3.94996	-.38151
	Hospital	Monestary/Friary	-2.254532	1.130520	.281	-5.25414	.74507
		Leprosarium	.294292	.917716	1.000	-2.14068	2.72926
		Other	-1.871441	.834922	.154	-4.08674	.34385
	<i>Other</i>	Monestary/Friary	-.383091	.942375	1.000	-2.88349	2.11731
		<i>Leprosarium</i>	2.165733	.672457	.008	.38151	3.94996
		Hospital	1.871441	.834922	.154	-.34385	4.08674

AT 80. Descriptive statistics and normality test for stature estimates for the supplemented dataset, categorised by leprosaria. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	sex	Descriptive statistics								Kolmogorov-Smirnov/Shapiro-Wilk ^a		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	W	df	<i>p</i>
MMW	Female	23	159.748	159.990	4.860	148.243	170.404	-0.050	0.849	0.982	23	0.931
	Male	55	169.069	169.105	5.285	157.205	183.980	0.053	0.497	0.098	55	0.200*
JTN	Female	50	159.339	159.153	6.353	144.104	175.498	0.386	0.513	0.977	50	0.419
	Male	33	170.138	171.813	6.263	154.592	179.790	-0.783	0.391	0.938	33	0.058
MHW	Female	1	168.780	-	-	-	-	-	-	-	-	-
	Male	0	-	-	-	-	-	-	-	-	-	-
BSA	Female	4	156.100	155.800	3.658	152.200	160.600	0.377	-1.323	0.980	4	0.902
	Male	1	168.400	-	-	-	-	-	-	-	-	-
MSL	Female	0	-	-	-	-	-	-	-	-	-	-
	Male	2	168.856	168.856	5.880	164.698	173.014	-	-	-	-	-

*This is a lower bound of the true significance

a. Lilliefors Significance corrections

AT 81. Homogeneity and Kruskal-Wallis results for the supplemented dataset, categorised by leprosaria.

	sex	Levene's test			Kruskal-Wallis/ANOVA					
		F	df	<i>p</i>	χ^2/F	df	<i>p</i>	η^2	ε^2	ω^2
Stature per site type	Female	0.953	2	0.390	1.307	3	0.278	0.050	0.012	0.004
	Male	0.556	2	0.575	0.263	3	0.852	0.009	-0.025	-0.008

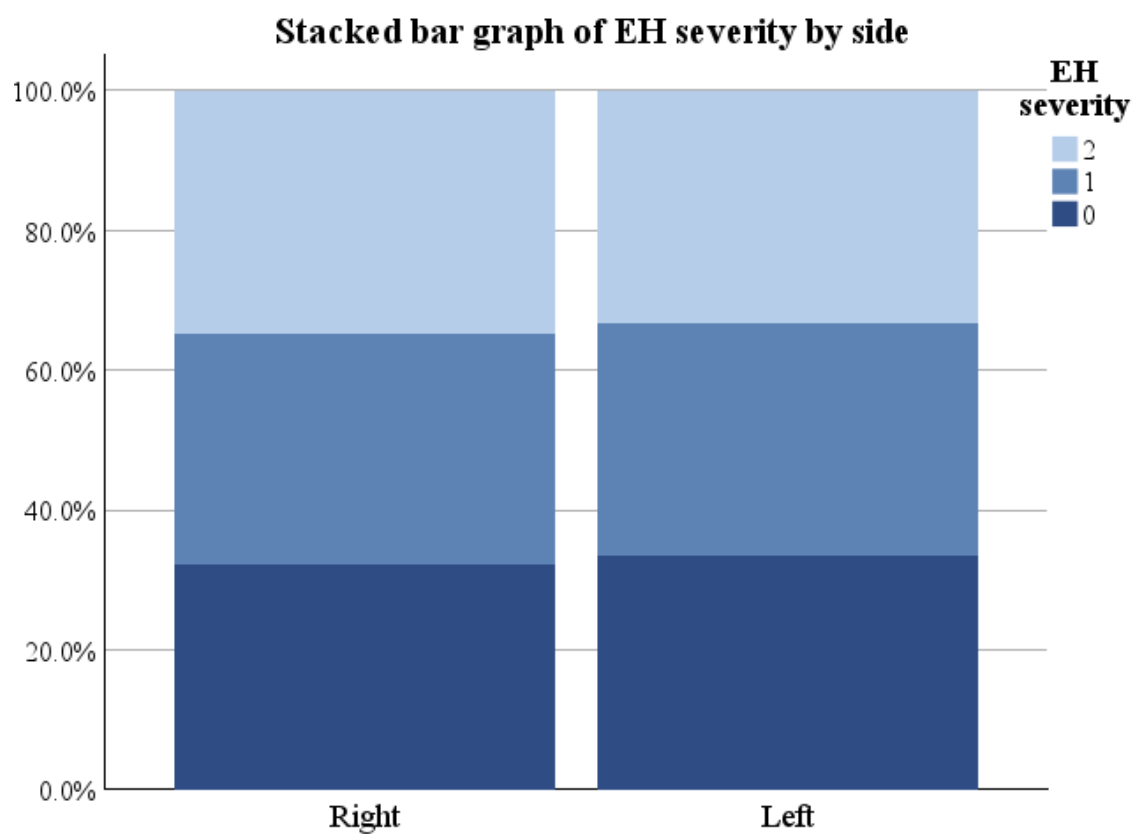
S. 4.4.1.2. Enamel hypoplasia

To test whether there are any differences in EH by left and right and/or between tooth type, the teeth are subdivided into a number of new variables (side, quadrant, tooth type and tooth type by side). Analysing the dentition by side shows no visual difference (AF 56 and AF 57). This is confirmed by Chi square which shows no statistically significant difference between side of dentition and EH severity ($n=4009$; $\chi^2=1.075$, $df=2$, $p=0.584$, $\phi_c=0.016$), side of dentition and number of EH defects ($n=3996$; $\chi^2=11.894$, $df=16$, $p=0.751$, $\phi_c=0.055$).

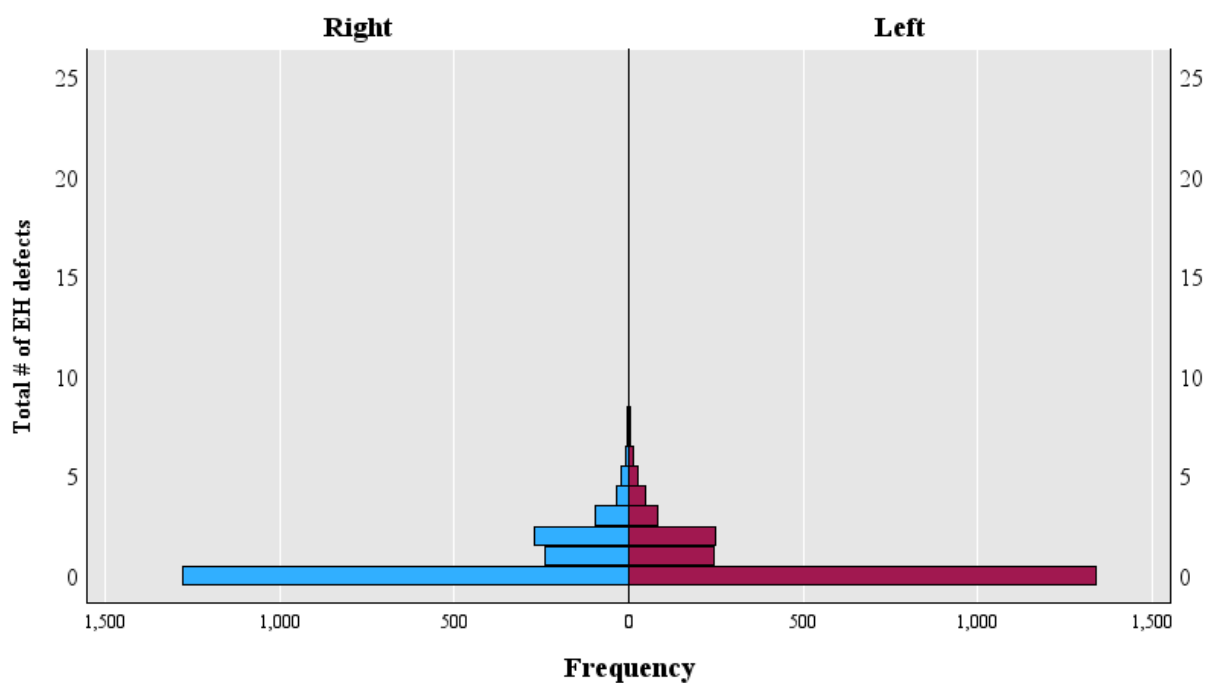
Analysing the dentition per quadrant, shows minor visual difference AF 58 and AF 59). This is confirmed by a Chi square which shows no statistically significant difference between quadrant and EH severity ($n=4009$; $\chi^2=12.208$, $df=6$, $p=0.057$, $\phi_c=0.039$). The statistical difference in the number of EH defects per tooth ($n=3996$; $\chi^2=71.339$, $df=48$, $p=0.016$, $\phi_c=0.077$) lies most notably in the lower number of cases without EH defects in the upper right quadrant.

Assessing the dentition per tooth type shows some visual differences (AF 60 and AF 61). This is confirmed by a Chi square, which shows a statistical difference tooth types for both EH severity ($n=3996$; $\chi^2=337.407$, $df=48$, $p=4.0513E-45$, $\phi_c=0.168$) and the number of EH defects per tooth ($n=4009$; $\chi^2=119.878$, $df=6$, $p=1.7289E-23$, $\phi_c=0.122$). The difference for number of EH defects appears to lie mostly with the molars, which have the highest count of no EH, followed by the premolars, incisors and canines, respectively. For EH severity this pattern is similar, with the highest number of severe EH scores lying among the canines, followed by the premolars, molars and incisors.

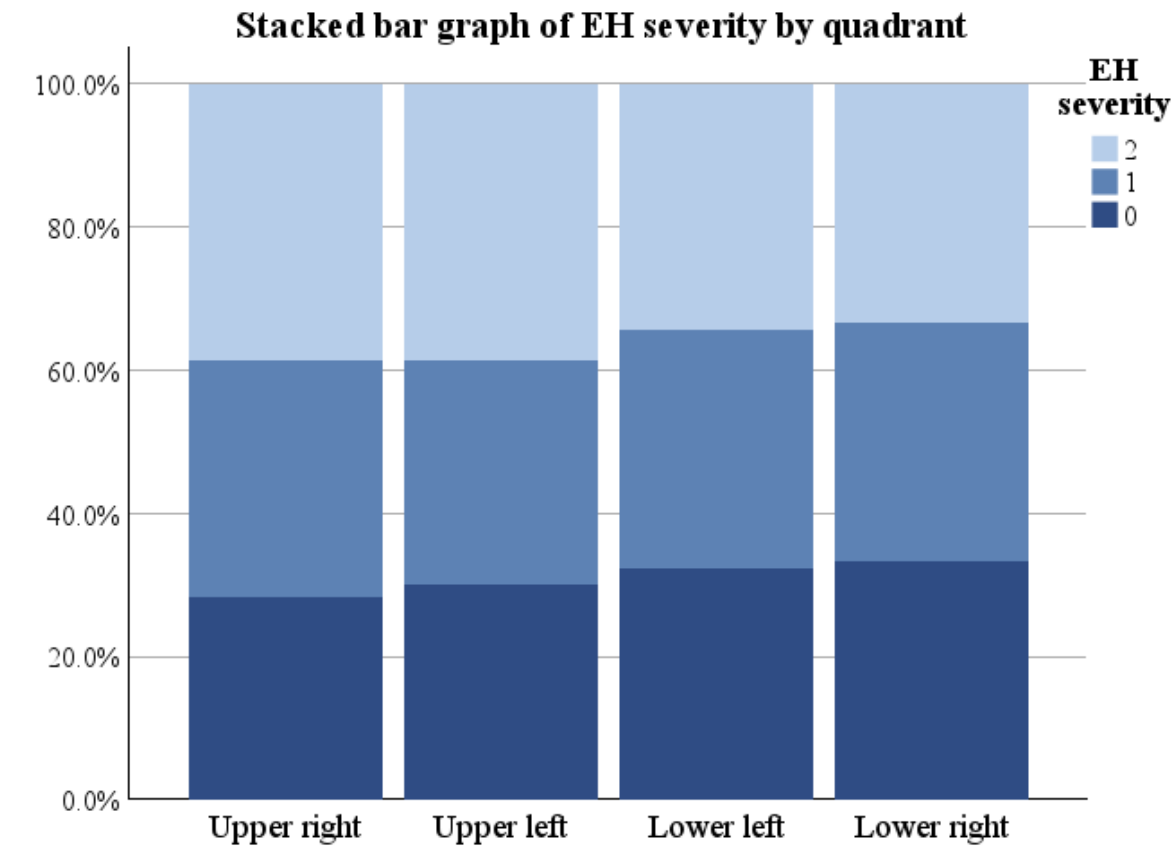
Assessing the dentition per tooth type and side combined shows several differences. Most notably, the number of EH lesions do not appear to be dependent on size, even accounting for tooth type (AF 62). A Chi square however does show a statistical difference ($n=3996$; $\chi^2=413.643$, $df=112$, $p=3.6801E-36$, $\phi_c=0.122$). Severity of lesions appears to differ slightly by side, though it is not consistent which side has a higher count of more severe EH lesions (AF 63), which is also significantly different (Chi square: $n=3996$; $\chi^2=122.861$, $df=14$, $p=1.7289E-19$, $\phi_c=0.124$). A visual evaluation of the count-expected count cross tabulation for both EH scores shows that the difference identified here further highlights that molars appear to least often have EH lesions (AT 82 and AT 83). This pattern is most likely explained by natural mastication processes, in which the molars and premolars play the largest role and are therefore most susceptible to surface wear that makes EH less observable.



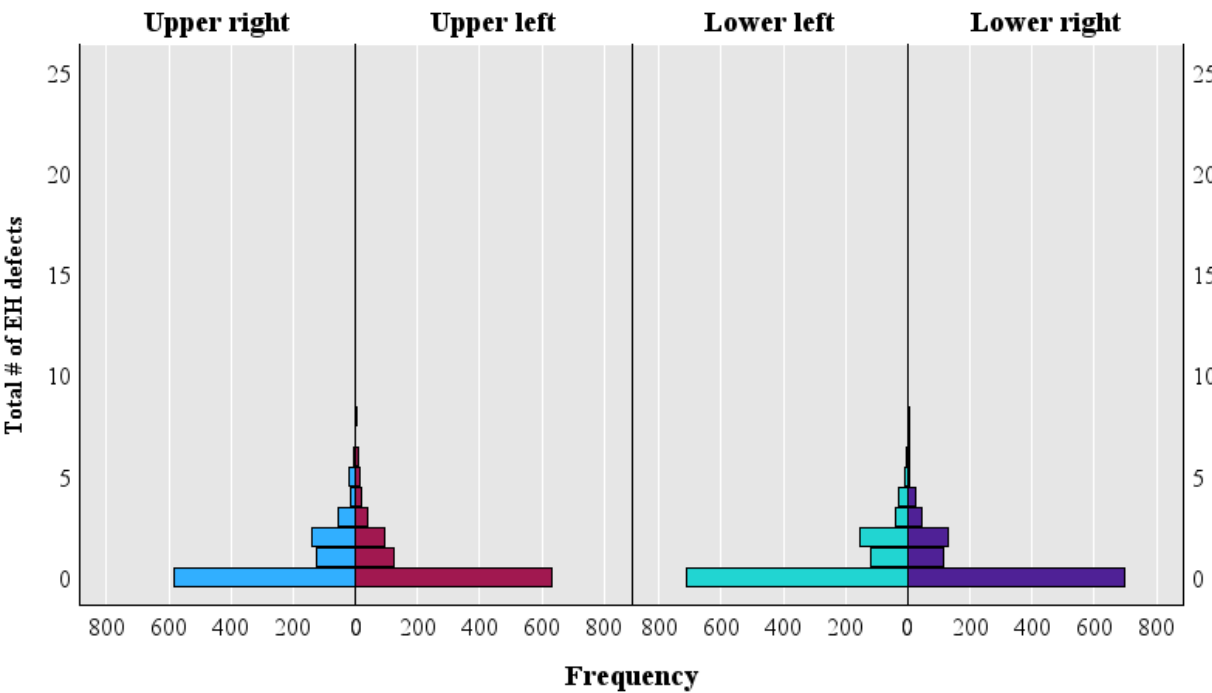
AF 56. Stacked bar graph of EH severity scores per tooth categorised by right ($n=1980$) and left ($n=2029$) side of the dentition.



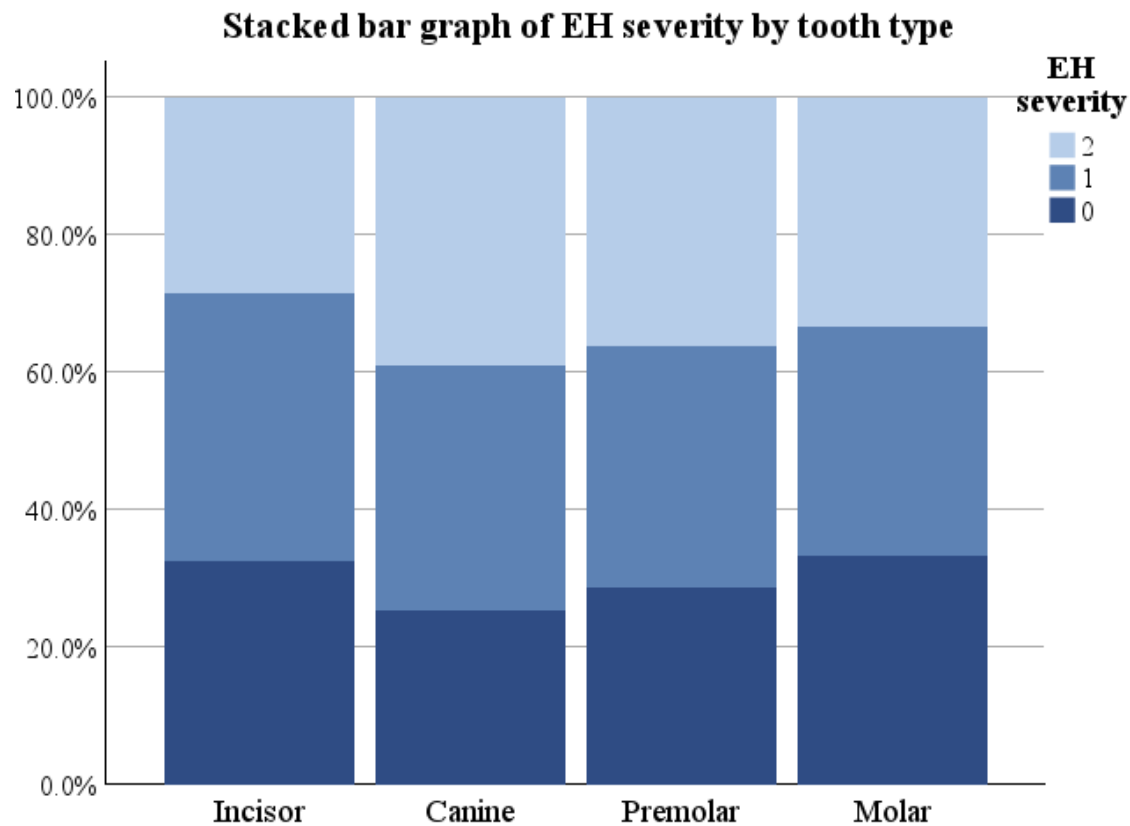
AF 57. Population pyramid graph of the total number of EH defects per tooth categorised by right ($n=1972$) and left ($n=2024$) side of the dentition.



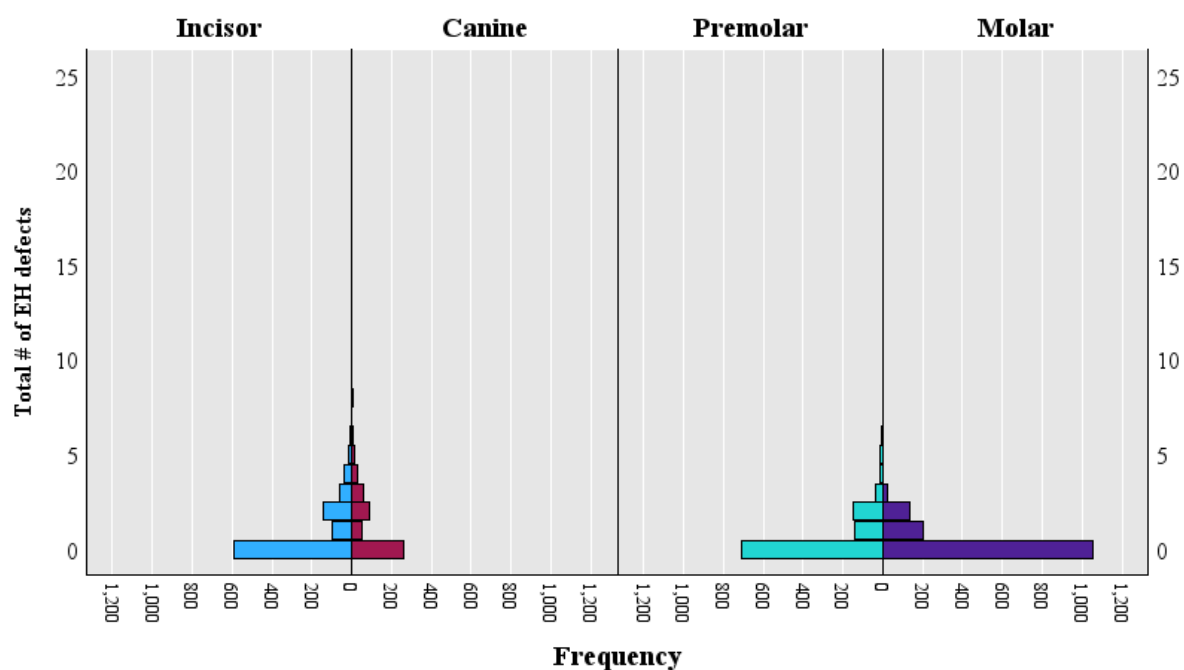
AF 58. Stacked bar graph of EH severity scores per tooth categorised by quadrant (upper right $n=939$, upper left $n=944$, lower left $n=1079$, lower right $n=1033$)



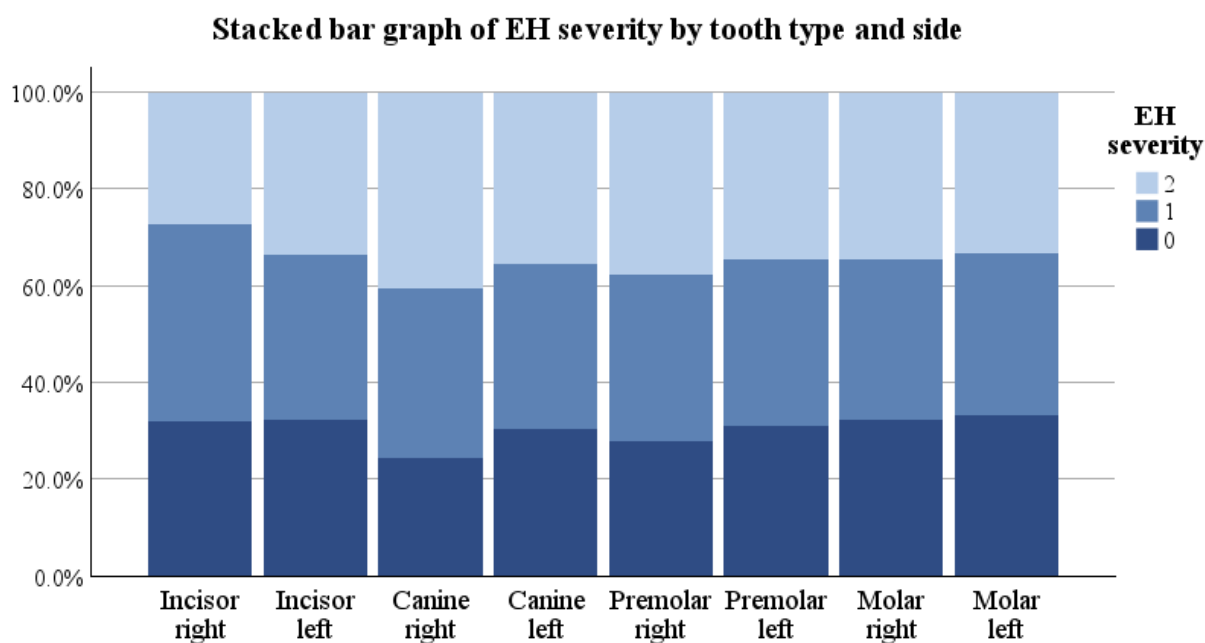
AF 59. Population pyramid graph of the total number of EH defects per tooth categorised by quadrant (upper right $n=939$, upper left $n=944$, lower left $n=1079$, lower right $n=1033$).



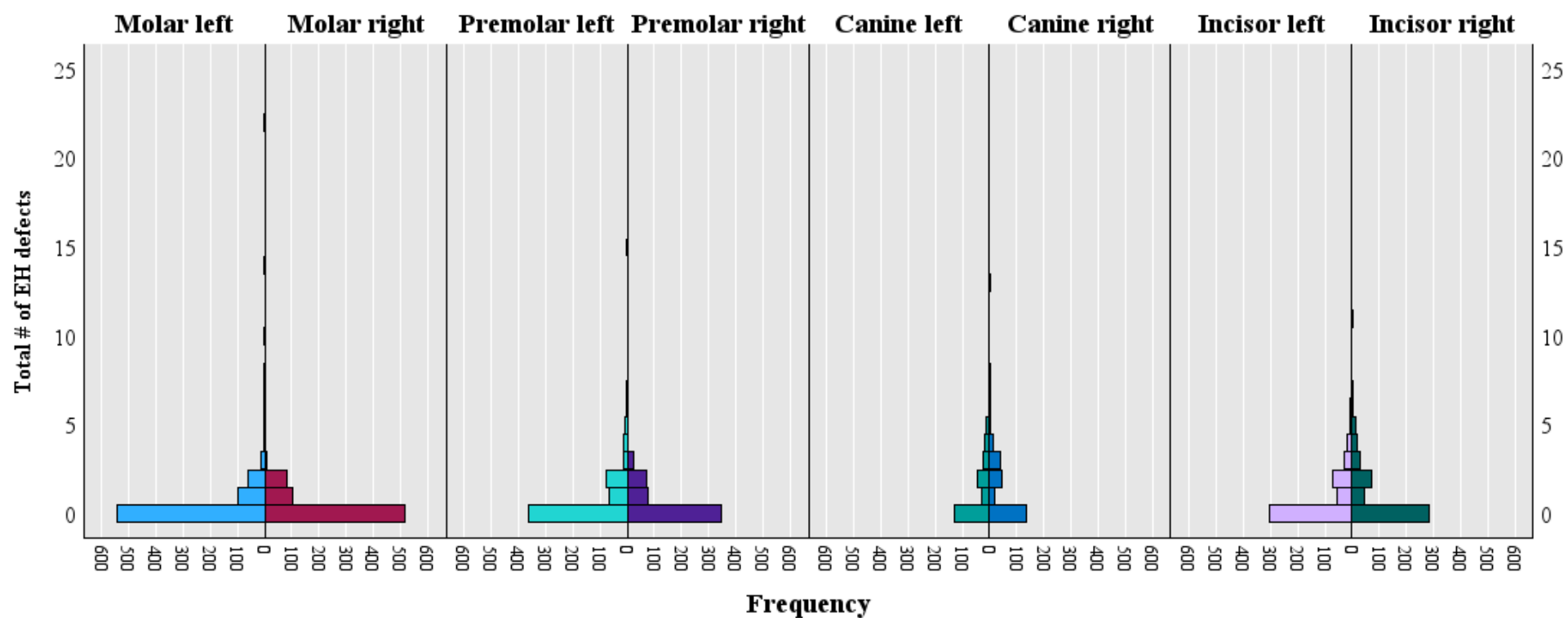
AF 60. Stacked bar graph of EH severity scores per tooth categorised by tooth type (incisor $n=956$, canine $n=534$, premolar $n=1077$, molar $n=1442$).



AF 61. Population pyramid graph of the total number of EH defects per tooth categorised by tooth type (incisor $n=954$, canine $n=533$, premolar $n=1075$, molar $n=1434$).



AF 62. Stacked bar graph of EH severity scores per tooth categorised by categorised by tooth type and side (right incisor $n=468$, right canine $n=267$, right premolar $n=530$, right molar $n=715$, left incisor $n=488$, left canine $n=267$, left premolar $n=547$, and left molar $n=727$).



AF 63. Population pyramid graph of the total number of EH defects per tooth categorised by tooth type and side (right incisor $n=468$, right canine $n=266$, right premolar $n=528$, right molar $n=710$, left incisor $n=486$, left canine $n=267$, left premolar $n=547$, and left molar $n=724$).

AT 82. Cross tabulation of counts and expected counts for the number of EH lesions per tooth type and side.

			Tooth type by side								Total
			Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	
Total # of EH defects	0	Count	284	133	347	513	304	130	364	543	2618
		Expected Count	306.6	174.3	345.9	465.2	318.4	174.9	358.4	474.3	2618. 0
	1	Count	44	19	76	102	54	30	65	97	487
		Expected Count	57.0	32.4	64.3	86.5	59.2	32.5	66.7	88.2	487.0
	2	Count	74	47	69	79	69	44	78	59	519
		Expected Count	60.8	34.5	68.6	92.2	63.1	34.7	71.0	94.0	519.0
	3	Count	28	39	23	8	29	23	16	14	180
		Expected Count	21.1	12.0	23.8	32.0	21.9	12.0	24.6	32.6	180.0
	4	Count	19	13	4	0	16	20	11	3	86
		Expected Count	10.1	5.7	11.4	15.3	10.5	5.7	11.8	15.6	86.0
	5	Count	12	5	4	3	7	11	7	1	50
		Expected Count	5.9	3.3	6.6	8.9	6.1	3.3	6.8	9.1	50.0
	6	Count	4	4	1	1	7	2	4	2	25
		Expected Count	2.9	1.7	3.3	4.4	3.0	1.7	3.4	4.5	25.0
	7	Count	2	2	1	1	0	1	1	1	9

		Tooth type by side								Total
		Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	
	Expected Count	1.1	.6	1.2	1.6	1.1	.6	1.2	1.6	9.0
8	Count	0	2	1	1	0	2	0	1	7
	Expected Count	.8	.5	.9	1.2	.9	.5	1.0	1.3	7.0
9	Count	0	0	1	1	0	2	0	0	4
	Expected Count	.5	.3	.5	.7	.5	.3	.5	.7	4.0
10	Count	0	0	1	0	0	0	0	1	2
	Expected Count	.2	.1	.3	.4	.2	.1	.3	.4	2.0
11	Count	1	0	0	0	0	1	0	0	2
	Expected Count	.2	.1	.3	.4	.2	.1	.3	.4	2.0
13	Count	0	2	0	0	0	1	0	0	3
	Expected Count	.4	.2	.4	.5	.4	.2	.4	.5	3.0
14	Count	0	0	0	0	0	0	0	1	1
	Expected Count	.1	.1	.1	.2	.1	.1	.1	.2	1.0
15	Count	0	0	0	0	0	0	1	0	1
	Expected Count	.1	.1	.1	.2	.1	.1	.1	.2	1.0
18	Count	0	0	0	1	0	0	0	0	1

			Tooth type by side							Total	
			Incisor right	Canine right	Premolar right	Molar right	Inciso r left	Canine left	Premola r left		Molar left
	22	Expected Count	.1	.1	.1	.2	.1	.1	.1	.2	1.0
		Count	0	0	0	0	0	0	0	1	1
		Expected Count	.1	.1	.1	.2	.1	.1	.1	.2	1.0
Total		Count	468	266	528	710	486	267	547	724	3996
		Expected Count	468.0	266.0	528.0	710.0	486.0	267.0	547.0	724.0	3996.0

AT 83. Cross tabulation of counts and expected counts for the EH severity scores per tooth type and side.

			Tooth type by side								Total
			Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	
EH severity	0	Count	284	134	349	518	306	130	364	546	2631
		Expected Count	307.1	175.2	347.8	469.2	320.3	175.2	359.0	477.1	2631.0
	1	Count	177	120	171	187	174	127	174	172	1302
		Expected Count	152.0	86.7	172.1	232.2	158.5	86.7	177.6	236.1	1302.0
	2	Count	7	13	10	10	8	10	9	9	76
		Expected Count	8.9	5.1	10.0	13.6	9.3	5.1	10.4	13.8	76.0

<i>Total</i>	<i>Count</i>	<i>468</i>	<i>267</i>	<i>530</i>	<i>715</i>	<i>488</i>	<i>267</i>	<i>547</i>	<i>727</i>	<i>4009</i>
	<i>Expected Count</i>	<i>468.0</i>	<i>267.0</i>	<i>530.0</i>	<i>715.0</i>	<i>488.0</i>	<i>267.0</i>	<i>547.0</i>	<i>727.0</i>	<i>4009.0</i>

A. 4.4.1.2.1. EH by sex

AT 84. Observed and expected counts of EH severity per tooth scores by sex.

EH severity		Final sex		Total
		Male	Female	
0	Count	1166	1043	2209
	<i>Expected Count</i>	<i>1302.8</i>	<i>906.2</i>	<i>2209.0</i>
1	Count	724	300	1024
	<i>Expected Count</i>	<i>603.9</i>	<i>420.1</i>	<i>1024.0</i>
2	Count	48	5	53
	<i>Expected Count</i>	<i>31.3</i>	<i>21.7</i>	<i>53.0</i>
<i>Total</i>	<i>Count</i>	<i>1938</i>	<i>1348</i>	<i>3286</i>
	<i>Expected Count</i>	<i>1938.0</i>	<i>1348.0</i>	<i>3286.0</i>

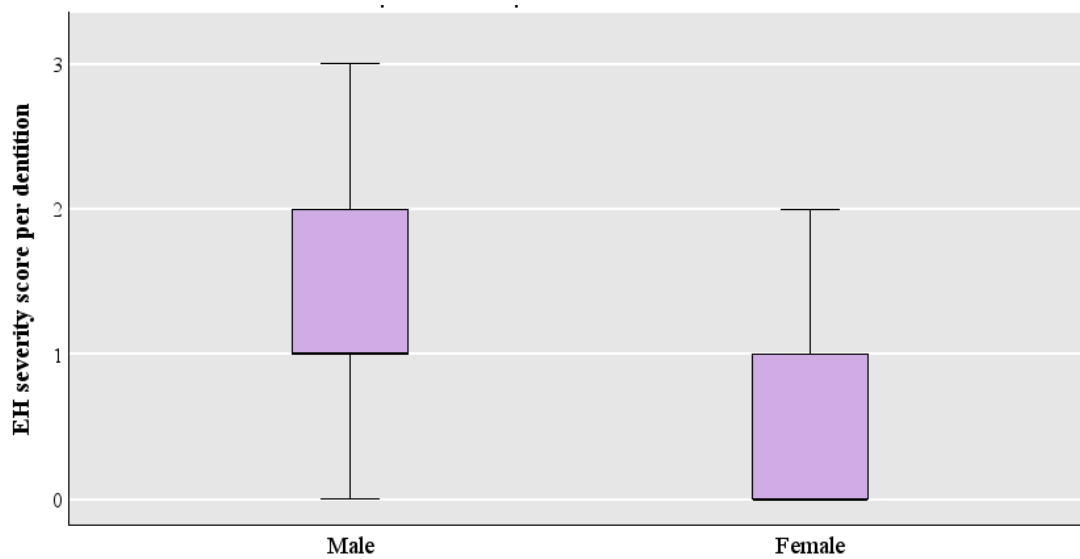
AT 85. Observed and expected counts of EH number of lesions per tooth scores by sex.

Total # of EH defects		Final sex		Total
		Male	Female	
0	Count	1164	1036	2200
	<i>Expected Count</i>	<i>1299.7</i>	<i>900.3</i>	<i>2200.0</i>
1	Count	272	121	393
	<i>Expected Count</i>	<i>232.2</i>	<i>160.8</i>	<i>393.0</i>
2	Count	292	118	410
	<i>Expected Count</i>	<i>242.2</i>	<i>167.8</i>	<i>410.0</i>
3	Count	104	38	142
	<i>Expected Count</i>	<i>83.9</i>	<i>58.1</i>	<i>142.0</i>
4	Count	45	19	64
	<i>Expected Count</i>	<i>37.8</i>	<i>26.2</i>	<i>64.0</i>
5	Count	27	6	33
	<i>Expected Count</i>	<i>19.5</i>	<i>13.5</i>	<i>33.0</i>
6	Count	15	2	17
	<i>Expected Count</i>	<i>10.0</i>	<i>7.0</i>	<i>17.0</i>
7	Count	5	1	6
	<i>Expected Count</i>	<i>3.5</i>	<i>2.5</i>	<i>6.0</i>
8	Count	4	0	4
	<i>Expected Count</i>	<i>2.4</i>	<i>1.6</i>	<i>4.0</i>
9	Count	2	0	2
	<i>Expected Count</i>	<i>1.2</i>	<i>.8</i>	<i>2.0</i>
10	Count	1	0	1
	<i>Expected Count</i>	<i>.6</i>	<i>.4</i>	<i>1.0</i>
11	Count	1	0	1
	<i>Expected Count</i>	<i>.6</i>	<i>.4</i>	<i>1.0</i>
13	Count	2	0	2
	<i>Expected Count</i>	<i>1.2</i>	<i>.8</i>	<i>2.0</i>
15	Count	1	0	1
	<i>Expected Count</i>	<i>.6</i>	<i>.4</i>	<i>1.0</i>
18	Count	1	0	1
	<i>Expected Count</i>	<i>.6</i>	<i>.4</i>	<i>1.0</i>
Total	Count	1936	1341	3277
	<i>Expected Count</i>	<i>1936.0</i>	<i>1341.0</i>	<i>3277.0</i>

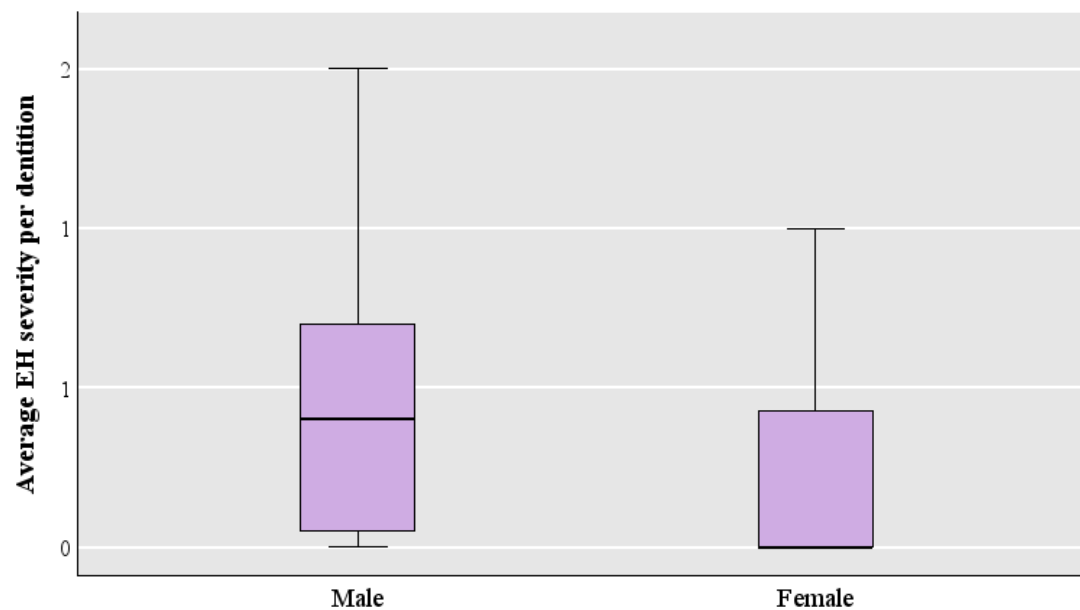
AT 86. Normality test for total number of EF lesions and average EH score per dentition and per tooth.

	Final sex	Kolmogorov-Smirnov ^a							
		Per dentition				Per tooth			
		<i>n</i>	Statistic	df	Sig.	<i>n</i>	Statistic	df	Sig.
Total# EH	Male	86	.157	86	<0.001	1936	0.323	1935	0.0E0
	Female	69	.311	69	<0.001	1341	0.450	1341	0.0E0
Average EH severity	Male	86	.116	86	.006	1936	0.384	1935	0.0E0
	Female	69	.324	69	<0.001	1341	0.477	1341	0.0E0

a. Lilliefors Significance Correction



AF 64. EH severity averages per dentition categorised by sex: males ($n=86$), females ($n=69$).



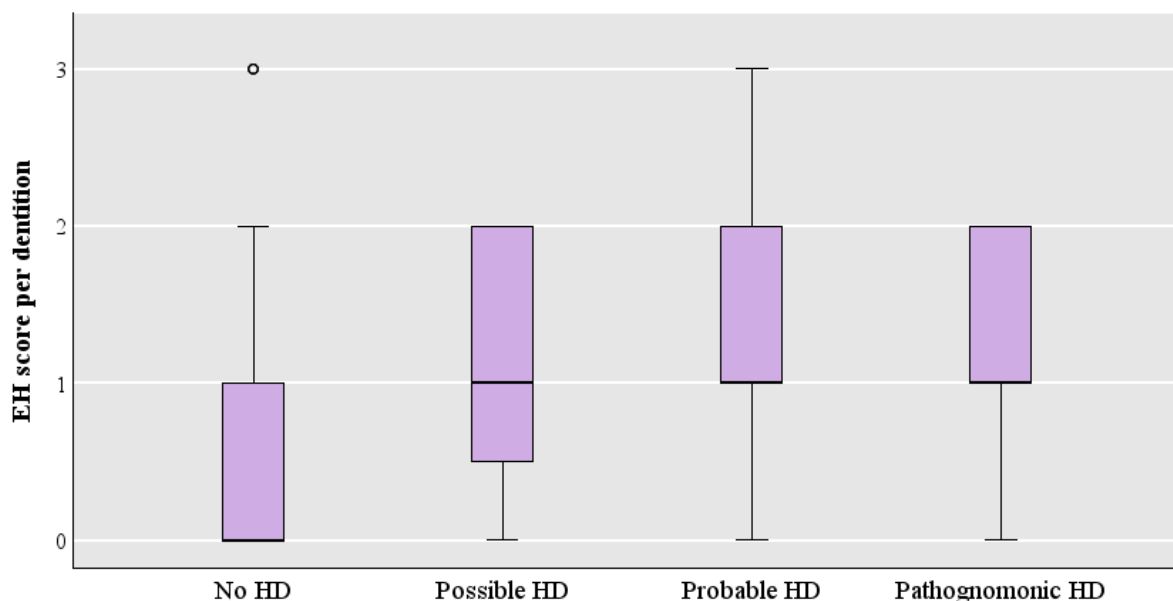
AF 65. Average EH severity averages per dentition categorised by sex: males ($n=86$), females ($n=69$).

A. 4.4.1.2.2. EH prevalence and HD

AT 87. Normality test for total number of EH lesions and (average) EH severity score per dentition and per tooth categorised by HD diagnosis severity/certainty. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n \leq 50$. Rows in *course* are not normally distributed.

	HD diagnosis/ severity level	Kolmogorov-Smirnov ^a							
		Per tooth				Per dentition			
		<i>n</i>	Statistic	df	Sig.	<i>n</i>	Statistic	df	Sig.
Total <i>n</i> EH	<i>No HD</i>	1309	0.454	1309	0.0E0	71	0.332	71	8.6332E-22
	<i>Possible HD</i>	836	0.342	836	3.5608E-281	40	0.833	40	0.000036495487993
	<i>Probable HD</i>	792	0.364	792	6.3597E-303	34	0.873	34	0.000954106897249
	<i>Pathognomonic HD</i>	1188	0.325	1188	0.0E0	44	0.914	44	.003
Average EH severity	<i>No HD</i>	1309	0.489	1309	0.0E0	71	0.338	71	1.3619E-22
	<i>Possible HD</i>	836	0.397	836	0.0E0	40	0.920	40	.008
	<i>Probable HD</i>	792	0.418	792	0.0E0	34	0.897	34	.004
	<i>Pathognomonic HD</i>	1188	0.383	1188	0.0E0	44	0.909	44	.002
EH score per dentition	<i>No HD</i>	-	-	-	-	71	.374	71	5.4926E-28
	<i>Possible HD</i>	-	-	-	-	40	.808	40	0.000009843351035
	<i>Probable HD</i>	-	-	-	-	34	.864	34	0.00058840487193
	<i>Pathognomonic HD</i>	-	-	-	-	44	.764	44	5.1717E-7

a. Lilliefors Significance Correction



AF 66. EH severity score per dentition categorised by HD category: No HD ($n=71$), Possible HD ($n=40$), Probable HD ($n=34$), and Pathognomonic HD ($n=44$)

AT 88. Kruskal-Wallis Post-Hoc Dunn's test results for EH counts per dentition by HD diagnosis severity/certainty. Rows in *cursive* are significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.^a
<i>No HD-Probable HD</i>	<i>-36.200</i>	<i>11.102</i>	<i>-3.261</i>	<i>0.0012</i>	<i>.007</i>
<i>No HD – Possible HD</i>	<i>-36.303</i>	<i>10.524</i>	<i>-3.450</i>	<i>0.0005</i>	<i>.003</i>
<i>No HD – Pathognomonic HD</i>	<i>-42.720</i>	<i>10.213</i>	<i>-4.183</i>	<i>8.3955E- 7</i>	<i>.000</i>
Probable HD-Possible HD	.104	12.417	.008	.993	1.000
Probable HD- Pathognomonic HD	-6.521	12.155	-.536	.592	1.000
Possible HD- Pathognomonic HD	-6.417	11.630	-.552	.581	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 89. Kruskal-Wallis Post-hoc Dunn's test results for EH average severity scores per dentition by HD diagnosis severity/certainty. Rows in *cur*sive are significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.^a
<i>No HD-Probable HD</i>	<i>-35.999</i>	<i>11.101</i>	<i>-3.243</i>	<i>0.00111</i>	<i>.007</i>
<i>No HD – Possible HD</i>	<i>-36.215</i>	<i>10.523</i>	<i>-3.441</i>	<i>0.00056</i>	<i>.003</i>
<i>No HD – Pathognomonic HD</i>	<i>-50.307</i>	<i>10.213</i>	<i>-4.926</i>	<i>0.00003</i>	<i>.000</i>
Probable HD-Possible HD	.215	12.416	.017	.986	1.000
Probable HD- Pathognomonic HD	-14.307	12.154	-1.177	.239	1.000
Possible HD- Pathognomonic HD	-14.092	11.629	-1.212	.226	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 90. Observed and expected counts of EH number of lesions per tooth scores by sex.

			Rhinomaxillary		Total
			No RS	RS	
EH severity	0	Count	1423	1358	2781
		Expected Count	1232.3	1548.7	2781.0
	1	Count	327	874	1201
		Expected Count	532.2	668.8	1201.0
	2	Count	46	25	71
		Expected Count	31.5	39.5	71.0
Total		Count	1796	2257	4053
		Expected Count	1796.0	2257.0	4053.0

AT 91. Normality test for total number of EH lesions and (average) EH severity score per dentition and per tooth by rhinomaxillary presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n \leq 50$. Rows in *ursive* are not normally distributed.

	RS	Kolmogorov-Smirnov ^a							
		Per tooth				Per dentition			
		n	Statistic	df	Sig.	n	Statistic	df	Sig.
Total# EH	<i>Not present</i>	1782	.444	1782	0.0E0	90	0.305	90	4.1201E-23
	<i>Present</i>	2256	.328	2256	0.0E0	93	0.141	93	0.00009309245339
Average EH severity	<i>Not present</i>	1782	.478	1782	0.0E0	90	0.313	90	1.5461E-24
	<i>Present</i>	2256	.389	2256	0.0E0	93	0.114	93	0.005
EH score per dentition	<i>Not present</i>	-	-	-	-	90	0.351	90	4.1188E-31
	<i>Present</i>	-	-	-	-	93	0.235	93	8.1281E-14

A. 4.4.1.2.3. EH prevalence and leprosaria

AT 92. Normality test for total number of EH lesions, and (average) EH severity score per tooth and per dentition categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n \leq 50$. Rows in *cursive* are not normally distributed.

	Site type	Kolmogorov-Smirnov/SW ^a							
		Per tooth				Per dentition			
		<i>n</i>	Statistic	df	Sig.	<i>n</i>	Statistic	df	Sig.
Total# EH	<i>Monastery/friary</i>	87	0.398	87	<0.001	4	.983	4	.920
	<i>Leprosarium</i>	2604	0.314	2604	<0.001	119	.146	119	0.000001
	<i>Hospital</i>	90	0.375	90	<0.001	4	.998	4	.995
	<i>Other</i>	536	0.264	536	<0.001	24	.880	24	.008
Average EH severity	<i>Monastery/friary</i>	87	0.426	87	<0.001	4	.929	4	.591
	<i>Leprosarium</i>	2604	0.379	2604	<0.001	119	.108	119	0.002
	<i>Hospital</i>	90	0.409	90	<0.001	4	.999	4	.998
	<i>Other</i>	536	0.340	536	<0.001	24	.959	24	.428
EH score per dentition	<i>Monastery/friary</i>	-	-	-	-	4	.863	4	.272
	<i>Leprosarium</i>	-	-	-	-	119	.227	119	1.162E-16
	<i>Hospital</i>	-	-	-	-	4	.945	4	.683
	<i>Other</i>	-	-	-	-	24	.834	24	.001

a. Lilliefors Significance Correction

AT 93. Normality tests for total number of EH lesions, and (average) EH severity score per tooth and per dentition categorised by leprosarium. Table shows Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n \leq 50$. Rows in *cursive* are not normally distributed.

	Leprosarium	Kolmogorov-Smirnov ^a							
		Per tooth				Per dentition			
		<i>n</i>	Statistic	df	Sig.	<i>n</i>	Statistic	df	Sig.
Total# EH	<i>MHW</i>	69	0.215	69	<0.001	6	0.869	6	0.220
	<i>MSL</i>	205	0.260	205	69	13	0.876	13	0.064
	<i>MMW</i>	2330	0.344	2330	205	100	0.154	100	0.000004
Average EH severity	<i>MHW</i>	69	0.340	69	2330	6	0.918	6	0.489
	<i>MSL</i>	205	0.427	205	69	13	0.936	13	0.409
	<i>MMW</i>	2330	0398	2330	205	100	0.120	100	0.001
EH score per dentition	<i>MHW</i>	-	-	-	-	6	0.915	6	0.473
	<i>MSL</i>	-	-	-	-	13	0.733	13	0.001
	<i>MMW</i>	-	-	-	-	100	0.241	100	8.7811E-16

a. Lilliefors Significance Correction

AT 94. Post-hoc Dunn's test results for the different leprosaria with EH data, JTN and BSA excluded.

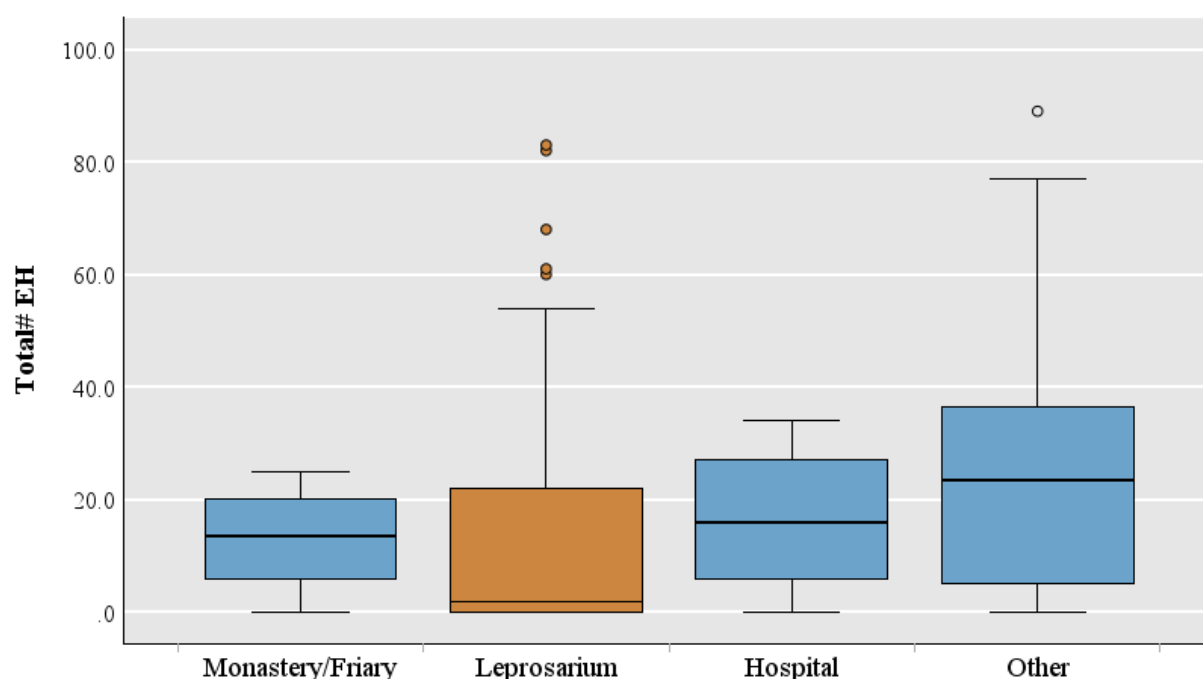
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
MMW-MHW	7.348	14.464	0.508	0.611	1.000
<i>MMW-MSL</i>	<i>44.803</i>	<i>10.146</i>	<i>4.416</i>	0.00001	p=<0.001
<i>MHW-MSL</i>	<i>-37.455</i>	<i>16.984</i>	<i>-2.205</i>	<i>0.027</i>	<i>0.082</i>

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

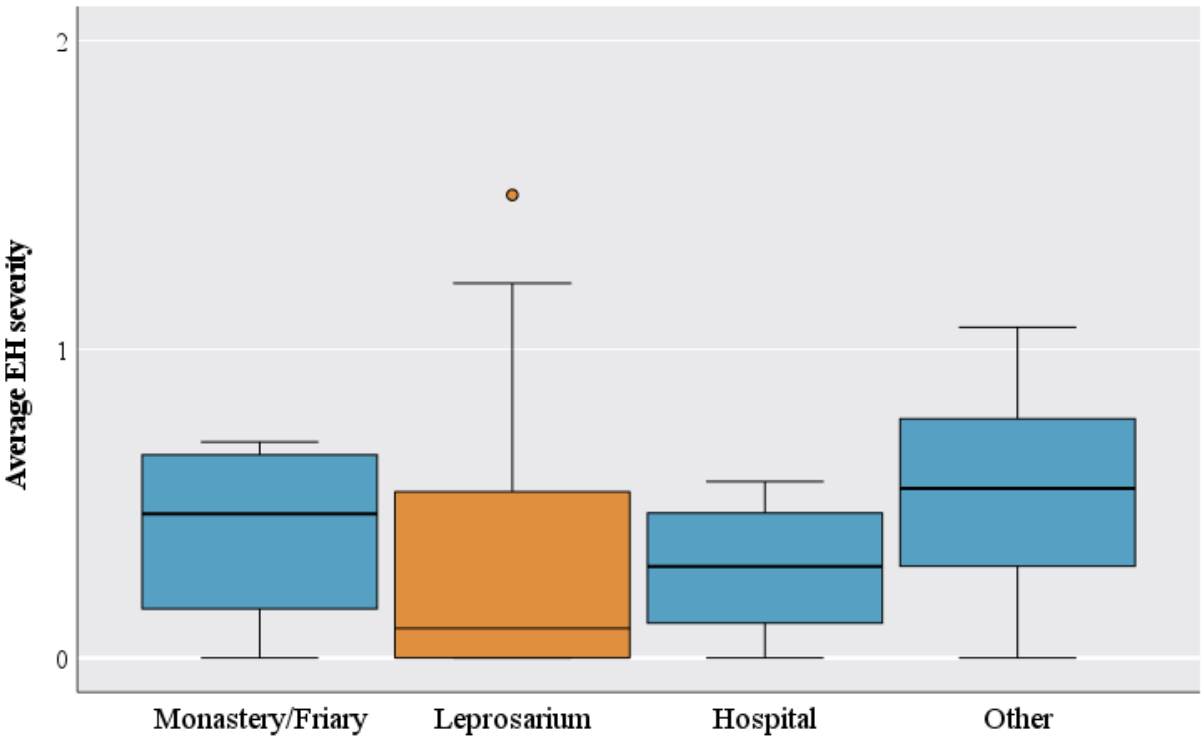
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.1.2.3.1 EH prevalence and leprosaria JTN and BSA included

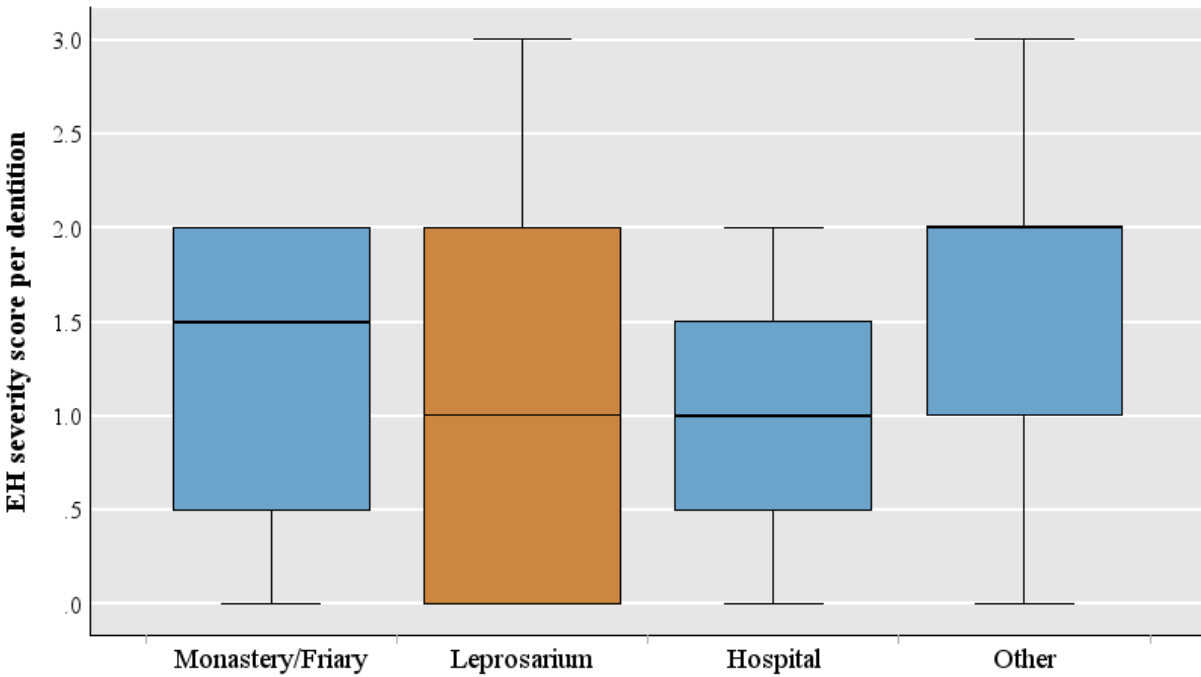
When including JTN and BSA, results look quite different (AT 95 for normality tests). Comparing EH rates between the different site types (AF 67) appears to show that leprosaria score low when it comes to the total number of EH lesions, with a statistically significant difference between leprosaria and 'other/normal' sites (Kruskal-Wallis: $n=214$; $\chi^2=10.338$, $df=3$, $p=0.016$; AT 96 for post-hoc results). Equally, the average severity of EH lesions per dentition is lowest for leprosaria, with a statistical difference between leprosaria and 'other/normal' sites (Kruskal-Wallis: $n=214$; $\chi^2=12.525$, $df=3$, AT 97 for post-hoc results). EH severity score per dentition reflects the wide distribution of values for leprosaria (AF 69), and shows no statistically significant difference between site types (Chi square: $n=214$; $\chi^2=13.749$, $df=9$, $p=0.132$, $\phi_c=0.146$). Most likely, these results are severely influenced by the fact that EH values for JTN are *only* reported when there are no EH lesions, but reports do not indicate the number, type or severity of EH when it is present.



AF 67. Boxplots for total number of EH lesions per dentition for the different site types; monastery/friary ($n=4$), leprosarium ($n=182$), hospital ($n=4$), 'other/normal' sites ($n=24$).



AF 68. Boxplots for average EH severity per dentition for the different site types; monastery/friary ($n=4$), leprosarium ($n=182$), Hospital ($n=4$), other sites ($n=24$).



AF 69. Boxplots for EH severity score per dentition for the different site types; monastery/friary ($n=4$), leprosarium ($n=182$), Hospital ($n=4$), other sites ($n=24$).

AT 95. Normality test for total number of EH lesions, and (average) EH severity score per tooth and per dentition categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n \leq 50$. Rows in *cursive* are not normally distributed.

	Site type	Kolmogorov-Smirnov/Shapiro-Wilk ^a							
		Per tooth				Per dentition			
		<i>n</i>	Statistic	df	Sig.	<i>n</i>	Statistic	df	Sig.
Total# EH	Monastery/friary	87	0.344	160	<0.001	4	.983	4	.920
	<i>Leprosarium</i>	15608	0.475	15608	<0.001	182	.236	182	5.4744E-16
	Hospital	128	0.405	128	<0.001	4	.998	4	.995
	<i>Other</i>	784	0.358	784	<0.001	24	.880	24	.008
Average EH severity	Monastery/friary	160	0.360	160	<0.001	4	.929	4	.591
	<i>Leprosarium</i>	15608	0.475	15608	<0.001	182	.247	182	2.1047E-14
	Hospital	128	0.433	128	<0.001	4	.999	4	.998
	<i>Other</i>	784	0.390	784	<0.001	24	.959	24	.428
EH score per dentition	Monastery/friary	-	-	-	-	4	.863	4	.272
	<i>Leprosarium</i>	-	-	-	-	182	.283	182	1.8297E-14
	Hospital	-	-	-	-	4	.945	4	.683
	<i>Other</i>	-	-	-	-	24	.834	24	.001

a. Lilliefors Significance Correction

AT 96. Post-hoc Dunn's test results comparison EH counts between the different site types, JTN and BSA included. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.^a
Leprosarium-Monastery/Friary	12.475	30.188	0.413	0.679	1.000
Leprosarium-Hospital	-21.225	30.188	-0.703	0.482	1.000
<i>Leprosarium-Other</i>	<i>-40.975</i>	<i>12.970</i>	<i>-3.159</i>	<i>0.002</i>	<i>0.009</i>
Monastery/Friary-Hospital	-8.750	42.231	-0.207	0.836	1.000
Monastery/Friary-Other	-28.500	32.255	-0.884	0.377	1.000
Hospital-Other	-19.750	32.255	-0.612	0.540	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 97. Post-hoc Dunn's test results comparing average EH severity score per dentition between the different site types, JTN and BSA included. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.^a
Leprosarium-Hospital	-10.231	30.190	-0.339	0.735	1.000
Leprosarium-Monastery/Friary	26.981	30.190	0.894	0.371	1.000
<i>Leprosarium-Other</i>	<i>-44.897</i>	<i>12.971</i>	<i>-3.461</i>	<i>0.0005</i>	<i>0.003</i>
Hospital-Monastery/Friary	16.750	42.234	0.397	0.692	1.000
Hospital-Other	-34.667	32.257	-1.075	0.283	1.000
Monastery/Friary-Other	-17.917	32.257	-0.555	0.579	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.1.3. Cribra orbitalia, femora and porotic hyperostosis

AT 98. Cross tabulation for cribra femora presence and HD diagnosis level.

			HD diagnosis				Total
			No HD	Possible HD	Probable HD	Pathogn HD	
CF	Absent	Count	94	55	37	42	228
		Expected Count	93.4	55.0	37.3	42.3	228.0
	Present	Count	1	1	1	1	4
		Expected Count	1.6	1.0	.7	.7	4.0
Total		Count	95	56	38	43	232
		Expected Count	95.0	56.0	38.0	43.0	232.0

AT 99. Cross tabulation for cribra femora presence and HD diagnosis level.

			Binary HD		Total
			No HD	HD	
CF	Absent	Count	94	134	228
		Expected Count	93.4	134.6	228.0
	Present	Count	1	3	4
		Expected Count	1.6	2.4	4.0
Total		Count	95	137	232
		Expected Count	95.0	137.0	232.0

AT 100. Cross tabulation for cribra femora presence and HD diagnosis level.

			Rhinomaxillary		Total
			No RS	RS	
CF	Present	Count	107	82	189
		Expected Count	105.3	83.7	189.0
	Present	Count	0	3	3
		Expected Count	1.7	1.3	3.0
Total		Count	107	85	192
		Expected Count	107.0	85.0	192.0

AT 101. Cross tabulation for cribra femora presence and site type.

			Site type				Total
			Monastery/Friary	Leprosarium	Hospital	Other	
CF	Absent	Count	4	240	3	18	265
		Expected Count	3.9	238.4	3.0	19.7	265.0
	Present	Count	0	2	0	2	4
		Expected Count	.1	3.6	.0	.3	4.0
Total		Count	4	242	3	20	269
		Expected Count	4.0	242.0	3.0	20.0	269.0

AT 102. Cross tabulation for cribra femora presence and the individual leprosaria.

			Site code					Total
			MHW	MSL	JTN	BSA	MMW	
CF	Absent	Count	2	5	118	5	110	240
		Expected Count	2.0	6.0	117.0	5.0	110.1	240.0
	Present	Count	0	1	0	0	1	2
		Expected Count	.0	.0	1.0	.0	.9	2.0
Total		Count	2	6	118	5	111	242
		Expected Count	2.0	6.0	118.0	5.0	111.0	242.0

A. 4.4.1.3.1. CO, CF and PH prevalence and HD

AT 103. Cross tabulation for cribra orbitalia presence and HD diagnosis level.

			HD diagnosis				Total
			No HD	Possible HD	Probable HD	Pathognomonic HD	
CO	Absent	Count	62	28	25	27	142
		Expected Count	60.6	27.1	25.2	29.0	142.0
	Present	Count	34	15	15	19	83
		Expected Count	35.4	15.9	14.8	17.0	83.0
Total		Count	96	43	40	46	225
		Expected Count	96.0	43.0	40.0	46.0	225.0

AT 104. Cross tabulation for porotic hyperostosis presence and HD diagnosis level.

			HD diagnosis				Total
			No HD	Possible HD	Probable HD	Pathognomonic HD	
PH	Absent	Count	74	42	33	40	189
		Expected Count	79.5	38.1	33.3	38.1	189.0
	Present	Count	24	5	8	7	44
		Expected Count	18.5	8.9	7.7	8.9	44.0
Total		Count	98	47	41	47	233
		Expected Count	98.0	47.0	41.0	47.0	233.0

AT 105. Cross tabulation for cribra orbitalia presence and HD diagnosis level.

			Binary HD		Total
			No HD	HD	
CO	Absent	Count	62	80	142
		Expected Count	60.6	81.4	142.0
	Present	Count	34	49	83
		Expected Count	35.4	47.6	83.0
Total		Count	96	129	225
		Expected Count	96.0	129.0	225.0

AT 106. Cross tabulation for porotic hyperostosis presence and HD diagnosis level.

			Binary HD		Total
			No HD	HD	
PH	Absent	Count	74	115	189
		Expected Count	79.5	109.5	189.0
	Present	Count	24	20	44
		Expected Count	18.5	25.5	44.0
Total		Count	98	135	233
		Expected Count	98.0	135.0	233.0

AT 107. Cross tabulation for cribra orbitalia presence and HD diagnosis level.

			Rhinomaxillary		Total
			No RS	RS	
CO	Absent	Count	81	56	137
		Expected Count	79.9	57.1	137.0
	Present	Count	49	37	86
		Expected Count	50.1	35.9	86.0
Total		Count	130	93	223
		Expected Count	130.0	93.0	223.0

AT 108. Cross tabulation for porotic hyperostosis presence and HD diagnosis level

			Rhinomaxillary		Total
			No RS	RS	
PH	Absent	Count	97	83	180
		Expected Count	102.9	77.1	180.0
	Present	Count	35	16	51
		Expected Count	29.1	21.9	51.0
Total		Count	132	99	231
		Expected Count	132.0	99.0	231.0

A. 4.4.1.3.2. CO, CF and PH prevalence and leprosaria

AT 109. Cross tabulation for cribra orbitalia presence among non-adults and HD diagnosis level.

			HD diagnosis				Total
			No HD	Possible HD	Probable HD	Pathognomonic HD	
CO	Absent	Count	21	6	4	3	34
		Expected Count	17.5	5.7	4.1	6.7	34.0
	Present	Count	13	5	4	10	32
		Expected Count	16.5	5.3	3.9	6.3	32.0
Total		Count	34	11	8	13	66
		Expected Count	34.0	11.0	8.0	13.0	66.0

AT 110. Cross tabulation for porotic hyperostosis presence among non-adults and HD diagnosis level.

			HD diagnosis				Total
			No HD	Possible HD	Probable HD	Pathognomonic HD	
PH	Absent	Count	32	11	6	13	62
		Expected Count	31.9	10.3	7.5	12.2	62.0
	Present	Count	2	0	2	0	4
		Expected Count	2.1	.7	.5	.8	4.0
Total		Count	34	11	8	13	66
		Expected Count	34.0	11.0	8.0	13.0	66.0

AT 111. Cross tabulation for cribra orbitalia presence among non-adults and binary HD diagnosis.

			Binary HD		Total
			No HD	HD	
CO	Absent	Count	21	13	34
		Expected Count	17.5	16.5	34.0
	Present	Count	13	19	32
		Expected Count	16.5	15.5	32.0
Total		Count	34	32	66
		Expected Count	34.0	32.0	66.0

AT 112. Cross tabulation for porotic hyperostosis presence among non-adults and binary HD diagnosis.

			Binary HD		Total
			No HD	HD	
PH	Absent	Count	32	30	62
		Expected Count	31.9	30.1	62.0
	Present	Count	2	2	4
		Expected Count	2.1	1.9	4.0
Total		Count	34	32	66
		Expected Count	34.0	32.0	66.0

AT 113. Cross tabulation for cribra orbitalia presence and site type.

			Site type				Total
			Monastery/Friary	Leprosarium	Hospital	Other	
CO	Absent	Count	2	146	3	12	163
		Expected Count	3.1	145.1	1.9	13.0	163.0
	Present	Count	3	89	0	9	101
		Expected Count	1.9	89.9	1.1	8.0	101.0
Total		Count	5	235	3	21	264
		Expected Count	5.0	235.0	3.0	21.0	264.0

AT 114. Cross tabulation for porotic hyperostosis presence and site type.

			Site type				Total
			Monastery/Friary	Leprosarium	Hospital	Other	
PH	Absent	Count	4	202	3	18	227
		Expected Count	3.9	202.7	3.1	17.2	227.0
	Present	Count	1	57	1	4	63
		Expected Count	1.1	56.3	.9	4.8	63.0
Total		Count	5	259	4	22	290
		Expected Count	5.0	259.0	4.0	22.0	290.0

AT 115. Cross tabulation for cribra orbitalia presence and the individual leprosaria.

			Site Code					Total
			MHW	MSL	JTN	BSA	MMW	
CO	Absent	Count	3	4	65	2	72	146
		Expected Count	1.9	3.1	68.3	5.6	67.1	146.0
	Present	Count	0	1	45	7	36	89
		Expected Count	1.1	1.9	41.7	3.4	40.9	89.0
Total		Count	3	5	110	9	108	235
		Expected Count	3.0	5.0	110.0	9.0	108.0	235.0

AT 116. Cross tabulation for porotic hyperostosis presence and the individual leprosaria.

			Site Code					Total
			MHW	MSL	JTN	BSA	MMW	
PH	Absent	Count	4	12	71	8	107	202
		Expected Count	3.9	12.5	95.2	6.2	84.2	202.0
	Present	Count	1	4	51	0	1	57
		Expected Count	1.1	3.5	26.8	1.8	23.8	57.0
Total		Count	5	16	122	8	108	259
		Expected Count	5.0	16.0	122.0	8.0	108.0	259.0

A. 4.4.1.4. Early life carbon and nitrogen isotopes

AT 117. Carbon and nitrogen values for all bulk dentine samples.

UIN	Tooth sampled	Dentine initial sample weight	Dentine collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Dentine collagen sample reps
1	37	0.330	0.0360	45.9305	-19.9017	0.0731	16.9308	11.0180	0.0622	3.1647	0.0177	3
2	27	0.446	0.0610	47.2104	-19.2943	0.0748	17.2231	12.1870	0.0489	3.1974	0.0162	3
4	37	0.710	0.1010	46.2943	-19.2557	0.0874	16.9727	10.8027	0.1025	3.1823	0.0230	3
5	47	0.406	0.0500	45.2952	-19.6110	0.0581	16.6858	9.6687	0.0516	3.1669	0.0244	3
6	47	0.492	0.0690	42.6127	-19.3847	0.0425	15.6590	10.4837	0.0899	3.1748	0.0178	3
13	47	0.490	0.0800	40.3605	-18.9200	0.1478	14.8664	13.5067	0.0738	3.1675	0.0149	3
51	47	0.681	0.0790	42.9248	-18.6587	0.0967	15.8745	13.8410	0.0624	3.1540	0.0285	3
63	37	0.669	0.0920	43.8912	-19.4737	0.0224	16.1212	13.4270	0.0620	3.1765	0.0222	3
129	47	0.547	0.0760	44.3761	-19.1487	0.1155	16.3998	12.3397	0.0652	3.1573	0.0237	3
148	47	0.749	0.1110	43.4138	-19.6510	0.0652	15.9906	11.7633	0.0595	3.1680	0.0220	3
167	37	0.340	0.0380	44.0689	-19.7843	0.1716	16.2415	11.8480	0.0954	3.1664	0.0226	3
175	35	0.121	0.0093	7.7000	-20.4000	0.0000	0.0000	11.4000	0.0000	3.2000	0.0000	3
176	45	0.216	0.0362	16.8000	-19.7000	0.0000	0.0000	10.9000	0.0000	3.1000	0.0000	3
201	37	0.564	0.0620	44.9766	-19.6700	0.1426	16.6023	12.9763	0.0728	3.1603	0.0231	3
202	27	0.360	0.0374	10.4000	-19.5000	0.0000	0.0000	12.0000	0.0000	3.1000	0.0000	3
205	17	0.275	0.0426	42.7298	-19.4900	0.0382	15.8175	11.0730	0.0545	3.1521	0.0211	3
206	27	0.321	0.0524	42.1964	-19.5680	0.0135	15.6197	10.7599	0.0634	3.1522	0.0164	3

UIN	Tooth sampled	Dentine initial sample weight	Dentine collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Dentine collagen sample reps
207	37	0.360	0.0535	48.7944	-18.7193	0.0240	18.0512	12.0138	0.0355	3.1531	0.0168	3
208	37	0.437	0.0450	43.4441	-19.2303	0.0242	15.9701	10.7513	0.0300	3.1728	0.0246	3
209	27	0.332	0.0300	42.7597	-18.8087	0.0344	15.7868	11.6462	0.0472	3.1598	0.0129	0
219	35	0.452	0.0598	43.9201	-19.4560	0.0219	16.2503	11.7407	0.0335	3.1533	0.0106	3
220	35	0.389	0.0290	45.8933	-19.2387	0.0256	16.9791	11.5183	0.0747	3.1522	0.0231	3
223	17	0.254	0.0369	41.7751	-19.6323	0.0142	15.3338	10.4835	0.0352	3.1787	0.0122	3
224	47	0.416	0.0599	43.4209	-18.9543	0.0134	16.0912	11.2367	0.0153	3.1486	0.0154	3
225	37	0.262	0.0368	44.1584	-19.9577	0.1026	16.2562	11.1993	0.0607	3.1699	0.0306	3
226	25	0.374	0.0511	44.2682	-18.7843	0.0068	16.3476	11.7855	0.0590	3.1596	0.0220	3
227	37	0.486	0.0863	49.0846	-18.5337	0.1086	18.1970	13.5387	0.0891	3.1445	0.0197	3
228	47	0.477	0.0608	43.6459	-19.3217	0.0150	16.1732	11.7699	0.0636	3.1486	0.0251	3
229	37	0.473	0.0675	47.3492	-19.5147	0.0204	17.4546	10.1594	0.0625	3.1647	0.0196	3
230	37	0.442	0.0742	42.9296	-19.2370	0.0056	15.8109	12.4663	0.0560	3.1678	0.0191	3
231	47	0.611	0.1056	46.6380	-19.3185	0.0290	17.1438	10.4593	0.0951	3.1736	0.0284	2
232	37	0.353	0.0555	43.7906	-19.3277	0.0365	16.1957	11.6594	0.0428	3.1554	0.0231	3
233	47	0.364	0.0300	42.2187	-19.8333	0.0602	15.4213	13.6999	0.0584	3.1941	0.0082	3
234	47	0.438	0.0529	44.8066	-18.6275	0.0403	16.4735	12.4017	0.0887	3.1734	0.0445	2
235	17	0.437	0.0614	43.3246	-19.8117	0.0140	16.0180	11.9444	0.1028	3.1555	0.0204	3

UIN	Tooth sampled	Dentine initial sample weight	Dentine collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Dentine collagen sample reps
300	55	0.151	0.0080	40.6960	-19.8437	0.1092	14.5922	10.3847	0.0423	3.2536	0.0089	3
301	47	0.436	0.0730	43.9416	-20.0190	0.0650	16.2700	10.5607	0.0691	3.1507	0.0272	3
302	47	0.452	0.0680	44.7969	-20.0383	0.0571	16.5277	10.0540	0.0350	3.1623	0.0240	3
303	27	0.469	0.0360	45.0979	-20.1793	0.0703	16.4844	10.6397	0.0787	3.1916	0.0271	3
304	37	0.331	0.0530	43.7382	-20.0740	0.0207	16.1539	10.2077	0.1045	3.1593	0.0285	3
305	47	0.433	0.0640	45.2542	-20.0763	0.0932	16.5459	12.3740	0.0724	3.1910	0.0218	3
306	47	0.538	0.0880	44.5057	-20.1033	0.0491	16.4017	10.6063	0.0695	3.1661	0.0266	3
357	17	0.462	0.0650	43.1667	-18.7790	0.0554	15.9361	11.0143	0.1075	3.1601	0.0155	3
367	27	0.347	0.0330	44.6268	-20.0223	0.0575	16.3792	9.2487	0.0949	3.1791	0.0276	3
370	27	0.526	0.0770	44.9671	-19.0293	0.0655	16.4812	11.3203	0.1054	3.1827	0.0273	3
371	47	0.539	0.0870	45.9300	-18.7270	0.0796	16.9023	10.6877	0.1037	3.1707	0.0240	3
379	27	0.513	0.0800	49.3430	-19.5453	0.1280	18.0944	11.7510	0.2235	3.1793	0.0303	3
387	47	0.708	0.0750	44.7722	-18.6863	0.0448	16.5413	10.4507	0.1328	3.1583	0.0219	3
388	47	0.518	0.0790	46.1502	-18.9687	0.0378	16.9480	12.2260	0.0901	3.1770	0.0268	3
401	27	0.605	0.0750	44.5388	-19.2507	0.0778	16.4206	10.3740	0.0795	3.1647	0.0225	3
408	85	0.321	0.0330	44.5672	-19.3750	0.0106	16.3764	10.9027	0.0984	3.1747	0.0210	3
424	17	0.596	0.0700	44.7566	-19.3680	0.1574	16.5093	10.1037	0.0935	3.1626	0.0204	3

A. 4.4.1.4.1. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ across time

AT 118. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the PhD dataset, categorised by time period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Early Medieval</i>	8	-19.9964	-20.0532	0.33247	-20.40	-19.26	1.729	4.332	8	0.277	0.048
<i>Early-High Medieval</i>	13	-19.3424	-19.3277	0.39589	-19.96	-18.53	0.659	0.156	13	0.168	0.644
High Medieval	11	-19.2359	-19.2507	0.44771	-20.02	-18.69	-0.442	0.801	11	0.132	0.533
High-Late Medieval	14	-19.3495	-19.4203	0.39833	-19.83	-18.63	0.642	-0.512	14	0.112	0.242

AT 119. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the PhD dataset, categorised by time period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnova/Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Early Medieval	8	10.6611	10.6230	0.42780	10.05	11.40	0.325	0.146	8	0.157	0.901
Early-High Medieval	13	11.5872	11.6594	1.00140	10.16	13.54	0.467	-0.311	13	0.114	0.821
High Medieval	11	1-.7694	10.6877	0.81455	9.25	12.23	0.058	0.467	11	0.132	0.962
High-Late Medieval	14	12.1693	12.0657	1.19653	9.67	13.84	-0.431	0.125	14	0.150	0.359

AT 120. Post-hoc Dunn's test results comparing dentine $\delta^{13}\text{C}$ values between periods within the PhD dataset. Rows in *cursive* are statistically significant.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Early Medieval-Early-High Medieval</i>	<i>-18.173</i>	<i>6.032</i>	<i>-3.013</i>	<i>.003</i>	<i>.016</i>
<i>Early Medieval-High-Late Medieval</i>	<i>-18.321</i>	<i>5.949</i>	<i>-3.080</i>	<i>.002</i>	<i>.012</i>
<i>Early Medieval-High Medieval</i>	<i>-21.068</i>	<i>6.237</i>	<i>-3.378</i>	<i><.001</i>	<i>.004</i>
Early-High Medieval-High-Late Medieval	-.148	5.170	-.029	.977	1.000
Early-High Medieval-High Medieval	-2.895	5.499	-.526	.599	1.000
High-Late Medieval-High Medieval	2.747	5.408	.508	.612	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 121. Post-hoc Tukey HSD and Bonferroni results comparing dentine $\delta^{15}\text{N}$ values between periods within the PhD dataset. *=The mean difference is significant at the 0.05 level.

						95% Confidence Interval	
		Mean Difference	Std.			Lower	Upper
(I) PeriodClustered	(J) PeriodClustered	(I-J)	Error	Sig.		Bound	Bound
Tukey HSD	Early Medieval	Early-High Medieval	-.92611	.43057	.154	-2.0779	.2256
		High Medieval	-.10830	.44523	.995	-1.2993	1.0827
		High-Late Medieval	-1.50816*	.42467	.005	-2.6441	-.3722
	Early-High Medieval	Early Medieval	.92611	.43057	.154	-.2256	2.0779
		High Medieval	.81781	.39255	.175	-.2322	1.8679
		High-Late Medieval	-.58205	.36906	.402	-1.5693	.4052
	High Medieval	Early Medieval	.10830	.44523	.995	-1.0827	1.2993
		Early-High Medieval	-.81781	.39255	.175	-1.8679	.2322
		High-Late Medieval	-1.39986*	.38607	.004	-2.4326	-.3671

		Mean Difference	Std.		95% Confidence Interval		
(I) PeriodClustered	(J) PeriodClustered	(I-J)	Error	Sig.	Lower Bound	Upper Bound	
Bonferroni	High-Late Medieval	Early Medieval	1.50816*	.42467	.005	.3722	2.6441
		Early-High Medieval	.58205	.36906	.402	-.4052	1.5693
		High Medieval	1.39986*	.38607	.004	.3671	2.4326
	Early Medieval	Early-High Medieval	-.92611	.43057	.224	-2.1184	.2661
		High Medieval	-.10830	.44523	1.000	-1.3412	1.1246
		High-Late Medieval	-1.50816*	.42467	.006	-2.6841	-.3322
	Early-High Medieval	Early Medieval	.92611	.43057	.224	-.2661	2.1184
		High Medieval	.81781	.39255	.260	-.2692	1.9048
		High-Late Medieval	-.58205	.36906	.734	-1.6040	.4399
	High Medieval	Early Medieval	.10830	.44523	1.000	-1.1246	1.3412
		Early-High Medieval	-.81781	.39255	.260	-1.9048	.2692
		High-Late Medieval	-1.39986*	.38607	.005	-2.4689	-.3308
	High-Late Medieval	Early Medieval	1.50816*	.42467	.006	.3322	2.6841
		Early-High Medieval	.58205	.36906	.734	-.4399	1.6040
		High Medieval	1.39986*	.38607	.005	.3308	2.4689

AT 122. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the supplemented dataset, categorised by time period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Early Medieval</i>	45	-20.1083	-20.1000	0.23724	-20.50	-19.26	0.977	2.422	0.935	45	0.015
<i>Early-High Medieval</i>	79	-19.4714	-19.4000	0.29311	-19.96	-18.53	0.576	0.302	0.120	79	0.007
High Medieval	47	-19.5308	-19.3900	0.59385	-21.00	-18.43	-0.508	-0.189	0.972	47	0.325
High-Late Medieval	11	-19.3737	-19.4560	0.31630	-19.78	-18.66	0.990	1.536	0.930	11	0.412
Late Medieval	79	-19.3099	-19.2943	0.60573	-20.60	-18.00	-0.147	-0.529	0.069	79	0.200*

AT 123. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the supplemented dataset, categorised by time period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Early Medieval	45	10.5353	10.6000	0.76102	8.40	11.80	-0.594	0.319	0.970	45	0.278
Early-High Medieval	79	11.5738	11.6000	0.97489	9.30	13.90	0.048	-0.432	0.054	79	0.200*
High Medieval	47	11.2831	11.0400	1.06429	9.25	13.90	0.673	-0.075	0.951	47	0.048
High-Late Medieval	11	12.0616	11.8480	0.86819	11.00	13.84	1.145	0.814	0.880	11	0.105
Late Medieval	79	11.9632	12.0000	1.33842	9.40	15.40	0.226	-0.138	0.059	79	0.200*

AT 124. Post-hoc Dunn's test results comparing dentine $\delta^{13}\text{C}$ values between periods within the supplemented dataset. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Early Medieval-High Medieval</i>	<i>-90.839</i>	<i>15.791</i>	<i>-5.753</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-Early-High Medieval</i>	<i>-104.383</i>	<i>14.140</i>	<i>-7.382</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-High-Late Medieval</i>	<i>-109.283</i>	<i>21.115</i>	<i>-5.176</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-Late Medieval</i>	<i>-115.290</i>	<i>14.388</i>	<i>-8.013</i>	<i><.001</i>	<i>.000</i>
Roman-High Medieval	-86.362	76.513	-1.129	.259	1.000
Roman-Early-High Medieval	-99.905	76.190	-1.311	.190	1.000
Roman-High-Late Medieval	-104.806	77.787	-1.347	.178	1.000
Roman-Late Medieval	-110.813	76.236	-1.454	.146	1.000
High Medieval-Early-High Medieval	13.543	13.947	.971	.332	1.000
High Medieval-High-Late Medieval	-18.444	20.986	-.879	.379	1.000
High Medieval-Late Medieval	-24.451	14.198	-1.722	.085	1.000
Early-High Medieval-High-Late Medieval	-4.900	19.774	-.248	.804	1.000
Early-High Medieval-Late Medieval	-10.907	12.336	-.884	.377	1.000
High-Late Medieval-Late Medieval	-6.007	19.952	-.301	.763	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 125. Post-hoc Dunn's test results comparing dentine $\delta^{15}\text{N}$ values between periods within the supplemented dataset. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Early Medieval-High Medieval</i>	<i>-47.808</i>	<i>15.801</i>	<i>-3.026</i>	<i>.002</i>	<i>.037</i>
<i>Early Medieval-Early-High Medieval</i>	<i>-71.251</i>	<i>14.149</i>	<i>-5.036</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-Late Medieval</i>	<i>-90.182</i>	<i>14.397</i>	<i>-6.264</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-High-Late Medieval</i>	<i>-100.300</i>	<i>21.129</i>	<i>-4.747</i>	<i><.001</i>	<i>.000</i>
Early Medieval-Roman	133.744	76.598	1.746	.081	1.000
High Medieval-Early-High Medieval	23.442	13.956	1.680	.093	1.000
High Medieval-Late Medieval	-42.374	14.207	-2.983	.003	.043
High Medieval-High-Late Medieval	-52.492	21.000	-2.500	.012	.186
High Medieval-Roman	85.936	76.562	1.122	.262	1.000
Early-High Medieval-Late Medieval	-18.931	12.344	-1.534	.125	1.000
Early-High Medieval-High-Late Medieval	-29.049	19.787	-1.468	.142	1.000
Early-High Medieval-Roman	62.494	76.239	.820	.412	1.000
Late Medieval-High-Late Medieval	10.118	19.965	.507	.612	1.000
Late Medieval-Roman	43.563	76.285	.571	.568	1.000
High-Late Medieval-Roman	33.444	77.837	.430	.667	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.1.4.2. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ across sex

AT 126. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ dentine values for the PhD dataset, categorised by sex. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
$\delta^{13}\text{C}$	Male	20	-19.4031	-19.3763	0.40572	-20.10	-18.69	0.093	-0.539	0.971	20	0.766
	Female	16	-19.4833	-19.4853	0.51358	-20.40	-18.63	-0.025	-0.702	0.983	16	0.984
$\delta^{15}\text{N}$	Male	20	11.4899	11.7572	1.00068	9.67	13.70	0.048	-0.242	0.955	20	0.442
	Female	16	11.2745	11.2598	1.07661	9.25	13.51	0.396	0.336	0.974	16	0.896

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 127. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ dentine values for the supplemented dataset, categorised by sex. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
$\delta^{13}\text{C}$	Male	130	-19.5443	-19.5000	0.55104	-20.70	-18.00	0.143	-0.316	0.059	130	0.200*
	Female	98	-19.6505	-19.5000	0.52741	-21.00	018.10	0.048	0.084	0.069	98	0.200*
$\delta^{15}\text{N}$	Male	130	11.4977	11.5000	1.20380	8.40	15.40	0.613	0.935	0.078	130	0.052
	Female	98	11.5418	11.4591	1.18530	8.90	13.90	-0.003	-0.635	0.062	98	0.200*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.1.4.3 $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ between HD diagnoses levels

AT 128. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the supplementary dataset, categorised by HD severity/certainty level. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
No HD	203	-19.4897	-19.5000	0.52424	-20.70	-18.00	0.155	-0.194	0.049	203	0.200*
Possible HD	15	-19.5716	-19.5453	0.50605	-20.50	-18.73	-0.189	-0.880	0.969	15	0.838
Probable HD	18	-19.4201	-19.3763	0.54918	-20.40	-19.63	-0.274	-0.873	0.953	18	0.474
Pathognomonic HD	25	-19.8534	-19.8534	0.55929	-21.00	-18.53	0.113	0.129	0.984	25	0.951
Unlike to have HD	218	-19.4953	-19.5000	0.52229	-20.70	-18.00	0.140	-0.223	0.047	218	0.200*
Likely to have HD	77	-19.6720	-19.6700	0.58957	-21.00	-18.53	-0.039	-0.504	0.984	43	0.793

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 129. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the supplementary dataset, categorised by HD severity/certainty level. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
No HD	203	11.4812	11.37000	1.20754	8.40	15.40	0.397	0.288	0.057	203	0.200*
Possible HD	15	11.1611	11.20000	0.66890	10.05	12.34	0.052	-1.054	0.964	15	0.760
Probable HD	18	11.4710	11.1255	1.28156	10.10	13.90	0.655	-1.020	0.878	18	0.024
Pathognomonic HD	25	11.6182	11.6000	1.08621	9.25	13.70	0.100	-0.120	0.983	25	0.932
Unlike to have HD	218	11.4592	11.3352	1.18018	8.40	15.40	0.434	0.404	0.056	218	0.093
Likely to have HD	77	11.5566	11.4000	1.15947	9.25	13.90	0.348	-0.726	0.961	43	154

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 130. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the supplementary dataset, categorised by RS presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
RS absent	9	-19.2756	-19.2387	0.42281	-19.96	-18.73	-0.684	-0.515	0.910	9	0.313
RS present	31	-19.4516	-19.4737	0.45700	-20.40	-18.53	0.275	-0.220	0.969	31	0.485

*. This is a lower bound of the true significance.

b. Lilliefors Significance Correction

AT 131. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the supplementary dataset, categorised by RS presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *ursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
RS absent	9	11.3076	11.2367	0.45561	10.69	12.23	0.854	1.088	0.958	9	0.782
RS present	31	11.3859	11.4000	1.14842	9.25	13.70	0.366	-0.647	0.949	31	0.151

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.1.4.2. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ across and between leprosaria

AT 132. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the supplemented dataset, categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *ursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/Friary	4	-19.3917	-19.5530	0.56713	-19.83	-18.63	1.049	-0.279	0.867	4	0.287
Leprosarium	60	-19.6593	-19.5727	0.60538	-21.00	-18.53	-0.172	-0.851	0.088	60	0.200*
Hospital	62	-19.1452	-19.1000	0.50235	-20.20	-18.00	0.089	-0.459	0.074	62	0.200*
<i>Other site types</i>	<i>136</i>	<i>-19.6254</i>	<i>-19.6000</i>	<i>0.43824</i>	<i>-20.50</i>	<i>-18.43</i>	<i>0.073</i>	<i>-0.475</i>	<i>0.085</i>	<i>136</i>	<i>0.019</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 133. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the supplemented dataset, categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/Friary	4	12.5582	12.2944	0.78371	11.94	13.70	1.664	2.940	0.838	4	0.188
Leprosarium	60	11.5696	11.5091	1.13791	9.25	13.90	0.363	-0.570	0.102	60	0.187
Hospital	62	12.0823	12.1000	1.34476	9.40	15.40	0.178	0.050	0.078	62	0.200*
Other site types	136	11.1424	11.1000	0.99240	8.40	13.90	0.160	-0.045	0.050	136	0.200*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 134. Post-hoc Dunn's test results for $\delta^{13}\text{C}$ dentine values per site type for the complete comparative dataset. All significant results are presented in *italics*.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Other-Leprosarium	1.653	11.734	.141	.888	1.000
Other-Monastery/Friary	28.570	38.409	.744	.457	1.000
<i>Other-Hospital</i>	<i>66.578</i>	<i>11.602</i>	<i>5.738</i>	<i><.001</i>	<i>.000</i>
Leprosarium-Monastery/Friary	26.917	39.098	.688	.491	1.000
<i>Leprosarium-Hospital</i>	<i>-64.925</i>	<i>13.711</i>	<i>-4.735</i>	<i><.001</i>	<i>.000</i>
Monastery/Friary-Hospital	-38.008	39.058	-.973	.330	1.000

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 135. Tukey HSD and Bonferroni results of $\delta^{15}\text{N}$ values comparisons between the different site types for the complementary dataset. Rows in *curse* show significant results.

Dependent Variable		(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Whole tooth d15N (‰)	Tukey HSD	Monastery/Friary	Leprosarium	.98868	.57646	.318	-.5020	2.4793
			Hospital	.47599	.57588	.842	-1.0131	1.9651
			Other	1.41586	.56630	.062	-.0485	2.8802
		Leprosarium	Monastery/Friary	-.98868	.57646	.318	-2.4793	.5020
			Hospital	-.51270	.20216	.057	-1.0354	.0101
			Other	.42718	.17301	.067	-.0202	.8746
		Hospital	Monastery/Friary	-.47599	.57588	.842	-1.9651	1.0131
			Leprosarium	.51270	.20216	.057	-.0101	1.0354
			<i>Other</i>	<i>.93988*</i>	<i>.17106</i>	<i><.001</i>	<i>.4975</i>	<i>1.3822</i>
		Other	Monastery/Friary	-1.41586	.56630	.062	-2.8802	.0485
			Leprosarium	-.42718	.17301	.067	-.8746	.0202
			<i>Hospital</i>	<i>-.93988*</i>	<i>.17106</i>	<i><.001</i>	<i>-1.3822</i>	<i>-.4975</i>
	Bonferroni	Monastery/Friary	Leprosarium	.98868	.57646	.525	-.5440	2.5213
			Hospital	.47599	.57588	1.000	-1.0551	2.0071
			Other	1.41586	.56630	.078	-.0898	2.9215
		Leprosarium	Monastery/Friary	-.98868	.57646	.525	-2.5213	.5440
			Hospital	-.51270	.20216	.071	-1.0502	.0248
			Other	.42718	.17301	.085	-.0328	.8872
		Hospital	Monastery/Friary	-.47599	.57588	1.000	-2.0071	1.0551
			Leprosarium	.51270	.20216	.071	-.0248	1.0502
			<i>Other</i>	<i>.93988*</i>	<i>.17106</i>	<i><.001</i>	<i>.4851</i>	<i>1.3947</i>
		Other	Monastery/Friary	-1.41586	.56630	.078	-2.9215	.0898
			Leprosarium	-.42718	.17301	.085	-.8872	.0328

Dependent Variable	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		<i>Hospital</i>	-.93988*	.17106	<.001	-1.3947	-.4851

AT 136. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the supplemented dataset, categorised by leprosaria. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	2	-19.3473	-19.3473	0.15368	-19.46	-19.24	-	-	-	-	-
JTN	10	-19.2582	-19.2596	0.41497	-19.96	-18.53	0.199	0.061	0.972	10	0.908
MHW	3	-19.3052	-19.3847	0.35228	-19.61	-18.91	0.963	-	0.962	3	0.625
<i>MMW</i>	10	-19.1752	-19.1400	0.42140	-20.02	-18.69	-0.730	0.237	0.933	10	0.482
<i>MSL</i>	5	-19.3433	-19.4737	0.45077	-19.78	-18.66	0.960	0.119	0.930	5	0.596
<i>SLP</i>	30	-20.0633	-20.1500	0.50752	-21.00	-19.10	0.434	-0.614	0.950	30	0.165

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 137. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the supplemented dataset, categorised by leprosaria. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	2	11.6295	11.6295	0.15730	11.52	11.74	-	-	-	-	-
JTN	10	11.4758	11.4480	1.01856	10.16	13.54	0.719	0.556	0.942	10	0.571
MHW	3	11.2197	10.4837	2.02209	9.67	13.51	1.421	-	0.901	3	0.388
<i>MMW</i>	10	10.8079	10.7952	0.84801	9.25	12.23	-0.099	0.352	0.990	10	0.996
<i>MSL</i>	5	12.6438	12.3397	0.94177	11.76	13.84	0.490	-2.532	0.875	5	0.288
<i>SLP</i>	30	11.7067	11.5500	1.11786	9.90	13.90	0.387	-0.867	0.949	30	0.160

AT 138. Tukey HSD and Bonferroni results of $\delta^{13}\text{C}$ values comparisons between the different site types for the complementary dataset. Rows in *cursive* show significant results.

Dependent Variable		(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Dentine d13C (‰)	Tukey HSD	MMW	JTN	.08302	.20819	.999	-.5321	.6981
			MHW	.13006	.30644	.998	-.7753	1.0354
			MSL	.16810	.25498	.986	-.5852	.9214
			BSA	.17217	.36059	.997	-.8932	1.2375
			<i>SPL</i>	<i>.88817</i>	<i>.16998</i>	<i><.001</i>	<i>.3860</i>	<i>1.3904</i>
	JTN	MMW		-.08302	.20819	.999	-.6981	.5321
		MHW		.04704	.30644	1.000	-.8583	.9524
		MSL		.08508	.25498	.999	-.6682	.8384
		BSA		.08915	.36059	1.000	-.9762	1.1545
		<i>SPL</i>		<i>.80515</i>	<i>.16998</i>	<i><.001</i>	<i>.3029</i>	<i>1.3074</i>
	MHW	MMW		-.13006	.30644	.998	-1.0354	.7753

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		JTN	-.04704	.30644	1.000	-.9524	.8583
		MSL	.03804	.33997	1.000	-.9664	1.0425
		BSA	.04211	.42496	1.000	-1.2134	1.2976
		SPL	.75811	.28189	.094	-.0747	1.5909
	MSL	MMW	-.16810	.25498	.986	-.9214	.5852
		JTN	-.08508	.25498	.999	-.8384	.6682
		MHW	-.03804	.33997	1.000	-1.0425	.9664
		BSA	.00407	.38948	1.000	-1.1466	1.1548
		SPL	.72007	.22487	.026	.0557	1.3844
	BSA	MMW	-.17217	.36059	.997	-1.2375	.8932
		JTN	-.08915	.36059	1.000	-1.1545	.9762
		MHW	-.04211	.42496	1.000	-1.2976	1.2134
		MSL	-.00407	.38948	1.000	-1.1548	1.1466
		SPL	.71600	.33997	.300	-.2884	1.7204
	SPL	MMW	-.88817	.16998	<.001	-1.3904	-.3860
		JTN	-.80515	.16998	<.001	-1.3074	-.3029
		MHW	-.75811	.28189	.094	-1.5909	.0747
		MSL	-.72007	.22487	.026	-1.3844	-.0557
		BSA	-.71600	.33997	.300	-1.7204	.2884
	Bonferroni MMW	JTN	.08302	.20819	1.000	-.5564	.7224
		MHW	.13006	.30644	1.000	-.8112	1.0713
		MSL	.16810	.25498	1.000	-.6150	.9512
		BSA	.17217	.36059	1.000	-.9354	1.2797
		SPL	.88817	.16998	<.001	.3661	1.4103

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	JTN	MMW	-.08302	.20819	1.000	-.7224	.5564
		MHW	.04704	.30644	1.000	-.8942	.9882
		MSL	.08508	.25498	1.000	-.6980	.8682
		BSA	.08915	.36059	1.000	-1.0184	1.1967
		SPL	.80515	.16998	<.001	.2831	1.3272
	MHW	MMW	-.13006	.30644	1.000	-1.0713	.8112
		JTN	-.04704	.30644	1.000	-.9882	.8942
		MSL	.03804	.33997	1.000	-1.0061	1.0822
		BSA	.04211	.42496	1.000	-1.2631	1.3473
		SPL	.75811	.28189	.143	-.1077	1.6239
	MSL	MMW	-.16810	.25498	1.000	-.9512	.6150
		JTN	-.08508	.25498	1.000	-.8682	.6980
		MHW	-.03804	.33997	1.000	-1.0822	1.0061
		BSA	.00407	.38948	1.000	-1.1922	1.2003
		SPL	.72007	.22487	.034	.0294	1.4107
	BSA	MMW	-.17217	.36059	1.000	-1.2797	.9354
		JTN	-.08915	.36059	1.000	-1.1967	1.0184
		MHW	-.04211	.42496	1.000	-1.3473	1.2631
		MSL	-.00407	.38948	1.000	-1.2003	1.1922
		SPL	.71600	.33997	.598	-.3282	1.7602
	SPL	MMW	-.88817	.16998	<.001	-1.4103	-.3661
		JTN	-.80515	.16998	<.001	-1.3272	-.2831
		MHW	-.75811	.28189	.143	-1.6239	.1077
		MSL	-.72007	.22487	.034	-1.4107	-.0294

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	SPL	BSA	-.71600	.33997	.598	-1.7602	.3282
		MMW	.89877	.39690	.414	-.3203	2.1178
		JTN	.23089	.39690	1.000	-.9881	1.4499
		MHW	.48700	.65818	1.000	-1.5345	2.5085
		MSL	-.93713	.52504	1.000	-2.5498	.6755
		BSA	.07716	.79379	1.000	-2.3609	2.5152

A. 4.4.1.4.4.2. Site types within their temporal context

A. 4.4.2.3.1.1.1. Early-High medieval period

AT 139. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the Early-High medieval sites from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
CPA	32	-19.5250	-19.6000	0.26027	-19.90	-19.00	0.550	-0.809	0.942	37	0.054
<i>CHI</i>	<i>37</i>	<i>-19.3424</i>	<i>-19.4000</i>	<i>0.24890</i>	<i>-19.80</i>	<i>-18.60</i>	<i>0.712</i>	<i>0.707</i>	<i>0.919</i>	<i>32</i>	<i>0.019</i>
JTN	10	-19.2582	-19.3201	0.41497	-19.96	-18.53	0.199	0.061	0.972	10	0.908

AT 140. Post-hoc Dunn's test results for $\delta^{13}\text{C}$ dentine values of individuals from early-high medieval sites for the complete comparative dataset. All significant results are presented in *italics*.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
CPA-CHI	15.454	5.512	2.804	.005	.015
CPA-JTN	-18.363	8.272	-2.220	.026	.079
CHI-JTN	-2.908	8.137	-.357	.721	1.000

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 141. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the Early-High medieval sites from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
CPA	32	11.8250	11.9500	0.97319	9.60	13.90	-0.245	-0.065	0.973	37	0.508
CHI	37	11.3831	11.2000	0.94243	9.30	13.10	0.109	-0.396	0.986	32	0.938
JTN	10	11.4758	11.4480	1.01856	10.16	13.54	0.719	0.556	0.942	10	0.571

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

6.3.1.1.1.1 A. 4.4.1.4.4.2.2. *High (and High-late) medieval period*

AT 142. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the High and High-late medieval sites from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	2	-19.3473	-19.3473	0.15368	-19.46	-19.24	-	-	-	-	-
CHI	4	-19.4250	-19.400	0.22174	-19.70	-19.20	-0.482	-1.700	0.963	4	0.798
MMW	10	-19.1752	-19.1553	0.42140	-20.02	-18.69	-0.730	0.237	0.933	10	0.482
MSL	5	-19.3433	-19.4737	0.45077	-19.78	-18.66	0.960	0.119	0.930	5	0.596
SLP	20	-19.9450	-20.0500	0.56798	-21.00	-19.10	-0.085	-0.998	0.959	20	0.519
WPY	17	-19.2526	-19.3100	0.39391	-19.84	-18.43	0.486	-0.058	0.959	17	0.621

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 143. Tukey HSD and Bonferroni results of $\delta^{13}\text{C}$ values comparisons between the different sites from the High and High-late medieval period for the complementary dataset. Rows in *cursive* show significant results.

Dependent Variable		(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Dentine (‰)	d13C Tukey HSD	MMW	CHI	.24983	.27449	.942	-.5623	1.0619
			WPY	.07740	.18491	.998	-.4697	.6245
			MSL	.16810	.25413	.985	-.5838	.9200
			BSA	.17217	.35939	.997	-.8911	1.2355
			SLP	.76983	.17970	.001	.2382	1.3015
	CHI	MMW		-.24983	.27449	.942	-1.0619	.5623
		WPY		-.17243	.25784	.985	-.9353	.5904

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		MSL	-.08173	.31124	1.000	-1.0026	.8391
		BSA	-.07767	.40182	1.000	-1.2665	1.1111
		SLP	.52000	.25413	.331	-.2319	1.2719
	WPY	MMW	-.07740	.18491	.998	-.6245	.4697
		CHI	.17243	.25784	.985	-.5904	.9353
		MSL	.09070	.23605	.999	-.6077	.7891
		BSA	.09476	.34684	1.000	-.9314	1.1209
		SLP	.69243	.15306	<.001	.2396	1.1453
	MSL	MMW	-.16810	.25413	.985	-.9200	.5838
		CHI	.08173	.31124	1.000	-.8391	1.0026
		WPY	-.09070	.23605	.999	-.7891	.6077
		BSA	.00407	.38819	1.000	-1.1444	1.1526
		SLP	.60173	.23199	.117	-.0846	1.2881
	BSA	MMW	-.17217	.35939	.997	-1.2355	.8911
		CHI	.07767	.40182	1.000	-1.1111	1.2665
		WPY	-.09476	.34684	1.000	-1.1209	.9314
		MSL	-.00407	.38819	1.000	-1.1526	1.1444
		SLP	.59767	.34409	.514	-.4204	1.6157
	SLP	MMW	-.76983	.17970	.001	-1.3015	-.2382
		CHI	-.52000	.25413	.331	-1.2719	.2319
		WPY	-.69243	.15306	<.001	-1.1453	-.2396
		MSL	-.60173	.23199	.117	-1.2881	.0846
		BSA	-.59767	.34409	.514	-1.6157	.4204

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	MMW	CHI	.24983	.27449	1.000	-.5947	1.0944
		WPY	.07740	.18491	1.000	-.4915	.6463
		MSL	.16810	.25413	1.000	-.6138	.9500
		BSA	.17217	.35939	1.000	-.9336	1.2780
		SLP	.76983	.17970	.001	.2169	1.3227
	CHI	MMW	-.24983	.27449	1.000	-1.0944	.5947
		WPY	-.17243	.25784	1.000	-.9658	.6209
		MSL	-.08173	.31124	1.000	-1.0394	.8759
		BSA	-.07767	.40182	1.000	-1.3140	1.1587
		SLP	.52000	.25413	.687	-.2619	1.3019
	WPY	MMW	-.07740	.18491	1.000	-.6463	.4915
		CHI	.17243	.25784	1.000	-.6209	.9658
		MSL	.09070	.23605	1.000	-.6356	.8170
		BSA	.09476	.34684	1.000	-.9724	1.1620
		SLP	.69243	.15306	<.001	.2215	1.1634
	MSL	MMW	-.16810	.25413	1.000	-.9500	.6138
		CHI	.08173	.31124	1.000	-.8759	1.0394
		WPY	-.09070	.23605	1.000	-.8170	.6356
		BSA	.00407	.38819	1.000	-1.1903	1.1985
		SLP	.60173	.23199	.185	-.1121	1.3155
	BSA	MMW	-.17217	.35939	1.000	-1.2780	.9336
		CHI	.07767	.40182	1.000	-1.1587	1.3140
		WPY	-.09476	.34684	1.000	-1.1620	.9724

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	SLP	MSL	-.00407	.38819	1.000	-1.1985	1.1903
		SLP	.59767	.34409	1.000	-.4611	1.6564
		MMW	-.76983	.17970	.001	-1.3227	-.2169
		CHI	-.52000	.25413	.687	-1.3019	.2619
		WPY	-.69243	.15306	<.001	-1.1634	-.2215
		MSL	-.60173	.23199	.185	-1.3155	.1121
		BSA	-.59767	.34409	1.000	-1.6564	.4611

AT 144. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the High and High-Late medieval sites from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	2	11.6295	11.6295	0.15730	11.52	11.74	-	-	-	-	-
CHI	4	11.5500	11.5500	0.53229	11.00	12.10	0.000	-4.655	0.895	4	0.409
MMW	10	10.8079	10.79352	0.84801	9.25	12.23	-0.099	0.352	0.990	10	0.996
MSL	5	12.6438	12.3397	0.94177	11.76	13.84	0.490	-2.532	0.875	5	0.288
SLP	20	11.9550	11.9000	1.09471	10.30	13.90	0.194	-1.147	0.947	20	0.329
WPY	17	10.7720	10.7400	0.66784	9.72	12.46	0.803	1.152	0.951	17	0.474

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 145. Tukey HSD and Bonferroni results of $\delta^{15}\text{N}$ values comparisons between the different sites from the High and High-late medieval period for the complementary dataset. Rows in *cursive* show significant results.

Dependent Variable			(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
								Lower Bound	Upper Bound
Dentine (‰)	d15N	Tukey HSD	MMW	CHI	-.74210	.52404	.717	-2.2925	.8083
				WPY	.03586	.35301	1.000	-1.0086	1.0803
				<i>MSL</i>	<i>-1.83590</i>	<i>.48517</i>	<i>.005</i>	<i>-3.2713</i>	<i>-.4005</i>
				BSA	-.82160	.68613	.836	-2.8516	1.2084
				<i>SLP</i>	<i>-1.14710</i>	<i>.34306</i>	<i>.018</i>	<i>-2.1621</i>	<i>-.1321</i>
			CHI	MMW	.74210	.52404	.717	-.8083	2.2925
				WPY	.77796	.49225	.615	-.6784	2.2343
				<i>MSL</i>	<i>-1.09380</i>	<i>.59420</i>	<i>.449</i>	<i>-2.8518</i>	<i>.6642</i>
				BSA	-.07950	.76712	1.000	-2.3491	2.1901
				<i>SLP</i>	<i>-.40500</i>	<i>.48517</i>	<i>.960</i>	<i>-1.8404</i>	<i>1.0304</i>
			WPY	MMW	-.03586	.35301	1.000	-1.0803	1.0086
				CHI	-.77796	.49225	.615	-2.2343	.6784
				<i>MSL</i>	<i>-1.87176</i>	<i>.45064</i>	<i>.002</i>	<i>-3.2050</i>	<i>-.5385</i>
				BSA	-.85747	.66217	.786	-2.8166	1.1016
				<i>SLP</i>	<i>-1.18296</i>	<i>.29221</i>	<i>.002</i>	<i>-2.0475</i>	<i>-.3184</i>
			MSL	<i>MMW</i>	<i>1.83590</i>	<i>.48517</i>	<i>.005</i>	<i>.4005</i>	<i>3.2713</i>
				CHI	1.09380	.59420	.449	-.6642	2.8518
				<i>WPY</i>	<i>1.87176</i>	<i>.45064</i>	<i>.002</i>	<i>.5385</i>	<i>3.2050</i>
				BSA	1.01430	.74110	.745	-1.1783	3.2069

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	BSA	SLP	.68880	.44289	.631	-.6215	1.9991
		MMW	.82160	.68613	.836	-1.2084	2.8516
		CHI	.07950	.76712	1.000	-2.1901	2.3491
		WPY	.85747	.66217	.786	-1.1016	2.8166
		MSL	-1.01430	.74110	.745	-3.2069	1.1783
		SLP	-.32550	.65692	.996	-2.2691	1.6181
	SLP	MMW	1.14710	.34306	.018	.1321	2.1621
		CHI	.40500	.48517	.960	-1.0304	1.8404
		WPY	1.18296	.29221	.002	.3184	2.0475
		MSL	-.68880	.44289	.631	-1.9991	.6215
		BSA	.32550	.65692	.996	-1.6181	2.2691
	MMW	CHI	-.74210	.52404	1.000	-2.3545	.8703
		WPY	.03586	.35301	1.000	-1.0503	1.1220
		MSL	-1.83590	.48517	.006	-3.3287	-.3431
		BSA	-.82160	.68613	1.000	-2.9327	1.2895
		SLP	-1.14710	.34306	.023	-2.2027	-.0915
	CHI	MMW	.74210	.52404	1.000	-.8703	2.3545
		WPY	.77796	.49225	1.000	-.7366	2.2925
		MSL	-1.09380	.59420	1.000	-2.9221	.7345
		BSA	-.07950	.76712	1.000	-2.4398	2.2808
		SLP	-.40500	.48517	1.000	-1.8978	1.0878
	WPY	MMW	-.03586	.35301	1.000	-1.1220	1.0503
		CHI	-.77796	.49225	1.000	-2.2925	.7366

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	MSL	<i>MSL</i>	<i>-1.87176</i>	<i>.45064</i>	<i>.002</i>	<i>-3.2583</i>	<i>-.4852</i>
		BSA	-.85747	.66217	1.000	-2.8949	1.1799
		<i>SLP</i>	<i>-1.18296</i>	<i>.29221</i>	<i>.003</i>	<i>-2.0820</i>	<i>-.2839</i>
		<i>MMW</i>	<i>1.83590</i>	<i>.48517</i>	<i>.006</i>	<i>.3431</i>	<i>3.3287</i>
		CHI	1.09380	.59420	1.000	-.7345	2.9221
		<i>WPY</i>	<i>1.87176</i>	<i>.45064</i>	<i>.002</i>	<i>.4852</i>	<i>3.2583</i>
		BSA	1.01430	.74110	1.000	-1.2660	3.2946
		SLP	.68880	.44289	1.000	-.6739	2.0515
		MMW	.82160	.68613	1.000	-1.2895	2.9327
		CHI	.07950	.76712	1.000	-2.2808	2.4398
	BSA	WPY	.85747	.66217	1.000	-1.1799	2.8949
		MSL	-1.01430	.74110	1.000	-3.2946	1.2660
		SLP	-.32550	.65692	1.000	-2.3467	1.6958
		<i>MMW</i>	<i>1.14710</i>	<i>.34306</i>	<i>.023</i>	<i>.0915</i>	<i>2.2027</i>
		CHI	.40500	.48517	1.000	-1.0878	1.8978
	SLP	<i>WPY</i>	<i>1.18296</i>	<i>.29221</i>	<i>.003</i>	<i>.2839</i>	<i>2.0820</i>
		MSL	-.68880	.44289	1.000	-2.0515	.6739
		BSA	.32550	.65692	1.000	-1.6958	2.3467

AT 146. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the High-late and Late medieval sites types as leprosaria/non-leprosaria from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Non-leprosarium sites	21	-19/2854	-19.3100	0.36922	-19.84	-18.43	0.642	0.324	0.952	21	0.368
Leprosaria	37	-19.6233	-19.5000	0.60522	-21.00	-18.66	-0.414	-0.516	0.968	37	0.345

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 147. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the High-late and Late medieval sites types as leprosaria/non-leprosaria from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Non-leprosarium sites	21	10.9202	10.8600	0.70519	9.72	12.46	0.434	-0.145	0.975	21	0.837
Leprosaria	37	11.7205	11.7407	1.13677	9.25	13.90	0.192	-0.515	0.972	37	0.477

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 148. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the High-late and Late medieval sites from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	2	-19.3473	-19.3473	0.15368	-19.46	-19.24	-	-	-	-	-
CHI	4	-19.4250	-19.4000	0.22174	-19.70	-19.20	-0.482	-1.700	0.963	4	0.798
CJH	62	-19.1452	-19.1000	0.50235	-20.20	-18.00	0.089	-0.459	0.074	62	0.200*
IBF	4	-19.3917	-19.5530	0.56713	-19.83	-18.63	1.049	-0.279	0.867	4	0.287
MHW	3	-19.3052	-19.3847	0.35228	-19.61	-18.92	0.963	-	0.962	3	0.625
MSL	5	-19.3433	-19.4737	0.45077	-19.78	-18.66	0.960	0.119	0.930	5	0.596
SLP	10	-20.3000	-20.3000	0.23570	-20.60	-19.80	0.827	1.360	0.921	10	0.365

AT 149. Tukey HSD and Bonferroni results of $\delta^{13}\text{C}$ values comparisons between the different sites from the High-late and Late medieval period for the complementary dataset. Rows in *cursive* show significant results.

Dependent Variable		(I) SiteAb	(J) SiteAb	Mean	Std. Error	Sig.	95% Confidence Interval	
				Difference (I-J)			Lower Bound	Upper Bound
Dentine (‰)	d13C Tukey HSD	CJH	CHI	.27984	.24084	.906	-.4480	1.0076
			IBF	.24655	.24084	.947	-.4812	.9743
			MHW	.16006	.27599	.997	-.6739	.9940
			MSL	.19811	.21704	.970	-.4578	.8540
			BSA	.20217	.33540	.997	-.8114	1.2157
			<i>SLP</i>	<i>1.15484</i>	<i>.15910</i>	<i><.001</i>	<i>.6741</i>	<i>1.6356</i>
		CHI	CJH	-.27984	.24084	.906	-1.0076	.4480
			IBF	-.03329	.33012	1.000	-1.0309	.9643

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	IBF	MHW	-.11978	.35657	1.000	-1.1973	.9577
		MSL	-.08173	.31318	1.000	-1.0281	.8646
		BSA	-.07767	.40431	1.000	-1.2994	1.1441
		SLP	.87500	.27620	.034	.0404	1.7096
		CJH	-.24655	.24084	.947	-.9743	.4812
		CHI	.03329	.33012	1.000	-.9643	1.0309
		MHW	-.08649	.35657	1.000	-1.1640	.9910
		MSL	-.04844	.31318	1.000	-.9948	.8979
		BSA	-.04437	.40431	1.000	-1.2661	1.1774
		SLP	.90829	.27620	.024	.0737	1.7429
	MHW	CJH	-.16006	.27599	.997	-.9940	.6739
		CHI	.11978	.35657	1.000	-.9577	1.1973
		IBF	.08649	.35657	1.000	-.9910	1.1640
		MSL	.03804	.34095	1.000	-.9922	1.0683
		BSA	.04211	.42618	1.000	-1.2458	1.3300
		SLP	.99478	.30733	.028	.0661	1.9235
	MSL	CJH	-.19811	.21704	.970	-.8540	.4578
		CHI	.08173	.31318	1.000	-.8646	1.0281
		IBF	.04844	.31318	1.000	-.8979	.9948
		MHW	-.03804	.34095	1.000	-1.0683	.9922
		BSA	.00407	.39060	1.000	-1.1763	1.1844
		SLP	.95673	.25571	.006	.1840	1.7295
	BSA	CJH	-.20217	.33540	.997	-1.2157	.8114

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
		CHI	.07767	.40431	1.000	-1.1441	1.2994
		IBF	.04437	.40431	1.000	-1.1774	1.2661
		MHW	-.04211	.42618	1.000	-1.3300	1.2458
		MSL	-.00407	.39060	1.000	-1.1844	1.1763
		SLP	.95267	.36163	.129	-.1401	2.0455
	SLP	<i>CJH</i>	<i>-1.15484</i>	<i>.15910</i>	<i><.001</i>	<i>-1.6356</i>	<i>-.6741</i>
		<i>CHI</i>	<i>-.87500</i>	<i>.27620</i>	<i>.034</i>	<i>-1.7096</i>	<i>-.0404</i>
		<i>IBF</i>	<i>-.90829</i>	<i>.27620</i>	<i>.024</i>	<i>-1.7429</i>	<i>-.0737</i>
		<i>MHW</i>	<i>-.99478</i>	<i>.30733</i>	<i>.028</i>	<i>-1.9235</i>	<i>-.0661</i>
		<i>MSL</i>	<i>-.95673</i>	<i>.25571</i>	<i>.006</i>	<i>-1.7295</i>	<i>-.1840</i>
		BSA	-.95267	.36163	.129	-2.0455	.1401
	Bonferroni CJH	CHI	.27984	.24084	1.000	-.4751	1.0347
		IBF	.24655	.24084	1.000	-.5083	1.0014
		MHW	.16006	.27599	1.000	-.7050	1.0251
		MSL	.19811	.21704	1.000	-.4822	.8784
		BSA	.20217	.33540	1.000	-.8491	1.2535
		SLP	1.15484*	.15910	<.001	.6562	1.6535
	CHI	CJH	-.27984	.24084	1.000	-1.0347	.4751
		IBF	-.03329	.33012	1.000	-1.0680	1.0014
		MHW	-.11978	.35657	1.000	-1.2374	.9979
		MSL	-.08173	.31318	1.000	-1.0634	.8999
		BSA	-.07767	.40431	1.000	-1.3449	1.1896
		SLP	.87500*	.27620	.045	.0093	1.7407

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	IBF	CJH	-.24655	.24084	1.000	-1.0014	.5083
		CHI	.03329	.33012	1.000	-1.0014	1.0680
		MHW	-.08649	.35657	1.000	-1.2041	1.0311
		MSL	-.04844	.31318	1.000	-1.0301	.9332
		BSA	-.04437	.40431	1.000	-1.3117	1.2229
		SLP	.90829*	.27620	.031	.0426	1.7740
	MHW	CJH	-.16006	.27599	1.000	-1.0251	.7050
		CHI	.11978	.35657	1.000	-.9979	1.2374
		IBF	.08649	.35657	1.000	-1.0311	1.2041
		MSL	.03804	.34095	1.000	-1.0306	1.1067
		BSA	.04211	.42618	1.000	-1.2937	1.3779
		SLP	.99478*	.30733	.036	.0315	1.9581
	MSL	CJH	-.19811	.21704	1.000	-.8784	.4822
		CHI	.08173	.31318	1.000	-.8999	1.0634
		IBF	.04844	.31318	1.000	-.9332	1.0301
		MHW	-.03804	.34095	1.000	-1.1067	1.0306
		BSA	.00407	.39060	1.000	-1.2202	1.2284
		SLP	.95673*	.25571	.007	.1552	1.7582
	BSA	CJH	-.20217	.33540	1.000	-1.2535	.8491
		CHI	.07767	.40431	1.000	-1.1896	1.3449
		IBF	.04437	.40431	1.000	-1.2229	1.3117
		MHW	-.04211	.42618	1.000	-1.3779	1.2937
		MSL	-.00407	.39060	1.000	-1.2284	1.2202

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	SLP	SLP	.95267	.36163	.211	-.1808	2.0862
		CJH	-1.15484*	.15910	<.001	-1.6535	-.6562
		CHI	-.87500*	.27620	.045	-1.7407	-.0093
		IBF	-.90829*	.27620	.031	-1.7740	-.0426
		MHW	-.99478*	.30733	.036	-1.9581	-.0315
		MSL	-.95673*	.25571	.007	-1.7582	-.1552
		BSA	-.95267	.36163	.211	-2.0862	.1808

AT 150. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the High-late and Late medieval sites from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	2	11.6295	11.6295	0.15730	11.52	11.74	-	-			
CHI	4	11.5500	11.5500	0.53229	11.00	12.10	0.000	-4.655	0.895	4	0.409
CJH	62	12.0823	12.1000	1.34476	9.40	15.40	0.178	0.050	0.078	62	0.200*
IBF	4	12.5582	12.2944	0.78371	11.94	13.70	1.664	2.940	0.838	4	0.188
MHW	3	11.2197	10.4837	2.02209	9.67	13.51	1.421	-	0.901	3	0.388
MSL	5	12.6438	12.3397	0.94177	11.76	13.84	0.490	-2.532	0.875	5	0.288
SLP	10	11.2100	11.1000	1.04185	9.90	13.50	1.077	1.751	.926	10	.413

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 151. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ dentine values for the High-late and Late medieval sites types from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/friary	4	-19.3917	-19.5530	0.56713	-19.83	-18.63	1.049	-0.279	0.867	4	0.287
Leprosarium	20	-19.8163	-19.7922	0.57430	-20.60	-18.66	0.359	-0.884	0.945	20	0.297
Hospital	62	-19.1452	-19.1000	0.50235	-20.20	-18.00	0.089	-0.459	0.074	62	0.200*
Other	4	-19.4250	-19.4000	0.22174	-19.70	-19.20	-0.482	-1.700	0.963	4	0.798

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 152. Tukey HSD and Bonferroni results of $\delta^{13}\text{C}$ values comparisons between the different site types from the High-late and Late medieval period for the complementary dataset. Rows in *cursive* show significant results.

Dependent Variable	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Dentine d13C Tukey HSD (‰)	Monastery/Friary	Leprosarium	.42463	.28185	.438	-.3138	1.1631
		Hospital	-.24655	.26546	.790	-.9421	.4490
		Other	.03329	.36387	1.000	-.9200	.9866
	Leprosarium	Monastery/Friary	-.42463	.28185	.438	-1.1631	.3138
		<i>Hospital</i>	-.67117	.13233	<.001	-1.0179	-.3245
		Other	-.39133	.28185	.510	-1.1298	.3471
	Hospital	Monastery/Friary	.24655	.26546	.790	-.4490	.9421
		<i>Leprosarium</i>	.67117	.13233	<.001	.3245	1.0179
		Other	.27984	.26546	.718	-.4157	.9753
	Other	Monastery/Friary	-.03329	.36387	1.000	-.9866	.9200

Dependent Variable	(I) Site type	(J) Site type	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni		Leprosarium	.39133	.28185	.510	-.3471	1.1298
		Hospital	-.27984	.26546	.718	-.9753	.4157
	Monastery/Friary	Leprosarium	.42463	.28185	.814	-.3366	1.1858
		Hospital	-.24655	.26546	1.000	-.9635	.4704
		Other	.03329	.36387	1.000	-.9494	1.0160
	Leprosarium	Monastery/Friary	-.42463	.28185	.814	-1.1858	.3366
		<i>Hospital</i>	-.67117	.13233	<.001	-1.0285	-.3138
		Other	-.39133	.28185	1.000	-1.1525	.3698
	Hospital	Monastery/Friary	.24655	.26546	1.000	-.4704	.9635
		<i>Leprosarium</i>	.67117	.13233	<.001	.3138	1.0285
		Other	.27984	.26546	1.000	-.4371	.9968
	Other	Monastery/Friary	-.03329	.36387	1.000	-1.0160	.9494
		Leprosarium	.39133	.28185	1.000	-.3698	1.1525
		Hospital	-.27984	.26546	1.000	-.9968	.4371

AT 153. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ dentine values for the High-late and Late medieval sites types from the supplemented dataset, categorised by site. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/friary	4	12.5582	12.2944	0.78371	11.94	13.70	1.664	2.940	0.838	4	0.188
Leprosarium	20	11.6119	11.5591	1.23375	9.67	13.84	0.368	-0.636	0.946	20	0.314
Hospital	62	12.0823	12.1000	1.34476	9.40	15.40	0.178	0.050	0.078	62	0.200*
Other	4	11.5500	10.7030	0.22174	-19.70	-19.20	-0.482	-1.700	0.895	4	0.409

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.1.5 Early life carbon and nitrogen isotopes (incremental data)

All incremental values can be found in AT 154 at the end of this section (page 747). AF 70 and AF 71 show the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of all individuals that are incrementally sampled. Overall, these individuals have a variable pattern of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ change through early life, though some cases stand out particularly. All cases will be discussed briefly below.

A. 4.4.1.5.1 HCH

Three individuals from HCH have been sampled for incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$. No comparative incremental data is available for HCH.

A. 4.4.1.5.1.1 UIN237, Skeleton H640

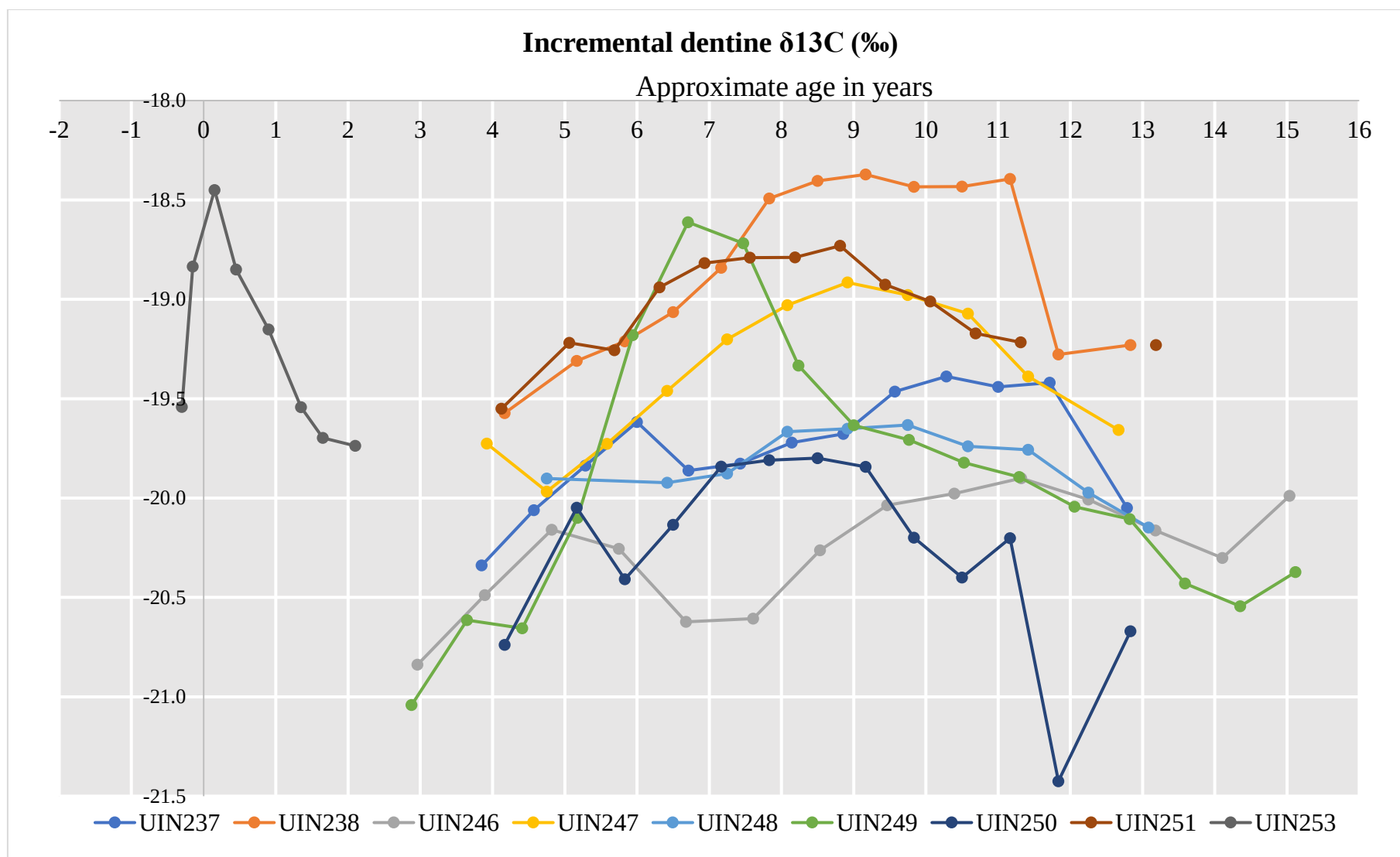
Skeleton H640 from Hereford Cathedral belonged to a 25-45 (middle adult) year old male. There are no skeletal signs of HD, apart from slight changes to the oral surface of the palate (PPMO, score 1), and possible leprogenic odontodysplasia. Lower limb and extremity bones were present but showed no signs of pathology. Ancient DNA samples were taken but did not yield any *M. leprae* DNA. AF 72 shows that this individual's $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values increase from age 7-8 to around 10-11, to then drop quite rapidly. The parallel increase of both values suggests a short-term alteration in diet, likely the inclusion of marine protein.

A. 4.4.5.1.2 UIN238, Skeleton H1552

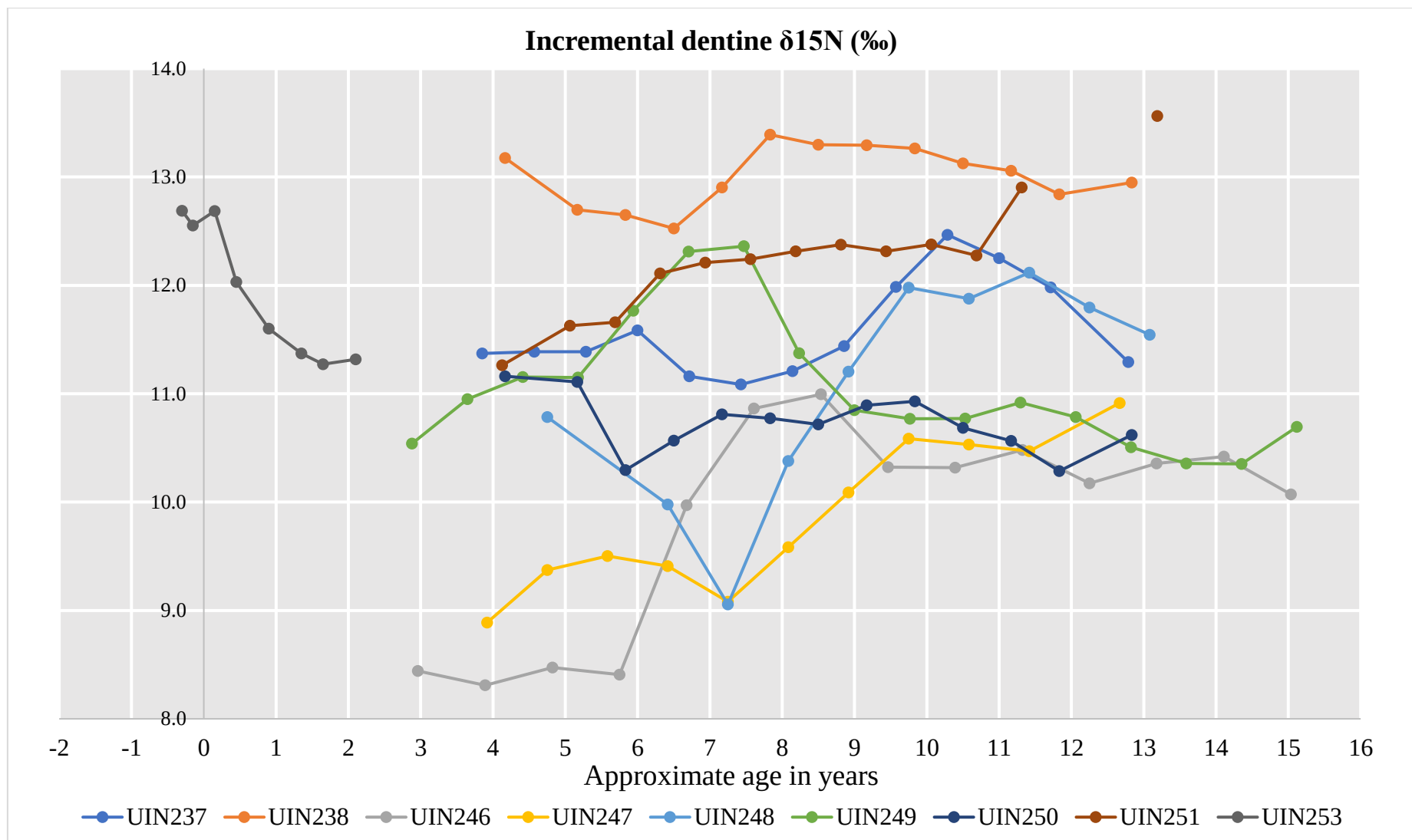
Skeleton H1552 from Hereford Cathedral belonged to a 36-45 (middle adult) year old female. This skeleton has several probable signs of HD, including: a score 1 APM; moderate periosteal changes to the right ulna and both radii; new periosteal bone on the left MC2 and right MC1, MC2, MC3, MC5; some new periosteal bone on the left fibula, MT1, MT2, MT3, MT4; some new periosteal bone on the right tibia and fibula, MT1 and MT 2 (other MTs not present). Ancient DNA samples were taken but these did not yield any *M. leprae* DNA. As visible in AF 73, this individual shows some of the highest $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values among the individuals around 4 years of age, which then drop until age 6.5 and increase again to age 8, after which they stay stable till age 11 and then drop down again. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values suggest a larger portion of diet consists of marine protein than is the case for individual UIN237, though there is fluctuation in the amount consumed throughout childhood.

A. 4.4.5.1.3 UIN246, Skeleton H4243

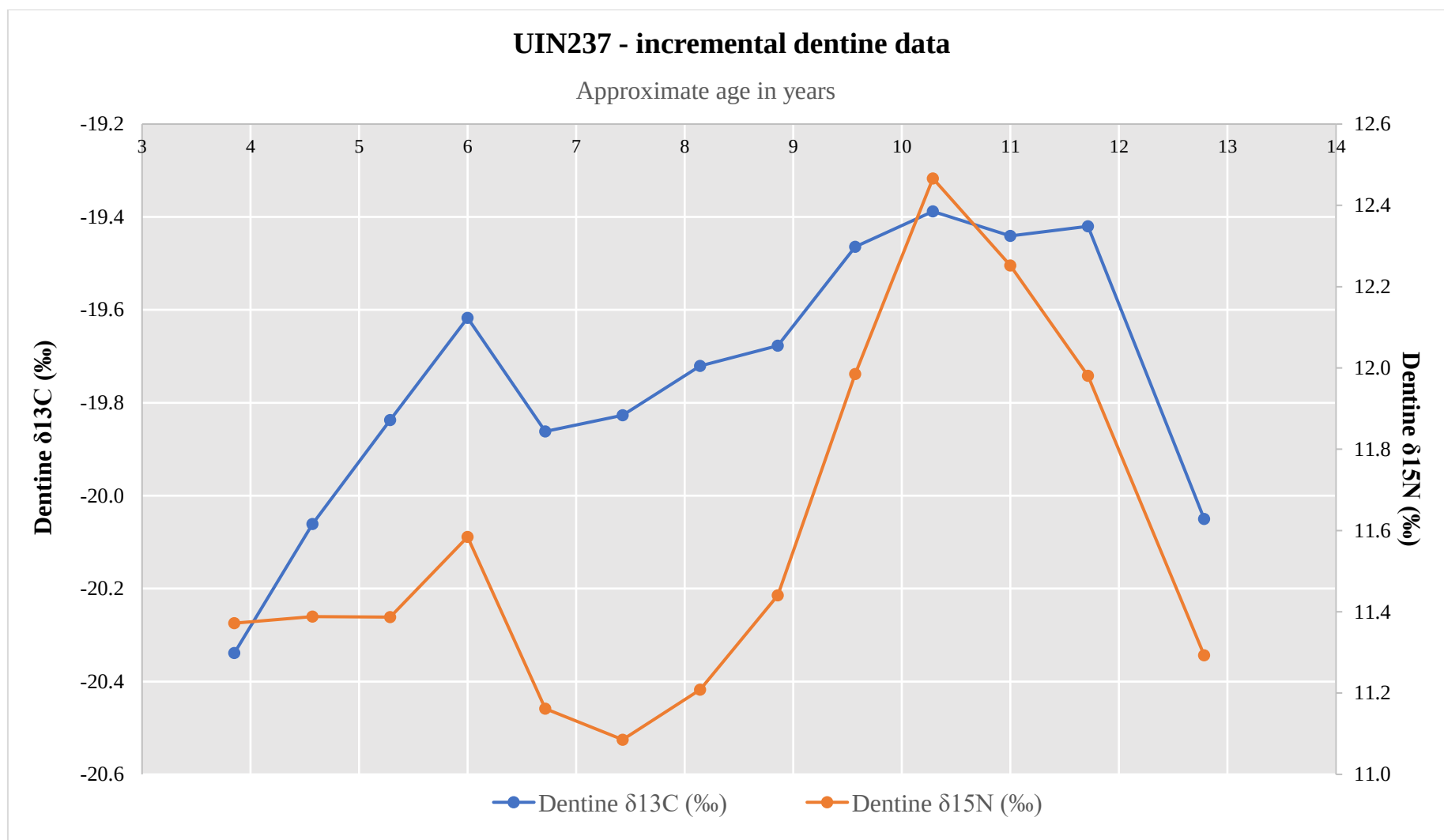
Skeleton H4243 from Hereford Cathedral belonged to a 46+ (old adult) year old male. This skeleton has no diagnostic signs of HD. Ancient DNA samples were taken but these did not yield any *M. leprae* DNA. This individual shows (AF 74) lower $\delta^{13}\text{C}$ values than the other individuals, and starts with the lowest $\delta^{15}\text{N}$ values in the sample set at age 3-6. The $\delta^{15}\text{N}$ values increase sharply around age 6 without an accompanying increase in $\delta^{13}\text{C}$ values, suggesting mostly likely dietary stress from age 6 to at least age 15. Alternatively, this individual shows a significant increase in terrestrial animal protein intake, or intake of terrestrial animal protein from a higher trophic level, though this would be expected to bring a slight increase in $\delta^{13}\text{C}$ values as well.



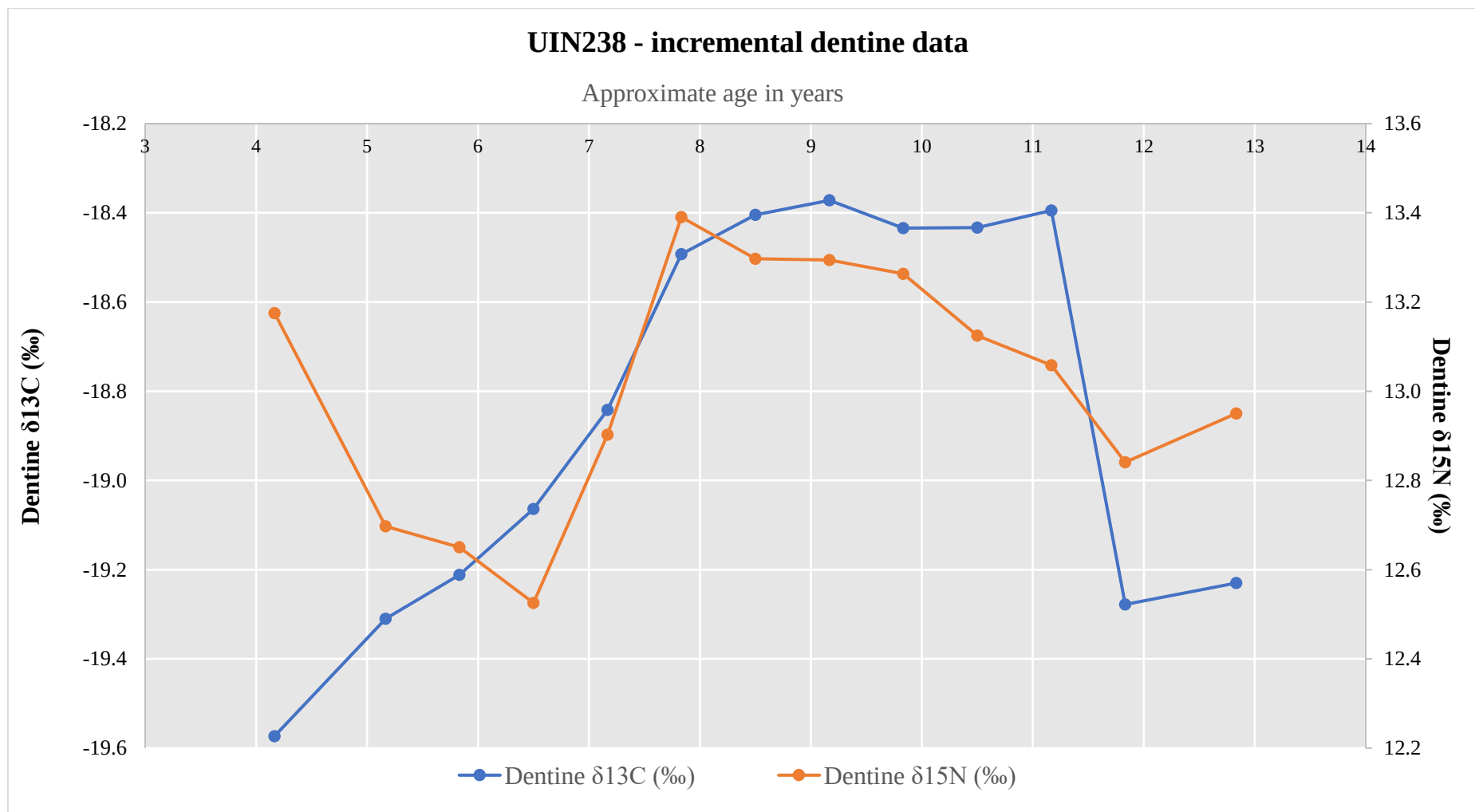
AF 70. Line plot for incremental $\delta^{13}\text{C}$ values of all UINs that were incrementally sampled.



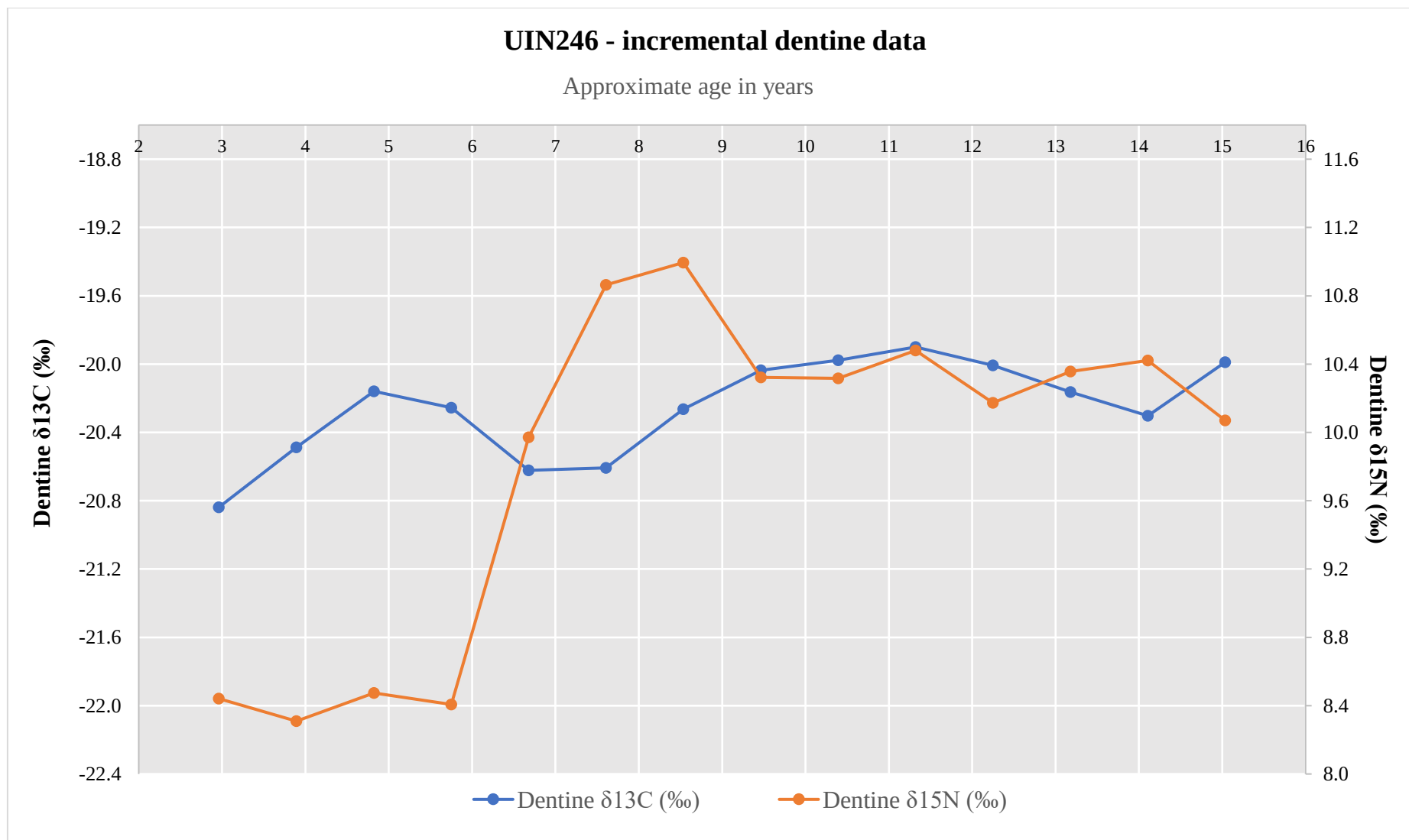
AF 71. Line plot for incremental $\delta^{15}\text{N}$ values of all UINs that were incrementally sampled.



AF 72. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN237, HCH.



AF 73. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN238, HCH.



AF 74. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN246, HCH.

A. 4.4.1.5.2 RFN

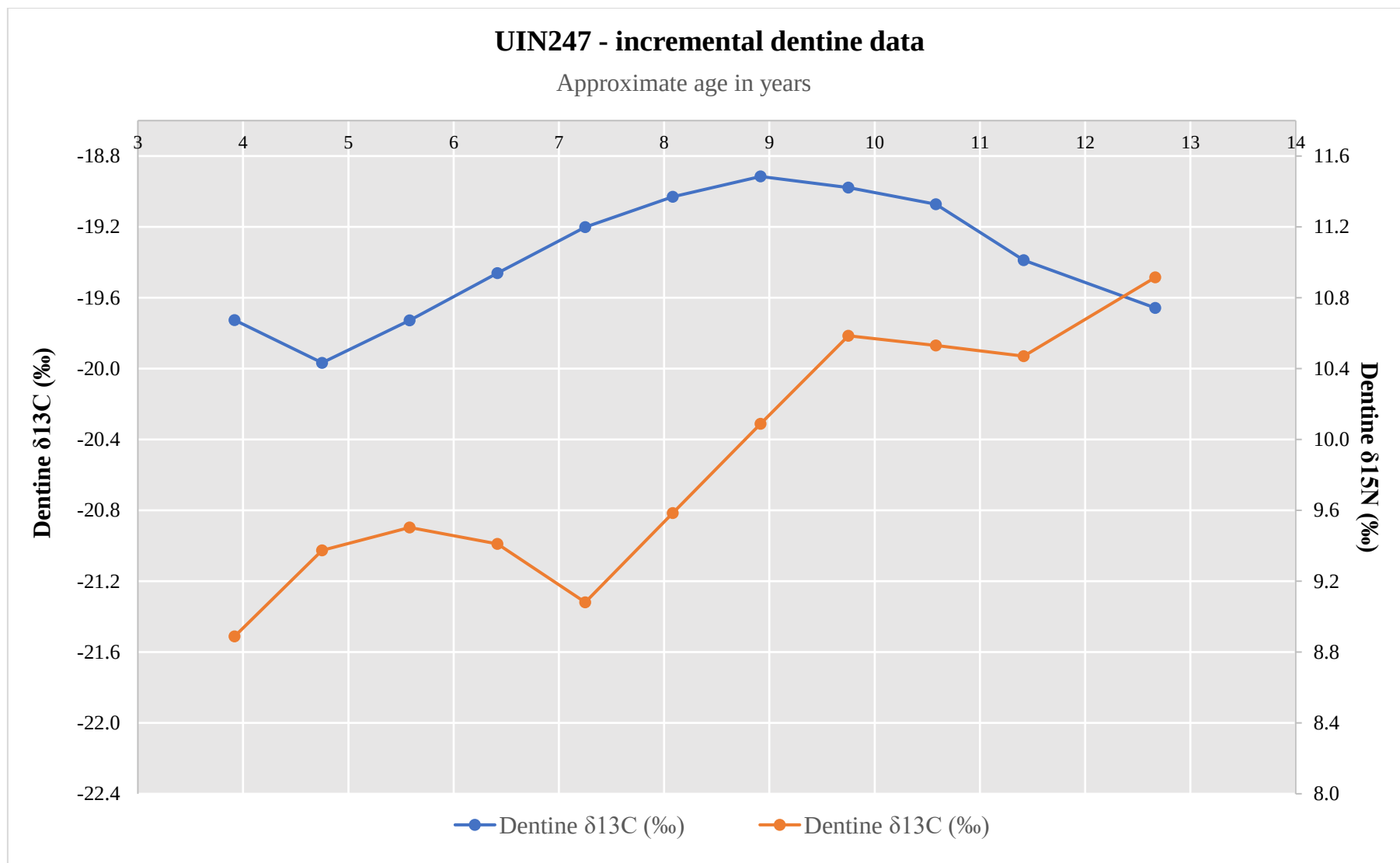
Two individuals from RFN have been sampled for incremental isotopes. Twenty-four individuals have previously been incrementally sampled but are published without ages (only increment numbers) and are not comparable teeth.

A. 4.4.1.5.2.1 UIN247, Skeleton R5029

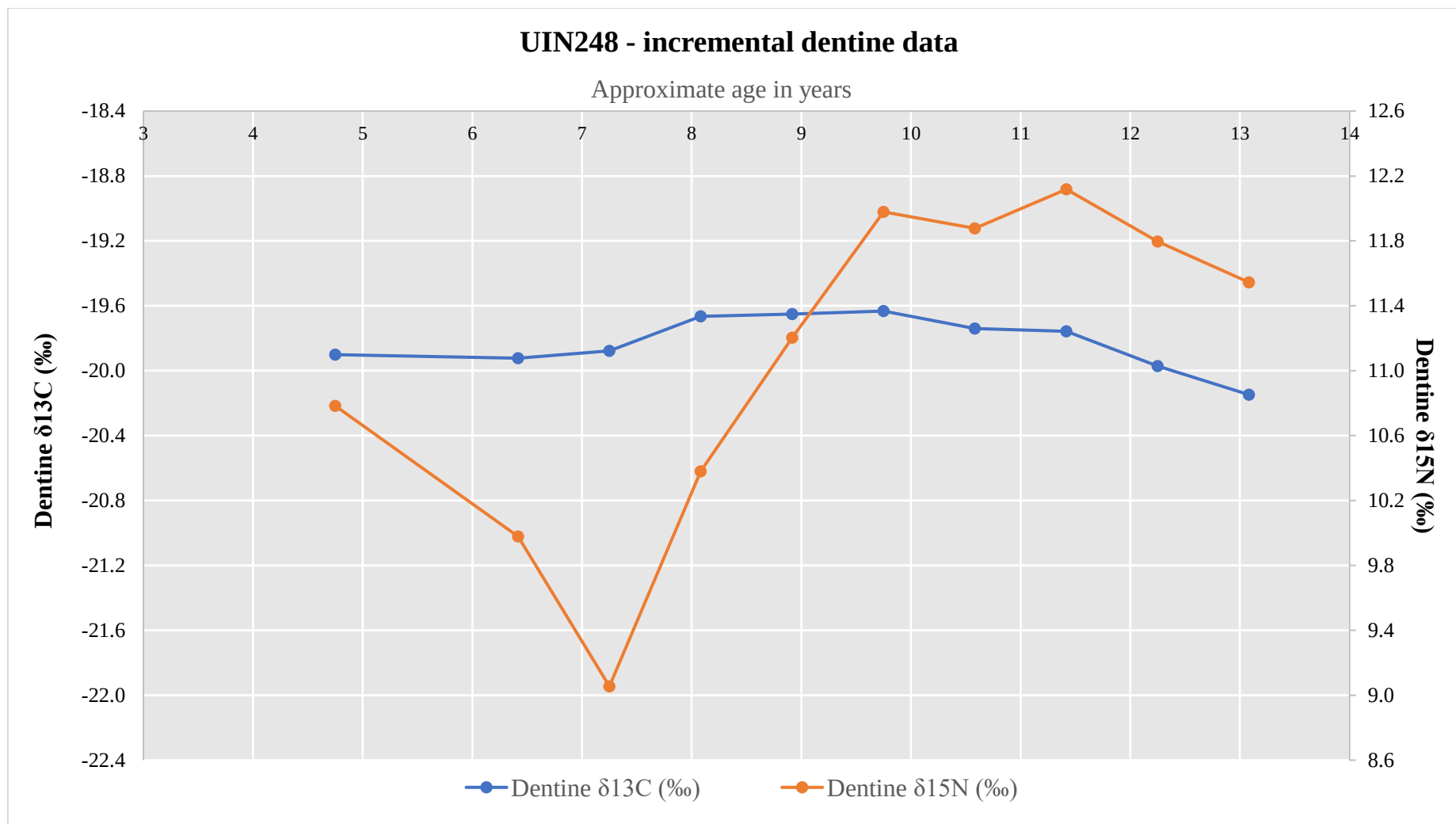
Skeleton R5029 a 40-50-year-old (middle adult) probable male with probable signs of HD, with most notably changes to ANS (score 2), APM (score 2), PPMN and PPMO (score 1) and NPI (score 2) and some NPBG to the left tibia and right fibula. ANS, hands and feet showed no pathological changes. Ancient DNA samples were taken but these did not yield any *M. leprae* DNA. AF 75 shows that $\delta^{13}\text{C}$ values do not seem remarkable compared to the other individuals studied here, but $\delta^{15}\text{N}$ is very low at age 4-7.5years, and though $\delta^{15}\text{N}$ then increases, its highest peak at 10-13years is still low compared to the other individuals at age 10-13years. There are very slight parallel changes in $\delta^{13}\text{C}$, though less substantial than the $\delta^{15}\text{N}$ changes, suggesting a change in the terrestrial protein consumption from animals one trophic level up, as this change would lift R5029 up one trophic level (increase in $\delta^{15}\text{N}$) but show little to no difference in $\delta^{13}\text{C}$.

A. 4.4.1.5.2.2 UIN248, Skeleton R5046

Skeleton R5046 is a 17-25-year-old (young adult) male with pathognomonic signs of HD. Most notably, they show substantial RS changes (ANS=2; APM=3; PPMN=1; PPMO=1; NPI=2), severe NPBG on the lower limbs and some MTs, and concentric remodelling of pedal phalanges. AF 76 shows that $\delta^{13}\text{C}$ changes little throughout childhood, while $\delta^{15}\text{N}$ values drop quite sharply between age 5 and 7 and increases quite sharply from 7 to 9.5 years. $\delta^{13}\text{C}$ values show a very flat curve in the middle of the range of the other individuals studied here; $\delta^{15}\text{N}$ shows a sharp drop between age 5 and 7 and a sharp increase between 7 and 9.5 years. This drop in $\delta^{15}\text{N}$ without accompanying change in $\delta^{13}\text{C}$ could suggest starvation from the age of 7-8 years. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ pattern of UIN248 is an exaggerated version of the pattern of UIN247. Though two individuals is not enough to conclude anything, this is a remarkable pattern.



AF 75. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN247, RFN.



AF 76. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN248, RFN.

A. 4.4.1.5.3. SGB

A. 4.4.1.5.3.1 UIN 249, Skeleton 1291

Skeleton 1291 is a 35-45-year-old middle adult probable male with probable signs of HD. RS lesions include ANS (score 2), PPMN (score 2), PPMO (score 1) and NPI (score 1), but there are no hands, lower limbs or feet to observe lesions in. UIN249 (AF 70 and AF 71) shows the lowest $\delta^{13}\text{C}$ values at age 4 of all samples included in this study, but then shows a very sharp increase towards almost the highest $\delta^{13}\text{C}$ values in the sample at age 7, which then slowly decreases until age 14.5. $\delta^{15}\text{N}$ values start at mid-range and increase from age 3 to 6.5 to almost the highest $\delta^{15}\text{N}$ in this sample, to then gradually decrease until age 15 and plot just below mid-range again. When $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ are plotted together (AF 77), they show a very similar curve, suggesting short-term input of marine protein between the age of 3-4 and 7-8.

A. 4.4.1.5.3.2 UIN250, Skeleton 1542

Skeleton 1542 is a probable male adult (18+) with probable signs of HD. RS was not pronounced (ANS=0; APM=99; PPMN=0; PPMO=0; NPI=0), there was some NPBG on the lower limbs, with concentric remodelling of pedal phalanges and one knife-edge remodelled and pen-in-cup formation pedal phalanx. AF 70 and AF 71 show that the $\delta^{13}\text{C}$ values of UIN250 fall within the lower range, dropping substantially and sharply at age 11-12, only to increase equally sharply from 12-13 years. $\delta^{15}\text{N}$ values appear quite mid-range and stable. When $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ are plotted together (AF 78) it is clear that $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ curve comparatively relative to each other, suggesting potentially only slight changes in C3-plant consumption at age 12.

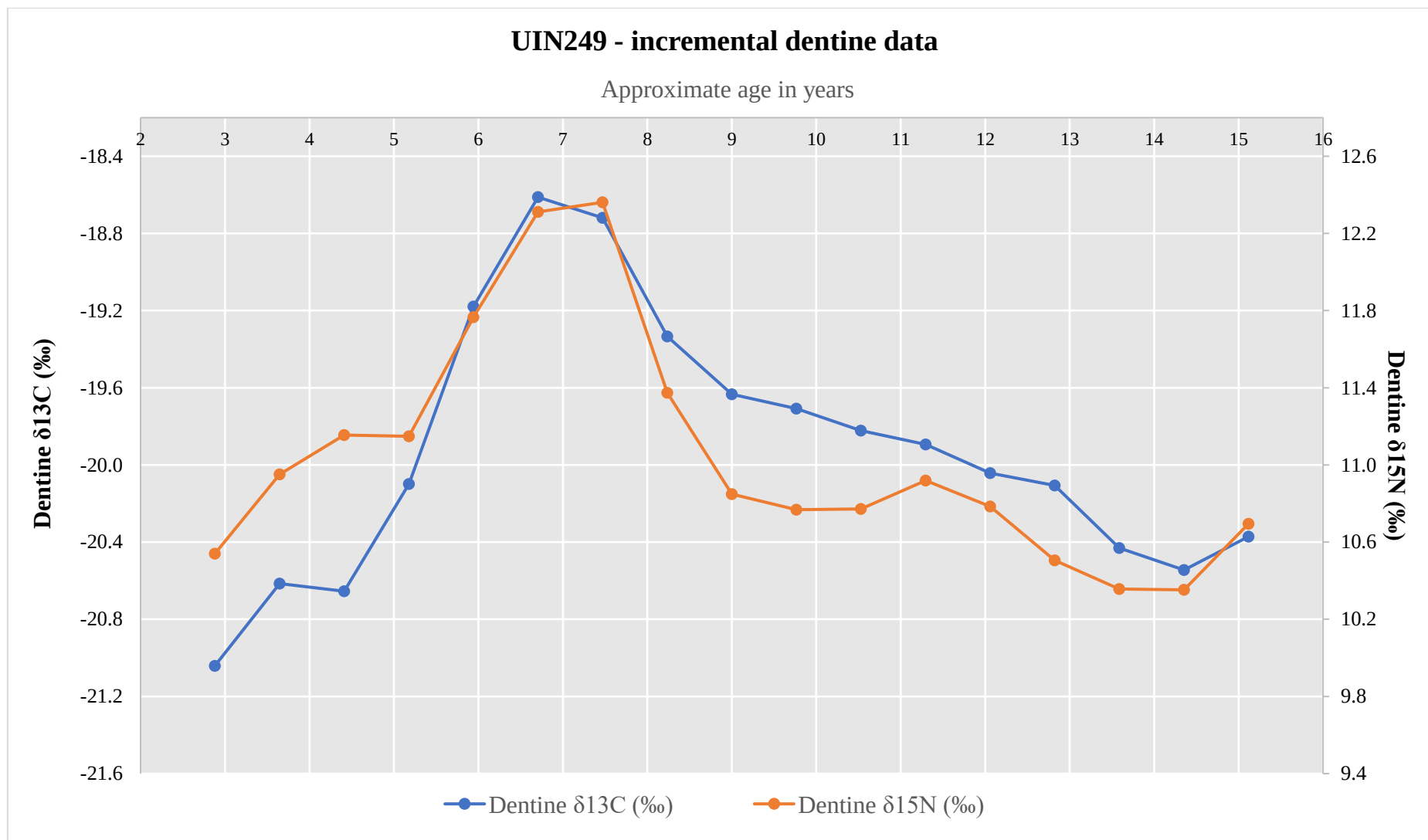
A. 4.4.1.5.3.3 UIN251, Skeleton 1561

Skeleton 1561 is a 17-25-year-old (young adult) probable male with pathognomonic signs of HD. RS lesions include ANS (score 2), PPMO (score 2) and NPI (score 2), along with some concentric remodelling in MCs, manual phalanges and some notching of two distal phalanges, some-severe NPBG in the lower limbs and concentric remodelling and NPBG in MTs. AF 70 and AF 71 show that UIN251 shows relatively high $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values. AF 79 shows that when $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ are plotted against each other, they show a parallel curve with a gradual increase in both values from age 4 to age 9, after which $\delta^{13}\text{C}$ slowly drops, while $\delta^{15}\text{N}$ stays level until age 10.5 when it increases sharply. This pattern at age 9-10 is characteristic of opposing covariance, representing physiological stress and stress-induced catabolism (Craig-Atkins *et al.* 2018).

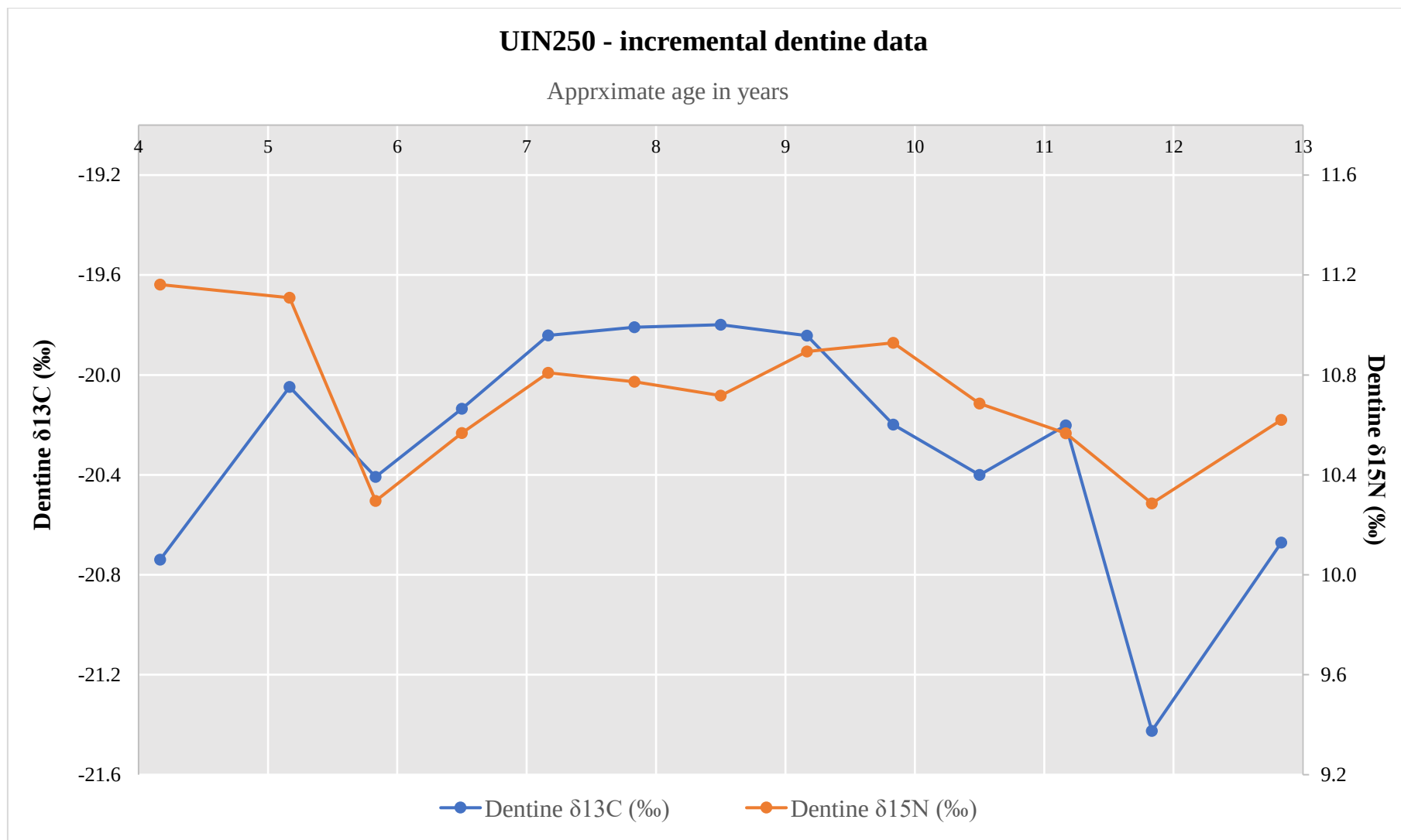
A. 4.4.1.5.4 GPL

A. 4.4.1.5.4.1 UIN 253, Unprovenanced child skull

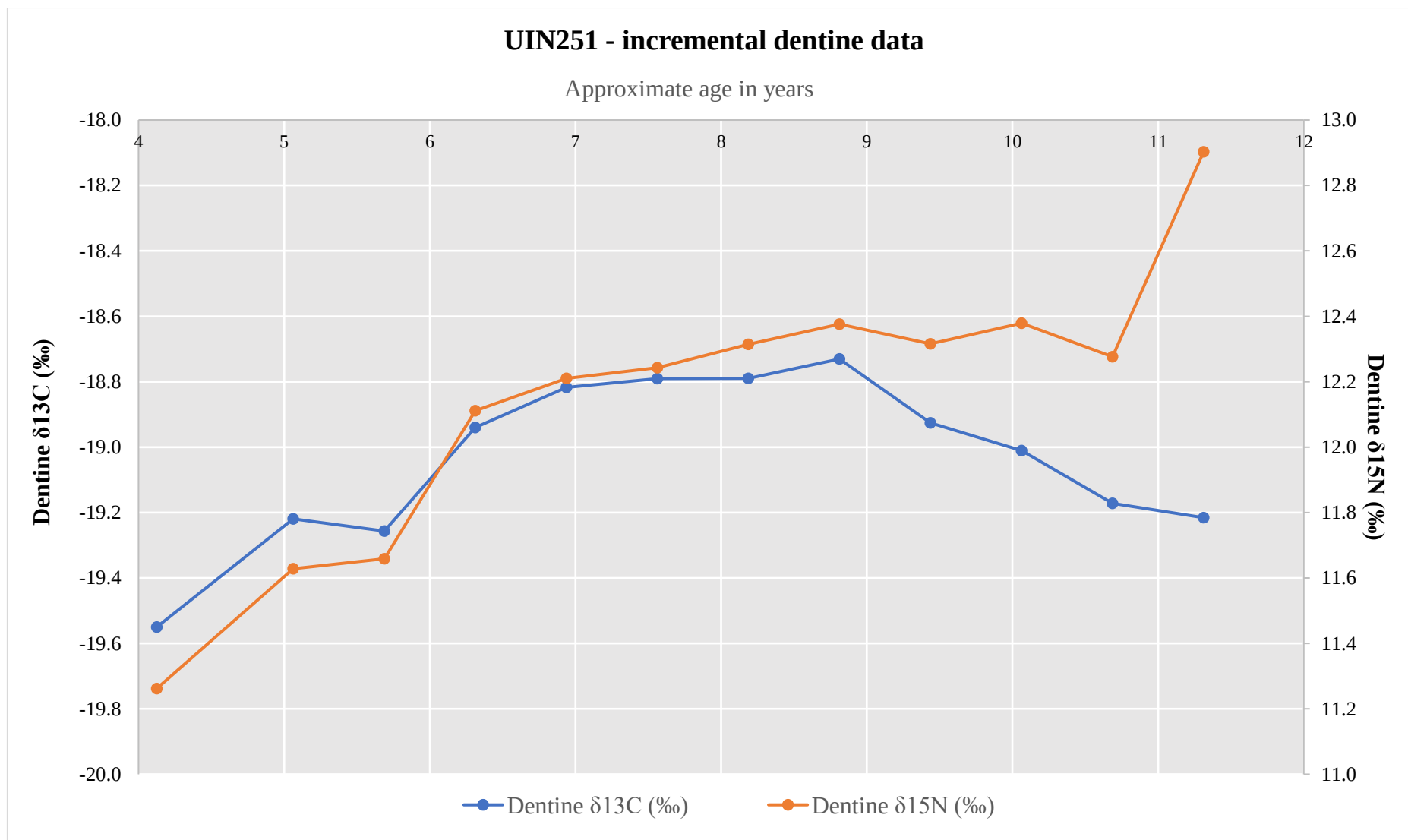
The unprovenanced child skull from GPL is only represented by a skull. Osteological ageing suggests they were 9-11 years old when they died, and their nasal opening suggests pathognomonic HD (ANS=3; APM=3; PPMN=1; PPMO=1; NPI=4). AF 80 shows that UIN253 shows a classic increase in $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values around birth, followed by a gradual drop in both values related to successful breastfeeding post-birth (Craig-Atkins *et al.* 2018). Breastfeeding is usually expected to happen until the age of 2, which is the time around which the data for this individual is cut off due to the selected sample. $\delta^{13}\text{C}$ data looks within normal range of other studies, and though the $\delta^{15}\text{N}$ values behave in a normal pattern, they are quite low for a breastfed infant, who is expected to be one trophic level higher than the mother. These values are therefore likely lower in the mother. No data for adult females from this site are available for comparison.



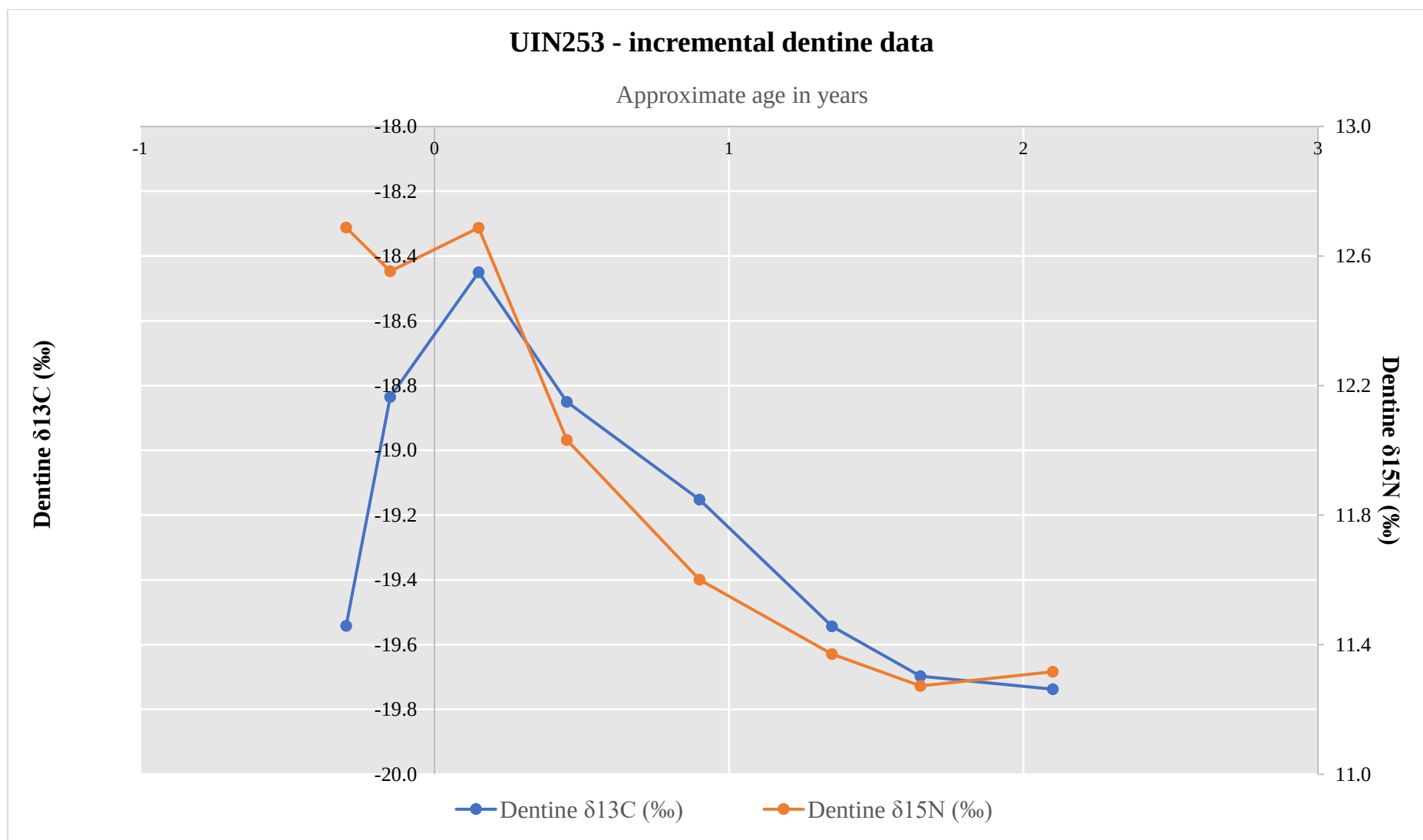
AF 77. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN249, SGB.



AF 78. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN250, SGB.



AF 79. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN251, SGB.



AF 80. Incremental $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for UIN253, GPL.

AT 154. Carbon and nitrogen values for all incremental dentine samples; standard deviations only provided for samples that were run more than one time.

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
237	15	1	0.0035	0.0013	39.8371	-20.0500	-	13.8063	11.2927	-	3.3663	-	1
237	15	3	0.0033	0.0012	44.2990	-19.4200	-	15.7816	11.9810	-	3.2748	-	1
237	15	4	0.0044	0.0009	46.3377	-19.4410	-	16.6878	12.2520	-	3.2395	-	1
237	15	5	0.0073	0.0018	50.5728	-19.3880	-	18.0371	12.4663	-	3.2711	-	1
237	15	6	0.0078	0.0022	42.3027	-19.4640	0.0481	15.4924	11.9850	0.0594	3.1861	0.0210	2
237	15	7	0.0076	0.0023	40.4937	-19.6770	0.0297	14.7242	11.4405	0.1336	3.2080	0.0423	2
237	15	8	0.0135	0.0029	42.6642	-19.7207	0.0361	15.6809	11.2082	0.0388	3.1751	0.0216	3
237	15	9	0.0144	0.0031	45.0182	-19.8267	0.0210	16.5465	11.0854	0.0912	3.1746	0.0247	3
237	15	10	0.0128	0.0028	44.8364	-19.8617	0.0310	16.4993	11.1620	0.0634	3.1711	0.0222	3
237	15	11	0.0156	0.0035	41.7405	-19.6173	0.0207	15.4913	11.5845	0.0339	3.1437	0.0264	3
237	15	12	0.0117	0.0029	40.8871	-19.8370	0.0277	15.0948	11.3867	0.1099	3.1601	0.0241	3
237	15	13	0.0054	0.0016	45.9228	-20.0610	-	16.7703	11.3880	-	3.1947	-	1
237	15	14	0.0028	0.0007	41.0830	-20.3390	-	14.3833	11.3718	-	3.3324	-	1

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
238	25	1	0.0056	0.0007	40.5255	-19.2300	-	14.2366	12.9500	-	3.3210	-	1
238	25	3	0.0047	0.0009	46.9822	-19.2780	-	16.1747	12.8410	-	3.3888	-	1
238	25	4	0.0077	0.0012	41.7665	-18.3945	0.0276	15.0474	13.0582	0.1205	3.2376	0.0361	2
238	25	5	0.0065	0.0014	52.1497	-18.4330	-	18.8809	13.1250	-	3.2224	-	1
238	25	6	0.0055	0.0014	41.9158	-18.4340	-	14.9426	13.2631	-	3.2726	-	1
238	25	7	0.0080	0.0016	45.7946	-18.3720	-	16.6830	13.2940	-	3.2025	-	1
238	25	8	0.0135	0.0031	47.1628	-18.4045	0.0318	17.2477	13.2974	0.1504	3.1884	0.0217	2
238	25	9	0.0211	0.0044	43.6351	-18.4927	0.0321	16.0595	13.3905	0.0752	3.1699	0.0232	3
238	25	10	0.0111	0.0025	45.3441	-18.8420	-	16.5096	12.9030	-	3.2043	-	1
238	25	11	0.0106	0.0023	54.0990	-19.0640	0.0028	20.0534	12.5255	0.0219	3.1473	0.0096	2
238	25	12	0.0070	0.0019	45.0270	-19.2115	0.0064	16.4025	12.6503	0.0307	3.2024	0.0316	2
238	25	13	0.0032	0.0008	51.2780	-19.3100	-	18.4599	12.6970	-	3.2408	-	1
238	25	14	0.0077	0.0009	52.0520	-19.5730	-	18.0527	13.1753	-	3.3639	-	1

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
246	17	1	0.0062	0.0020	39.8966	-19.9885	0.0035	14.3815	10.0705	0.0940	3.2375	0.0226	2
246	17	2	0.0099	0.0018	43.0654	-20.3020	-	14.8956	10.4209	-	3.3730	-	1
246	17	3	0.0110	0.0010	35.0455	-20.1630	-	12.4939	10.3570	-	3.2725	-	1
246	17	4	0.0173	0.0016	38.5362	-20.0070	-	13.9625	10.1730	-	3.2200	-	1
246	17	5	0.0170	0.0015	38.6777	-19.9000	-	13.8316	10.4806	-	3.2624	-	1
246	17	6	0.0201	0.0019	49.2795	-19.9770	-	17.9123	10.3170	-	3.2097	-	1
246	17	7	0.3060	0.0031	40.6192	-20.0365	0.0134	14.8749	10.3221	0.0298	3.1859	0.0334	2
246	17	8	0.0520	0.0038	41.0843	-20.2633	0.0742	15.1905	10.9946	0.1043	3.1566	0.0287	3
246	17	9	0.0385	0.0040	42.7654	-20.6070	0.0231	15.7942	10.8642	0.0683	3.1589	0.0270	3
246	17	10	0.0292	0.0085	46.6056	-20.6225	0.0403	17.1175	9.9711	0.0623	3.1754	0.0278	2
246	17	11	0.0135	0.0027	41.8017	-20.2550	0.0236	15.5126	8.4073	0.0569	3.1432	0.0294	3
246	17	12	0.0241	0.0058	43.9114	-20.1597	0.0311	16.2618	8.4738	0.0330	3.1507	0.0264	3
246	17	13	0.0245	0.0055	45.3613	-20.4877	0.0300	16.7918	8.3093	0.0704	3.1538	0.0304	3

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
246	17	14	0.0114	0.0027	44.3592	-20.8387	0.0081	16.3348	8.4409	0.0474	3.1683	0.0352	3
247	15	1	0.0055	0.0009	39.6195	-19.6580	-	13.9650	10.9150	-	3.3099	-	1
247	15	3	0.0063	0.0013	40.6998	-19.3880	-	14.6794	10.4710	-	3.2347	-	1
247	15	4	0.0084	0.0018	40.7490	-19.0720	0.0509	14.6964	10.5302	0.0879	3.2349	0.0555	2
247	15	5	0.0090	0.0021	48.1957	-18.9785	0.0403	17.5472	10.5855	0.0756	3.2033	0.0408	2
247	15	6	0.0089	0.0015	45.4931	-18.9155	0.0021	16.6642	10.0885	0.0403	3.1845	0.0183	2
247	15	7	0.0113	0.0019	41.5353	-19.0295	0.0375	15.1611	9.5843	0.1305	3.1963	0.0378	2
247	15	8	0.0155	0.0025	44.3714	-19.2010	0.0701	16.2773	9.0807	0.0498	3.1830	0.0455	3
247	15	9	0.0081	0.0018	43.6574	-19.4605	0.0276	15.8971	9.4104	0.0178	3.2055	0.0475	2
247	15	10	0.0098	0.0018	42.1379	-19.7275	0.0389	15.4461	9.5030	0.0325	3.1825	0.0239	2
247	15	11	0.0064	0.0013	39.0891	-19.9670	-	13.9988	9.3735		3.2577	-	1
247	15	12	0.0083	0.0014	40.9161	-19.7255	0.0714	15.0695	8.8890	0.0877	3.1687	0.0258	2
248	15	1	0.0100	0.0013	40.7389	-20.1480	-	13.7260	11.5451	-	3.4627	-	1

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
248	15	4	0.0051	0.0010	41.1499	-19.9720	-	14.4503	11.7960	-	3.3223	-	1
248	15	5	0.0075	0.0014	46.3243	-19.7570	-	16.6711	12.1180	-	3.2418	-	1
248	15	6	0.0095	0.0021	40.7865	-19.7395	0.0460	14.7173	11.8778	0.1233	3.2351	0.0379	2
248	15	7	0.0116	0.0023	42.9268	-19.6325	0.0431	15.6648	11.9782	0.0059	3.1971	0.0456	2
248	15	8	0.0166	0.0029	44.8326	-19.6515	0.1209	16.5042	11.2035	0.0629	3.1687	0.0423	2
248	15	9	0.0129	0.0023	40.2795	-19.6655	0.0233	14.7026	10.3795	0.0149	3.1963	0.0355	2
248	15	10	0.0082	0.0016	42.1629	-19.8770	-	15.5642	9.0550	-	3.1605	-	1
248	15	11	0.0077	0.0017	42.3398	-19.9225	0.0361	15.3890	9.9778	0.1086	3.2100	0.0436	2
248	15	12	0.0065	0.0017	49.8987	-19.9010	--	18.3152	10.7840	-	3.1785	-	1
249	17	1	0.0030	0.0022	39.6431	-20.3720	0.7382	14.1601	10.6951	0.5782	3.2643	0.1705	2
249	17	2	0.0050	0.0013	42.1822	-20.5440	0.0990	15.0264	10.3524	0.0261	3.2747	0.0601	2
249	17	3	0.0096	0.0025	44.3857	-20.4300	0.1515	15.8499	10.3572	0.0101	3.2685	0.0611	3
249	17	4	0.0151	0.0040	42.1288	-20.1060	0.0600	15.3489	10.5054	0.0234	3.2025	0.0329	3

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
249	17	5	0.0144	0.0042	40.8799	-20.0430	0.1101	14.9293	10.7843	0.0602	3.1951	0.0357	3
249	17	6	0.0123	0.0031	39.5968	-19.8940	0.0489	14.3629	10.9195	0.0252	3.2164	0.0301	3
249	17	7	0.0173	0.0048	44.0202	-19.8215	0.0969	16.0023	10.7715	0.0615	3.2120	0.0534	2
249	17	8	0.0142	0.0040	40.9944	-19.7077	0.0772	14.9672	10.7682	0.0612	3.1959	0.0360	3
249	17	9	0.0238	0.0053	42.9530	-19.6340	0.0934	15.6869	10.8481	0.0469	3.1947	0.0361	3
249	17	10	0.0210	0.0055	41.5886	-19.3337	0.0987	15.2155	11.3743	0.0653	3.1888	0.0352	3
249	17	11	0.0201	0.0055	42.2638	-18.7187	0.1054	15.4800	12.3612	0.0220	3.1858	0.0358	3
249	17	12	0.0227	0.0063	44.2983	-18.6120	0.0952	16.2497	12.3121	0.0796	3.1811	0.0355	3
249	17	13	0.0280	0.0076	41.6854	-19.1797	0.0949	15.3209	11.7653	0.0830	3.1749	0.0340	3
249	17	14	0.0192	0.0054	41.9689	-20.0990	0.0836	15.4207	11.1489	0.0288	3.1762	0.0294	3
249	17	15	0.0162	0.0047	43.3109	-20.6547	0.3042	16.0306	11.1547	0.1109	3.1532	0.0631	3
249	17	16	0.0134	0.0049	41.9762	-20.6147	0.1141	15.4453	10.9513	0.1420	3.1716	0.0244	3
249	17	17	0.0062	0.0009	41.3434	-21.0410	-	14.8445	10.5400	-	3.2493	-	1

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
250	25	1	0.0064	0.0016	43.5557	-20.6705	0.5240	15.5026	10.6205	0.1138	3.2767	0.0388	2
250	25	3	0.0057	0.0020	43.4078	-21.4245	0.0092	14.3629	10.2862	0.1418	3.5254	0.0308	2
250	25	4	0.0045	0.0014	45.2355	-20.2020	-	16.2808	10.5660	-	3.2415	-	1
250	25	5	0.0041	0.0012	43.8921	-20.4000	-	15.4099	10.6851	-	3.3230	-	1
250	25	6	0.0033	0.0012	39.4546	-20.1990	-	14.1490	10.9290	-	3.2533	-	1
250	25	7	0.0092	0.0029	41.8061	-19.8427	0.1123	15.2364	10.8943	0.0847	3.2017	0.0369	3
250	25	8	0.0098	0.0026	41.4039	-19.7990	0.1091	15.0564	10.7171	0.0208	3.2088	0.0367	3
250	25	9	0.0113	0.0028	42.3824	-19.8093	0.0060	15.3236	10.7727	0.0356	3.2261	0.0390	3
250	25	10	0.0116	0.0033	42.2600	-19.8417	0.0734	15.4235	10.8089	0.0255	3.1966	0.0378	3
250	25	11	0.0077	0.0025	42.1327	-20.1350	0.1264	15.2959	10.5674	0.0774	3.2140	0.0478	3
250	25	12	0.0062	0.0024	46.4482	-20.4080	0.1499	16.5589	10.2960	0.1231	3.2765	0.0597	2
250	25	13	0.0056	0.0019	46.4481	-20.0483	0.5917	16.7678	11.1094	0.3597	3.2322	0.0537	3
250	25	14	0.0047	0.0014	43.8901	-20.7390	-	15.5003	11.1616	-	3.3035	-	1

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
251	15	1	0.0079	0.0010	46.9719	-19.2300	-	16.7041	13.5640	-	3.2807	-	1
251	15	2	0.0270				-			-		-	
251	15	4	0.0056	0.0011	44.0641	-19.2160	-	15.5604	12.9030	--	3.3038	-	1
251	15	5	0.0066	0.0014	46.3898	-19.1720	-	16.4080	12.2762	-	3.2985	-	1
251	15	6	0.0063	0.0018	51.9581	-19.0105	0.1322	18.8521	12.3790	0.0990	3.2138	0.0254	2
251	15	7	0.0077	0.0022	40.4404	-18.9260	0.0995	14.7041	12.3156	0.0539	3.2102	0.0465	3
251	15	8	0.0094	-	39.5832	-18.7307	0.0581	14.4639	12.3762	0.0699	3.1941	0.0451	3
251	15	9	0.0106	0.0029	43.6545	-18.7897	0.1607	15.8976	12.3144	0.0530	3.2031	0.0552	3
251	15	10	0.0092	0.0029	41.4194	-18.7907	0.1115	15.1368	12.2429	0.0239	3.1925	0.0486	3
251	15	11	0.0115	0.0038	42.6304	-18.8177	0.1217	15.6348	12.2101	0.0475	3.1816	0.0486	3
251	15	12	0.0121	0.0035	42.4221	-18.9400	0.1115	15.5434	12.1114	0.0439	3.1820	0.0657	3
251	15	13	0.0123	0.0031	44.4274	-19.2565	0.0078	16.2437	11.6588	0.0295	3.1907	0.0504	2
251	15	14	0.0126	0.0027	47.2386	-19.2190	0.0667	17.4660	11.6280	0.0337	3.1553	0.0034	3

UIN	Tooth sampled	Slice number	Initial sample weight	Collagen weight	Dentine collagen C yield	Dentine collagen mean d13C	Dentine collagen STDEV d13C	Dentine collagen N yield	Dentine collagen mean d15N	Dentine collagen STDEV d15N	Dentine collagen mean C:N	Dentine collagen STDEV C:N	Number of sample reps
251	15	15	0.0075	0.0014	40.8140	-19.5500	-	14.1882	11.2620	-	3.3561	-	1
253	55	1	0.0116	0.0090	37.9849	-19.7375	0.0219	13.0672	11.3165	0.7262	3.3985	0.1450	2
253	55	3	0.0080	0.0012	40.8292	-19.6970	-	13.3722	11.2726	-	3.5622	-	1
253	55	4	0.0086	0.0010	35.3559	-19.5430	-	11.9324	11.3710	-	3.4569	-	1
253	55	5	0.0093	0.0080	41.5457	-19.1520	-	14.1401	11.6010	-	3.4278	-	1
253	55	7	0.0110	0.0015	44.5953	-18.8500	-	15.7366	12.0320	-	3.3062	-	1
253	55	8	0.0122	0.0015	43.5122	-18.4500	-	15.5404	12.6870	-	3.2666	-	1
253	55	9	0.0192	0.0012	77.5585	-18.8350	-	25.8797	12.5533	-	3.4964	-	1
253	55	10	0.0094	0.0013	40.0273	-19.5420	-	13.1426	12.6880	-	3.5532	-	1

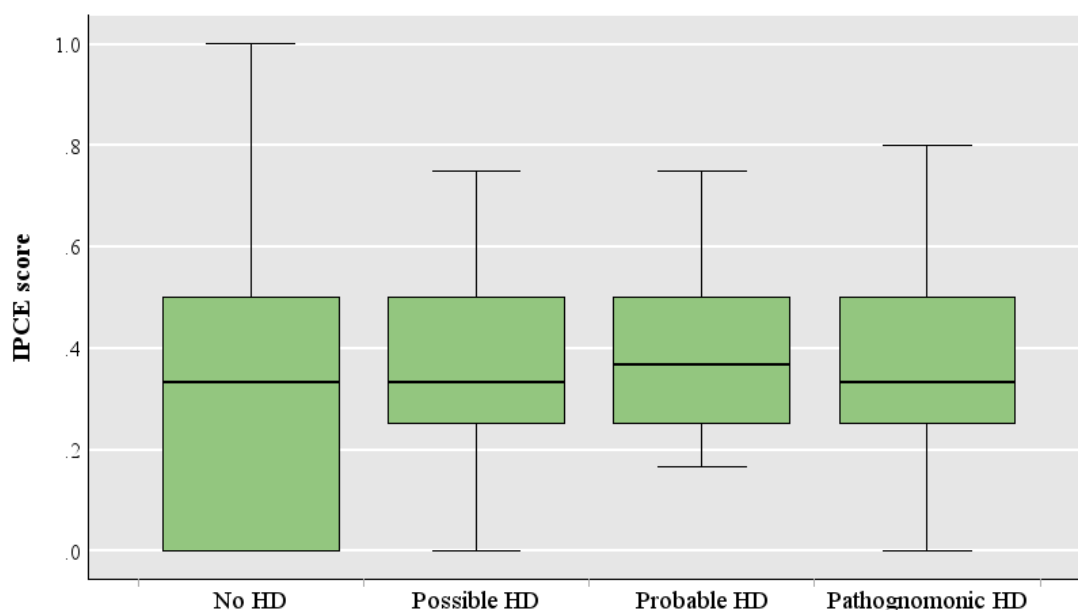
*Slice 1 and 2 combined and labelled 1, next slice will be numbered 3

**Slice 1, 2 and 3 combined and labelled 1, next slice will be numbered 4

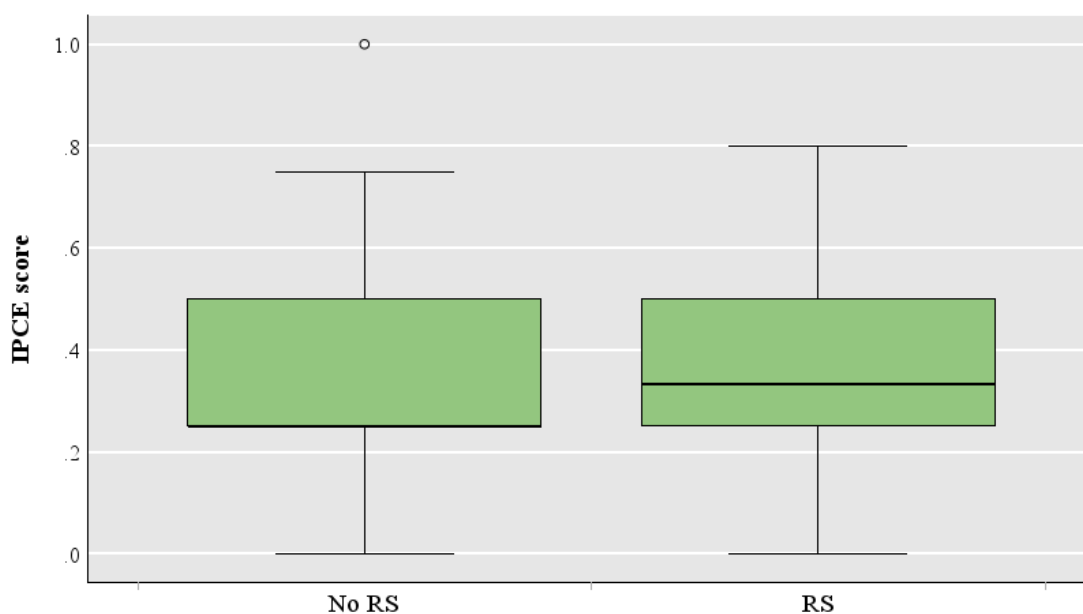
***Slice 14 and 15 combined and labelled 14.

A. 4.4.1.5 Index of Poor Childhood Environment (IPCE)

Analysing IPCE excluding BSA and JTN shows that the HD categories tend to more frequently have higher IPCE scores (AF 81), though they do not fall outside of the range of non-HD cases, and statistically speaking, the difference is not significant (AT 155; (Kruskal-Wallis): $n=138$, $\chi^2=3.019$, $df=3$, $p=0.389$). Comparing IPCE between the presence of RS does show a statistical significance, (AT 156; (Kruskal-Wallis): $n=127$, $\chi^2=4.083$, $df=1$, $p=0.043$) though the difference is not visually visible (AF 82).

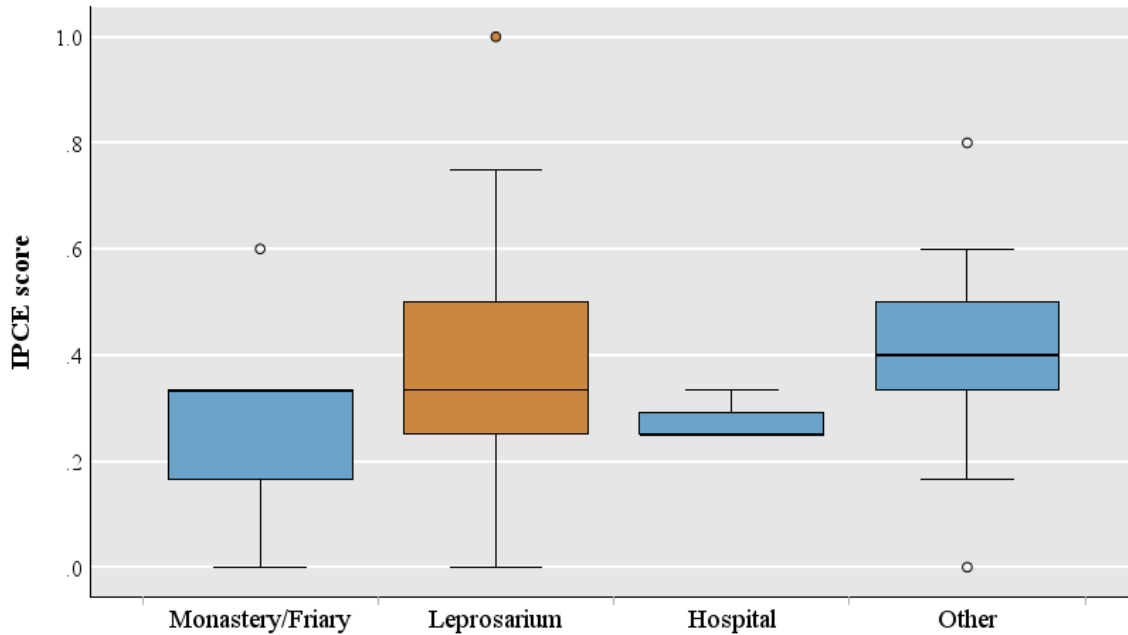


AF 81. Boxplots for IPCE score per HD severity/certainty level: no HD ($n=43$); possible HD ($n=31$); probable HD ($n=28$); and pathognomonic HD ($n=36$).



AF 82. Boxplots for IPCE score comparison for the presence of RS: no RS ($n=52$); and RS ($n=75$).

Comparing IPCE per site type (AF 83) shows that leprosaria tend to show relatively high IPCE scores along with 'other/normal' sites, compared to monasteries/friaries and hospitals, though the difference is not statistically significant (AT 157; (Kruskal-Wallis): $n=143$, $\chi^2=2.496$, $df=3$, $p=0.476$). Comparing the leprosaria excluding JTN and BSA shows that MMW has the highest average IPCE score, though all ranges show overlap and are not significantly different (AT 158; (Kruskal-Wallis): $n=114$, $\chi^2=0.371$, $df=2$, $p=0.831$).



AF 83. Boxplots for IPCE score comparison between the different site types: monastery/friary ($n=5$); leprosarium ($n=188$); hospital ($n=3$); and 'other/normal' sites ($n=21$).

AT 155. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by HD severity/certainty score, excluding JTN and BSA. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
No HD	43	0.31473	0.33333	0.265529	0.000	1.000	0.526	-0.387	0.906	43	0.002
Possible HD	31	0.38226	0.33333	0.173735	0.000	0.750	0.357	-0.004	0.934	31	0.057
Probable HD	28	0.39702	0.3667	0.174274	0.167	0.750	0.440	-0.740	0.903	28	0.013
Pathognomonic HD	36	0.38472	0.3333	0.201911	0.000	0.800	0.355	-0.582	0.896	36	0.003

AT 156. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by RS presence, excluding JTN and BSA. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No RS</i>	<i>52</i>	<i>0.32724</i>	<i>0.25000</i>	<i>0.235101</i>	<i>0.000</i>	<i>1.000</i>	<i>0.663</i>	<i>0.303</i>	<i>0.201</i>	<i>52</i>	<i>0.00002</i>
<i>RS</i>	<i>75</i>	<i>0.40346</i>	<i>0.3333</i>	<i>0.185112</i>	<i>0.000</i>	<i>0.800</i>	<i>0.213</i>	<i>-0.729</i>	<i>0.183</i>	<i>75</i>	<i>0.000001</i>

AT 157. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by site type, excluding JTN and BSA. Kolmogorov-Smirnov (KS) test reported when n > 50; Shapiro-Wilk (SW) test reported when n < 50. Rows in *course* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/friary	5	0.28667	0.3333	0.223109	0.000	0.600	0.213	0.379	0.968	5	0.862
<i>Leprosarium</i>	<i>114</i>	<i>0.36345</i>	<i>0.3333</i>	<i>0.224319</i>	<i>0.000</i>	<i>1.000</i>	<i>0.301</i>	<i>-0.440</i>	<i>0.176</i>	<i>114</i>	<i>2.6563E-9</i>
<i>Hospital</i>	<i>3</i>	<i>0.27778</i>	<i>0.2500</i>	<i>0.048113</i>	<i>0.250</i>	<i>0.333</i>	<i>0.1732</i>	-	<i>0.750</i>	<i>3</i>	<i>-8.4815E-16</i>
Other site types	21	0.40794	0.4000	0.176275	0.000	0.800	-0.203	-0.768	0.959	21	0.499

AT 158. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by leprosarium. Kolmogorov-Smirnov (KS) test reported when n > 50; Shapiro-Wilk (SW) test reported when n < 50. Rows in *course* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
MHW	3	0.40000	0.25000	0.304138	0.200	0.750	1.680	-	0.818	3	0.157
<i>MSL</i>	<i>5</i>	<i>0.29000</i>	<i>0.33333</i>	<i>0.061914</i>	<i>0.200</i>	<i>0.333</i>	<i>-0.964</i>	<i>-1301</i>	<i>0.771</i>	<i>5</i>	<i>0.046</i>
<i>MMW</i>	<i>106</i>	<i>0.36588</i>	<i>0.33333</i>	<i>0.227912</i>	<i>0.000</i>	<i>1.000</i>	<i>0.239</i>	<i>-0.511</i>	<i>0.166</i>	<i>106</i>	<i>1.2733E-7</i>

AT 159. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by HD severity/certainty score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No HD</i>	81	0.25947	0.25000	0.234697	0.000	1.000	0.713	0.239	0.199	81	1.907E-8
<i>Possible HD</i>	39	0.34231	0.3333	0.186647	0.000	0.750	0.175	0.120	0.936	39	0.028
Probable HD	38	0.34693	0.3333	0.19663	0.000	0.750	0.060	-0.367	0.951	38	0.094
<i>Pathognomonic HD</i>	45	0.34000	0.2500	0.208875	0.000	0.800	0.426	-0.368	0.904	45	0.001

AT 160. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by RS presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No RS</i>	99	0.26010	0.25000	0.219575	0.000	1.000	0.731	0.625	0.188	99	3.5895E-9
<i>RS</i>	91	0.37033	0.3333	0.193183	0.000	0.800	0.194	-0.523	0.173	91	4.3814E-7

AT 161. Descriptive statistics and normality tests for IPCE scores for the PhD dataset, categorised by leprosarium. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
MHW	3	0.40000	0.25000	0.304138	0.200	0.750	1.680	-	0.818	3	0.157
<i>MSL</i>	<i>5</i>	<i>0.29000</i>	<i>0.33333</i>	<i>0.061914</i>	<i>0.200</i>	<i>0.333</i>	<i>-0.964</i>	<i>-1301</i>	<i>0.771</i>	<i>5</i>	<i>0.046</i>
<i>JTN</i>	<i>68</i>	<i>0.17721</i>	<i>0.25000</i>	<i>0.167161</i>	<i>0.000</i>	<i>0.667</i>	<i>0.283</i>	<i>-0.779</i>	<i>0.282</i>	<i>68</i>	<i>9.1717E-15</i>
BSA	6	0.26944	0.29167	0.166805	0.000	0.500	-0.461	1.122	0.964	6	0.852
<i>MMW</i>	<i>106</i>	<i>0.36588</i>	<i>0.33333</i>	<i>0.227912</i>	<i>0.000</i>	<i>1.000</i>	<i>0.239</i>	<i>-0.511</i>	<i>0.166</i>	<i>106</i>	<i>1.2733E-7</i>

AT 162. Post-hoc Dunn's test results comparing IPCE scores between leprosaria within the PhD dataset. Rows in *cursive* are statistically significant.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
JTN-BSA	-22.199	22.687	-.978	.328	1.000
JTN-MSL	29.649	24.684	1.201	.230	1.000
JTN-MHW	34.949	31.428	1.112	.266	1.000
<i>JTN-MMW</i>	<i>-40.604</i>	<i>8.277</i>	<i>-4.906</i>	<i><.001</i>	<i>.000</i>
BSA-MSL	7.450	32.258	.231	.817	1.000
BSA-MHW	12.750	37.669	.338	.735	1.000
BSA-MMW	-18.406	22.355	-.823	.410	1.000
MSL-MHW	5.300	38.904	.136	.892	1.000
MSL-MMW	-10.956	24.379	-.449	.653	1.000
MHW-MMW	-5.656	31.189	-.181	.856	1.000

A. 4.4.2. Later life health and disease

A. 4.4.2.1. Dental health

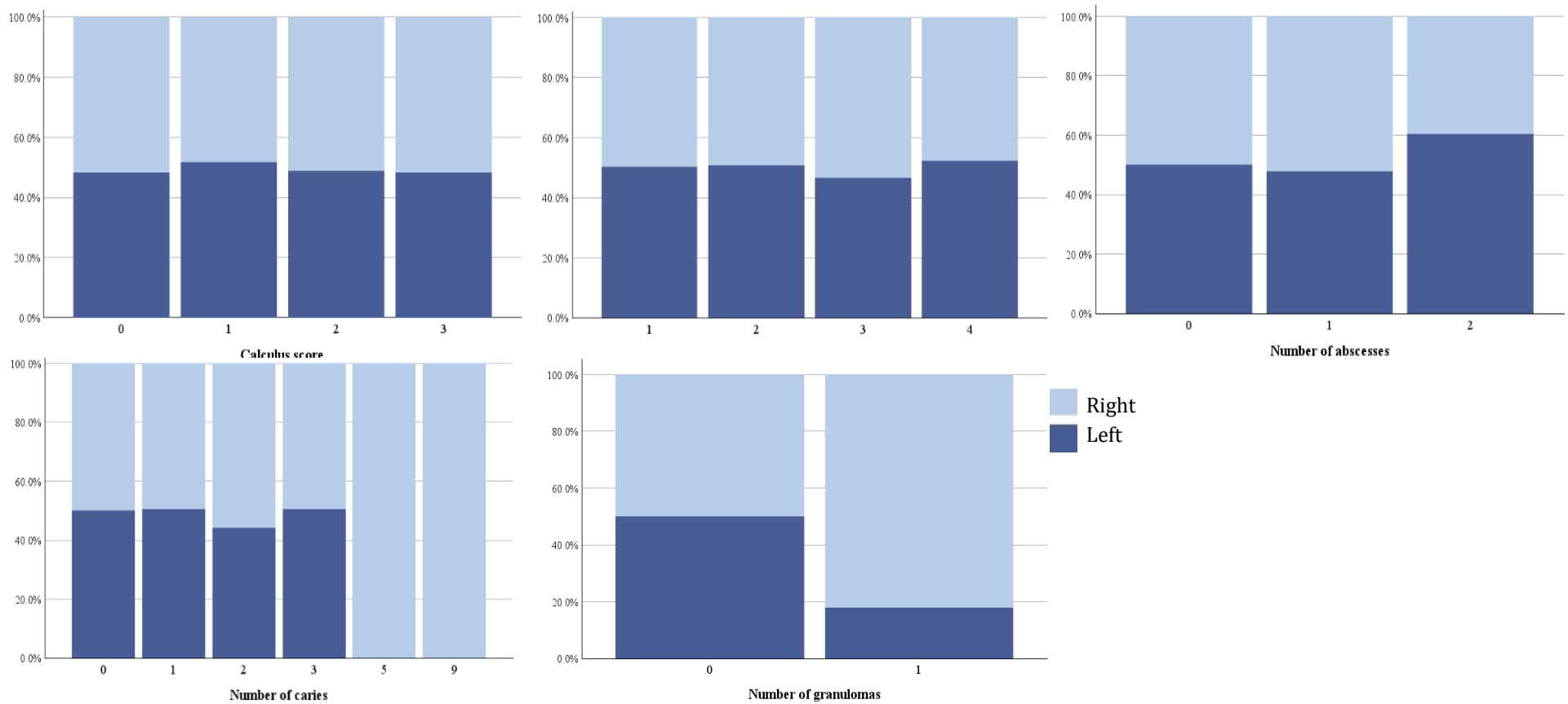
To test whether there are any differences in dental disease by left and right and/or between tooth type, the teeth are subdivided into a number of new variables (side, quadrant, tooth type and tooth type by side). Analysing the dentition by side shows no statistically significant or visually substantial difference (AF 84) between severity of calculus (Chi square; $n=5122$; $\chi^2=5.013$, $df=3$, $p=0.171$), severity of periodontal disease (Chi square; $n=3420$; $\chi^2=3.203$, $df=3$, $p=0.361$), number of abscesses (Chi square; $n=6428$; $\chi^2=0.563$, $df=2$, $p=0.755$), or the number of caries (Chi square; $n=5157$; $\chi^2=2.569$, $df=5$, $p=0.766$). The number of granulomas per side does show a visual (AF 84) and statistical difference (Chi square; $n=6250$; $\chi^2=6.941$, $df=1$, $p=0.008$, $\phi_c=0.033$), with 3 granulomas within 3087 positions on the right side, and 14 granulomas within 3153 position on the left side. The number of granulomas overall is, however, very low.

Analysing the dentition per quadrant shows more differences than comparing left and right (AF 85), with all dental diseases other than caries showing a statistical difference. Calculus shows a significant difference (Chi square: $n=5122$; $\chi^2=154.579$, $df=9$, $p=9.9116E-29$, $\phi_c=0.100$), with visual observation of the cross tabulations (AT 163) showing that the maxillary quadrants show a larger number of teeth than expected with low calculus scores (0 and 1), while the mandibular quadrants show a larger number of teeth with high calculus scores (2 and 3), indicating that calculus is more severe in mandibular teeth. This pattern is to be expected as saliva plays a large role in plaque and calculus formation, and saliva can pool around the mandibular teeth. As this is a normal biological pattern, it will not be considered as a variable in further tests.

AT 163. Cross tabulation for calculus score per tooth, per quadrant.

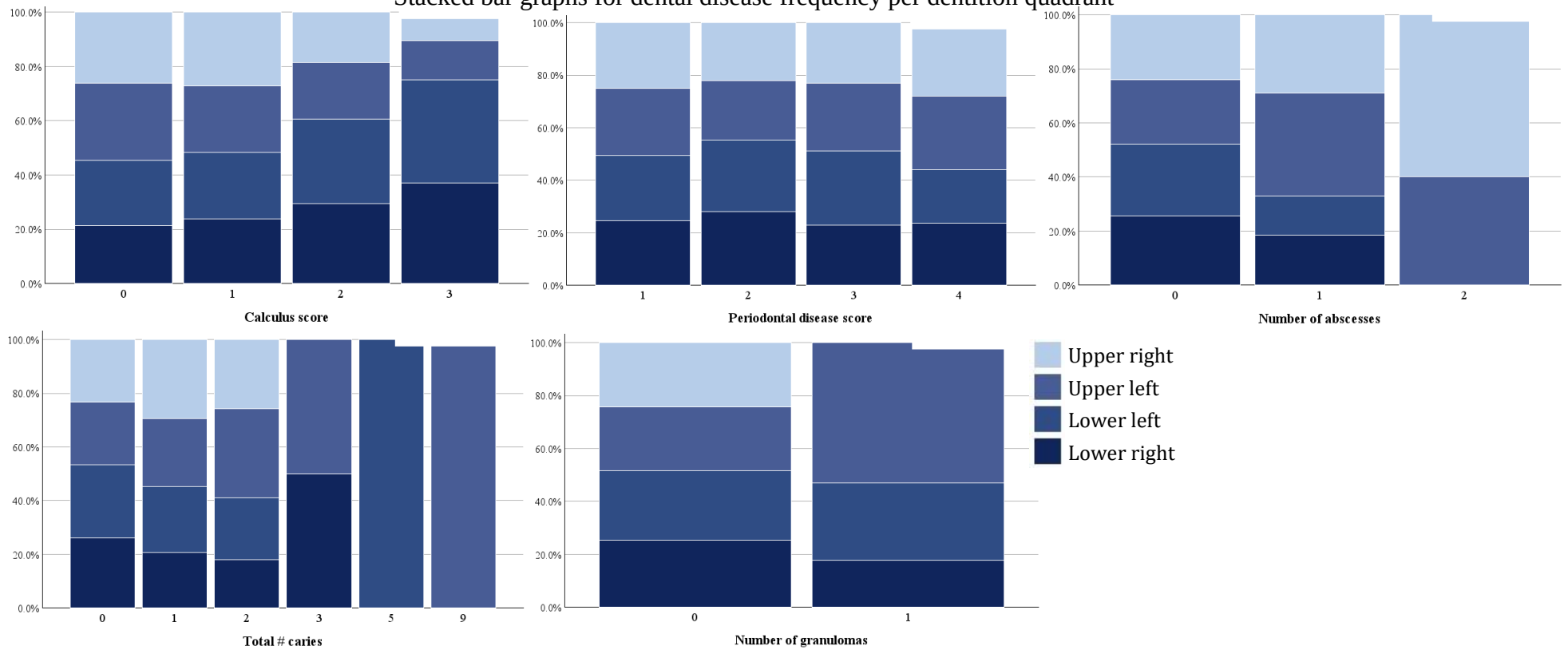
		Tooth per quadrant				Total
		Upper right	Upper left	Lower left	Lower right	
Calculus	0					
	Count	307	332	280	250	1169
	Expected Count	277.5	277.3	315.2	299.0	1169.0
	1					
	Count	642	576	581	562	2361
	Expected Count	560.5	560.1	636.6	603.8	2361.0
	2					
	Count	229	255	383	364	1231
	Expected Count	292.2	292.0	331.9	314.8	1231.0
	3					
	Count	38	52	137	134	361
	Expected Count	85.7	85.6	97.3	92.3	361.0
Total	Count	1216	1215	1381	1310	5122
	Expected Count	1216.0	1215.0	1381.0	1310.0	5122.0

Stacked bar graphs for dental disease frequency per dentition side



AF 84. Stacked bar graphs for dental disease frequencies per left and right. Calculus score observable teeth 5122, periodontal disease observable tooth sockets 3420, number of abscesses observable tooth positions 6428, total number of caries observable teeth 5157, and number of granulomas observable tooth positions 6250.

Stacked bar graphs for dental disease frequency per dentition quadrant



AF 85. Stacked bar graphs for dental disease frequencies per dental quadrant. Calculus score observable teeth 5122, periodontal disease observable tooth sockets 3420, number of abscesses observable tooth positions 6428, total number of caries observable teeth 5157, and number of granulomas observable tooth positions 6250.

Periodontal disease also shows a significant difference (Chi square: $n=3420$; $\chi^2=17.421$, $df=9$, $p=0.043$, $\phi_c=0.041$). Visual observation of the cross tabulation (AT 164) shows a higher than expected case count for score 1 and 4 in the maxillary quadrants and a lower than expected count in the mandibular quadrants. This pattern is reversed for periodontal disease score 2. Score three shows a higher than expected count for the left side, while the right side shows the reverse. There does not appear to be a clear pattern in these results, and it will therefore not be used as a variable in further tests.

The number of abscesses also show a significant difference (Chi square: $n=6428$; $\chi^2=38.317$, $df=6$, $p=9.739E-7$, $\phi_c=0.055$). Visual observation of the cross tabulation (AT 165) shows that the upper quadrants have higher numbers of single abscesses (58 and 76 for right and left respectively) compared to the lower quadrants (37 and 29 for the right and left respectively). The only cases of double abscesses are also in the upper right ($n=3$) and left ($n=2$) quadrants.

The number of granulomas mostly show a difference between the upper right and upper left quadrant (AT 166), though, as mentioned above, the number of granulomas in total is very small and therefore more likely to show significant results that might not be true patterns (Chi square: $n=6250$; $\chi^2=10.454$, $df=3$, $p=0.015$, $\phi_c=0.041$).

Number of caries per tooth is the only dental disease that does not appear to show a difference between the quadrants, though AT 167 does show a higher caries count in the upper than in the lower quadrants (Chi square: $n=5157$; $\chi^2=22.762$, $df=15$, $p=0.089$).

AT 164. Cross tabulation for periodontal disease score per tooth socket, per quadrant.

			Tooth per quadrant				
			Upper right	Upper left	Lower left	Lower right	Total
Periodontal score	1	Count	290	295	289	285	1159
		Expected	271.8	283.0	305.3	298.9	1159.0
	2	Count	338	350	420	430	1538
		Expected	360.7	375.5	405.2	396.6	1538.0
	3	Count	129	145	159	129	562
		Expected	131.8	137.2	148.1	144.9	562.0
	4	Count	45	45	33	38	161
		Expected	37.8	39.3	42.4	41.5	161.0
Total	Count	802	835	901	882	3420	
	Expected	802.0	835.0	901.0	882.0	3420.0	

AT 165. Cross tabulation for number of abscesses per tooth position, per quadrant.

			Tooth per quadrant				
			Upper right	Upper left	Lower left	Lower right	Total
Number of abscesses	0	Count	1498	1482	1654	1589	6223
		Expected Count	1509.3	1510.2	1629.3	1574.1	6223.0
	1	Count	58	76	29	37	200
		Expected Count	48.5	48.5	52.4	50.6	200.0
	2	Count	3	2	0	0	5
		Expected Count	1.2	1.2	1.3	1.3	5.0
Total		Count	1559	1560	1683	1626	6428
		Expected Count	1559.0	1560.0	1683.0	1626.0	6428.0

AT 166. Cross tabulation for number of granulomas per tooth position, per quadrant.

			Tooth per quadrant				
			Upper right	Upper left	Lower left	Lower right	Total
Number of granulomas	0	Count	1514	1499	1640	1580	6233
		Expected Count	1509.9	1503.9	1640.5	1578.7	6233.0
	1	Count	0	9	5	3	17
		Expected Count	4.1	4.1	4.5	4.3	17.0
Total		Count	1514	1508	1645	1583	6250
		Expected Count	1514.0	1508.0	1645.0	1583.0	6250.0

AT 167. Cross tabulation for number of caries per tooth, per quadrant.

			Tooth per quadrant				
			Upper right	Upper left	Lower left	Lower right	Total
Total <i>n</i> caries	0	Count	1099	1097	1282	1235	4713
		Expected Count	1121.4	1109.5	1270.3	1211.8	4713.0
	1	Count	118	102	98	83	401
		Expected Count	95.4	94.4	108.1	103.1	401.0
	2	Count	10	13	9	7	39
		Expected Count	9.3	9.2	10.5	10.0	39.0
	3	Count	0	1	0	1	2
		Expected Count	.5	.5	.5	.5	2.0
	5	Count	0	0	1	0	1
		Expected Count	.2	.2	.3	.3	1.0
	9	Count	0	1	0	0	1
		Expected Count	.2	.2	.3	.3	1.0
Total	Count	1227	1214	1390	1326	5157	
	Expected Count	1227.0	1214.0	1390.0	1326.0	5157.0	

Analysing the dentition per tooth type shows a significant difference for every dental disease (AF 86). Calculus shows (AT 168) higher than expected counts of calculus score 1 for premolars and molars, and higher than expected counts of score 2 and 3 in incisors and canines (Chi square: $n=5122$; $\chi^2=90.111$, $df=9$, $p=1.5465E-15$, $\phi_c=0.077$). This pattern shows that, within this sample, severe calculus is more commonly encountered on incisors and canines and less severe, or no calculus, is more commonly encountered on the premolars and molars. This pattern can likely be explained by two patterns: 1) premolars and molars are subject to more abrasion during the mastication process wearing down calculus formation as it grows; and 2) saliva pools anteriorly in the mouth, causing more calculus growth on those teeth that 'sit' in saliva for extended amounts of time. As this is a normal biological pattern, it will not be considered as a variable in further tests.

Cross tabulation (

AT 169) shows incisors more frequently have a higher periodontal disease score than expected (score 3 and 4), while other tooth types roughly show a higher than expected count for the middle classes (score 2 and 3; Chi square: $n=3420$ $\chi^2=46.933$, $df=9$, $p=4.0396E-7$, $\phi_c=0.068$). This pattern reflects that periodontal disease is linked to calculus, and that those teeth more severely affected by calculus, also display more severe periodontal disease.

The number of abscesses and granulomas is lower than expected in incisors and canines while molars have a higher than expected count (AT 170 and AT 171; Chi square (granulomas): $n=6428$ $\chi^2=19.763$, $df=6$, $p=0.003$, $\phi_c=0.039$; Chi square (abscesses): $n=6250$ $\chi^2=16.033$, $df=3$, $p=0.001$, $\phi_c=0.051$). This pattern is likely caused by higher rates of wear and caries (see below) in molars, exposing dentine and eventually pulp, creating a route for bacteria to enter the blood stream of the tooth. As this pattern can be explained by natural/biological processes, this is not further considered in subsequent analyses.

AT 168. Cross tabulation for calculus scores per tooth, per tooth type.

			Tooth type				
			Incisor	Canine	Premolar	Molar	Total
Calculus	0	Count	242	132	333	462	1169
		Expected Count	269.1	152.7	322.0	425.2	1169.0
	1	Count	483	277	720	881	2361
		Expected Count	543.5	308.4	650.4	858.8	2361.0
	2	Count	333	204	292	402	1231
		Expected Count	283.4	160.8	339.1	447.7	1231.0
	3	Count	121	56	66	118	361
		Expected Count	83.1	47.2	99.4	131.3	361.0
Total	Count	1179	669	1411	1863	5122	
	Expected Count	1179.0	669.0	1411.0	1863.0	5122.0	

AT 169. Cross tabulation for periodontal disease scores per tooth socket, per tooth type.

			Tooth type				
			Incisor	Canine	Premolar	Molar	Total
Periodontal disease score	1	Count	284	144	281	450	1159
		Expected Count	296.5	156.2	304.7	401.6	1159.0
	2	Count	372	222	457	487	1538
		Expected Count	393.5	207.3	404.3	532.9	1538.0
	3	Count	165	81	138	178	562
		Expected Count	143.8	75.8	147.7	194.7	562.0
	4	Count	54	14	23	70	161
		Expected Count	41.2	21.7	42.3	55.8	161.0
Total	Count		875	461	899	1185	3420
	Expected Count		875.0	461.0	899.0	1185.0	3420.0

AT 170. Cross tabulation for number of abscesses per tooth position, per tooth type.

		Tooth type					
		Incisor	Canine	Premolar	Molar	Total	
Number of abscesses	0	Count	1591	804	1581	2247	6223
		Expected Count	1575.1	795.8	1578.0	2274.1	6223.0
	1	Count	36	17	47	100	200
		Expected Count	50.6	25.6	50.7	73.1	200.0
	2	Count	0	1	2	2	5
		Expected Count	1.3	.6	1.3	1.8	5.0
Total	Count	1627	822	1630	2349	6428	
	Expected Count	1627.0	822.0	1630.0	2349.0	6428.0	

AT 171. Cross tabulation for number of granulomas per tooth position, per tooth type.

		Tooth type					
		Incisor	Canine	Premolar	Molar	Total	
Number of granulomas	0	Count	1580	800	1587	2266	6233
		Expected Count	1575.7	798.8	1584.7	2273.8	6233.0
	1	Count	0	1	2	14	17
		Expected Count	4.3	2.2	4.3	6.2	17.0
Total		Count	1580	801	1589	2280	6250
		Expected Count	1580.0	801.0	1589.0	2280.0	6250.0

The cross tabulation for number of caries shows that premolars and molars show higher counts of caries than incisors and canines (AT 172; $n=5157$ $\chi^2=68.989$, $df=15$, $p=6.7571E-9$, $\phi_c=0.67$). This pattern is probably caused by the larger number of grooves on premolars and molars in which caries can develop. As this pattern can be explained by natural/biological processes, this is not further considered in subsequent analyses.

AT 172. Cross tabulation for number of caries per tooth, per tooth type.

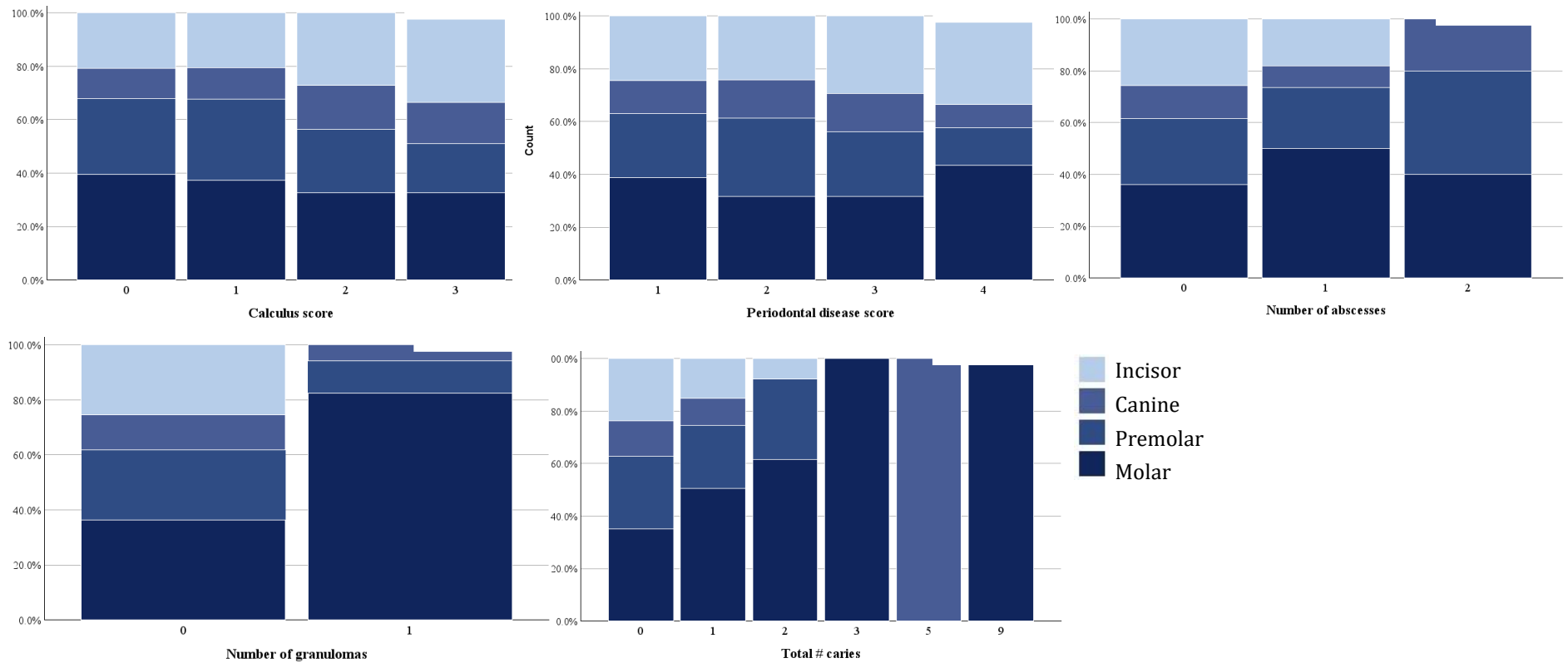
		Tooth type					
		Incisor	Canine	Premolar	Molar	Total	
Total n caries	0	Count	1122	636	1301	1654	4713
		Expected Count	1083.9	619.6	1287.7	1721.8	4713.0
	1	Count	61	41	96	203	401
		Expected Count	92.2	52.7	109.6	146.5	401.0
	2	Count	3	0	12	24	39
		Expected Count	9.0	5.1	10.7	14.2	39.0
	3	Count	0	0	0	2	2
		Expected Count	.5	.3	.5	.7	2.0
	5	Count	0	1	0	0	1
		Expected Count	.2	.1	.3	.4	1.0
	9	Count	0	0	0	1	1
		Expected Count	.2	.1	.3	.4	1.0
Total	Count	1186	678	1409	1884	5157	
	Expected Count	1186.0	678.0	1409.0	1884.0	5157.0	

Analysing these patterns by tooth type *and* side confirms the patterns from above. The statistics (AT 173) nor visual inspection of the cross tabulations (AT 174-AT 178) shows a difference between the left and right side per tooth type, meaning that all results from the analysis per tooth type can be repeated here.

AT 173. Chi square results for dental disease, per tooth type and side.

	n	χ^2	df	p	ϕ_c
Calculus score	5122	102.575	21	1.0085E-12	0.082
Periodontal disease score	3420	52.131	21	0.0002	0.071
Number of abscesses	6428	37.944	14	0.0005	0.054
Number of granulomas	6250	21.874	7	0.00004	0.071
Number of caries	5157	88.097	35	0.000002	0.058

Stacked bar graphs for dental disease frequency per tooth type



AF 86. Stacked bar graphs for dental disease frequencies per tooth type. Calculus score observable teeth 5122, periodontal disease observable tooth sockets 3420, number of abscesses observable tooth positions 6428, total number of caries observable teeth 5157, and number of granulomas observable tooth positions 6250.

AT 174. Cross tabulation for calculus score per tooth, per tooth type and side.

		Tooth type by side								Total
		Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	
Calculus	0	Count	113	64	164	216	129	68	169	1169
		Expected Count	130.5	75.8	159.3	210.9	138.5	76.9	162.7	1169.0
	1	Count	243	144	362	455	240	133	358	2361
		Expected Count	263.7	153.0	321.7	425.9	279.8	155.3	328.7	2361.0
	2	Count	151	95	145	202	182	109	147	1231
		Expected Count	137.5	79.8	167.8	222.1	145.9	81.0	171.4	1231.0
	3	Count	65	29	27	51	56	27	39	361
		Expected Count	40.3	23.4	49.2	65.1	42.8	23.8	50.3	361.0
	Total	Count	572	332	698	924	607	337	713	5122
		Expected Count	572.0	332.0	698.0	924.0	607.0	337.0	713.0	5122.0

AT 175. Cross tabulation for periodontal disease score per tooth socket, per tooth type and side.

		Tooth type by side									
		Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	Total	
Periodontal disease score	1	Count	139	76	143	217	145	68	138	233	1159
		Expected Count	147.8	78.3	151.5	193.2	148.8	77.9	153.2	208.4	1159.0
	2	Count	192	111	226	239	180	111	231	248	1538
		Expected Count	196.1	103.9	201.0	256.3	197.4	103.4	203.3	276.6	1538.0
	3	Count	79	37	65	77	86	44	73	101	562
		Expected Count	71.6	38.0	73.5	93.7	72.1	37.8	74.3	101.1	562.0
	4	Count	26	7	13	37	28	7	10	33	161
		Expected Count	20.5	10.9	21.0	26.8	20.7	10.8	21.3	29.0	161.0
Total	Count	436	231	447	570	439	230	452	615	3420	
	Expected Count	436.0	231.0	447.0	570.0	439.0	230.0	452.0	615.0	3420.0	

AT 176. Cross tabulation for number of abscesses per tooth position, per tooth type and side.

		Tooth type by side								Total
		Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	
Number of	0	Count	802	399	791	1095	789	405	790	6223
		Expected Count	786.1	395.0	784.2	1118.2	789.0	400.8	793.8	6223.0
	1	Count	10	8	19	58	26	9	28	200
		Expected Count	25.3	12.7	25.2	35.9	25.4	12.9	25.5	200.0
	2	Count	0	1	0	2	0	0	2	5
		Expected Count	.6	.3	.6	.9	.6	.3	.9	5.0
Total		Count	812	408	810	1155	815	414	820	6428
		Expected Count	812.0	408.0	810.0	1155.0	815.0	414.0	820.0	6428.0

AT 177. Cross tabulation for number of granulomas per tooth position, per tooth type and side.

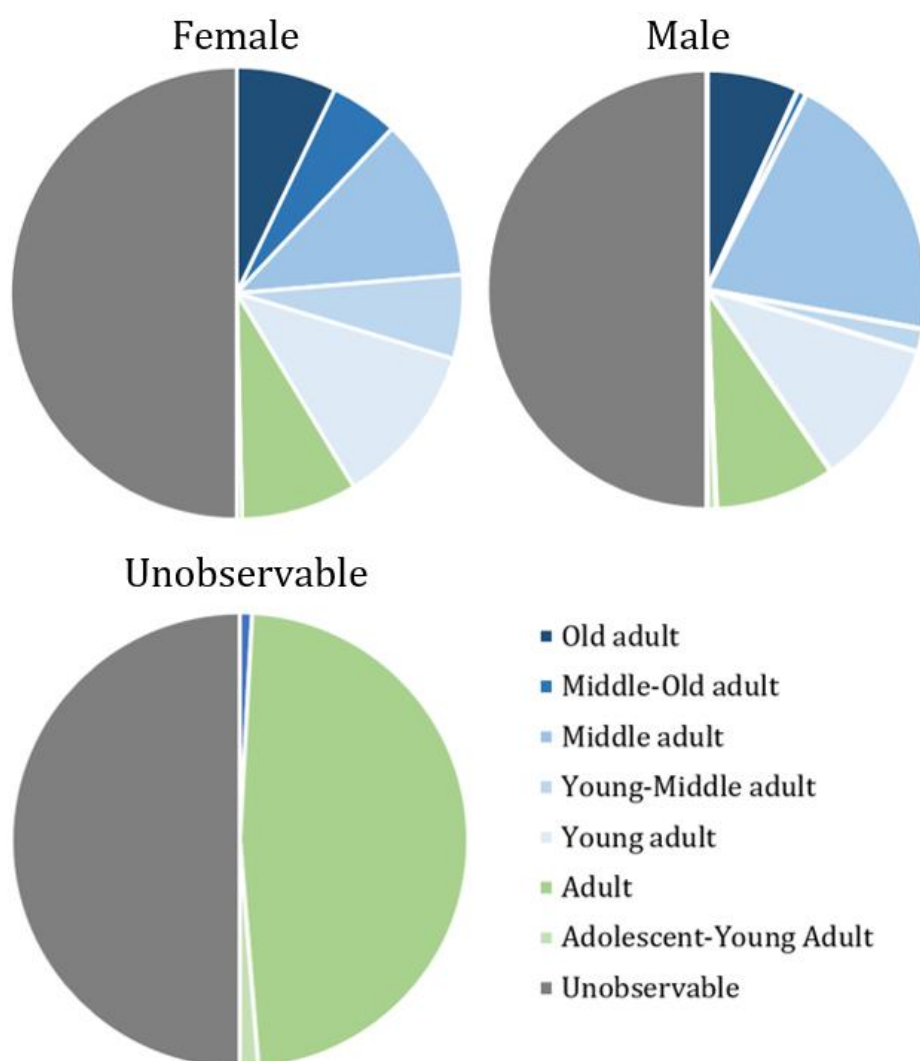
			Tooth type by side								Total
			Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	
Number of granulomas	0	Count	789	397	790	1118	791	403	797	1148	6233
		Expected Count	786.9	395.9	788.8	1117.0	788.8	402.9	795.8	1156.8	6233.0
	1	Count	0	0	1	2	0	1	1	12	17
		Expected Count	2.1	1.1	2.2	3.0	2.2	1.1	2.2	3.2	17.0
Total		Count	789	397	791	1120	791	404	798	1160	6250
		Expected Count	789.0	397.0	791.0	1120.0	791.0	404.0	798.0	1160.0	6250.0

AT 178. Cross tabulation for number of caries per tooth, per tooth type and side.

		Tooth type by side									
		Incisor right	Canine right	Premolar right	Molar right	Incisor left	Canine left	Premolar left	Molar left	Total	
Total # caries	0	Count	550	321	650	813	572	315	651	841	4713
		Expected Count	527.3	308.0	638.8	859.1	556.6	311.6	648.9	862.7	4713.0
	1	Count	26	16	45	114	35	25	51	89	401
		Expected Count	44.9	26.2	54.4	73.1	47.4	26.5	55.2	73.4	401.0
	2	Count	1	0	4	12	2	0	8	12	39
		Expected Count	4.4	2.5	5.3	7.1	4.6	2.6	5.4	7.1	39.0
	3	Count	0	0	0	1	0	0	0	1	2
		Expected Count	.2	.1	.3	.4	.2	.1	.3	.4	2.0
	5	Count	0	0	0	0	0	1	0	0	1
		Expected Count	.1	.1	.1	.2	.1	.1	.1	.2	1.0
	9	Count	0	0	0	0	0	0	0	1	1
		Expected Count	.1	.1	.1	.2	.1	.1	.1	.2	1.0
	Total	Count	577	337	699	940	609	341	710	944	5157
		Expected Count	577.0	337.0	699.0	940.0	609.0	341.0	710.0	944.0	5157.0

A. 4.4.2.1.1 Dental disease by sex

Though there is a statistically significant difference in the age category distribution between females and males (Chi square $n = 280$; $X = 23.136$; $df = 6$ and $p = 0.00075$), this differentiation appears largely due to the large number of age categories, which is an effect of different ageing styles between the data collected for the this thesis from skeletons, and that collected from catalogues. Visual comparison (see AF 87) shows that overall, the older and younger categories are not differently represented among females and males.



AF 87. The distribution of age categories among the sexes.

AT 179. Cross tabulation for number of caries per tooth, per tooth type and side.

		Final sex		Total
		Male	Female	
Calculus	0	Count	420	413
		Expected Count	458.8	374.2
	1	Count	1169	831
		Expected Count	1101.6	898.4
	2	Count	572	485
		Expected Count	582.2	474.8
	3	Count	148	154
		Expected Count	166.3	135.7
Total	Count		2309	1883
	Expected Count		2309.0	1883.0

AT 180. Cross tabulation for periodontal disease score per tooth socket by sex.

		Final sex		Total
		Male	Female	
Periodontal disease score	1	Count	524	297
		Expected Count	543.6	277.4
	2	Count	903	429
		Expected Count	882.0	450.0
	3	Count	348	158
		Expected Count	335.1	170.9
	4	Count	89	67
		Expected Count	103.3	52.7
Total	Count		1864	951
	Expected Count		1864.0	951.0

AT 181. Cross tabulation for number of abscesses per tooth position by sex.

		Final sex		Total
		Male	Female	
Number of abscesses	0	Count	2708	2311
		Expected Count	2694.3	2324.7
	1	Count	88	102
		Expected Count	102.0	88.0
	2	Count	3	2
		Expected Count	2.7	2.3
Total	Count		2799	2415
	Expected Count		2799.0	2415.0

AT 182. Cross tabulation for number of abscesses per dentition by sex.

Final sex	Total

		Male	Female	
Abscesses	0	73	58	131
	1	14	13	27
	2	8	9	17
	3	7	8	15
	≥3	8	7	15
Total		110	95	205

AT 183. Cross tabulation for number of granulomas per tooth position by sex.

			Final sex		
			Male	Female	Total
Number of granulomas	0	Count	2674	2343	5017
		Expected Count	2675.9	2341.1	5017.0
	1	Count	11	6	17
		Expected Count	9.1	7.9	17.0
Total		Count	2685	2349	5034
		Expected Count	2685.0	2349.0	5034.0

AT 184. Cross tabulation for number of granulomas per dentition by sex.

		Final sex		Total
		1	2	
Number of granulomas	0	102	92	194
	≥1	8	4	12
Total		110	96	206

AT 185. Cross tabulation for the number of caries per tooth by sex.

Final sex	Total

			Male	Female	
Total # caries	0	Count	2131	1722	3853
		Expected Count	2108.2	1744.8	3853.0
	1	Count	182	199	381
		Expected Count	208.5	172.5	381.0
	2	Count	23	13	36
		Expected Count	19.7	16.3	36.0
	3	Count	1	1	2
		Expected Count	1.1	.9	2.0
	5	Count	1	0	1
		Expected Count	.5	.5	1.0
Total	Count	2338	1935	4273	
	Expected Count	2338.0	1935.0	4273.0	

AT 186. Cross tabulation for number of caries per dentition by sex.

		Final sex		Total
		1	2	
Caries	0	46	43	89
	1	18	16	34
	2	17	13	30
	3	5	5	10
	4	3	3	6
	≥5	15	15	30
	Total	104	95	199

AT 187. Descriptive statistics and normality tests for %DMT per dentition, categorised by sex. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

Descriptive statistics									Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	n	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	p
<i>Male</i>	111	0.13647	0.04082	0.2218	0.000	1.000	2.473	6.123	0.269	111	4.0169E-22
<i>Female</i>	97	0.10108	0.03774	0.1624	0.000	1.000	2.731	9.894	0.267	97	6.7499E-19

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.2.1.3 Oral health and HD

AT 188. Descriptive statistics and normality tests for AMTL percentages per dentition, categorised by HD certainty/severity diagnosis and by RS presence/absence, respectively. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	n	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	p
<i>No HD</i>	82	2.16	0.00	4.821	0	27	3.520	14.057	0.327	82	1.9135E-24
<i>Possible HD</i>	40	2.80	0.00	5.388	0	23	2.277	4.819	0.592	40	2.4174E-9
<i>Probable HD</i>	40	1.90	0.00	3.388	0	13	1.931	2.874	0.634	40	9.4303E-9
<i>Pathognomonic HD</i>	49	0.92	0.00	2.344	0	13	3.746	15.820	0.454	49	2.9977E-12
<i>RS absent</i>	110	2.17	0.00	4.589	0	27	3.328	12.967	0.318	110	4.4545E-31
<i>RS present</i>	101	1.69	0.00	3.877	0	23	3.103	10.839	0.353	101	1.8439E-35

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 189. Descriptive statistics and normality tests for DMT percentages per dentition, categorised by HD certainty/severity diagnosis and by RS presence/absence, respectively. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No HD</i>	82	0.11237	0.02453	0.20735	0.0000	1.0000	2.842	8.577	0.294	82	1.6457E-19
<i>Possible HD</i>	40	0.14088	0.03813	0.04600	0.0000	0.8333	1.704	2.119	0.702	40	1.0627E-7
<i>Probable HD</i>	40	0.09715	0.02324	0.14039	0.0000	0.5172	1.667	2.105	0.734	40	3.7221E-7
<i>Pathognomonic HD</i>	49	0.03676	0.01786	0.06254	0.0000	0.3023	2.428	6.432	0.641	49	1.0723E-9
<i>RS absent</i>	110	0.11302	0.03143	0.20122	0.0000	1.0000	2.619	7.328	0.287	110	4.2298E-25
<i>RS present</i>	101	0.08022	0.01887	0.14224	0.0000	0.8333	2.753	8.955	0.286	101	7.4147E-23

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

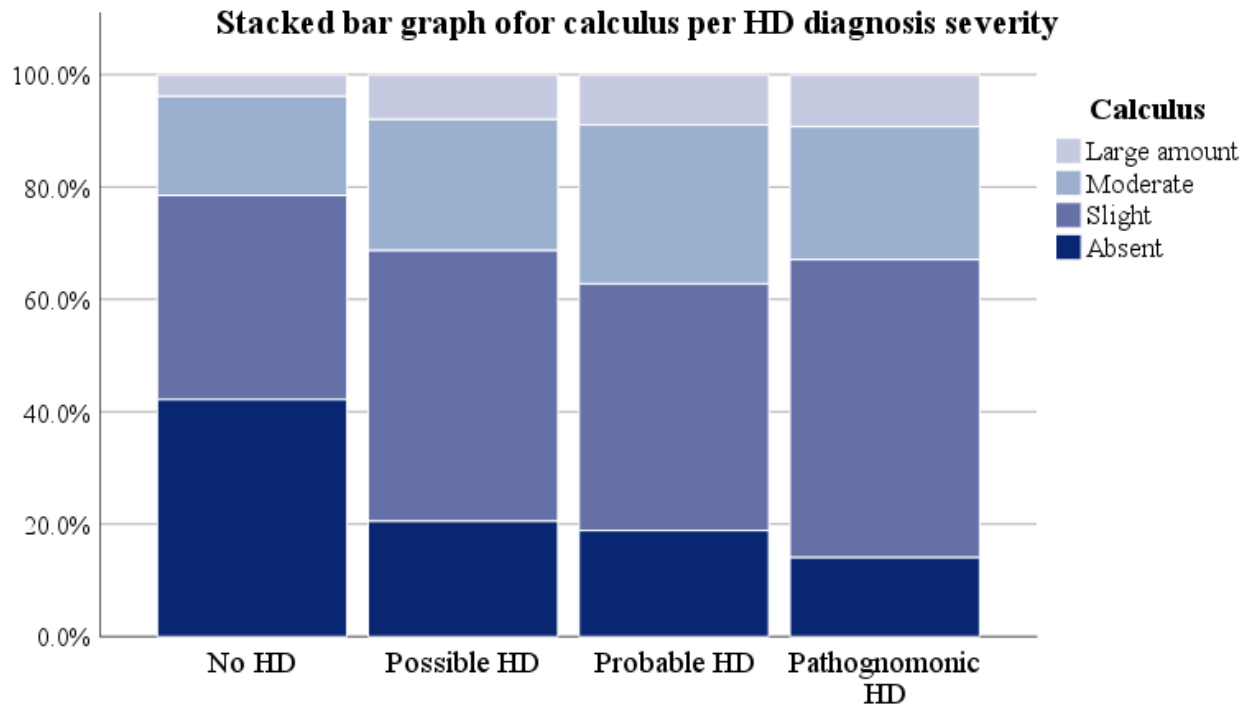
A. 4.4.2.1.3.1 Dental disease prevalence per individual tooth and HD

AT 190 shows the number and percentage of teeth observed with a specific calculus score per HD severity group. For those cases where no HD lesions were observed, the number of cases per calculus score decreases as the severity of calculus increases (also visible in AF 88). For all other diagnosis levels, the number of cases per calculus score increases as the severity of the HD diagnosis score increases. This suggests an increased rate of calculus severity in HD cases (Chi square: $\chi^2=405.607$, $df=9$, $p=8.714E-82$, $\phi_c=0.164$).

AT 191 additionally shows that individuals with RS always show a higher prevalence of calculus presence scores, and a lower prevalence of calculus absence (Chi square: $\chi^2=231.550$, $df=3$, $p=6.3916E-50$, $\phi_c=0.214$).

AT 190. Cross table of number of teeth with different scores of calculus per HD diagnosis severity/certainty. Calculus scores based on Brothwell (1981); Buikstra and Ubelaker (1994).

	Calculus score								Total
	No		Slight		Moderate		Large		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
No	752	42.2	648	36.3	314	17.6	69	3.9	1783
Possible	198	20.5	465	48.2	225	23.3	77	8.0	965
Probable	190	18.9	442	43.9	285	28.3	90	8.9	1007
Pathognomonic	181	14.1	683	53.0	305	23.7	119	9.2	355
Total	1321	26.2	2238	44.4	1129	22.4	355	7.0	5043



AF 88. Stacked bar graph showing the percentage of teeth belonging to the different HD severity scores with a specific calculus score.

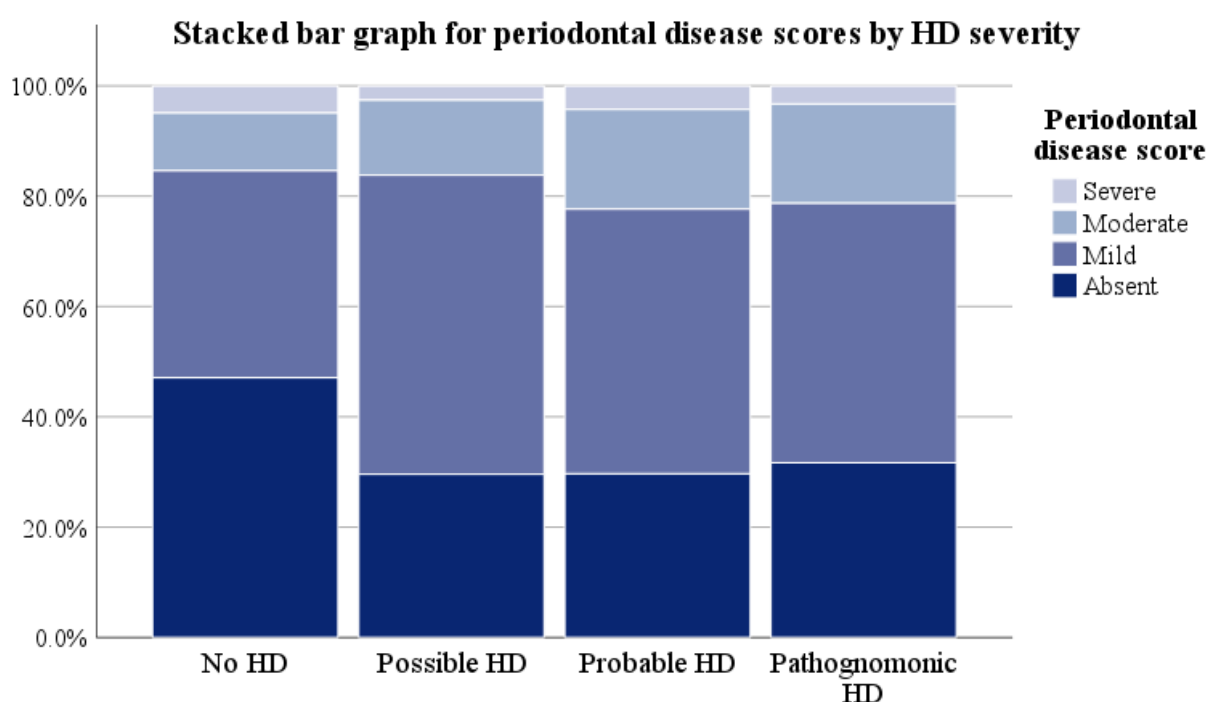
AT 191. Cross table of number of teeth with different scores of calculus per HD diagnosis severity/certainty. Calculus scores based on Brothwell (1981); Buikstra and Ubelaker (1994).

	Calculus score								<i>Total</i>
	No		Slight		Moderate		Large		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
RS absent	871	33.8	1031	40.0	548	21.2	129	5.0	2579
RS present	384	15.6	1244	50.5	624	25.3	212	8.6	2464
<i>Total</i>	1255	24.9	2275	45.1	1172	23.2	241	47.8	5043

AT 192 shows the number and percentage of teeth observed with a specific periodontal disease score per HD severity group. There appears to be a pattern that shows that an increase in HD lesion severity coincides to a slight increase in periodontal disease severity, though the relationship is not as linear as for calculus severity. This pattern is also visible in AF 89, and statistically significant (Chi square: $\chi^2=111.428$, $df=9$, $p=7.5252E-20$, $\phi_c=0.103$). This difference is also notable and statistically significant between RS presence and absence (Chi square: $\chi^2=39.846$, $df=3$, $p=1.1485E-8$, $\phi_c=0.108$), though the difference is only apparently in score 1 and 2 (AT 193).

AT 192. Cross table of number of teeth with different scores of periodontal disease per HD diagnosis severity/certainty.
Periodontal disease scores based on (Ogden and Lee 2008).

	Periodontal disease scores								<i>Total</i>
	1		2		3		4		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
No HD	432	47.1	344	37.5	96	10.5	45	4.9	917
Possible HD	207	29.6	379	54.2	95	13.6	18	2.6	699
Probable HD	230	29.7	372	48.0	140	18.1	33	4.3	775
Pathognomonic HD	357	31.6	530	47.0	203	18.0	37	3.3	1127
<i>Total</i>	1226	34.8	1625	46.2	534	15.2	133	3.8	3518



AF 89. Stacked bar graph showing the percentage of teeth belonging to the different HD severity scores with a specific periodontal disease score.

AT 193. Cross table of number of teeth with different scores of periodontal disease per RS presence. Periodontal disease scores based on (Ogden and Lee 2008).

	Periodontal disease scores								<i>Total</i>
	1		2		3		4		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
RS absent	498	39.6	500	39.8	207	16.5	50	4.0	1255
RS present	660	30.7	1087	50.6	318	14.8	83	3.9	2148
<i>Total</i>	1158	34.0	1587	46.6	525	15.4	133	3.9	3403

AT 194 and AT 195 show the number and percentage of teeth observed with abscesses and granulomas per HD severity group, and RS presence, respectively. There is no apparent pattern visible or statistically identifiable (abscesses, HD (Chi square): $n=6071$, $\chi^2=6.543$, $df=6$, $p=0.365$; abscesses, RS (Chi square): $n=6330$, $\chi^2=0.820$, $df=2$, $p=0.664$; granulomas, HD (Chi square): $n=5934$, $\chi^2=9.213$, $df=3$, $p=0.027$, $\phi_c=0.001$; abscesses, RS (Chi square): $n=6175$, $\chi^2=0.310$, $df=1$, $p=0.578$), suggesting that there is not necessarily a higher rate of abscess or granuloma formation in individuals with HD, nor in those with oral lesions specifically.

AT 194. Cross table of number of teeth with abscesses and granulomas (presented as number per tooth position) per HD diagnosis severity/certainty.

	Abscesses							Granulomas				
	0		1		2		Total	0		1		Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%	
No HD	2305	97.1	65	2.7	3	0.1	2373	2319	99.8	4	23.5	2323
Possible HD	1002	97.5	26	2.5	0	0.0	1028	958	99.5	5	29.4	963
Probable HD	1141	96.5	41	3.5	0	0.0	1182	1174	99.4	7	41.2	1181
Pathogn HD	1452	97.6	34	2.3	2	0.1	1488	1466	99.9	1	5.9	1467
Total	5900	97.2	166	2.7	5	0.1	6071	5917	99.7	17	100	5934

AT 195. Cross table of number of teeth with abscesses and granulomas (presented as number per tooth position) per HD diagnosis severity/certainty.

	Abscesses							Granulomas				
	0		1		2		Total	0		1		Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%	
RS absent	3342	96.8	109	3.2	3	0.09	3454	3313	53.7	2845	46.2	6158
RS present	2794	97.1	80	2.8	2	0.07	2876	8	47.1	9	52.9	17
Total	6136	96.9	189	0.03	5	0.08	6330	3321	53.8	2854	46.2	6175

The rate of caries can increase in individuals consuming carbohydrate-rich diets, and it can be dependent on the oral microbiome, the latter being something that can be altered by oral HD lesions. AT 196 shows the number and percentage of teeth observed with caries per HD severity group. There is no clear pattern visible in caries frequencies between different categories, though there is statistically significant difference (Chi square: $n=5029$, $\chi^2=56.693$, $df=9$, $p=5.7867E-9$, $\phi_c=0.061$). RS presence and caries show no real difference either (AT 197; Chi square: $n=5091$, $\chi^2=6.068$, $df=3$, $p=50.108$, $\phi_c=0.035$).

AT 196. Cross table of number of teeth with caries (presented as number per tooth) per HD diagnosis severity/certainty.

	Number of caries	Total

	0		1		2		≤3		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
No	1562	91.0	142	8.3	13	0.8	0	0.0	1717
Possible	886	89.1	93	9.4	14	1.4	1	0.1	994
Probable	900	89.6	95	9.5	7	0.7	2	0.2	1004
Pathognomonic	1263	96.0	47	3.7	4	0.3	0	0.0	1316
<i>Total</i>	4611	91.7	379	7.5	38	0.8	3	0.1	5031

AT 197. Cross table of number of teeth with caries (presented as number per tooth), categorised by RS presence.

	Number of caries								<i>Total</i>
	0		1		2		≤3		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
RS absent	2364	90.8	215	8.3	23	0.9	1	0.04	2603
RS present	2304	92.6	166	6.7	16	0.6	2	0.08	2488
<i>Total</i>	4668	91.7	381	7.5	39	0.8	3	0.06	5091

A. 4.4.2.1.3.1 Sinusitis, HD and dental health

AT 198. Descriptive statistics and normality tests for %AMTL per dentition, categorised by sinusitis presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Sinusitis absent	130	0.0696	0.0000	0.1686	0.0000	1.0000	3.296	12.089	0.368	130	5.5301E-50
<i>Sinusitis present</i>	<i>62</i>	<i>0.0672</i>	<i>0.0179</i>	<i>0.1002</i>	<i>0.0000</i>	<i>0.4545</i>	<i>2.133</i>	<i>5.105</i>	<i>0.251</i>	<i>62</i>	<i>1.5376E-10</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 199. Descriptive statistics and normality tests for DMT percentages per dentition, categorised by HD sinusitis presence/absence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
%DMT	<i>Sinusitis absent</i>	<i>130</i>	<i>0.0812</i>	<i>0.0000</i>	<i>0.1627</i>	<i>0.000</i>	<i>1.000</i>	<i>3.113</i>	<i>11.427</i>	<i>0.309</i>	<i>130</i>	<i>1.0644E-34</i>
	<i>Sinusitis present</i>	<i>62</i>	<i>0.0886</i>	<i>0.0404</i>	<i>0.1175</i>	<i>0.000</i>	<i>0.461</i>	<i>1.813</i>	<i>3.017</i>	<i>0.233</i>	<i>62</i>	<i>5.6109E-9</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A.4.4.2.1.4 Oral health and leprosaria

A. 4.4.2.1.4.1. Leprosaria versus other site types

AT 200. Descriptive statistics and normality tests for %AMTL per dentition, categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/friary	4	0.1488	0.1190	0.1510	0.0000	0.3571	1.082	1.753	0.938	4	0.641
<i>Leprosarium</i>	<i>245</i>	<i>0.0852</i>	<i>0.0000</i>	<i>0.1900</i>	<i>0.0000</i>	<i>1.0000</i>	<i>3.277</i>	<i>11.560</i>	<i>0.327</i>	<i>245</i>	<i>1.5795E-74</i>
<i>Hospital</i>	<i>4</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	<i>0.0000</i>	-	-	-	4	-
<i>Other</i>	<i>24</i>	<i>0.0658</i>	<i>0.0000</i>	<i>0.1505</i>	<i>0.0000</i>	<i>0.6190</i>	<i>2.900</i>	<i>8.399</i>	<i>0.510</i>	<i>24</i>	<i>7.1009E-8</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 201. Descriptive statistics and normality tests for calculus scores per dentition, categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Monastery/friary</i>	<i>4</i>	<i>1.50</i>	<i>1.50</i>	<i>0.577</i>	<i>1.00</i>	<i>2.00</i>	<i>0.000</i>	<i>-6.000</i>	<i>0.729</i>	<i>4</i>	<i>0.024</i>
<i>Leprosarium</i>	<i>131</i>	<i>1.35</i>	<i>1.00</i>	<i>1.129</i>	<i>0.00</i>	<i>5.00</i>	<i>0.930</i>	<i>0.712</i>	<i>0.271</i>	<i>131</i>	<i>1.388E-26</i>
<i>Hospital</i>	<i>3</i>	<i>2.33</i>	<i>3.00</i>	<i>1.155</i>	<i>1.00</i>	<i>3.00</i>	<i>-1.732</i>	-	<i>0.750</i>	<i>3</i>	<i>-4.2407E-16</i>
<i>Other site types</i>	<i>22</i>	<i>1.91</i>	<i>2.00</i>	<i>0.971</i>	<i>0.00</i>	<i>4.00</i>	<i>0.195</i>	<i>-0.330</i>	<i>0.911</i>	<i>22</i>	<i>0.050</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 202. Descriptive statistics and normality tests for periodontal disease scores per dentition, categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/friary	44	2.00	2.00	0.826	1.00	3.00	0.000	1.500	0.945	4	0.683
<i>Leprosarium</i>	<i>235</i>	<i>2.24</i>	<i>2.00</i>	<i>1.460</i>	<i>0.00</i>	<i>5.00</i>	<i>-0.321</i>	<i>-1.106</i>	<i>0.193</i>	<i>234</i>	<i>1.0134E-23</i>
Hospital	4	2.50	3.00	1.915	0.00	4.00	-0.855	-1.289	0.863	4	0.272
<i>Other site types</i>	<i>24</i>	<i>2.58</i>	<i>3.00</i>	<i>0.974</i>	<i>1.00</i>	<i>4.00</i>	<i>-0.255</i>	<i>-0.788</i>	<i>0.877</i>	<i>24</i>	<i>0.007</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 203. Post-hoc Dunn test results for periodontal disease scores between different site types

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Leprosarium-Monastery/Friary	12.903	22.436	.575	.565	1.000
Leprosarium-Other	-25.994	10.184	-2.552	.011	.064
Leprosarium-Hospital	-40.319	25.810	-1.562	.118	.710
Monastery/Friary-Other	-13.091	24.026	-.545	.586	1.000
Monastery/Friary-Hospital	-27.417	33.760	-.812	.417	1.000
Other-Hospital	14.326	27.204	.527	.598	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 204. Descriptive statistics and normality tests for DMT percentages per dentition, categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Monastery/friary</i>	4	0.2051	0.2084	0.1322	0.0426	0.3611	-0.140	0.617	0.995	4	0.984
<i>Leprosarium</i>	245	0.1021	0.2127	0.1919	0.0000	1.0000	3.019	9.925	0.297	245	2.659E-61
<i>Hospital</i>	4	0.0000	0.0000	0.0000	0.0000	0.0000	-	-	-	4	-
<i>Other</i>	24	0.6631	0.0089	0.1289	0.0000	0.5172	2.427	5.995	0.589	24	4.7231E-7

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.2.1.4.1 Between leprosaria

AT 205. Descriptive statistics and normality tests for %AMTL per dentition, categorised by leprosarium. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
MHW	10	0.24777	0.07919	0.4014	0.00	1.000	1.673	1.185	0.634	10	0.00014
<i>MSL</i>	<i>14</i>	<i>0.08923</i>	<i>0.00000</i>	<i>0.2664</i>	<i>0.00</i>	<i>1.000</i>	<i>3.556</i>	<i>12.905</i>	<i>0.389</i>	<i>14</i>	<i>9.0107E-7</i>
<i>JTN</i>	<i>112</i>	<i>0.04854</i>	<i>0.00000</i>	<i>0.0836</i>	<i>0.00</i>	<i>0.429</i>	<i>2.085</i>	<i>4.620</i>	<i>0.353</i>	<i>112</i>	<i>1.9277E-39</i>
<i>BSA</i>	<i>6</i>	<i>0.07738</i>	<i>0.00000</i>	<i>0.1895</i>	<i>0.00</i>	<i>0.464</i>	<i>2.449</i>	<i>6.000</i>	<i>0.496</i>	<i>6</i>	<i>0.00002</i>
<i>MMW</i>	<i>103</i>	<i>0.10926</i>	<i>0.00000</i>	<i>0.2216</i>	<i>0.00</i>	<i>1.00</i>	<i>2.479</i>	<i>5.993</i>	<i>0.337</i>	<i>103</i>	<i>1.0266E-32</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 206. Descriptive statistics and normality tests for calculus scores per dentition, categorised by leprosarium. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
MHW	8	1.63	1.50	1.408	0	4	0.480	-0.564	0.934	8	0.557
<i>MSL</i>	<i>13</i>	<i>2.54</i>	<i>2.00</i>	<i>1.127</i>	<i>1</i>	<i>4</i>	<i>0.301</i>	<i>-1.359</i>	<i>0.822</i>	<i>13</i>	<i>0.013</i>
<i>JTN</i>	<i>109</i>	<i>2.19</i>	<i>3.00</i>	<i>1.536</i>	<i>0</i>	<i>5</i>	<i>-0.346</i>	<i>-1.264</i>	<i>0.205</i>	<i>109</i>	<i>3.2299E-12</i>
<i>BSA</i>	<i>5</i>	<i>1.00</i>	<i>0.00</i>	<i>2.236</i>	<i>0</i>	<i>5</i>	<i>2.236</i>	<i>5.00</i>	<i>0.552</i>	<i>5</i>	<i>0.00013</i>
<i>MMW</i>	<i>100</i>	<i>2.36</i>	<i>3.00</i>	<i>1.352</i>	<i>0</i>	<i>5</i>	<i>-0.434</i>	<i>-0.829</i>	<i>0.212</i>	<i>100</i>	<i>5.319E-12</i>

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 207. Descriptive statistics and normality tests for periodontal disease scores per dentition, categorised by leprosarium. Kolmogorov-Smirnov (KS) test reported when n > 50; Shapiro-Wilk (SW) test reported when n < 50. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
MHW	9	2.11	2.00	1.364	1	5	1.268	1.383	0.820	9	0.035
<i>MSL</i>	<i>12</i>	<i>2.08</i>	<i>1.50</i>	<i>1.240</i>	<i>1</i>	<i>4</i>	<i>0.501</i>	<i>-1.543</i>	<i>0.784</i>	<i>12</i>	<i>0.006</i>
<i>JTN</i>	<i>4</i>	<i>1.25</i>	<i>0.00</i>	<i>2.500</i>	<i>0</i>	<i>5</i>	<i>2.00</i>	<i>4.00</i>	<i>0.630</i>	<i>4</i>	<i>0.001</i>
<i>BSA</i>	<i>6</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0</i>	<i>0</i>	-	-	-	<i>6</i>	-
<i>MMW</i>	<i>100</i>	<i>1.28</i>	<i>1.00</i>	<i>0.956</i>	<i>0</i>	<i>4</i>	<i>0.647</i>	<i>0.088</i>	<i>0.274</i>	<i>100</i>	<i>1.2124E-20</i>

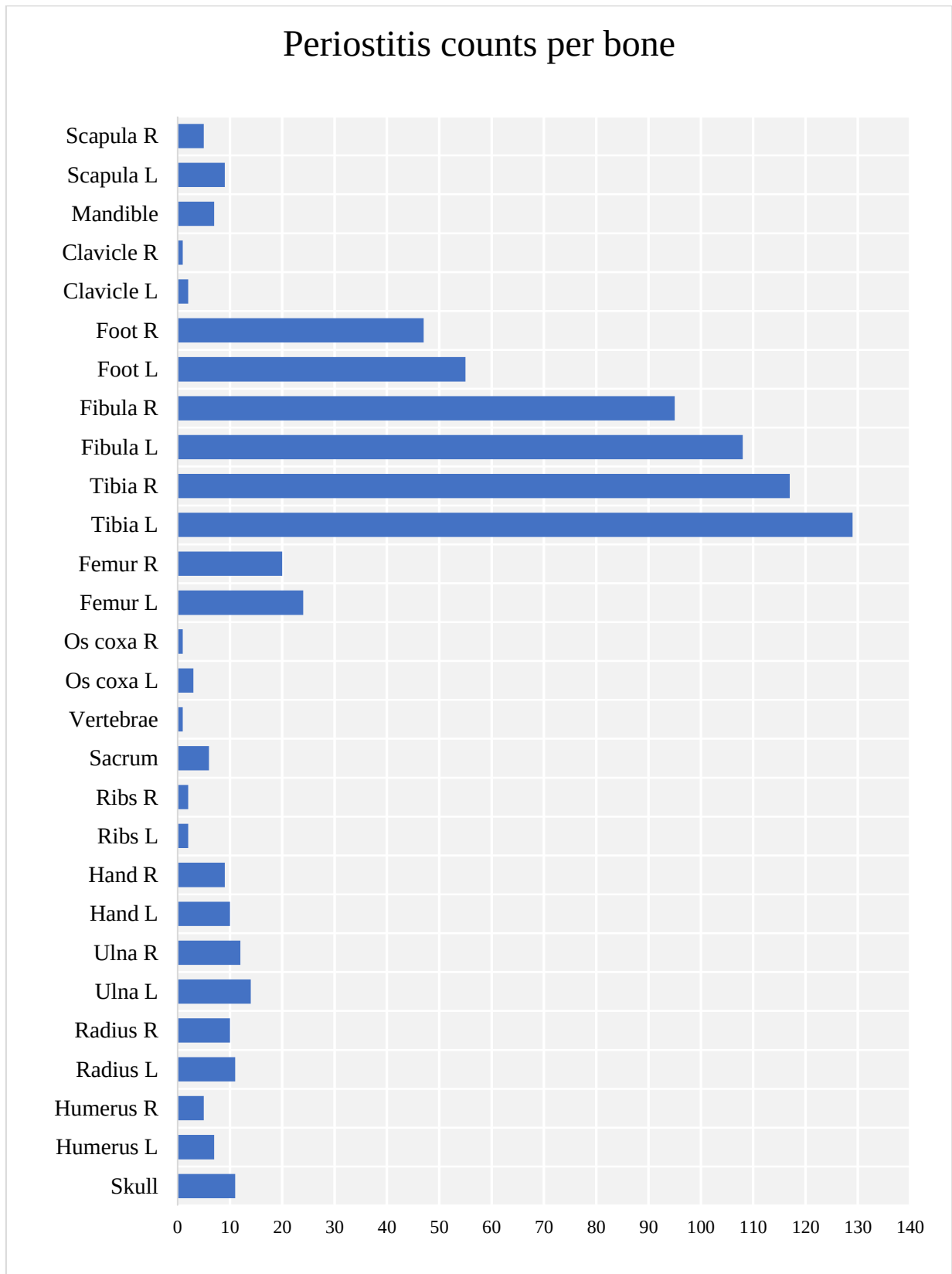
*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 208. Descriptive statistics and normality tests for %DMT per dentition, categorised by leprosarium. Kolmogorov-Smirnov (KS) test reported when n > 50; Shapiro-Wilk (SW) test reported when n < 50. Rows in *cursive* are not normally distributed.

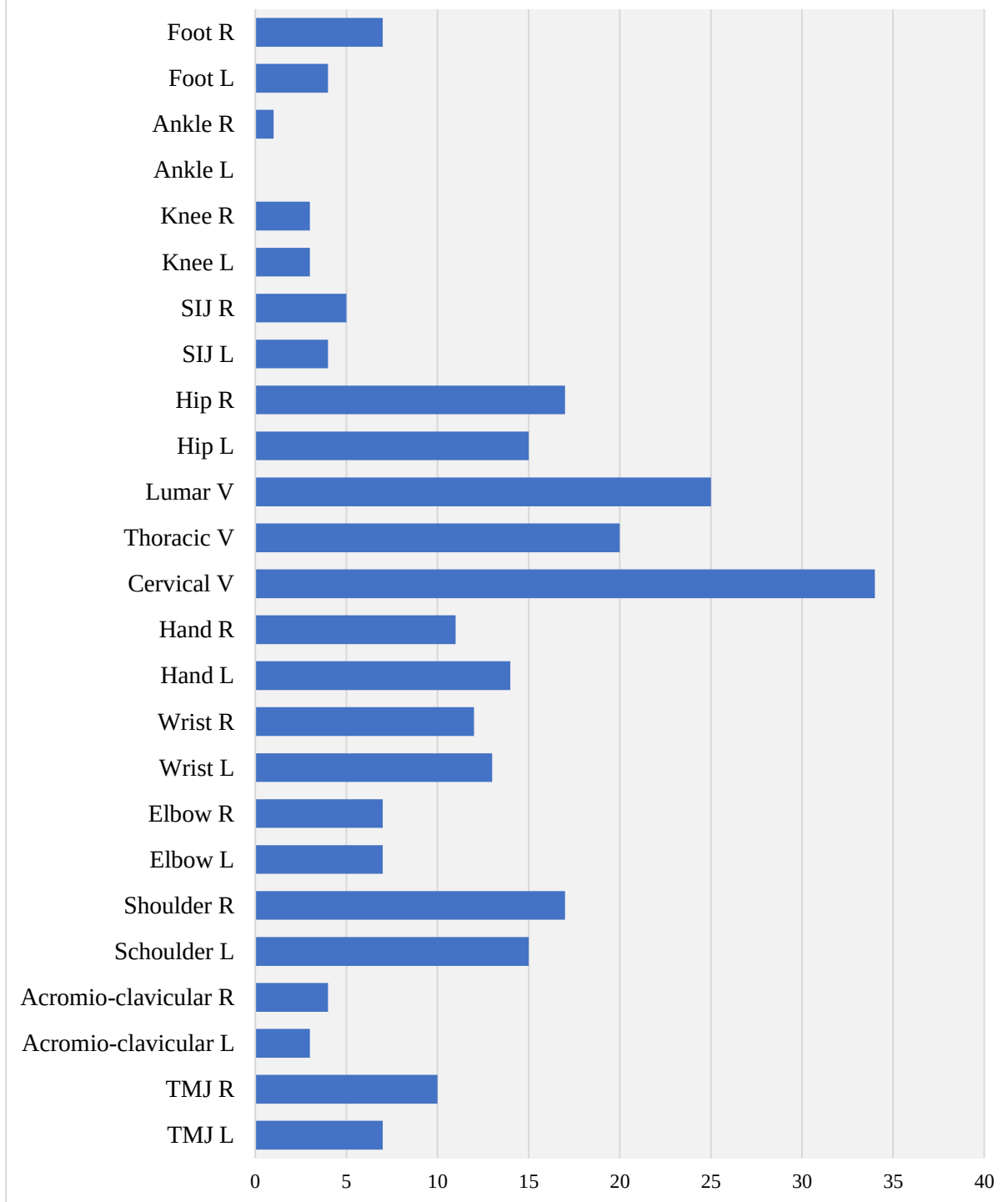
	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>MHW</i>	<i>10</i>	<i>0.2554</i>	<i>0.1027</i>	<i>0.3992</i>	<i>0.00</i>	<i>1.00</i>	<i>1.635</i>	<i>1.107</i>	<i>.651</i>	<i>10</i>	<i>0.0002</i>
<i>MSL</i>	<i>14</i>	<i>0.1051</i>	<i>0.0000</i>	<i>0.2651</i>	<i>0.00</i>	<i>1.00</i>	<i>3.399</i>	<i>12.070</i>	<i>.453</i>	<i>14</i>	<i>0.000003</i>
<i>JTN</i>	<i>112</i>	<i>0.0670</i>	<i>0.0235</i>	<i>0.1035</i>	<i>0.00</i>	<i>0.46</i>	<i>2.176</i>	<i>4.686</i>	<i>.259</i>	<i>112</i>	<i>1.6498E-20</i>
<i>BSA</i>	<i>6</i>	<i>0.0861</i>	<i>0.0446</i>	<i>0.1121</i>	<i>0.00</i>	<i>0.30</i>	<i>1.915</i>	<i>3.803</i>	<i>.777</i>	<i>6</i>	<i>.036</i>
<i>MMW</i>	<i>103</i>	<i>0.1258</i>	<i>0.0189</i>	<i>0.2206</i>	<i>0.00</i>	<i>1.00</i>	<i>2.346</i>	<i>5.335</i>	<i>.284</i>	<i>103</i>	<i>5.9849E-23</i>

A. 4.4.2.2. Non-HD paleopathological conditions

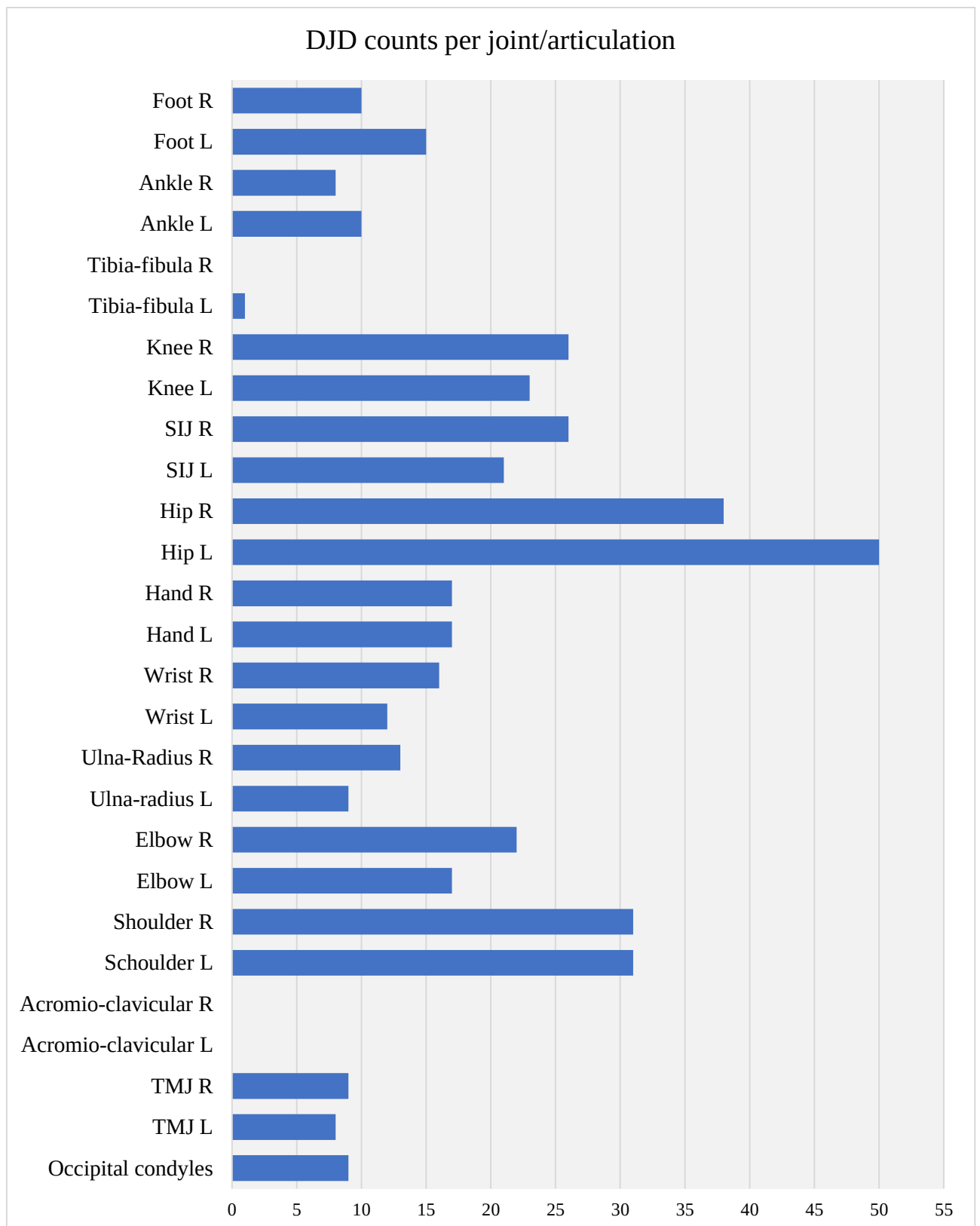


AF 90. Overview of number of bones with periostitis.

OA counts per joint/articulation



AF 91. Overview of number of joints/articulations with OA.



AF 92. Overview of number of joints/articulations with DJD.

A. 4.4.1.4. Late life carbon and nitrogen isotopes

AT 209. Carbon and nitrogen values for all rib samples.

UIN	Rib sampled	Rib initial sample weight	Rib collagen weight	Rib collagen C yield	Rib collagen mean d13C	Rib collagen STDEV d13C	Rib collagen N yield	Rib collagen mean d15N	Rib collagen STDEV d15N	Rib collagen mean C:N	Rib collagen STDEV C:N	Rib collagen sample reps
1	Fragment	0.491	0.031	43.8735	-20.3193	0.2181	15.8059	10.6353	0.1350	3.2383	0.0221	3
2	-	-	-	-	-	-	-	-	-	-	-	-
4	Fragment	0.575	0.047	45.8358	-19.7823	0.0578	16.7094	10.2610	0.1309	3.2003	0.0215	3
5	Fragment	0.741	0.130	52.0158	-19.5217	0.0316	19.1854	9.6703	0.1194	3.1625	0.0218	3
6	Fragment	0.583	0.089	48.1864	-19.1600	0.1612	17.6710	11.0363	0.1241	3.1811	0.0219	3
13	Fragment	0.553	0.093	47.2668	-18.7883	0.1397	17.4109	12.4447	0.0868	3.1672	0.0205	3
51	Fragment	0.519	0.030	44.7218	-19.2670	0.1047	16.3084	13.6783	0.1646	3.1992	0.0148	3
63	Fragment	0.538	0.070	47.2998	-19.4003	0.0705	17.3995	13.4907	0.1289	3.1710	0.0246	3
129	Fragment	0.510	0.022	43.1630	-19.2713	0.0996	15.5807	13.6580	0.1182	3.2321	0.0090	3
148	Fragment	0.586	0.055	44.0680	-18.6050	0.0636	16.1889	15.0687	0.1444	3.1763	0.0196	0
167	Fragment	0.777	0.035	45.0251	-19.2927	0.0873	16.4413	13.2633	0.1055	3.1949	0.0294	3

UIN	Rib sampled	Rib initial sample weight	Rib collagen weight	Rib collagen C yield	Rib collagen mean d13C	Rib collagen STDEV d13C	Rib collagen N yield	Rib collagen mean d15N	Rib collagen STDEV d15N	Rib collagen mean C:N	Rib collagen STDEV C:N	Rib collagen sample reps
175	Fragment	0.531	0.043	8.0000	-20.4000	0.0000	0.0000	11.4000	0.0000	3.2000	0.0000	3
176	Fragment	0.619	0.112	18.0000	-19.4000	0.0000	0.0000	11.2000	0.0000	3.1000	0.0000	3
201	Fragment	0.439	0.056	44.7001	-19.5443	0.0419	16.4208	11.9890	0.0928	3.1756	0.0304	3
202	Fragment	0.438	0.035	7.9000	-19.8000	0.0000	0.0000	11.4000	0.0000	3.2000	0.0000	3
205	Fragment	0.597	0.074	43.7250	-18.9640	0.1066	16.0313	11.9562	0.0905	3.1818	0.0088	3
206	Fragment	0.439	0.074	44.3476	-19.1733	0.0970	16.3026	11.8420	0.0781	3.1733	0.0130	3
207	Fragment	0.613	0.031	46.5726	-18.8980	0.0521	16.8653	12.3976	0.0450	3.2221	0.0186	3
208	Fragment	0.855	0.055	50.5187	-18.6260	0.0785	18.2657	13.3575	0.0275	3.2268	0.0161	3
209	Fragment	0.409	0.021	43.2969	-19.0163	0.0575	15.5787	11.9247	0.1022	3.2420	0.0182	3
211	Fragment	0.803	0.081	41.3252	-19.3340	0.0600	15.2424	10.7072	0.0598	3.1630	0.0117	3
218	Fragment	0.577	0.017	41.2270	-19.0547	0.0815	15.1129	11.4168	0.0696	3.1825	0.0084	3
219	Fragment	0.598	0.048	41.8544	-19.5073	0.0808	15.3203	11.2953	0.0830	3.1870	0.0130	3
220	Fragment	0.523	0.053	54.8516	-19.2893	0.0424	20.2634	10.9365	0.0702	3.1559	0.0167	3

UIN	Rib sampled	Rib initial sample weight	Rib collagen weight	Rib collagen C yield	Rib collagen mean d13C	Rib collagen STDEV d13C	Rib collagen N yield	Rib collagen mean d15N	Rib collagen STDEV d15N	Rib collagen mean C:N	Rib collagen STDEV C:N	Rib collagen sample reps
223	Fragment	0.530	0.079	44.8980	-18.9870	0.0658	16.6456	11.7097	0.0671	3.1466	0.0139	3
224	Fragment	0.922	-	43.8754	-19.0900	0.0424	16.2355	11.3024	0.0234	3.1535	0.0236	2
225	Fragment	0.597	0.015	47.3367	-20.1797	0.0256	17.0683	11.1532	0.0546	3.2360	0.0167	3
226	Fragment	0.864	3.131	40.3598	-18.5057	0.0748	14.9466	12.0187	0.0816	3.1505	0.0076	3
227	Fragment	0.797	0.059	40.6249	-18.1380	0.0867	14.8073	13.6183	0.0519	3.2014	0.0167	3
228	Fragment	0.388	0.057	51.7635	-19.3643	0.0894	18.9217	11.9248	0.0588	3.1875	0.0363	3
229	Fragment	0.358	0.035	43.9067	-18.8567	0.0274	16.0236	11.5317	0.0248	3.1966	0.0194	3
230	Fragment	0.641	0.059	48.9576	-18.7245	0.0474	18.0296	12.6620	0.0184	3.1675	0.0088	2
231	Fragment	0.653	0.094	46.9344	-19.5490	0.1655	17.0345	11.0981	0.0439	3.2149	0.0580	3
232	Fragment	0.794	0.110	45.0584	-18.8287	0.0468	16.6625	12.1067	0.0620	3.1552	0.0172	3
233	Fragment	0.784	0.147	53.0111	-19.1200	0.0475	19.6506	12.4419	0.1670	3.1443	0.0206	3
234	-	-	-	-	-	-	-	-	-	-	-	-
235	Fragment	0.552	0.037	49.6379	-19.7703	0.0725	18.3886	11.8578	0.0872	3.1482	0.0144	3

UIN	Rib sampled	Rib initial sample weight	Rib collagen weight	Rib collagen C yield	Rib collagen mean d13C	Rib collagen STDEV d13C	Rib collagen N yield	Rib collagen mean d15N	Rib collagen STDEV d15N	Rib collagen mean C:N	Rib collagen STDEV C:N	Rib collagen sample reps
237	Fragment	0.535	0.029	43.8881	-19.1863	0.0341	15.9700	12.0046	0.0257	3.2066	0.0237	3
238	Fragment	0.606	0.000	41.2022	-18.8323	0.0126	15.0501	11.8558	0.0303	3.1933	0.0191	3
244	Fragment	0.667	0.000	42.7547	-19.3717	0.0275	15.6669	11.2614	0.0399	3.1831	0.0188	3
246	Fragment	0.633	0.000	39.9746	-19.9107	0.0635	14.6746	9.4593	0.0481	3.1787	0.0261	3
247	Fragment	0.470	-	43.2997	-19.2670	0.0312	15.8493	11.2011	0.0138	3.1878	0.0149	3
248	Fragment	0.552	-	45.2563	-19.4603	0.0505	16.3008	11.2467	0.0402	3.2395	0.0219	3
249	Fragment	0.567	-	34.5881	-21.4497	0.0275	11.2211	9.9242	0.0226	3.5963	0.0055	3
250	Fragment	-	-	42.5000	-19.7200	0.0000	15.0000	10.8100	0.0000	3.3500	0.0000	2
251	Fragment	0.535	-	33.4602	-19.7650	0.0130	11.2868	12.5281	0.0516	3.4592	0.0136	3
253	-	-	-	-	-	-	-	-	-	-	-	-
300	Fragment	0.554	0.028	46.9183	-20.3120	0.0389	17.0733	9.7187	0.1179	3.2061	0.0216	3
301	Fragment	0.491	0.088	46.8405	-20.2040	0.0130	17.2287	9.3697	0.0823	3.1715	0.0259	3
302	Fragment	0.714	0.089	47.1378	-20.3097	0.0438	17.3291	10.1480	0.1129	3.1726	0.0274	3

UIN	Rib sampled	Rib initial sample weight	Rib collagen weight	Rib collagen C yield	Rib collagen mean d13C	Rib collagen STDEV d13C	Rib collagen N yield	Rib collagen mean d15N	Rib collagen STDEV d15N	Rib collagen mean C:N	Rib collagen STDEV C:N	Rib collagen sample reps
303	Fragment	0.549	0.043	44.3186	-20.2940	0.0404	16.1609	10.1137	0.0571	3.1986	0.0223	3
304	Fragment	0.566	0.099	45.9598	-19.9820	0.0491	16.8147	9.5973	0.0750	3.1888	0.0266	3
305	Fragment	0.607	0.000	44.3958	-19.8087	0.0760	16.2888	10.2297	0.0832	3.1800	0.0175	3
306	Fragment	0.652	0.075	45.1657	-20.1770	0.0712	16.5477	9.7290	0.0607	3.1841	0.0210	3
357	Fragment	0.481	0.041	45.9670	-19.1603	0.0012	16.8541	10.2750	0.1011	3.1819	0.0219	3
367	Fragment	0.739	0.053	48.4931	-19.8423	0.0410	17.8308	9.7927	0.0925	3.1712	0.0250	3
370	Fragment	0.586	0.026	48.7438	-19.6217	0.0412	17.7601	11.7350	0.1205	3.2012	0.0178	3
371	Fragment	0.669	0.106	46.6188	-19.1560	0.0808	17.0113	10.5237	0.0607	3.1971	0.0218	3
379	Fragment	0.582	0.049	44.2696	-18.9647	0.0142	16.1438	13.1773	0.1696	3.1995	0.0104	3
387	Fragment	0.547	0.065	45.0945	-19.4100	0.0902	16.5180	10.2243	0.0455	3.1847	0.0203	3
388	Fragment	0.694	0.091	45.5326	-18.6437	0.0785	16.5914	11.9430	0.0572	3.2011	0.0197	3
401	Fragment	0.746	0.058	40.9186	-18.8400	0.0726	15.0247	11.3603	0.1268	3.1771	0.0182	3
408	Fragment	0.552	0.040	44.4296	-20.2357	0.1002	16.1598	9.3200	0.0946	3.2076	0.0178	3

UIN	Rib sampled	Rib initial sample weight	Rib collagen weight	Rib collagen C yield	Rib collagen mean d13C	Rib collagen STDEV d13C	Rib collagen N yield	Rib collagen mean d15N	Rib collagen STDEV d15N	Rib collagen mean C:N	Rib collagen STDEV C:N	Rib collagen sample reps
424	Fragment	0.579	0.035	45.1624	-19.5443	0.0917	16.4159	10.1223	0.0679	3.2099	0.0246	3

AT 210. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values for the PhD and complementary datasets. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

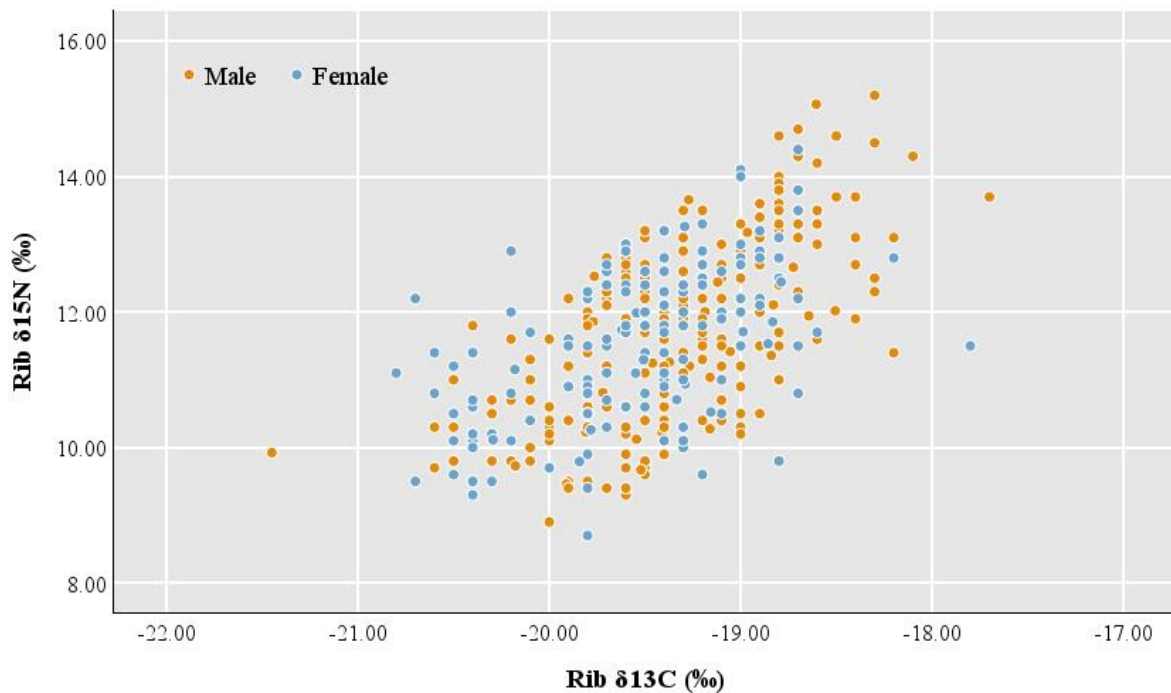
		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
PhD dataset	Rib $\delta^{13}\text{C}$	56	-19.4700	-19.4002	0.59102	-21.45	-18.14	-0.562	1.122	0.090	56	0.200*
	Rib $\delta^{15}\text{N}$	56	11.3320	11.2784	1.27279	9.32	15.07	0.580	0.186	0.083	56	0.200*
Complementary dataset	Rib $\delta^{13}\text{C}$	626	-19.6091	-19.6000	0.69302	-23.10	-17.00	-0.551	2.392	0.043	626	0.007
	Rib $\delta^{15}\text{N}$	626	11.4674	11.5000	1.46857	5.77	15.20	-0.159	-0.190	0.055	626	0.00012

*. This is a lower bound of the true significance.

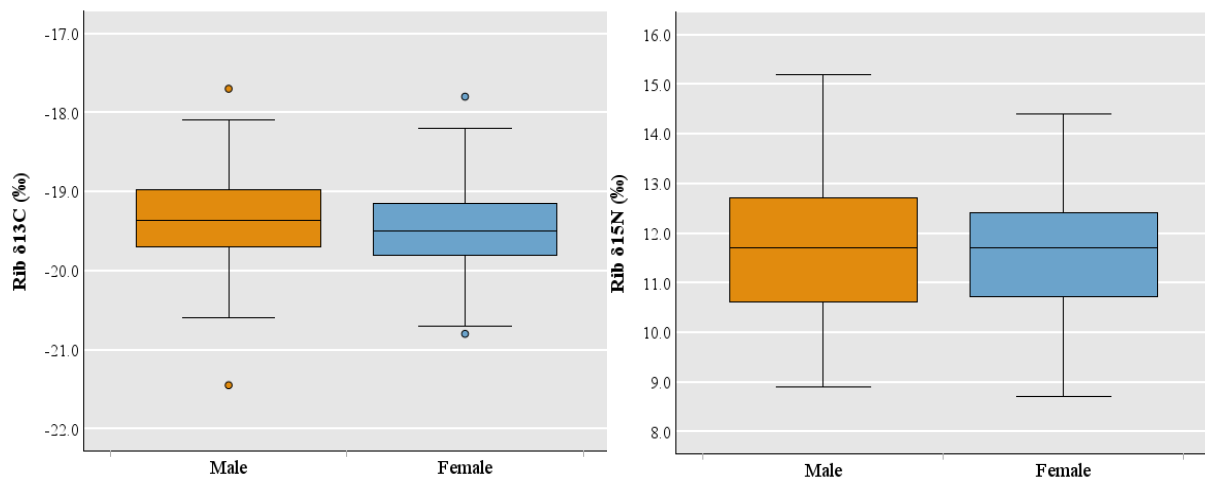
a. Lilliefors Significance Correction

A. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ across sex

For this analysis, the 'indeterminate' category is not considered. AF 93 and AF 94 show the range of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values between males and females (AT 211). There is a slight difference between males and females with more males having more positive $\delta^{15}\text{N}$ and less negative $\delta^{13}\text{C}$ values, which is statistically significant for $\delta^{13}\text{C}$ ($\delta^{13}\text{C}$: $\chi^2=7.386$, $\text{df}=1$, $p=0.007$; $\delta^{15}\text{N}$ rib: $\chi^2=0.929$, $\text{df}=1$, $p=0.335$). The difference does not, however, appear substantial in AF 94, with medians looking very similar. Moreover, splitting data by sex will exclude a number of external datapoints from sites where sex data was not available and all indeterminate individuals. As such, further analyses will not split data by sex.



AF 93. Scatterplot of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values coloured per sex; male ($n=235$) and female ($n=142$).



AF 94. Boxplots of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values coloured per sex; male ($n=235$) and female ($n=142$).

AT 211. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by sex. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

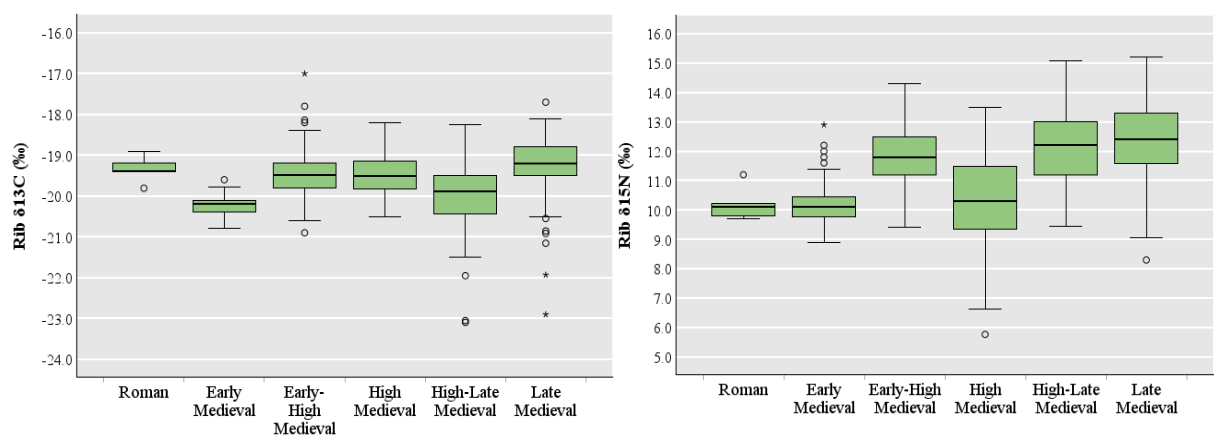
		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Males	$\delta^{13}\text{C}$	235	-19.3453	-19.3717	0.55406	-21.45	-17.70	-0.200	0.407	0.051	235	0.200*
	$\delta^{15}\text{N}$	235	11.7240	11.7000	1.32953	8.90	15.20	0.176	-0.658	0.073	235	0.004
Females	$\delta^{13}\text{C}$	142	-19.5194	-19.5000	0.55574	-20.80	-17.80	-0.163	-0.037	0.081	142	0.022
	$\delta^{15}\text{N}$	142	11.5656	11.7000	1.14304	8.70	14.40	-0.083	-0.522	0.056	142	0.200*

*. This is a lower bound of the true significance.

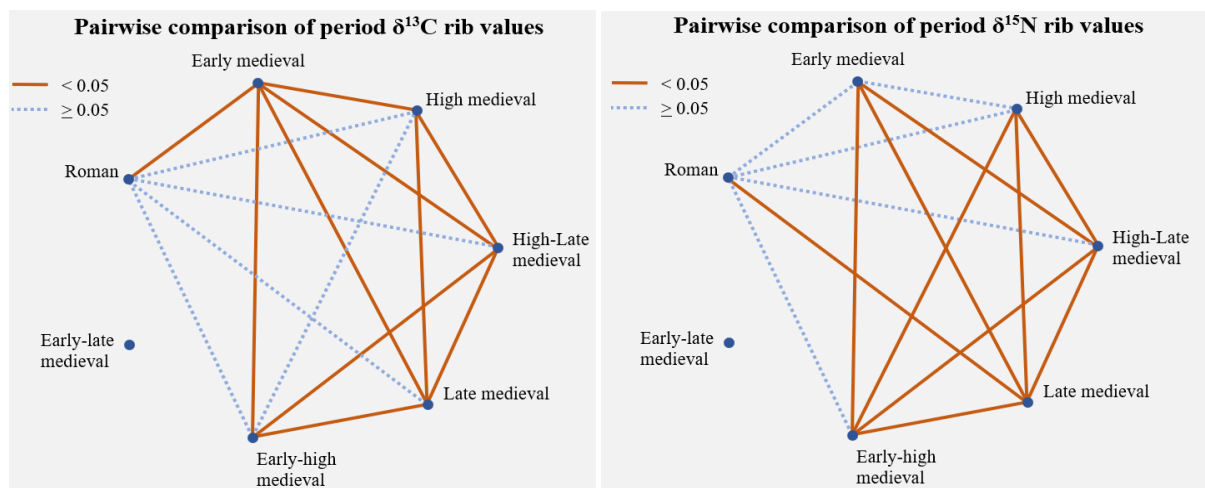
a. Lilliefors Significance Correction

A. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ across time

AF 95⁹⁴ shows that there are some changes through time, though $\delta^{15}\text{N}$ shows a gradual increase of values as time passes, while $\delta^{13}\text{C}$ values fluctuate through time with both the early medieval and high-late medieval period showing a drop of average values compared to the other values (AT 212 and AT 213). Statistically speaking, there is a significant difference between almost all periods ($\delta^{13}\text{C}$: $\chi^2=234.466$, $df=5$, $p=0.00$; $\delta^{15}\text{N}$ rib: $\chi^2=256.229$, $df=5$, $p=0.00$). A post-hoc tests shows (AF 96) that there is statistical difference between almost all periods (AT 214 and AT 215). As such, all statistical analyses performed for rib $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values are also performed per time period and presented here. These results did not suggest a difference in interpretation compared to analyses that combine all time periods.



AF 95. Boxplots showing rib $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values through time, split by rib and rib. o=outlier as identified by SPSS, *=extreme outlier as identified by SPSS.



⁹⁴ Early-Late medieval (n=6) is combined with Early-High medieval due to sample size.

AF 96. Pairwise comparisons of the different periods as part of the post-hoc Dunn's test per isotope (carbon left; nitrogen right).

AT 212. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ rib values categorised by period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Roman	5	-19.3417	-19.4000	0.33168	-19.81	-18.90	-0.150	0.887	0.967	5	0.854
<i>Early Medieval</i>	<i>115</i>	<i>-20.2458</i>	<i>-20.2000</i>	<i>0.22156</i>	<i>-20.80</i>	<i>-19.60</i>	<i>-0.128</i>	<i>-0.175</i>	<i>0.131</i>	<i>115</i>	<i>0.00005</i>
<i>Early-High Medieval</i>	<i>116</i>	<i>-19.4247</i>	<i>-19.5000</i>	<i>0.52543</i>	<i>-20.90</i>	<i>-17.00</i>	<i>1.096</i>	<i>4.217</i>	<i>0.148</i>	<i>116</i>	<i>0.000002</i>
High Medieval	100	-19.5108	-19.5000	0.50929	-20.50	-18.20	-.048	-0.393	0.065	100	0.200*
<i>High-Late Medieval</i>	<i>97</i>	<i>-19.9259</i>	<i>-19.8450</i>	<i>0.86082</i>	<i>-23.10</i>	<i>-18.24</i>	<i>-1.008</i>	<i>2.489</i>	<i>0.093</i>	<i>97</i>	<i>0.036</i>
Late Medieval	193	-19.2390	-19.2000	0.63542	-22.90	-17.70	-1.684	6.725	0.102	193	0.00004

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 213. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ rib values categorised by period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

	Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
	<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Roman	5	10.2059	10.1000	0.59597	9.70	11.20	1.545	2.595	0.284	5	0.200
<i>Early Medieval</i>	<i>115</i>	<i>10.1579</i>	<i>10.1000</i>	<i>0.62705</i>	<i>8.90</i>	<i>12.90</i>	<i>1.457</i>	<i>3.683</i>	<i>0.151</i>	<i>115</i>	<i>7.9475E-7</i>
Early-High Medieval	116	11.8243	11.8500	0.94613	9.40	14.30	-0.167	-0.067	0.051	116	0.200*
High Medieval	100	10.3542	10.3000	1.56118	5.77	13.50	-0.190	0.064	0.077	100	0.145
High-Late Medieval	97	12.0450	12.2000	1.17694	9.45	15.07	-0.088	-0.549	0.065	97	0.200*
Late Medieval	193	12.3523	12.4000	1.24403	8.30	15.20	-0.408	0.103	0.053	193	0.200*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 214. Post-hoc Dunn's test results comparing rib $\delta^{13}\text{C}$ values between periods. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Early Medieval-High-Late Medieval</i>	-130.701	24.918	-5.245	<.001	.000
<i>Early Medieval-High Medieval</i>	-222.770	24.715	-9.014	<.001	.000
<i>Early Medieval-Early-High Medieval</i>	-242.412	23.785	-10.192	<.001	.000
<i>Early Medieval-Roman</i>	277.835	82.573	3.365	<.001	.011
<i>Early Medieval-Late Medieval</i>	-309.293	21.293	-14.526	<.001	.000
<i>High-Late Medieval-High Medieval</i>	92.069	25.759	3.574	<.001	.005
<i>High-Late Medieval-Early-High Medieval</i>	111.712	24.869	4.492	<.001	.000
High-Late Medieval-Roman	147.134	82.892	1.775	.076	1.000
<i>High-Late Medieval-Late Medieval</i>	-178.593	22.497	-7.939	<.001	.000
High Medieval-Early-High Medieval	19.643	24.665	.796	.426	1.000
High Medieval-Roman	55.065	82.831	.665	.506	1.000
<i>High Medieval-Late Medieval</i>	-86.524	22.271	-3.885	<.001	.002
Early-High Medieval-Roman	35.422	82.558	.429	.668	1.000
<i>Early-High Medieval-Late Medieval</i>	-66.881	21.235	-3.150	.002	.025
Roman-Late Medieval	-31.459	81.875	-.384	.701	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 215 Post-hoc Dunn's test results comparing rib $\delta^{15}\text{N}$ values between periods. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Early Medieval-Roman	3.500	82.610	.042	.966	1.000
Early Medieval-High Medieval	-56.000	24.726	-2.265	.024	.353
<i>Early Medieval-Early-High Medieval</i>	<i>-224.489</i>	<i>23.796</i>	<i>-9.434</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-High-Late Medieval</i>	<i>-251.071</i>	<i>24.929</i>	<i>-10.071</i>	<i><.001</i>	<i>.000</i>
<i>Early Medieval-Late Medieval</i>	<i>-287.778</i>	<i>21.302</i>	<i>-13.509</i>	<i><.001</i>	<i>.000</i>
Roman-High Medieval	-52.500	82.868	-.634	.526	1.000
Roman-Early-High Medieval	-220.989	82.595	-2.676	.007	.112
<i>Roman-High-Late Medieval</i>	<i>-247.571</i>	<i>82.929</i>	<i>-2.985</i>	<i>.003</i>	<i>.042</i>
<i>Roman-Late Medieval</i>	<i>-284.278</i>	<i>81.912</i>	<i>-3.471</i>	<i><.001</i>	<i>.008</i>
<i>High Medieval-Early-High Medieval</i>	<i>168.489</i>	<i>24.676</i>	<i>6.828</i>	<i><.001</i>	<i>.000</i>
<i>High Medieval-High-Late Medieval</i>	<i>-195.071</i>	<i>25.771</i>	<i>-7.570</i>	<i><.001</i>	<i>.000</i>
<i>High Medieval-Late Medieval</i>	<i>-231.778</i>	<i>22.281</i>	<i>-10.403</i>	<i><.001</i>	<i>.000</i>
Early-High Medieval-High-Late Medieval	-26.582	24.880	-1.068	.285	1.000
<i>Early-High Medieval-Late Medieval</i>	<i>-63.289</i>	<i>21.245</i>	<i>-2.979</i>	<i>.003</i>	<i>.043</i>
High-Late Medieval-Late Medieval	-36.707	22.507	-1.631	.103	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.2.3.1 Rib $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ across site types

AT 216. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ rib values categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Monastery/friary</i>	$\delta^{13}\text{C}$	56	- 20.3545	- 20.2500	0.95952	- 23.10	- 18.24	-0.816	2.073	0.141	56	0.007
	$\delta^{15}\text{N}$	56	12.8794	13.0325	1.05750	9.05	14.86	-1.235	2.487	0.101	56	0.200*
<i>Leprosarium</i>	$\delta^{13}\text{C}$	130	- 19.3956	- 19.4000	0.62616	- 21.18	- 17.00	0.065	1.505	0.090	130	0.011
	$\delta^{15}\text{N}$	130	11.2479	11.2000	1.17578	8.70	15.07	0.459	0.019	0.063	130	0.200*
<i>Hospital</i>	$\delta^{13}\text{C}$	173	- 19.0800	- 19.0000	0.45462	- 21.45	- 17.70	-0.682	3.516	0.078	173	0.011
	$\delta^{15}\text{N}$	173	12.3165	12.4000	1.19090	8.30	15.20	-0.387	0.257	0.048	173	0.200*
<i>'Other/normal' site types</i>	$\delta^{13}\text{C}$	267	- 19.8994	- 19.9107	0.45648	- 21.02	- 18.40	0.337	-0.088	0.078	267	0.0005
	$\delta^{15}\text{N}$	267	10.7279	10.5000	1.33697	5.77	14.30	-0.134	0.338	0.081	267	0.0002

AT 217. Post-hoc Dunn's test results comparing rib $\delta^{13}\text{C}$ values between site types. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Monastery/Friary-Other	-69.167	26.566	-2.604	0.009	.055
<i>Monastery/Friary-Leprosarium</i>	<i>-219.122</i>	<i>28.892</i>	<i>-7.584</i>	<i>3.3307E-14</i>	<i>.000</i>
<i>Monastery/Friary-Hospital</i>	<i>-314.661</i>	<i>27.790</i>	<i>-11.323</i>	<i>0.0E0</i>	<i>.000</i>
<i>Other-Leprosarium</i>	<i>149.955</i>	<i>19.331</i>	<i>7.757</i>	<i>8.6597E-15</i>	<i>.000</i>
<i>Other-Hospital</i>	<i>245.494</i>	<i>17.641</i>	<i>13.916</i>	<i>0.0E0</i>	<i>.000</i>
<i>Leprosarium-Hospital</i>	<i>-95.539</i>	<i>20.980</i>	<i>-4.554</i>	<i>0.000005</i>	<i>.000</i>

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 218. Post-hoc Dunn's test results comparing rib $\delta^{15}\text{N}$ values between site types. Rows in *cursive* are statistically significant.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Other-Leprosarium</i>	<i>58.037</i>	<i>19.339</i>	<i>3.001</i>	<i>0.003</i>	<i>.016</i>
<i>Other-Hospital</i>	<i>197.314</i>	<i>17.649</i>	<i>11.180</i>	<i>0.0E0</i>	<i>.000</i>
<i>Other-Monastery/Friary</i>	<i>269.464</i>	<i>26.578</i>	<i>10.138</i>	<i>0.0E0</i>	<i>.000</i>
<i>Leprosarium-Hospital</i>	<i>-139.277</i>	<i>20.990</i>	<i>-6.636</i>	<i>3.233E-11</i>	<i>.000</i>
<i>Leprosarium-Monastery/Friary</i>	<i>211.427</i>	<i>28.905</i>	<i>7.315</i>	<i>2.5802E-13</i>	<i>.000</i>
Hospital-Monastery/Friary	72.150	27.802	2.595	0.009	.057

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 219. Descriptive statistics and normality tests for $\delta^{15}\text{N}$ rib values categorised by site from the early-high medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
CHI	$\delta^{13}\text{C}$	44	-19.5919	-19.6000	0.21729	-19.90	-19.10	0.432	-0.726	0.917	44	0.004
	$\delta^{15}\text{N}$	44	11.5566	11.7500	0.94744	9.40	13.00	-0.442	-0.641	0.953	44	0.072
CPA	$\delta^{13}\text{C}$	44	-19.3977	-19.4000	0.36947	-20.20	-18.40	0.485	0.614	0.977	44	0.244
	$\delta^{15}\text{N}$	44	12.3591	12.3500	0.71213	11.10	14.30	0.460	0.206	0.979	44	0.591
JTN	$\delta^{13}\text{C}$	28	-19.2044	-19.0950	0.88668	-20.90	-17.00	0.183	0.256	0.977	28	0.776
	$\delta^{15}\text{N}$	28	11.4045	11.4000	0.89990	9.80	13.62	0.674	0.910	0.955	25	0.257

AT 220. Post hoc Dunns test results for $\delta^{13}\text{C}$ rib values.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>CHI-CPA</i>	-17.398	7.143	-2.436	.015	.045
<i>CHI-JTN</i>	-25.435	8.100	-3.140	.002	.005
CPA-JTN	-8.037	8.100	-.992	.321	.963

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 221. Post-hoc Tukey HSD test for $\delta^{15}\text{N}$ rib values ANOVA.

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<i>JTN</i>	<i>CPA</i>	-.95461*	.20627	<.001	-1.4559	-.4533
	<i>CHI</i>	-.15208	.20627	1.000	-.6534	.3492
<i>CPA</i>	<i>JTN</i>	.95461*	.20627	<.001	.4533	1.4559
	<i>CHI</i>	.80252*	.18192	<.001	.3604	1.2446
<i>CHI</i>	<i>JTN</i>	.15208	.20627	1.000	-.3492	.6534
	<i>CPA</i>	-.80252*	.18192	<.001	-1.2446	-.3604

*. The mean difference is significant at the 0.05 level.

AT 222. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by site for the high and high-late medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
AMP	$\delta^{13}\text{C}$	6	-20.1850	-19.9275	0.74612	-21.49	-19.54	-1.301	1.057	.863	6	.199
	$\delta^{15}\text{N}$	6	13.3275	13.5075	0.97054	11.65	14.34	-1.079	1.060	.914	6	.466
BSA	$\delta^{13}\text{C}$	4	-19.2963	-19.3117	0.18654	-19.51	-19.05	0.479	1.352	.972	4	.853
	$\delta^{15}\text{N}$	4	11.0890	11.1159	0.32609	10.71	11.42	-0.291	-3.142	.939	4	.649
CHI	$\delta^{13}\text{C}$	4	-19.6500	-19.6000	0.17321	-19.90	-19.50	-1.540	2.889	.840	4	.195
	$\delta^{15}\text{N}$	4	12.2250	12.2000	0.67020	11.60	12.90	0.057	-5.453	.833	4	.177
HCH	$\delta^{13}\text{C}$	8	-20.0045	-19.9003	0.85740	-21.02	-18.83	-0.039	-1.779	.891	8	.238
	$\delta^{15}\text{N}$	8	11.2070	11.2132	0.88608	9.46	12.24	-0.993	1.278	.925	8	.471
JMC	$\delta^{13}\text{C}$	6	-20.5658	-20.6275	0.40959	-21.18	-20.10	-0.194	-0.629	.928	6	.562
	$\delta^{15}\text{N}$	6	11.1767	11.4850	0.74705	10.17	11.86	-0.704	-1.912	.826	6	.100
MMW	$\delta^{13}\text{C}$	54	-19.2800	-19.3000	0.42666	-20.50	-18.20	-0.150	0.782	0.063	54	0.200*
	$\delta^{15}\text{N}$	54	10.5717	10.4000	0.94570	8.70	13.18	0.756	0.640	0.173	54	0.0003
MSL	$\delta^{13}\text{C}$	5	-19.1673	-19.2713	0.31897	-19.40	-18.61	2.067	4.482	.703	5	.010
	$\delta^{15}\text{N}$	5	13.8318	13.6580	0.71118	13.26	15.07	1.923	4.020	.766	5	.042
RFN	$\delta^{13}\text{C}$	21	-19.7730	-19.7750	0.24245	-20.34	-19.27	-0.149	0.586	.987	21	.991
	$\delta^{15}\text{N}$	21	11.0316	11.0600	0.79240	9.45	12.40	-0.097	-0.556	.980	21	.923
SGB	$\delta^{13}\text{C}$	20	-19.2967	-19.1000	0.72850	-21.45	-18.30	-1.304	2.654	.893	20	.031
	$\delta^{15}\text{N}$	20	12.3131	12.4500	0.98041	9.92	13.80	-0.884	0.480	.930	20	.154

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
SJA	$\delta^{13}\text{C}$	23	-20.6730	-20.4900	0.99052	-23.10	-18.24	-0.738	3.043	.827	23	.001
	$\delta^{15}\text{N}$	23	12.6670	12.7450	0.79224	10.38	13.62	-1.520	2.885	.851	23	.003
SLP	$\delta^{13}\text{C}$	20	-19.5600	-19.5500	0.47506	-20.50	-18.70	-0.123	-0.093	.959	20	.526
	$\delta^{15}\text{N}$	20	12.0950	12.2000	0.98647	9.50	13.50	-0.798	0.954	.946	20	.312
WPY	$\delta^{13}\text{C}$	26	-19.9524	-20.0050	0.38710	-20.50	-19.11	0.517	-0.354	.956	26	.322
	$\delta^{15}\text{N}$	26	8.5634	8.7500	1.07437	5.77	10.60	-0.677	0.864	.963	26	.445

AT 223. Post hoc Dunns test results for $\delta^{13}\text{C}$ rib values for all high and high-late Medieval sites.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
JMC-SJA	-6.844	26.129	-.262	.793	1.000
JMC-AMP	35.750	32.908	1.086	.277	1.000
JMC-WPY	-43.199	25.815	-1.673	.094	1.000
JMC-HCH	53.771	30.782	1.747	.081	1.000
JMC-RFN	-58.821	26.385	-2.229	.026	1.000
JMC-CHI	74.583	36.792	2.027	.043	1.000
JMC-SLP	-84.758	26.531	-3.195	.001	.092
<i>JMC-SGB</i>	<i>-109.008</i>	<i>26.531</i>	<i>-4.109</i>	<i><.001</i>	<i>.003</i>
<i>JMC-MMW</i>	<i>-112.352</i>	<i>24.528</i>	<i>-4.581</i>	<i><.001</i>	<i>.000</i>
JMC-BSA	115.833	36.792	3.148	.002	.108
<i>JMC-MSL</i>	<i>-126.283</i>	<i>34.514</i>	<i>-3.659</i>	<i><.001</i>	<i>.017</i>
SJA-AMP	28.906	26.129	1.106	.269	1.000
SJA-WPY	-36.355	16.316	-2.228	.026	1.000
SJA-HCH	46.927	23.395	2.006	.045	1.000
SJA-RFN	51.977	17.203	3.021	.003	.166
SJA-CHI	67.739	30.878	2.194	.028	1.000
<i>SJA-SLP</i>	<i>-77.914</i>	<i>17.427</i>	<i>-4.471</i>	<i><.001</i>	<i>.001</i>
<i>SJA-SGB</i>	<i>102.164</i>	<i>17.427</i>	<i>5.863</i>	<i><.001</i>	<i>.000</i>
<i>SJA-MMW</i>	<i>105.508</i>	<i>14.192</i>	<i>7.434</i>	<i><.001</i>	<i>.000</i>
<i>SJA-BSA</i>	<i>108.989</i>	<i>30.878</i>	<i>3.530</i>	<i><.001</i>	<i>.027</i>
<i>SJA-MSL</i>	<i>119.439</i>	<i>28.125</i>	<i>4.247</i>	<i><.001</i>	<i>.001</i>
AMP-WPY	-7.449	25.815	-.289	.773	1.000
AMP-HCH	-18.021	30.782	-.585	.558	1.000
AMP-RFN	-23.071	26.385	-.874	.382	1.000
AMP-CHI	-38.833	36.792	-1.055	.291	1.000
AMP-SLP	-49.008	26.531	-1.847	.065	1.000
AMP-SGB	-73.258	26.531	-2.761	.006	.380
AMP-MMW	-76.602	24.528	-3.123	.002	.118
AMP-BSA	-80.083	36.792	-2.177	.030	1.000
AMP-MSL	-90.533	34.514	-2.623	.009	.575
WPY-HCH	10.572	23.044	.459	.646	1.000
WPY-RFN	15.623	16.723	.934	.350	1.000
WPY-CHI	31.385	30.613	1.025	.305	1.000
WPY-SLP	41.560	16.953	2.452	.014	.939
<i>WPY-SGB</i>	<i>65.810</i>	<i>16.953</i>	<i>3.882</i>	<i><.001</i>	<i>.007</i>
<i>WPY-MMW</i>	<i>69.153</i>	<i>13.606</i>	<i>5.083</i>	<i><.001</i>	<i>.000</i>
WPY-BSA	72.635	30.613	2.373	.018	1.000
WPY-MSL	83.085	27.833	2.985	.003	.187
HCH-RFN	-5.051	23.681	-.213	.831	1.000
HCH-CHI	20.813	34.904	.596	.551	1.000
HCH-SLP	-30.988	23.844	-1.300	.194	1.000
HCH-SGB	-55.238	23.844	-2.317	.021	1.000

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
HCH-MMW	-58.581	21.593	-2.713	.007	.440
HCH-BSA	62.063	34.904	1.778	.075	1.000
HCH-MSL	-72.513	32.494	-2.232	.026	1.000
RFN-CHI	15.762	31.095	.507	.612	1.000
RFN-SLP	-25.937	17.808	-1.456	.145	1.000
RFN-SGB	-50.187	17.808	-2.818	.005	.319
<i>RFN-MMW</i>	<i>53.530</i>	<i>14.658</i>	<i>3.652</i>	<i><.001</i>	<i>.017</i>
RFN-BSA	57.012	31.095	1.833	.067	1.000
RFN-MSL	67.462	28.363	2.379	.017	1.000
CHI-SLP	-10.175	31.219	-.326	.744	1.000
CHI-SGB	-34.425	31.219	-1.103	.270	1.000
CHI-MMW	-37.769	29.536	-1.279	.201	1.000
CHI-BSA	41.250	40.304	1.023	.306	1.000
CHI-MSL	-51.700	38.235	-1.352	.176	1.000
SLP-SGB	24.250	18.024	1.345	.178	1.000
SLP-MMW	27.594	14.920	1.849	.064	1.000
SLP-BSA	31.075	31.219	.995	.320	1.000
SLP-MSL	41.525	28.499	1.457	.145	1.000
SGB-MMW	3.344	14.920	.224	.823	1.000
SGB-BSA	6.825	31.219	.219	.827	1.000
SGB-MSL	17.275	28.499	.606	.544	1.000
MMW-BSA	3.481	29.536	.118	.906	1.000
MMW-MSL	-13.931	26.644	-.523	.601	1.000
BSA-MSL	-10.450	38.235	-.273	.785	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 224. Post hoc Dunns test results for $\delta^{15}\text{N}$ rib values for all high and high-late Medieval sites.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>WPY-MMW</i>	<i>53.130</i>	<i>13.608</i>	<i>3.904</i>	<i><.001</i>	<i>.006</i>
<i>WPY-RFN</i>	<i>72.607</i>	<i>16.726</i>	<i>4.341</i>	<i><.001</i>	<i>.001</i>
WPY-BSA	75.500	30.619	2.466	.014	.902
WPY-JMC	77.250	25.820	2.992	.003	.183
<i>WPY-HCH</i>	<i>79.875</i>	<i>23.049</i>	<i>3.465</i>	<i><.001</i>	<i>.035</i>
<i>WPY-SLP</i>	<i>115.275</i>	<i>16.956</i>	<i>6.798</i>	<i><.001</i>	<i>.000</i>
<i>WPY-CHI</i>	<i>119.375</i>	<i>30.619</i>	<i>3.899</i>	<i><.001</i>	<i>.006</i>
<i>WPY-SGB</i>	<i>123.250</i>	<i>16.956</i>	<i>7.269</i>	<i><.001</i>	<i>.000</i>
<i>WPY-SJA</i>	<i>137.663</i>	<i>16.319</i>	<i>8.436</i>	<i><.001</i>	<i>.000</i>
<i>WPY-AMP</i>	<i>155.917</i>	<i>25.820</i>	<i>6.039</i>	<i><.001</i>	<i>.000</i>
<i>WPY-MSL</i>	<i>171.650</i>	<i>27.839</i>	<i>6.166</i>	<i><.001</i>	<i>.000</i>
MMW-RFN	-19.478	14.661	-1.329	.184	1.000
MMW-BSA	22.370	29.542	.757	.449	1.000

MMW-JMC	24.120	24.533	.983	.326	1.000
MMW-HCH	26.745	21.597	1.238	.216	1.000
<i>MMW-SLP</i>	<i>-62.145</i>	<i>14.923</i>	<i>-4.164</i>	<i><.001</i>	<i>.002</i>
MMW-CHI	66.245	29.542	2.242	.025	1.000
<i>MMW-SGB</i>	<i>-70.120</i>	<i>14.923</i>	<i>-4.699</i>	<i><.001</i>	<i>.000</i>
<i>MMW-SJA</i>	<i>-84.533</i>	<i>14.195</i>	<i>-5.955</i>	<i><.001</i>	<i>.000</i>
<i>MMW-AMP</i>	<i>102.787</i>	<i>24.533</i>	<i>4.190</i>	<i><.001</i>	<i>.002</i>
<i>MMW-MSL</i>	<i>-118.520</i>	<i>26.650</i>	<i>-4.447</i>	<i><.001</i>	<i>.001</i>
RFN-BSA	2.893	31.101	.093	.926	1.000
RFN-JMC	4.643	26.390	.176	.860	1.000
RFN-HCH	7.268	23.686	.307	.759	1.000
RFN-SLP	-42.668	17.812	-2.395	.017	1.000
RFN-CHI	46.768	31.101	1.504	.133	1.000
RFN-SGB	-50.643	17.812	-2.843	.004	.295
<i>RFN-SJA</i>	<i>-65.056</i>	<i>17.207</i>	<i>-3.781</i>	<i><.001</i>	<i>.010</i>
RFN-AMP	83.310	26.390	3.157	.002	.105
<i>RFN-MSL</i>	<i>99.043</i>	<i>28.369</i>	<i>3.491</i>	<i><.001</i>	<i>.032</i>
BSA-JMC	-1.750	36.799	-.048	.962	1.000
BSA-HCH	-4.375	34.911	-.125	.900	1.000
BSA-SLP	-39.775	31.225	-1.274	.203	1.000
BSA-CHI	-43.875	40.312	-1.088	.276	1.000
BSA-SGB	-47.750	31.225	-1.529	.126	1.000
BSA-SJA	-62.163	30.884	-2.013	.044	1.000
BSA-AMP	80.417	36.799	2.185	.029	1.000
BSA-MSL	-96.150	38.243	-2.514	.012	.787
JMC-HCH	2.625	30.789	.085	.932	1.000
JMC-SLP	-38.025	26.536	-1.433	.152	1.000
JMC-CHI	42.125	36.799	1.145	.252	1.000
JMC-SGB	-46.000	26.536	-1.733	.083	1.000
JMC-SJA	-60.413	26.134	-2.312	.021	1.000
JMC-AMP	78.667	32.914	2.390	.017	1.000
JMC-MSL	-94.400	34.521	-2.735	.006	.412
HCH-SLP	-35.400	23.849	-1.484	.138	1.000
HCH-CHI	39.500	34.911	1.131	.258	1.000
HCH-SGB	-43.375	23.849	-1.819	.069	1.000
HCH-SJA	-57.788	23.400	-2.470	.014	.893
HCH-AMP	76.042	30.789	2.470	.014	.892
HCH-MSL	-91.775	32.500	-2.824	.005	.313
SLP-CHI	4.100	31.225	.131	.896	1.000
SLP-SGB	7.975	18.028	.442	.658	1.000
SLP-SJA	22.388	17.430	1.284	.199	1.000
SLP-AMP	40.642	26.536	1.532	.126	1.000
SLP-MSL	56.375	28.505	1.978	.048	1.000
CHI-SGB	-3.875	31.225	-.124	.901	1.000

CHI-SJA	-18.288	30.884	-.592	.554	1.000
CHI-AMP	36.542	36.799	.993	.321	1.000
CHI-MSL	-52.275	38.243	-1.367	.172	1.000
SGB-SJA	-14.413	17.430	-.827	.408	1.000
SGB-AMP	32.667	26.536	1.231	.218	1.000
SGB-MSL	48.400	28.505	1.698	.090	1.000
SJA-AMP	18.254	26.134	.698	.485	1.000
SJA-MSL	33.987	28.130	1.208	.227	1.000
AMP-MSL	-15.733	34.521	-.456	.649	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 225. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by site type for the high and high-late medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Monastery/friary</i>	$\delta^{13}\text{C}$	29	-20.5721	-20.4400	0.95435	-23.10	-18.24	-0.874	2.784	0.882	29	0.004
	$\delta^{15}\text{N}$	29	12.8036	12.8100	0.85762	10.38	14.34	-0.986	1.743	0.938	29	0.087
<i>Leprosarium</i>	$\delta^{13}\text{C}$	89	-19.4240	-19.4000	0.53294	-21.18	-18.20	-0.732	1.086	0.122	89	0.002
	$\delta^{15}\text{N}$	89	11.1612	11.0000	1.27435	8.70	15.07	0.591	-0.075	0.120	89	0.003
<i>Hospital</i>	$\delta^{13}\text{C}$	20	-19.2967	-19.1000	0.72850	-21.45	-18.30	-1.304	2.654	0.893	20	0.031
	$\delta^{15}\text{N}$	20	13.3131	12.4500	0.98041	9.92	13.80	-0.884	0.480	0.930	20	0.154
Other sites	$\delta^{13}\text{C}$	59	-19.8751	-19.8500	0.43289	-21.02	-18.83	-0.417	0.689	0.098	59	0.200*
	$\delta^{15}\text{N}$	59	10.0486	10.2350	1.63781	5.77	12.90	-0.402	-0.443	0.108	59	0.083

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 226. Post hoc Dunns test results for $\delta^{13}\text{C}$ rib values for all high and high-late Medieval sites, categorised by site type

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Monastery/Friary-Other</i>	-39.496	12.926	-3.055	.002	.013
<i>Monastery/Friary-Leprosarium</i>	-86.691	12.187	-7.113	<.001	.000
<i>Monastery/Friary-Hospital</i>	-96.184	16.567	-5.806	<.001	.000
<i>Other-Leprosarium</i>	47.195	9.569	4.932	<.001	.000
<i>Other-Hospital</i>	56.688	14.748	3.844	<.001	.001
<i>Leprosarium-Hospital</i>	-9.492	14.105	-.673	.501	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 227. Post hoc Dunns test results for $\delta^{15}\text{N}$ rib values for all high and high-late Medieval sites, categorised by site type.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Other-Leprosarium</i>	31.618	9.571	3.304	<.001	.006
<i>Other-Hospital</i>	78.483	14.751	5.321	<.001	.000
<i>Other-Monastery/Friary</i>	96.673	12.929	7.477	<.001	.000
<i>Leprosarium-Hospital</i>	-46.865	14.108	-3.322	<.001	.005
<i>Leprosarium-Monastery/Friary</i>	65.055	12.190	5.337	<.001	.000
<i>Hospital-Monastery/Friary</i>	18.190	16.570	1.098	.272	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 228. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by site for the high-late and late medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
AMP	$\delta^{13}\text{C}$	6	-20.1850	-19.9275	0.74612	-21.49	-19.54	-1.301	1.057	.863	6	.199
	$\delta^{15}\text{N}$	6	13.3275	13.5075	0.97054	11.65	14.34	-1.079	1.060	.914	6	.466
BFG	$\delta^{13}\text{C}$	9	-20.3912	-20.1950	1.48002	-22.90	-18.24	-0.273	-0.465	.984	9	.981
	$\delta^{15}\text{N}$	9	11.8450	12.000	1.40340	9.05	13.68	-0.886	0.819	.952	9	.708
BSA	$\delta^{13}\text{C}$	4	-19.2963	-19.3117	0.18654	-19.51	-19.05	0.479	1.352	.972	4	.853
	$\delta^{15}\text{N}$	4	11.0890	11.1159	0.32609	10.71	11.42	-0.291	-3.142	.939	4	.649
CHI	$\delta^{13}\text{C}$	4	-19.6500	-19.6000	0.17321	-19.90	-19.50	-1.540	2.889	.840	4	.195
	$\delta^{15}\text{N}$	4	12.2250	12.2000	0.67020	11.60	12.90	0.057	-5.453	.833	4	.177
CJH	$\delta^{13}\text{C}$	153	-19.0516	-19.000	0.40067	-19.90	-17.70	0.250	0.049	.068	153	.077
	$\delta^{15}\text{N}$	153	12.3170	12.3000	1.21849	8.30	15.20	-0.357	0.214	.048	153	.200*
HCH	$\delta^{13}\text{C}$	8	-20.0045	-19.9003	0.85740	-21.02	-18.83	-0.039	-1.779	.891	8	.238
	$\delta^{15}\text{N}$	8	11.2070	11.2132	0.88608	9.46	12.24	-0.993	1.278	.925	8	.471
IBF	$\delta^{13}\text{C}$	18	-19.9856	-20.1150	0.47134	-20.92	019.12	0.154	-0.347	.972	18	.828
	$\delta^{15}\text{N}$	18	13.5186	13.6550	0.68626	11.86	14.86	-0.572	1.330	.959	18	.589
JMC	$\delta^{13}\text{C}$	6	-20.5658	-20.6275	0.40959	-21.18	-20.10	-0.194	-0.629	.928	6	.562
	$\delta^{15}\text{N}$	6	11.1767	11.4850	0.74705	10.17	11.86	-0.704	-1.912	.826	6	.100
MHW	$\delta^{13}\text{C}$	3	-19.1567	-20.0675	0.36668	-19.52	-18.79	0.041	-	1.000	3	.985
	$\delta^{15}\text{N}$	3	11.0504	11.0363	1.38722	9.67	12.44	0.046	-	1.000	3	.983
MSL	$\delta^{13}\text{C}$	5	-19.1673	-19.2713	0.31897	-19.40	-18.61	2.067	4.482	.703	5	.010

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
RFN	$\delta^{15}\text{N}$	5	13.8318	13.6580	0.71118	13.26	15.07	1.923	4.020	.766	5	.042
	$\delta^{13}\text{C}$	21	-19.7730	-19.7750	0.24245	-20.34	-19.27	-0.149	0.586	.987	21	.991
	$\delta^{15}\text{N}$	21	11.0316	11.0600	0.79240	9.45	12.40	-0.097	-0.556	.980	21	.923
SGB	$\delta^{13}\text{C}$	20	-19.2967	-19.1000	0.72850	-21.45	-18.30	-1.304	2.654	.893	20	.031
	$\delta^{15}\text{N}$	20	12.3131	12.4500	0.98041	9.92	13.80	-0.884	0.480	.930	20	.154
SJA	$\delta^{13}\text{C}$	23	-20.6730	-20.4900	0.99052	-23.10	-18.24	-0.738	3.043	.827	23	.001
	$\delta^{15}\text{N}$	23	12.6670	12.7450	0.79224	10.38	13.62	-1.520	2.885	.851	23	.003
SLP	$\delta^{13}\text{C}$	10	-19.7500	-19.7500	0.41700	-20.50	-19.10	-0.052	0.062	.975	10	.930
	$\delta^{15}\text{N}$	10	11.6400	11.7000	0.86307	9.80	13.20	-0.485	2.596	.922	10	.373

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 229. Post hoc Dunns test results for $\delta^{13}\text{C}$ rib values for all high-late and late Medieval sites.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
JMC-SJA	-9.478	38.416	-.247	.805	1.000
JMC-AMP	32.500	48.383	.672	.502	1.000
JMC-IBF	42.944	39.505	1.087	.277	1.000
JMC-RFN	-55.810	38.793	-1.439	.150	1.000
JMC-BFG	57.222	44.167	1.296	.195	1.000
JMC-HCH	61.375	45.258	1.356	.175	1.000
JMC-SLP	-65.300	43.275	-1.509	.131	1.000
JMC-CHI	70.875	54.094	1.310	.190	1.000
JMC-BSA	125.500	54.094	2.320	.020	1.000
<i>JMC-SGB</i>	<i>-138.100</i>	<i>39.008</i>	<i>-3.540</i>	<i><.001</i>	<i>.036</i>
JMC-MSL	-147.400	50.745	-2.905	.004	.334
JMC-MHW	-153.833	59.257	-2.596	.009	.858
<i>JMC-CJH</i>	<i>164.490</i>	<i>34.876</i>	<i>4.716</i>	<i><.001</i>	<i>.000</i>
SJA-AMP	23.022	38.416	.599	.549	1.000
SJA-IBF	33.466	26.372	1.269	.204	1.000
SJA-RFN	46.331	25.293	1.832	.067	1.000
SJA-BFG	47.744	32.949	1.449	.147	1.000
SJA-HCH	51.897	34.397	1.509	.131	1.000
SJA-SLP	-55.822	31.743	-1.759	.079	1.000
SJA-CHI	61.397	45.399	1.352	.176	1.000
SJA-BSA	116.022	45.399	2.556	.011	.965
<i>SJA-SGB</i>	<i>128.622</i>	<i>25.622</i>	<i>5.020</i>	<i><.001</i>	<i>.000</i>
SJA-MSL	137.922	41.351	3.335	<.001	.078
SJA-MHW	144.355	51.442	2.806	.005	.456
SJA-CJH	155.012	18.741	8.271	<.001	.000
AMP-IBF	-10.444	39.505	-.264	.791	1.000
AMP-RFN	-23.310	38.793	-.601	.548	1.000
AMP-BFG	-24.722	44.167	-.560	.576	1.000
AMP-HCH	-28.875	45.258	-.638	.523	1.000
AMP-SLP	-32.800	43.275	-.758	.448	1.000
AMP-CHI	-38.375	54.094	-.709	.478	1.000
AMP-BSA	-93.000	54.094	-1.719	.086	1.000
AMP-SGB	-105.600	39.008	-2.707	.007	.618
AMP-MSL	-114.900	50.745	-2.264	.024	1.000
AMP-MHW	-121.333	59.257	-2.048	.041	1.000
<i>AMP-CJH</i>	<i>-131.990</i>	<i>34.876</i>	<i>-3.785</i>	<i><.001</i>	<i>.014</i>
IBF-RFN	-12.865	26.918	-.478	.633	1.000
IBF-BFG	14.278	34.212	.417	.676	1.000
IBF-HCH	18.431	35.609	.518	.605	1.000

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
IBF-SLP	-22.356	33.052	-.676	.499	1.000
IBF-CHI	27.931	46.323	.603	.547	1.000
IBF-BSA	82.556	46.323	1.782	.075	1.000
<i>IBF-SGB</i>	<i>-95.156</i>	<i>27.227</i>	<i>-3.495</i>	<i><.001</i>	<i>.043</i>
IBF-MSL	-104.456	42.364	-2.466	.014	1.000
IBF-MHW	-110.889	52.260	-2.122	.034	1.000
<i>IBF-CJH</i>	<i>121.546</i>	<i>20.882</i>	<i>5.821</i>	<i><.001</i>	<i>.000</i>
RFN-BFG	1.413	33.387	.042	.966	1.000
RFN-HCH	5.565	34.818	.160	.873	1.000
RFN-SLP	-9.490	32.198	-.295	.768	1.000
RFN-CHI	15.065	45.718	.330	.742	1.000
RFN-BSA	69.690	45.718	1.524	.127	1.000
RFN-SGB	-82.290	26.183	-3.143	.002	.152
RFN-MSL	91.590	41.701	2.196	.028	1.000
RFN-MHW	98.024	51.724	1.895	.058	1.000
<i>RFN-CJH</i>	<i>108.681</i>	<i>19.502</i>	<i>5.573</i>	<i><.001</i>	<i>.000</i>
BFG-HCH	-4.153	40.720	-.102	.919	1.000
BFG-SLP	-8.078	38.504	-.210	.834	1.000
BFG-CHI	-13.653	50.359	-.271	.786	1.000
BFG-BSA	-68.278	50.359	-1.356	.175	1.000
BFG-SGB	-80.878	33.637	-2.404	.016	1.000
BFG-MSL	-90.178	46.742	-1.929	.054	1.000
BFG-MHW	-96.611	55.868	-1.729	.084	1.000
<i>BFG-CJH</i>	<i>-107.268</i>	<i>28.744</i>	<i>-3.732</i>	<i><.001</i>	<i>.017</i>
HCH-SLP	-3.925	39.751	-.099	.921	1.000
HCH-CHI	9.500	51.318	.185	.853	1.000
HCH-BSA	64.125	51.318	1.250	.211	1.000
HCH-SGB	-76.725	35.057	-2.189	.029	1.000
HCH-MSL	-86.025	47.774	-1.801	.072	1.000
HCH-MHW	-92.458	56.734	-1.630	.103	1.000
<i>HCH-CJH</i>	<i>103.115</i>	<i>30.393</i>	<i>3.393</i>	<i><.001</i>	<i>.063</i>
SLP-CHI	5.575	49.578	.112	.910	1.000
SLP-BSA	60.200	49.578	1.214	.225	1.000
SLP-SGB	72.800	32.456	2.243	.025	1.000
SLP-MSL	82.100	45.900	1.789	.074	1.000
SLP-MHW	88.533	55.165	1.605	.109	1.000
<i>SLP-CJH</i>	<i>99.190</i>	<i>27.353</i>	<i>3.626</i>	<i><.001</i>	<i>.026</i>
CHI-BSA	54.625	59.257	.922	.357	1.000
CHI-SGB	-67.225	45.900	-1.465	.143	1.000
CHI-MSL	-76.525	56.216	-1.361	.173	1.000

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
CHI-MHW	-82.958	64.005	-1.296	.195	1.000
CHI-CJH	-93.615	42.445	-2.206	.027	1.000
BSA-SGB	-12.600	45.900	-.275	.784	1.000
BSA-MSL	-21.900	56.216	-.390	.697	1.000
BSA-MHW	-28.333	64.005	-.443	.658	1.000
BSA-CJH	-38.990	42.445	-.919	.358	1.000
SGB-MSL	9.300	41.901	.222	.824	1.000
SGB-MHW	15.733	51.885	.303	.762	1.000
SGB-CJH	26.390	19.926	1.324	.185	1.000
MSL-MHW	6.433	61.200	.105	.916	1.000
MSL-CJH	17.090	38.085	.449	.654	1.000
MHW-CJH	10.657	48.855	.218	.827	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 230. Post hoc Dunns test results for $\delta^{15}\text{N}$ rib values for all high-late and late Medieval sites.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
BSA-RFN	-5.381	45.743	-.118	.906	1.000
BSA-JMC	-12.167	54.124	-.225	.822	1.000
BSA-MHW	-17.000	64.040	-.265	.791	1.000
BSA-HCH	-17.625	51.346	-.343	.731	1.000
BSA-SLP	-44.150	49.605	-.890	.373	1.000
BSA-BFG	68.667	50.387	1.363	.173	1.000
BSA-CHI	-83.250	59.290	-1.404	.160	1.000
BSA-CJH	-95.866	42.469	-2.257	.024	1.000
BSA-SGB	-96.500	45.926	-2.101	.036	1.000
BSA-SJA	-124.174	45.424	-2.734	.006	.570
BSA-AMP	166.833	54.124	3.082	.002	.187
<i>BSA-IBF</i>	<i>-184.111</i>	<i>46.349</i>	<i>-3.972</i>	<i><.001</i>	<i>.006</i>
<i>BSA-MSL</i>	<i>-199.200</i>	<i>56.247</i>	<i>-3.542</i>	<i><.001</i>	<i>.036</i>
RFN-JMC	6.786	38.814	.175	.861	1.000
RFN-MHW	11.619	51.752	.225	.822	1.000
RFN-HCH	12.244	34.837	.351	.725	1.000
RFN-SLP	-38.769	32.216	-1.203	.229	1.000
RFN-BFG	63.286	33.406	1.894	.058	1.000
RFN-CHI	77.869	45.743	1.702	.089	1.000
RFN-CJH	90.485	19.513	4.637	<.001	.000
<i>RFN-SGB</i>	<i>-91.119</i>	<i>26.198</i>	<i>-3.478</i>	<i><.001</i>	<i>.046</i>

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>RFN-SJA</i>	-118.793	25.307	-4.694	<.001	.000
<i>RFN-AMP</i>	161.452	38.814	4.160	<.001	.003
<i>RFN-IBF</i>	178.730	26.933	6.636	<.001	.000
<i>RFN-MSL</i>	193.819	41.724	4.645	<.001	.000
JMC-MHW	-4.833	59.290	-.082	.935	1.000
JMC-HCH	5.458	45.283	.121	.904	1.000
JMC-SLP	-31.983	43.299	-.739	.460	1.000
JMC-BFG	56.500	44.192	1.279	.201	1.000
JMC-CHI	71.083	54.124	1.313	.189	1.000
JMC-CJH	83.699	34.896	2.399	.016	1.000
JMC-SGB	-84.333	39.029	-2.161	.031	1.000
JMC-SJA	-112.007	38.437	-2.914	.004	.325
JMC-AMP	154.667	48.410	3.195	.001	.127
<i>JMC-IBF</i>	171.944	39.526	4.350	<.001	.001
<i>JMC-MSL</i>	-187.033	50.773	-3.684	<.001	.021
MHW-HCH	.625	56.766	.011	.991	1.000
MHW-SLP	-27.150	55.196	-.492	.623	1.000
MHW-BFG	51.667	55.899	.924	.355	1.000
MHW-CHI	66.250	64.040	1.035	.301	1.000
MHW-CJH	78.866	48.882	1.613	.107	1.000
MHW-SGB	-79.500	51.914	-1.531	.126	1.000
MHW-SJA	-107.174	51.470	-2.082	.037	1.000
MHW-AMP	149.833	59.290	2.527	.011	1.000
MHW-IBF	167.111	52.289	3.196	.001	.127
MHW-MSL	-182.200	61.234	-2.975	.003	.266
HCH-SLP	-26.525	39.773	-.667	.505	1.000
HCH-BFG	51.042	40.743	1.253	.210	1.000
HCH-CHI	65.625	51.346	1.278	.201	1.000
HCH-CJH	78.241	30.410	2.573	.010	.918
HCH-SGB	-78.875	35.076	-2.249	.025	1.000
HCH-SJA	-106.549	34.416	-3.096	.002	.179
<i>HCH-AMP</i>	149.208	45.283	3.295	<.001	.090
<i>HCH-IBF</i>	-166.486	35.629	-4.673	<.001	.000
<i>HCH-MSL</i>	-181.575	47.801	-3.799	<.001	.013
SLP-BFG	24.517	38.526	.636	.525	1.000
SLP-CHI	39.100	49.605	.788	.431	1.000
SLP-CJH	51.716	27.368	1.890	.059	1.000
SLP-SGB	52.350	32.474	1.612	.107	1.000
SLP-SJA	80.024	31.760	2.520	.012	1.000
SLP-AMP	122.683	43.299	2.833	.005	.419

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>SLP-IBF</i>	139.961	33.070	4.232	<.001	.002
SLP-MSL	155.050	45.926	3.376	<.001	.067
BFG-CHI	-14.583	50.387	-.289	.772	1.000
BFG-CJH	-27.199	28.760	-.946	.344	1.000
BFG-SGB	-27.833	33.656	-.827	.408	1.000
BFG-SJA	-55.507	32.967	-1.684	.092	1.000
BFG-AMP	98.167	44.192	2.221	.026	1.000
BFG-IBF	-115.444	34.231	-3.373	<.001	.068
BFG-MSL	-130.533	46.768	-2.791	.005	.478
CHI-CJH	-12.616	42.469	-.297	.766	1.000
CHI-SGB	-13.250	45.926	-.289	.773	1.000
CHI-SJA	-40.924	45.424	-.901	.368	1.000
CHI-AMP	83.583	54.124	1.544	.123	1.000
CHI-IBF	-100.861	46.349	-2.176	.030	1.000
CHI-MSL	-115.950	56.247	-2.061	.039	1.000
CJH-SGB	-.634	19.937	-.032	.975	1.000
CJH-SJA	-28.308	18.752	-1.510	.131	1.000
CJH-AMP	70.967	34.896	2.034	.042	1.000
<i>CJH-IBF</i>	-88.245	20.893	-4.224	<.001	.002
CJH-MSL	-103.334	38.106	-2.712	.007	.609
SGB-SJA	-27.674	25.636	-1.079	.280	1.000
SGB-AMP	70.333	39.029	1.802	.072	1.000
SGB-IBF	87.611	27.242	3.216	.001	.118
SGB-MSL	102.700	41.924	2.450	.014	1.000
SJA-AMP	42.659	38.437	1.110	.267	1.000
SJA-IBF	59.937	26.387	2.271	.023	1.000
SJA-MSL	75.026	41.374	1.813	.070	1.000
AMP-IBF	-17.278	39.526	-.437	.662	1.000
AMP-MSL	-32.367	50.773	-.637	.524	1.000
IBF-MSL	-15.089	42.387	-.356	.722	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 231. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by site for the high-late and late medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Monastery/friary</i>	$\delta^{13}\text{C}$	56	-20.3545	-20.2500	0.95952	-23.10	-18.24	-0.816	2.073	0.141	56	0.007
	$\delta^{15}\text{N}$	56	12.8794	13.0325	1.05750	9.05	14.86	-1.235	2.487	0.101	56	0.200*
Leprosarium	$\delta^{13}\text{C}$	28	-19.6924	-19.5145	0.62840	-21.18	-18.61	-0.601	-0.156	0.957	28	.0293
	$\delta^{15}\text{N}$	28	11.7902	11.6600	1.25637	9.67	15.07	0.645	0.489	0.952	28	0.221
<i>Hospital</i>	$\delta^{13}\text{C}$	173	-19.0800	-19.0000	0.45462	-21.45	-17.70	-0.682	3.516	0.078	173	0.011
	$\delta^{15}\text{N}$	173	12.3165	12.4000	1.19090	8.30	15.20	-0.387	0.257	0.048	173	0.200*
<i>Other</i>	$\delta^{13}\text{C}$	33	-19.8142	-19.7750	0.46249	-21.02	-18.83	-0.997	1.951	0.895	33	0.004
	$\delta^{15}\text{N}$	33	11.2188	11.2467	0.86942	9.45	12.90	-0.188	-0.352	0.984	33	0.895

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 232. Homogeneity of variances result for $\delta^{15}\text{N}$ values per site type, for the (high-)late medieval period.

		Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰)	Based on Mean	1.767	3	286	.154
	Based on Median	1.794	3	286	.148
	Based on Median and with adjusted df	1.794	3	275.392	.149
	Based on trimmed mean	1.797	3	286	.148

AT 233. Post-hoc Dunn's test results for $\delta^{13}\text{C}$ values from (high-)late medieval sites categorised by site type.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Monastery/Friary-Other	-28.610	18.391	-1.556	.120	.719
<i>Monastery/Friary-Leprosarium</i>	<i>-53.679</i>	<i>19.396</i>	<i>-2.767</i>	<i>.006</i>	<i>.034</i>
<i>Monastery/Friary-Hospital</i>	<i>-131.064</i>	<i>12.884</i>	<i>-10.173</i>	<i><.001</i>	<i>.000</i>
Other-Leprosarium	25.069	21.532	1.164	.244	1.000
<i>Other-Hospital</i>	<i>102.454</i>	<i>15.919</i>	<i>6.436</i>	<i><.001</i>	<i>.000</i>
<i>Leprosarium-Hospital</i>	<i>-77.386</i>	<i>17.071</i>	<i>-4.533</i>	<i><.001</i>	<i>.000</i>

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 234. Post-hoc Tukey HSD and Bonferroni results for the ANOVA comparison of $\delta^{15}\text{N}$ values between (high-)late medieval site types.

		Mean Difference	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
Tukey HSD	Monastery/Friary	Leprosarium	1.08915*	.26406	<.001	.4068	1.7715
		Hospital	.56282*	.17540	.008	.1095	1.0161
		Other	1.66061*	.25037	<.001	1.0136	2.3076
	Leprosarium	Monastery/Friary	-1.08915*	.26406	<.001	-1.7715	-.4068
		Hospital	-.52633	.23240	.109	-1.1269	.0742
		Other	.57146	.29313	.210	-.1861	1.3290
	Hospital	Monastery/Friary	-.56282*	.17540	.008	-1.0161	-.1095
		Leprosarium	.52633	.23240	.109	-.0742	1.1269
		Other	1.09779*	.21672	<.001	.5378	1.6578
	Other	Monastery/Friary	-1.66061*	.25037	<.001	-2.3076	-1.0136
		Leprosarium	-.57146	.29313	.210	-1.3290	.1861
		Hospital	-1.09779*	.21672	<.001	-1.6578	-.5378
Bonferroni	Monastery/Friary	Leprosarium	1.08915*	.26406	<.001	.3876	1.7907
		Hospital	.56282*	.17540	.009	.0968	1.0288
		Other	1.66061*	.25037	<.001	.9954	2.3258
	Leprosarium	Monastery/Friary	-1.08915*	.26406	<.001	-1.7907	-.3876
		Hospital	-.52633	.23240	.146	-1.1437	.0911
		Other	.57146	.29313	.313	-.2073	1.3502
	Hospital	Monastery/Friary	-.56282*	.17540	.009	-1.0288	-.0968

		Leprosarium	.52633	.23240	.146	-.0911	1.1437
		<i>Other</i>	<i>1.09779*</i>	<i>.21672</i>	<i><.001</i>	<i>.5220</i>	<i>1.6735</i>
	<i>Other</i>	<i>Monastery/Friary</i>	<i>-1.66061*</i>	<i>.25037</i>	<i><.001</i>	<i>-2.3258</i>	<i>-.9954</i>
		Leprosarium	-.57146	.29313	.313	-1.3502	.2073
		<i>Hospital</i>	<i>-1.09779*</i>	<i>.21672</i>	<i><.001</i>	<i>-1.6735</i>	<i>-.5220</i>

*. The mean difference is significant at the 0.05 level.

AT 235. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by leprosaria. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	$\delta^{13}\text{C}$	4	-19.2963	-19.3117	0.18654	-19.51	-19.05	0.479	1.352	.972	4	.853
	$\delta^{15}\text{N}$	4	11.0890	11.1159	0.32609	10.71	11.42	-0.291	-3.142	.939	4	.649
JMC	$\delta^{13}\text{C}$	6	-20.5658	-20.6275	0.40959	-21.18	-20.10	-0.194	-0.629	.928	6	.562
	$\delta^{15}\text{N}$	6	11.1767	11.4850	0.74705	10.17	11.86	-0.704	-1.912	.826	6	.100
JTN	$\delta^{13}\text{C}$	28	-19.2044	-19.0950	0.88668	-20.90	-17.00	0.183	0.256	.977	28	.776
	$\delta^{15}\text{N}$	28	11.4045	11.4000	0.89990	9.80	13.62	0.674	0.910	.955	28	.257
MHW	$\delta^{13}\text{C}$	3	-19.1567	-19.1600	0.36668	-19.52	-18.79	0.041	-	1.000	3	.985
	$\delta^{15}\text{N}$	3	11.0504	11.0363	1.38722	9.67	12.44	0.046	-	1.000	3	.983
<i>MMW</i>	$\delta^{13}\text{C}$	54	-19.2800	-19.3000	0.42666	-20.50	-18.20	-0.150	0.782	.063	54	.200*
	$\delta^{15}\text{N}$	54	10.5717	10.4000	0.94570	8.70	13.18	0.765	0.640	.173	54	0.0003
<i>MSL</i>	$\delta^{13}\text{C}$	5	-19.1673	-19.2713	0.31897	-19.40	-18.61	2.067	4.482	.703	5	.010

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
	$\delta^{15}\text{N}$	5	13.8318	13.6580	0.71118	13.26	15.07	1.923	4.020	.766	5	.042
SLP	$\delta^{13}\text{C}$	30	-19.6233	-19.7000	0.45840	-20.50	-18.70	-0.018	-0.212	.976	30	.705
	$\delta^{15}\text{N}$	30	11.9433	11.9000	0.95725	9.50	13.50	00.558	0.586	.954	30	.219

AT 236. Post-hoc Dunn's test results for $\delta^{13}\text{C}$ values for the individual leprosaria.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
JMC-SLP	-40.100	16.835	-2.382	.017	.362
JMC-BSA	64.083	24.299	2.637	.008	.176
<i>JMC-MMW</i>	<i>-64.491</i>	<i>16.200</i>	<i>-3.981</i>	<i><.001</i>	<i>.001</i>
<i>JMC-JTN</i>	<i>-68.458</i>	<i>16.935</i>	<i>-4.042</i>	<i><.001</i>	<i>.001</i>
<i>JMC-MSL</i>	<i>-73.633</i>	<i>22.795</i>	<i>-3.230</i>	<i>.001</i>	<i>.026</i>
JMC-MHW	-75.500	26.619	-2.836	.005	.096
SLP-BSA	23.983	20.038	1.197	.231	1.000
SLP-MMW	24.391	8.572	2.845	.004	.093
SLP-JTN	28.358	9.892	2.867	.004	.087
SLP-MSL	33.533	18.184	1.844	.065	1.000
SLP-MHW	35.400	22.795	1.553	.120	1.000
BSA-MMW	-.407	19.507	-.021	.983	1.000
BSA-JTN	-4.375	20.122	-.217	.828	1.000
BSA-MSL	-9.550	25.253	-.378	.705	1.000
BSA-MHW	-11.417	28.752	-.397	.691	1.000
MMW-JTN	3.968	8.767	.453	.651	1.000
MMW-MSL	-9.143	17.597	-.520	.603	1.000
MMW-MHW	11.009	22.330	.493	.622	1.000
JTN-MSL	-5.175	18.277	-.283	.777	1.000
JTN-MHW	-7.042	22.869	-.308	.758	1.000
MSL-MHW	1.867	27.492	.068	.946	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 237. Post-hoc Dunn's test results for $\delta^{15}\text{N}$ values for the individual leprosaria.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
MMW-MHW	17.370	22.341	.778	.437	1.000
MMW-BSA	18.537	19.517	.950	.342	1.000
MMW-JMC	23.704	16.208	1.462	.144	1.000
<i>MMW-JTN</i>	<i>29.341</i>	<i>8.771</i>	<i>3.345</i>	<i><.001</i>	<i>.017</i>
<i>MMW-SLP</i>	<i>-47.387</i>	<i>8.576</i>	<i>-5.525</i>	<i><.001</i>	<i>.000</i>
<i>MMW-MSL</i>	<i>-83.637</i>	<i>17.606</i>	<i>-4.750</i>	<i><.001</i>	<i>.000</i>
MHW-BSA	1.167	28.766	.041	.968	1.000
MHW-JMC	6.333	26.632	.238	.812	1.000
MHW-JTN	11.970	22.880	.523	.601	1.000
MHW-SLP	-30.017	22.806	-1.316	.188	1.000
MHW-MSL	-66.267	27.506	-2.409	.016	.336
BSA-JMC	-5.167	24.312	-.213	.832	1.000
BSA-JTN	-10.804	20.132	-.537	.592	1.000
BSA-SLP	-28.850	20.048	-1.439	.150	1.000
BSA-MSL	-65.100	25.265	-2.577	.010	.210
JMC-JTN	-5.637	16.944	-.333	.739	1.000
JMC-SLP	-23.683	16.844	-1.406	.160	1.000
JMC-MSL	-59.933	22.806	-2.628	.009	.180
JTN-SLP	-18.046	9.897	-1.823	.068	1.000
JTN-MSL	-54.296	18.286	-2.969	.003	.063
SLP-MSL	36.250	18.193	1.993	.046	.973

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.2.3.2 HD and isotopically measurable diet

AT 238. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by HD diagnosis. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No HD</i>	$\delta^{13}\text{C}$	510	-19.6501	-19.6000	0.70669	-23.10	-17.70	-0.604	2.275	.042	510	.032
	$\delta^{15}\text{N}$	510	11.5381	11.7000	1.53254	5.77	15.20	-0.267	-0.215	.063	510	0.00005
Possible HD	$\delta^{13}\text{C}$	33	- 19.4080	- 19.3000	0.52447	- 20.60	- 18.60	-0.580	-0.370	.952	33	.152
	$\delta^{15}\text{N}$	33	11.1269	11.0000	1.15870	8.70	13.66	0.441	0.150	.968	33	.418
<i>Probable HD</i>	$\delta^{13}\text{C}$	33	-19.3842	-19.2670	0.62746	-21.45	-18.20	-1.281	2.779	.900	33	.005
	$\delta^{15}\text{N}$	33	10.9085	10.6000	1.00174	9.37	13.49	0.607	-0.002	.963	33	.312
<i>Pathogn. HD</i>	$\delta^{13}\text{C}$	44	-19.4030	-19.4838	0.59365	-20.30	-17.00	1.844	5.475	.863	44	0.00009
	$\delta^{15}\text{N}$	44	11.2866	11.3477	1.09747	9.30	13.62	0.049	-0.568	.977	44	.503
<i>Unlikely to have HD</i>	$\delta^{13}\text{C}$	510	-19.6501	-19.6000	0.70669	-23.10	-17.70	-0.604	2.275	.042	510	.032
	$\delta^{15}\text{N}$	510	11.5381	11.7000	1.53254	5.77	15.20	-0.267	-0.215	.063	510	0.00005
Likely to have HD	$\delta^{13}\text{C}$	110	- 19.3989	- 19.4000	0.57919	- 21.45	- 17.00	0.189	2.996	0.075	110	0.164
	$\delta^{15}\text{N}$	110	11.1252	11.2000	1.09024	8.70	13.66	0.330	-0.337	0.067	110	0.200*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 239. Post-hoc Dunn's test results for $\delta^{13}\text{C}$ values for the HD diagnosis levels.

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
No-Pathognomonic	-52.659	28.128	-1.872	.061	.367
No-Possible	-71.072	32.156	-2.210	.027	.163
No-Probable	-82.678	32.156	-2.571	.010	.061
Pathognomonic-Possible	18.413	41.225	.447	.655	1.000
Pathognomonic-Probable	30.019	41.225	.728	.467	1.000
Possible-Probable	-11.606	44.071	-.263	.792	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 240. Post-hoc Dunn's test results for $\delta^{15}\text{N}$ values for the HD diagnosis levels

	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Probable-Possible	30.576	44.092	.693	.488	1.000
Probable-Pathognomonic	-49.015	41.244	-1.188	.235	1.000
<i>Probable-No</i>	<i>85.872</i>	<i>32.170</i>	<i>2.669</i>	<i>.008</i>	<i>.046</i>
Possible-Pathognomonic	-18.439	41.244	-.447	.655	1.000
Possible-No	55.296	32.170	1.719	.086	.514
Pathognomonic-No	36.857	28.141	1.310	.190	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.2.3.2.1 Oral lesions and diet

AT 241. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by RS presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Rs not present	$\delta^{13}\text{C}$	198	-19.4247	-19.4000	0.57352	-20.80	-17.80	-0.090	-0.144	.070	198	.021
	$\delta^{15}\text{N}$	198	11.7746	11.8000	1.25925	9.30	15.20	0.057	-0.532	.053	198	.200*
RS present	$\delta^{13}\text{C}$	79	-19.3844	-19.3717	0.59098	-21.45	-17.00	0.332	3.929	.089	79	.191
	$\delta^{15}\text{N}$	79	11.1587	11.2000	1.15121	8.70	13.66	0.270	-0.477	.066	79	.200*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 242. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by ANS score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\delta^{13}\text{C}$	140	-19.3977	-19.4000	0.56188	-20.70	-17.80	-0.083	-0.018	.074	140	.060
	$\delta^{15}\text{N}$	140	11.7156	11.8000	1.27527	8.70	15.20	0.102	-0.290	.062	140	.200*
1	$\delta^{13}\text{C}$	14	-19.4071	-19.4050	0.46178	-20.20	-18.51	0.191	-0.167	.991	14	1.000
	$\delta^{15}\text{N}$	14	11.1962	10.5500	1.12093	9.37	13.66	1.187	1.974	.915	14	.188
2	$\delta^{13}\text{C}$	28	-19.2360	-19.1800	0.78389	-21.45	-17.00	-0.011	3.405	.908	28	.018
	$\delta^{15}\text{N}$	28	11.1962	11.2233	1.24487	9.40	13.62	0.405	-0.725	.946	28	.160
3	$\delta^{13}\text{C}$	10	-19.5789	019.5722	0.41919	-20.20	-18.72	0.650	0.898	.971	10	.898
	$\delta^{15}\text{N}$	10	11.0697	11.2477	1.10063	9.30	12.66	-0.256	-1.138	.952	10	.689

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 243. Homogeneity of variance test for rib $\delta^{15}\text{N}$ values for ANS scores.

		Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰)	Based on Mean	.250	3	188	.861
	Based on Median	.322	3	188	.810
	Based on Median and with adjusted df	.322	3	186.391	.810
	Based on trimmed mean	.287	3	188	.834

AT 244. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by APM score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\delta^{13}\text{C}$	144	-19.3775	-19.4000	0.56879	-20.70	-17.80	-0.133	-0.075	.077	144	.036
	$\delta^{15}\text{N}$	144	11.7978	11.8000	1.25130	9.40	15.20	0.095	-0.423	.058	144	.200*
1	$\delta^{13}\text{C}$	28	-19.3289	-19.3000	0.48682	-20.24	-18.20	0.557	0.525	.961	28	.367
	$\delta^{15}\text{N}$	28	10.6516	10.2875	1.21815	8.70	13.66	0.801	0.124	.934	28	.079
2	$\delta^{13}\text{C}$	21	-19.3452	-19.4000	0.65357	-20.20	-17.00	2.256	8.147	.780	21	0.0003
	$\delta^{15}\text{N}$	21	11.0873	11.2953	0.88020	9.37	12.44	-0.476	-0.753	.945	21	.270
3	$\delta^{13}\text{C}$	7	-19.3933	-19.4000	0.50577	-20.20	-18.80	-0.314	-0.417	.937	7	.609
	$\delta^{15}\text{N}$	7	11.2300	11.2467	1.23310	9.50	13.26	0.280	0.260	.981	7	.963

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 245. Homogeneity of variance test for rib $\delta^{15}\text{N}$ values for APM scores.

		Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰)	Based on Mean	.892	3	196	.446
	Based on Median	.980	3	196	.403
	Based on Median and with adjusted df	.980	3	187.903	.403
	Based on trimmed mean	.920	3	196	.432

AT 246. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by PPMN score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\delta^{13}\text{C}$	153	-19.3783	-19.4000	0.55537	-20.70	-17.80	-0.087	-0.049	.070	153	.062
	$\delta^{15}\text{N}$	153	11.6912	11.8000	1.27657	8.70	15.20	0.149	-0.394	.056	153	.200*
1	$\delta^{13}\text{C}$	24	-19.3505	-19.2963	0.51678	-20.40	-18.20	-0.244	0.792	.941	24	.176
	$\delta^{15}\text{N}$	24	11.1754	11.3512	1.25750	9.30	13.66	0.246	-0.793	.949	24	.251
2	$\delta^{13}\text{C}$	26	-19.4063	-19.4000	0.74650	-21.45	-17.00	0.533	5.234	.874	26	.004
	$\delta^{15}\text{N}$	26	11.1971	11.3317	1.05272	9.37	13.49	0.011	-0.508	.969	26	.600
3	$\delta^{13}\text{C}$	5	-19.2485	-19.4000	0.44745	-19.84	-18.80	-0.167	-1.566	.876	5	.292
	$\delta^{15}\text{N}$	5	10.5985	10.6000	0.68406	9.79	11.50	0.195	-1.322	.977	5	.915

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 247. Homogeneity of variance test for rib $\delta^{15}\text{N}$ values for PPMN scores.

		Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰)	Based on Mean	1.159	3	204	.327
	Based on Median	1.078	3	204	.359
	Based on Median and with adjusted df	1.078	3	197.719	.359
	Based on trimmed mean	1.168	3	204	.323

AT 248. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by PPMO score; score 3-5 combined. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\delta^{13}\text{C}$	132	-19.3987	-19.4000	0.57212	-20.70	-17.80	-0.126	-0.046	.082	132	.029
	$\delta^{15}\text{N}$	132	11.8273	11.8000	1.23083	9.32	15.20	0.112	-0.258	.052	132	.200*
1	$\delta^{13}\text{C}$	47	-19.2736	-19.2713	0.66832	-21.45	-17.00	0.122	3.861	.930	47	.007
	$\delta^{15}\text{N}$	47	10.9838	11.2011	1.23659	8.70	13.66	0.409	-0.512	.960	47	.106
2	$\delta^{13}\text{C}$	21	-19.5388	-19.6000	0.35929	-20.20	-19.00	0.112	-0.985	.941	21	.231
	$\delta^{15}\text{N}$	21	11.2979	11.4168	1.11575	9.50	13.49	0.211	-0.564	.960	47	.106
3-5	$\delta^{13}\text{C}$	1	-19.2940	-19.400	0.39205	-19.84	-18.80	0.098	-1.350	.906	8	.106
	$\delta^{15}\text{N}$	1	10.5396	10.5500	0.53369	9.79	11.50	0.565	0.401	.968	8	.881

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 249. Homogeneity of variance test for rib $\delta^{15}\text{N}$ values for PPMO scores, score 3-5 combined.

		Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰)	Based on Mean	2.064	3	204	.106
	Based on Median	1.978	3	204	.118
	Based on Median and with adjusted df	1.978	3	197.114	.119
	Based on trimmed mean	2.064	3	204	.106

AT 250. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by NPI scores. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\delta^{13}\text{C}$	141	-19.4052	-19.4000	0.55081	-20.70	-17.80	-0.131	0.017	.078	141	.035
	$\delta^{15}\text{N}$	141	11.7621	11.8000	1.24786	9.32	15.20	0.119	-0.333	.058	141	.200*
1	$\delta^{13}\text{C}$	18	-19.2588	-19.1835	0.75706	-21.45	-18.14	-1.274	3.325	.905	18	.070
	$\delta^{15}\text{N}$	18	10.7799	10.4000	1.27369	8.70	13.62	1.001	10.060	.904	18	.069
2	$\delta^{13}\text{C}$	20	-19.4801	-19.5500	0.58396	-20.40	-18.20	0.365	-0.149	.960	20	.538
	$\delta^{15}\text{N}$	20	11.1621	11.4000	1.12288	9.50	13.10	-0.045	-1.023	.950	20	.370
3	$\delta^{13}\text{C}$	15	-19.2358	-19.3000	0.70251	-20.20	-17.00	2.367	7.973	.746	15	0.0008
	$\delta^{15}\text{N}$	15	10.7390	10.6000	1.01636	9.30	12.44	0.188	-1.277	.940	15	.385
4	$\delta^{13}\text{C}$	3	-19.1474	-18.8000	0.60179	-19.84	-18.80	-1.732	-	.750	3	-8.4815E-16
	$\delta^{15}\text{N}$	3	10.7642	11.0000	0.87775	9.79	11.50	-1.122	-	.946	3	.552
5	$\delta^{13}\text{C}$	5	-19.3695	-19.3717	0.13891	-19.54	-19.20	-0.042	-1.553	.976	5	.912
	$\delta^{15}\text{N}$	5	11.7110	11.2614	1.22521	10.40	13.66	1.123	1.662	.915	5	.501

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 251. Homogeneity of variance test for rib $\delta^{15}\text{N}$ values for NPI scores.

	Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰) Based on Mean	.248	5	196	.940
Based on Median	.378	5	196	.864
Based on Median and with adjusted df	.378	5	184.391	.863
Based on trimmed mean	.265	5	196	.932

AT 252. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\delta^{15}\text{N}$ values per ANS score.

		Mean Difference	Std. Error	Sig.	95% Confidence Interval		
(I) ANS	(J) ANS	(I-J)			Lower Bound	Upper Bound	
Tukey HSD	0	1	.89387	.35121	.056	-.0165	1.8043
		2	.51946	.25938	.191	-.1529	1.1918
		3	.64593	.41012	.395	-.4172	1.7090
	1	0	-.89387	.35121	.056	-1.8043	.0165
		2	-.37442	.41012	.798	-1.4375	.6887
		3	-.24794	.51877	.964	-1.5927	1.0968
	2	0	-.51946	.25938	.191	-1.1918	.1529
		1	.37442	.41012	.798	-.6887	1.4375
		3	.12648	.46158	.993	-1.0700	1.3230
	3	0	-.64593	.41012	.395	-1.7090	.4172
		1	.24794	.51877	.964	-1.0968	1.5927
		2	-.12648	.46158	.993	-1.3230	1.0700

Bonferroni	0	1	.89387	.35121	.070	-.0426	1.8304
		2	.51946	.25938	.280	-.1722	1.2111
		3	.64593	.41012	.702	-.4476	1.7395
	1	0	-.89387	.35121	.070	-1.8304	.0426
		2	-.37442	.41012	1.000	-1.4680	.7192
		3	-.24794	.51877	1.000	-1.6312	1.1353
	2	0	-.51946	.25938	.280	-1.2111	.1722
		1	.37442	.41012	1.000	-.7192	1.4680
		3	.12648	.46158	1.000	-1.1043	1.3573
	3	0	-.64593	.41012	.702	-1.7395	.4476
		1	.24794	.51877	1.000	-1.1353	1.6312
		2	-.12648	.46158	1.000	-1.3573	1.1043

AT 253. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\delta^{15}\text{N}$ values per APM score.

		Mean Difference			95% Confidence Interval		
	(I) APM	(J) APM	(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Tukey HSD	0	1	1.14622*	.25062	<.001	.4968	1.7956
		2	.71052	.28344	.062	-.0239	1.4450
		3	.56781	.46964	.622	-.6491	1.7848
	1	0	-1.14622*	.25062	<.001	-1.7956	-.4968
		2	-.43570	.35028	.600	-1.3434	.4720
		3	-.57841	.51276	.673	-1.9071	.7503
	2	0	-.71052	.28344	.062	-1.4450	.0239
		1	.43570	.35028	.600	-.4720	1.3434
		3	-.14271	.52958	.993	-1.5150	1.2295
	3	0	-.56781	.46964	.622	-1.7848	.6491
		1	.57841	.51276	.673	-.7503	1.9071
		2	.14271	.52958	.993	-1.2295	1.5150
Bonferroni	0	1	1.14622*	.25062	<.001	.4782	1.8142
		2	.71052	.28344	.078	-.0449	1.4660
		3	.56781	.46964	1.000	-.6839	1.8196
	1	0	-1.14622*	.25062	<.001	-1.8142	-.4782
		2	-.43570	.35028	1.000	-1.3693	.4979
		3	-.57841	.51276	1.000	-1.9451	.7883
	2	0	-.71052	.28344	.078	-1.4660	.0449

3	1	.43570	.35028	1.000	-.4979	1.3693
	3	-.14271	.52958	1.000	-1.5542	1.2688
	0	-.56781	.46964	1.000	-1.8196	.6839
	1	.57841	.51276	1.000	-.7883	1.9451
	2	.14271	.52958	1.000	-1.2688	1.5542

*. The mean difference is significant at the 0.05 level.

AT 254. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\delta^{15}\text{N}$ values per PPMN score.

		Mean	Std. Error	Sig.	95% Confidence Interval	
(I) PPMN	(J) PPMN	Difference (I-J)			Lower Bound	Upper Bound
Tukey HSD 0	1	.51581	.27223	.234	-.1894	1.2210
	2	.49415	.26303	.240	-.1872	1.1755
	3	1.09270	.56351	.215	-.3670	2.5524
	1	0				
	0	-.51581	.27223	.234	-1.2210	.1894
	2	-.02166	.35099	1.000	-.9308	.8875
	3	.57689	.60956	.780	-1.0021	2.1559
	2	0				
	0	-.49415	.26303	.240	-1.1755	.1872
	1	.02166	.35099	1.000	-.8875	.9308
	3	.59855	.60550	.756	-.9699	2.1670
	2	0				
	0	-1.09270	.56351	.215	-2.5524	.3670
	1	-.57689	.60956	.780	-2.1559	1.0021
	2	-.59855	.60550	.756	-2.1670	.9699
	3	0				
	0					
	1					

		Mean			95% Confidence Interval		
	(I) PPMN	(J) PPMN	Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Bonferroni	0	1	.51581	.27223	.357	-.2095	1.2411
		2	.49415	.26303	.370	-.2066	1.1949
		3	1.09270	.56351	.323	-.4086	2.5940
	1	0	-.51581	.27223	.357	-1.2411	.2095
		2	-.02166	.35099	1.000	-.9568	.9135
		3	.57689	.60956	1.000	-1.0471	2.2009
	2	0	-.49415	.26303	.370	-1.1949	.2066
		1	.02166	.35099	1.000	-.9135	.9568
		3	.59855	.60550	1.000	-1.0147	2.2118
	3	0	-1.09270	.56351	.323	-2.5940	.4086
		1	-.57689	.60956	1.000	-2.2009	1.0471
		2	-.59855	.60550	1.000	-2.2118	1.0147

AT 255. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ rib values categorised by PPMO score; all scores separate. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

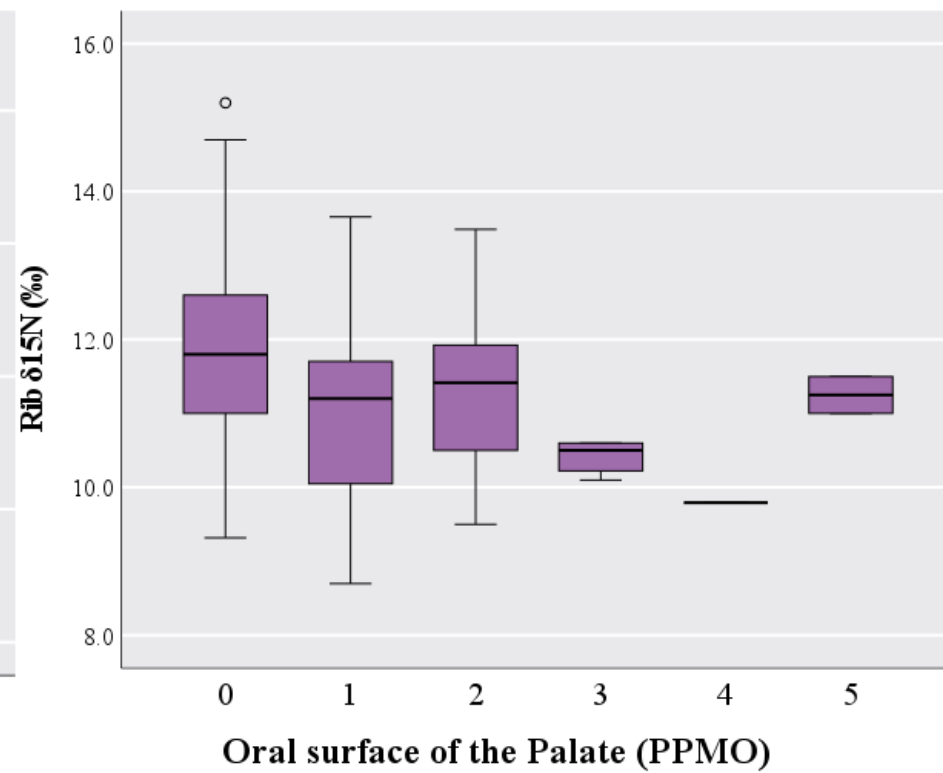
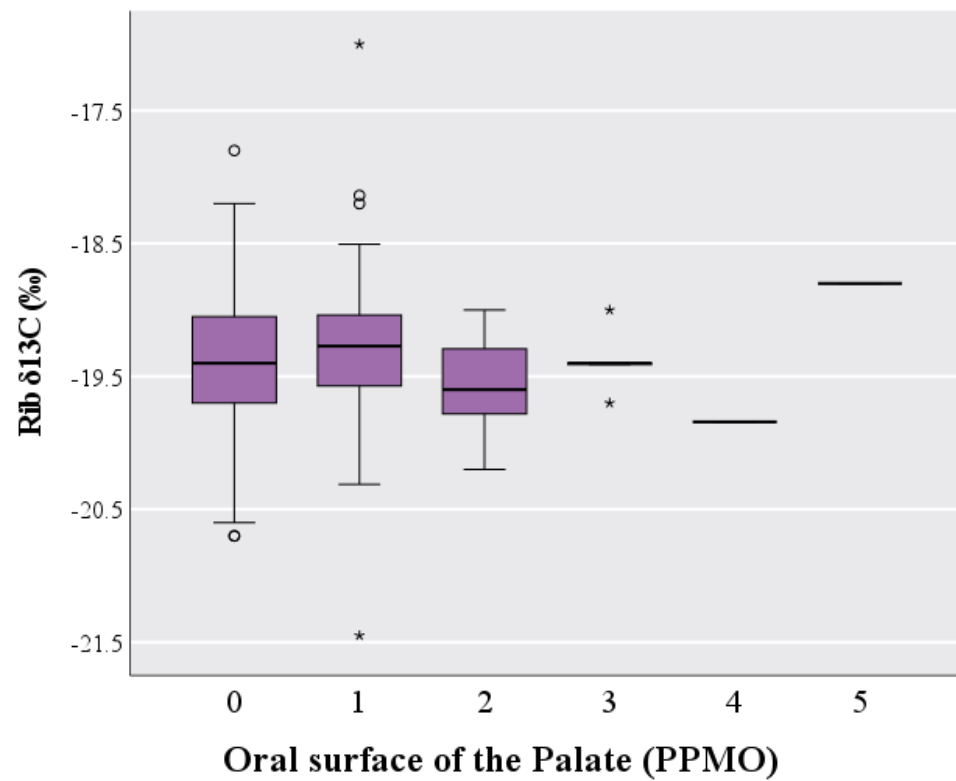
		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\delta^{13}\text{C}$	132	-19.3987	-19.4000	0.57212	-20.70	-17.80	-0.126	-0.046	.082	132	.029
	$\delta^{15}\text{N}$	132	11.8273	11.8000	1.23083	9.32	15.20	0.112	-0.258	.052	132	.200*
1	$\delta^{13}\text{C}$	47	-19.2736	-19.2713	0.66832	-21.45	-17.00	0.122	3.861	.930	47	.007
	$\delta^{15}\text{N}$	47	10.9838	11.2011	1.23659	8.70	13.66	0.409	-0.512	.960	47	.106
2	$\delta^{13}\text{C}$	21	-19.5388	-19.6000	0.35929	-20.20	-19.00	0.112	-0.985	.941	21	.231
	$\delta^{15}\text{N}$	21	11.2979	11.4168	1.11575	9.50	13.49	0.211	-0.564	.960	47	.106
3	$\delta^{13}\text{C}$	5	-19.3820	-19.4000	0.24924	-19.70	-19.00	0.634	2.210	.880	5	.310
	$\delta^{15}\text{N}$	5	10.4049	10.5000	0.22953	10.10	10.60	-0.637	-2.289	.849	5	.191
4	$\delta^{13}\text{C}$	1	-19.84	-	-	-	-	-	-	-	-	-
	$\delta^{15}\text{N}$	1	9.79	-	-	-	-	-	-	-	-	-
5	$\delta^{13}\text{C}$	2	-18.8000	-18.8000	0.0000	-18.80	-18.80	-	-	-	-	-
	$\delta^{15}\text{N}$	2	11.2500	11.2500	0.35355	11.00	11.50	-	-	-	-	-

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 256. Homogeneity of variance test for rib $\delta^{15}\text{N}$ values for PPMO scores, all scores separate.

		Levene Statistic	df1	df2	Sig.
Rib $\delta^{15}\text{N}$ (‰)	Based on Mean	2.208	4	202	.069
	Based on Median	2.192	4	202	.071
	Based on Median and with adjusted df	2.192	4	194.760	.071
	Based on trimmed mean	2.212	4	202	.069



AF 97. Boxplots for $\delta^{13}\text{C}$ rib values categorised by PPMO severity level, all scores separate: Stage 0 ($n=132$), stage 1 ($n=47$), stage 2 ($n=21$), stage 3 ($n=5$), stage 4 ($n=1$) and stage 5 $n=2$).

AT 257. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\delta^{15}\text{N}$ values per PPMO score, score 3-5 combined.

		Mean			95% Confidence Interval		
(I) PPMO	(J) PPMO	Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound	
Tukey HSD	0	1	.84348*	.20450	<.001	.3138	1.3732
		2	.52943	.28285	.243	-.2032	1.2621
		3	1.28766*	.43836	.019	.1522	2.4232
	1	0	-.84348*	.20450	<.001	-1.3732	-.3138
		2	-.31405	.31601	.753	-1.1326	.5045
		3	.44418	.46046	.770	-.7486	1.6369
	2	0	-.52943	.28285	.243	-1.2621	.2032
		1	.31405	.31601	.753	-.5045	1.1326
		3	.75824	.50020	.430	-.5375	2.0539
	3	0	-1.28766*	.43836	.019	-2.4232	-.1522
		1	-.44418	.46046	.770	-1.6369	.7486
		2	-.75824	.50020	.430	-2.0539	.5375
Bonferroni	0	1	.84348*	.20450	<.001	.2986	1.3883
		2	.52943	.28285	.376	-.2241	1.2830
		3	1.28766*	.43836	.022	.1198	2.4556
	1	0	-.84348*	.20450	<.001	-1.3883	-.2986
		2	-.31405	.31601	1.000	-1.1560	.5279
		3	.44418	.46046	1.000	-.7826	1.6710
2	0	-.52943	.28285	.376	-1.2830	.2241	

3	1	.31405	.31601	1.000	-.5279	1.1560
	3	.75824	.50020	.787	-.5744	2.0909
	0	-1.28766*	.43836	.022	-2.4556	-.1198
	1	-.44418	.46046	1.000	-1.6710	.7826
	2	-.75824	.50020	.787	-2.0909	.5744

*. The mean difference is significant at the 0.05 level.

AT 258. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\delta^{15}\text{N}$ values per NPI score.

		Mean Difference		Std. Error	Sig.	95% Confidence Interval	
(I) NPI	(J) NPI	(I-J)	Lower Bound			Upper Bound	
Tukey HSD	0	1	.98217*	.30526	.019	.1036	1.8608
		2	.60004	.29142	.313	-.2387	1.4388
		3	1.02316*	.33123	.027	.0698	1.9765
		4	.99789	.71160	.726	-1.0502	3.0460
		5	.05110	.55502	1.000	-1.5463	1.6485
	1	0	-.98217*	.30526	.019	-1.8608	-.1036
		2	-.38213	.39625	.929	-1.5226	.7583
		3	.04099	.42638	1.000	-1.1862	1.2682
		4	.01572	.76057	1.000	-2.1733	2.2047
		5	-.93107	.61655	.658	-2.7056	.8434
2	0	-.60004	.29142	.313	-1.4388	.2387	
	1	.38213	.39625	.929	-.7583	1.5226	

(I) NPI	(J) NPI	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
		(I-J)			Lower Bound	Upper Bound
	3	.42312	.41658	.912	-.7759	1.6221
	4	.39785	.75511	.995	-1.7755	2.5712
	5	-.54894	.60981	.946	-2.3041	1.2062
	0	<i>-1.02316*</i>	.33123	.027	-1.9765	-.0698
	1	-.04099	.42638	1.000	-1.2682	1.1862
	2	-.42312	.41658	.912	-1.6221	.7759
	4	-.02526	.77135	1.000	-2.2453	2.1948
	5	-.97206	.62981	.637	-2.7847	.8406
	4	-.99789	.71160	.726	-3.0460	1.0502
	1	-.01572	.76057	1.000	-2.2047	2.1733
	2	-.39785	.75511	.995	-2.5712	1.7755
	3	.02526	.77135	1.000	-2.1948	2.2453
	5	-.94679	.89068	.895	-3.5103	1.6167
	0	-.05110	.55502	1.000	-1.6485	1.5463
	1	.93107	.61655	.658	-.8434	2.7056
Bonferroni	2	.54894	.60981	.946	-1.2062	2.3041
	3	.97206	.62981	.637	-.8406	2.7847
	4	.94679	.89068	.895	-1.6167	3.5103
	0	<i>.98217*</i>	.30526	.023	.0750	1.8893
	2	.60004	.29142	.612	-.2659	1.4660

(I) NPI	(J) NPI	Mean Difference	Std. Error	Sig.	95% Confidence Interval		
		(I-J)			Lower Bound	Upper Bound	
1	3	1.02316*	.33123	.035	.0389	2.0074	
	4	.99789	.71160	1.000	-1.1167	3.1125	
	5	.05110	.55502	1.000	-1.5982	1.7004	
	0	-.98217*	.30526	.023	-1.8893	-.0750	
	2	-.38213	.39625	1.000	-1.5596	.7954	
	3	.04099	.42638	1.000	-1.2261	1.3080	
	4	.01572	.76057	1.000	-2.2444	2.2758	
	5	-.93107	.61655	1.000	-2.7632	.9011	
	2	0	-.60004	.29142	.612	-1.4660	.2659
	1	.38213	.39625	1.000	-.7954	1.5596	
2	3	.42312	.41658	1.000	-.8148	1.6610	
	4	.39785	.75511	1.000	-1.8461	2.6418	
	5	-.54894	.60981	1.000	-2.3611	1.2632	
	3	0	-1.02316*	.33123	.035	-2.0074	-.0389
	1	-.04099	.42638	1.000	-1.3080	1.2261	
3	2	-.42312	.41658	1.000	-1.6610	.8148	
	4	-.02526	.77135	1.000	-2.3174	2.2669	
	5	-.97206	.62981	1.000	-2.8436	.8995	
	4	0	-.99789	.71160	1.000	-3.1125	1.1167
	1	-.01572	.76057	1.000	-2.2758	2.2444	

(I) NPI	(J) NPI	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
		(I-J)			Lower Bound	Upper Bound
5	2	-.39785	.75511	1.000	-2.6418	1.8461
	3	.02526	.77135	1.000	-2.2669	2.3174
	5	-.94679	.89068	1.000	-3.5936	1.7000
	0	-.05110	.55502	1.000	-1.7004	1.5982
	1	.93107	.61655	1.000	-.9011	2.7632
	2	.54894	.60981	1.000	-1.2632	2.3611
	3	.97206	.62981	1.000	-.8995	2.8436
	4	.94679	.89068	1.000	-1.7000	3.5936

*. The mean difference is significant at the 0.05 level.

A. 4.4.3.1 Continuity and change during life

AT 259. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by site type. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/Friary	$\Delta^{13}\text{C}$	2	0.3773	0.3773	0.47518	0.04	0.71	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	-0.6723	-0.6723	0.82834	-1.26	-0.09	-	-	-	-	-
Leprosarium	$\Delta^{13}\text{C}$	60	0.2519	0.2517	0.50417	-0.86	1.20	-0.122	-0.670	.076	60	.200*
	$\Delta^{15}\text{N}$	60	0.2711	0.1000	1.07417	-2.70	3.31	0.157	0.937	.097	60	.200*
Hospital	$\Delta^{13}\text{C}$	60	0.1117	0.1000	0.36411	-0.60	1.00	-0.038	-0.2484	.096	60	.200*

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>Other site types</i>	$\Delta^{15}\text{N}$	60	0.5817	0.5500	1.18099	-2.70	3.50	0.503	-0.3396	.110	60	.066
	$\Delta^{13}\text{C}$	113	-0.2484	-0.2000	0.36396	-0.136	0.70	-0.365	0.482	.107	113	.003
	$\Delta^{15}\text{N}$	113	-0.3396	-0.1000	1.21637	-6.69	2.10	-1.466	5.611	.129	113	0.00009

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 260. Post-hoc Dunn's test results for $\Delta^{13}\text{C}$ values for the different site types.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>Other-Hospital</i>	57.144	10.844	5.270	<.001	.000
<i>Other-Leprosarium</i>	70.177	10.844	6.472	<.001	.000
<i>Other-Monastery/Friary</i>	96.327	48.424	1.989	.047	.280
Hospital-Leprosarium	13.033	12.394	1.052	.293	1.000
Hospital-Monastery/Friary	39.183	48.794	.803	.422	1.000
Leprosarium-Monastery/Friary	26.150	48.794	.536	.592	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 261. Post-hoc Dunn's test results for $\Delta^{15}\text{N}$ values for the different site types.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a

Monastery/Friary-Other	-32.327	48.480	-.667	.505	1.000
Monastery/Friary-Leprosarium	-62.800	48.851	-1.286	.199	1.000
Monastery/Friary-Hospital	-81.942	48.851	-1.677	.093	.561
<i>Other-Leprosarium</i>	<i>30.473</i>	<i>10.856</i>	<i>2.807</i>	<i>.005</i>	<i>.030</i>
<i>Other-Hospital</i>	<i>49.614</i>	<i>10.856</i>	<i>4.570</i>	<i><.001</i>	<i>.000</i>
Leprosarium-Hospital	-19.142	12.408	-1.543	.123	.737

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.3.1.1. Site types within their temporal context

A. 4.4.3.1.1.1. Early-high medieval period

AT 262. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by sites from the high medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>CHI</i>	$\Delta^{13}\text{C}$	37	-0.2588	-0.2000	0.28029	-1.20	0.13	-1.065	2.109	.919	37	.011
	$\Delta^{15}\text{N}$	37	0.1652	0.4000	0.85269	-2.40	2.10	-0.601	1.376	.965	37	.284
CPA	$\Delta^{13}\text{C}$	14	0.1357	0.3000	0.39924	-0.70	0.70	-0.882	-0.068	.881	14	.061
	$\Delta^{15}\text{N}$	14	0.3571	0.2000	0.86533	-1.30	1.90	0.291	0.277	.933	14	.332
<i>JTN</i>	$\Delta^{13}\text{C}$	10	0.2358	0.3372	0.35928	-0.23	0.66	-0.248	-1.883	.870	10	.099
	$\Delta^{15}\text{N}$	10	0.4368	0.2145	0.49629	-0.05	1.37	1.210	0.183	.826	10	.030

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 263. Post-hoc Dunn's test results for $\Delta^{13}\text{C}$ values for the high medieval sites.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
<i>CHI-CPA</i>	-17.499	5.554	-3.150	.002	.005
<i>CHI-JTN</i>	-20.592	6.309	-3.264	.001	.003
CPA-JTN	-3.093	7.329	-.422	.673	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.3.1.1.2. High(-late) medieval period

AT 264. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by sites from the high(-late) medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk ^a		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	$\Delta^{13}\text{C}$	2	-0.0510	-0.0510	0.00047	-0.05	-0.05	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	-0.5136	-0.5136	0.09640	-0.58	-0.45	-	-	-	-	-
CHI	$\Delta^{13}\text{C}$	4	-0.2250	-0.2500	0.09574	-0.30	-0.10	0.855	-1.289	.863	4	.272
	$\Delta^{15}\text{N}$	4	0.6750	0.7000	0.15000	0.50	0.80	-0.370	-3.901	.849	4	.224
MMW	$\Delta^{13}\text{C}$	10	-0.1667	-0.2788	0.51010	-0.86	0.58	0.166	-1.555	.935	10	.499
	$\Delta^{15}\text{N}$	10	0.0395	-0.0727	0.86085	-1.58	1.43	-0.240	0.389	.981	10	.968
MSL	$\Delta^{13}\text{C}$	5	0.1760	0.0733	0.62679	-0.61	1.05	0.304	-0.150	.991	5	.982
	$\Delta^{15}\text{N}$	5	1.1880	1.3183	1.38205	-0.16	3.31	0.887	0.575	.906	5	.445
SLP	$\Delta^{13}\text{C}$	20	0.3850	0.5000	0.54025	-0.60	1.10	-0.258	-1.323	.916	20	.083
	$\Delta^{15}\text{N}$	20	0.1400	-0.1000	1.17626	-2.70	1.90	-0.393	0.090	.936	20	.200
WPY	$\Delta^{13}\text{C}$	17	-0.7570	-0.7800	0.28343	-1.36	-0.15	0.184	0.820	.971	17	.841
	$\Delta^{15}\text{N}$	17	-2.1886	-2.0400	1.35449	-6.69	-0.25	-2.274	8.014	.764	17	0.0007

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 265. Homogeneity of variance test for rib $\Delta^{13}\text{C}$ values for high(-late) medieval sites.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	5.689	5	52	<.001
	Based on Median	4.473	5	52	.002
	Based on Median and with adjusted df	4.473	5	39.726	.003
	Based on trimmed mean	5.550	5	52	<.001

AT 266. Post-hoc Dunn's test results for $\Delta^{13}\text{C}$ values for the high(-late) medieval sites.

	Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
$\Delta^{13}\text{C}$	WPY-CHI	16.779	9.381	1.789	.074	1.000
	WPY-MMW	17.029	6.727	2.531	.011	.170
	WPY-BSA	24.029	12.619	1.904	.057	.853
	WPY-MSL	26.529	8.588	3.089	.002	.030
	<i>WPY-SLP</i>	<i>31.379</i>	<i>5.568</i>	<i>5.635</i>	<i><.001</i>	<i>.000</i>
	CHI-MMW	-.250	9.986	-.025	.980	1.000
	CHI-BSA	7.250	14.619	.496	.620	1.000
	CHI-MSL	-9.750	11.324	-.861	.389	1.000
	CHI-SLP	-14.600	9.246	-1.579	.114	1.000
	MMW-BSA	7.000	13.075	.535	.592	1.000
	MMW-MSL	-9.500	9.246	-1.028	.304	1.000
	MMW-SLP	-14.350	6.538	-2.195	.028	.422
	BSA-MSL	-2.500	14.123	-.177	.859	1.000

	Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
	BSA-SLP	-7.350	12.519	-.587	.557	1.000
	MSL-SLP	-4.850	8.440	-.575	.566	1.000
$\Delta^{15}\text{N}$	WPY-BSA	13.441	12.621	1.065	.287	1.000
	WPY-MMW	24.141	6.729	3.588	<.001	.005
	WPY-SLP	24.616	5.570	4.420	<.001	.000
	WPY-CHI	32.816	9.382	3.498	<.001	.007
	WPY-MSL	35.541	8.589	4.138	<.001	.001
	BSA-MMW	-10.700	13.078	-.818	.413	1.000
	BSA-SLP	-11.175	12.521	-.892	.372	1.000
	BSA-CHI	-19.375	14.622	-1.325	.185	1.000
	BSA-MSL	-22.100	14.126	-1.565	.118	1.000
	MMW-SLP	-.475	6.539	-.073	.942	1.000
	MMW-CHI	8.675	9.988	.869	.385	1.000
	MMW-MSL	-11.400	9.247	-1.233	.218	1.000
	SLP-CHI	8.200	9.247	.887	.375	1.000
	SLP-MSL	10.925	8.442	1.294	.196	1.000
	CHI-MSL	-2.725	11.326	-.241	.810	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 267. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by site types from the high(-late) medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Leprosaria	$\Delta^{13}\text{C}$	37	0.1841	0.0733	0.56783	-0.86	1.10	0.030	-1.082	0.954	37	0.131
	$\Delta^{15}\text{N}$	37	0.2191	0.0000	1.14045	-2.70	3.31	0.190	0.797	0.962	37	0.241
<i>Other site types</i>	$\Delta^{13}\text{C}$	21	-0.6556	-0.7100	0.33385	-1.36	-0.10	0.010	-0.547	0.961	21	0.531
	$\Delta^{15}\text{N}$	21	-1.6431	-1.8600	1.67294	-6.69	0.80	-0.947	3.191	0.871	21	0.010

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 268. Homogeneity of variance test for rib $\Delta^{13}\text{C}$ values for high(-late) medieval site types.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	8.931	1	56	.004
	Based on Median	7.915	1	56	.007
	Based on Median and with adjusted df	7.915	1	49.837	.007
	Based on trimmed mean	8.893	1	56	.004

A. 4.4.3.1.1.3. Late(-high-late) medieval period

AT 269. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by sites from the late(-high-late) medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	$\Delta^{13}\text{C}$	2	-0.0510	-0.0510	0.00047	-0.05	-0.05	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	-0.5136	-0.5136	0.09640	-0.58	-0.45	-	-	-	-	-
CHI	$\Delta^{13}\text{C}$	4	-0.2250	-0.2500	0.09574	-0.30	-0.10	0.855	-1.289	.863	4	.272
	$\Delta^{15}\text{N}$	4	0.6750	0.7000	0.15000	0.50	0.80	-0.370	-3.901	.849	4	.224
CJH	$\Delta^{13}\text{C}$	60	0.1117	0.1000	0.36411	-0.60	1.00	0.197	-0.038	.096	60	.200*
	$\Delta^{15}\text{N}$	60	0.5817	0.5500	1.395	-2.70	3.50	0.093	0.503	.110	60	.066
IBF	$\Delta^{13}\text{C}$	2	0.3773	0.3773	0.47518	0.04	0.71	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	-0.6723	-0.6723	0.82834	-1.26	-0.09	-	-	-	-	-
MHW	$\Delta^{13}\text{C}$	3	0.1486	0.1317	0.06923	0.09	0.22	1.032	-	.955	3	.593
	$\Delta^{15}\text{N}$	3	-0.1692	0.0017	0.82079	-1.06	0.55	-0.896	-	.967	3	.654
MSL	$\Delta^{13}\text{C}$	5	0.1760	0.0733	0.62679	-0.61	1.05	0.304	-0.150	.991	5	.982
	$\Delta^{15}\text{N}$	5	1.1880	1.3183	1.38205	-0.16	3.31	0.887	0.575	.906	5	.445
SLP	$\Delta^{13}\text{C}$	10	0.5500	0.6000	0.35355	0.10	1.20	0.519	-0.066	.918	10	.337
	$\Delta^{15}\text{N}$	10	0.4300	0.3500	1.35323	-2.00	2.70	0.057	0.459	.961	10	.800

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 270. Homogeneity of variance test for rib $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values for late(-high-late) medieval sites.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	2.108	6	79	.061
	Based on Median	1.857	6	79	.099
	Based on Median and with adjusted df	1.857	6	64.632	.102
	Based on trimmed mean	2.082	6	79	.065
$\Delta^{15}\text{N}$ (‰)	Based on Mean	1.118	6	79	.360
	Based on Median	1.114	6	79	.362
	Based on Median and with adjusted df	1.114	6	72.161	.363
	Based on trimmed mean	1.125	6	79	.356

AT 271. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\Delta^{13}\text{C}$ values per late(-high-late) medieval site.

				Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
Dependent Variable	(I) SiteAb	(J) SiteAb					Lower Bound	Upper Bound
$\Delta^{13}\text{C}$ (‰)	Tukey HSD	CHI		.33667	.19077	.575	-.2405	.9139
		IBF		-.26567	.26554	.952	-1.0691	.5377
		MHW		-.03689	.21855	1.000	-.6981	.6244
		MSL		-.06433	.17196	1.000	-.5846	.4559
		BSA		.16267	.26554	.996	-.6407	.9661
		SLP		-.43833*	.12618	.014	-.8201	-.0566
	CHI	CJH		-.33667	.19077	.575	-.9139	.2405
		IBF		-.60233	.31993	.498	-1.5703	.3656
		MHW		-.37356	.28215	.839	-1.2272	.4801
		MSL		-.40100	.24781	.671	-1.1508	.3488
		BSA		-.17400	.31993	.998	-1.1420	.7940
		SLP		-.77500*	.21855	.011	-1.4363	-.1137
	IBF	CJH		.26567	.26554	.952	-.5377	1.0691
		CHI		.60233	.31993	.498	-.3656	1.5703
		MHW		.22878	.33723	.993	-.7916	1.2491
		MSL		.20133	.30908	.995	-.7338	1.1365
		BSA		.42833	.36942	.907	-.6894	1.5461

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	MHW	SLP	-.17267	.28615	.997	-1.0385	.6931
		CJH	.03689	.21855	1.000	-.6244	.6981
		CHI	.37356	.28215	.839	-.4801	1.2272
		IBF	-.22878	.33723	.993	-1.2491	.7916
		MSL	-.02744	.26979	1.000	-.8437	.7888
		BSA	.19956	.33723	.997	-.8208	1.2199
	MSL	SLP	-.40144	.24318	.650	-1.1372	.3343
		CJH	.06433	.17196	1.000	-.4559	.5846
		CHI	.40100	.24781	.671	-.3488	1.1508
		IBF	-.20133	.30908	.995	-1.1365	.7338
		MHW	.02744	.26979	1.000	-.7888	.8437
		BSA	.22700	.30908	.990	-.7082	1.1622
	BSA	SLP	-.37400	.20234	.520	-.9862	.2382
		CJH	-.16267	.26554	.996	-.9661	.6407
		CHI	.17400	.31993	.998	-.7940	1.1420
		IBF	-.42833	.36942	.907	-1.5461	.6894
		MHW	-.19956	.33723	.997	-1.2199	.8208
		MSL	-.22700	.30908	.990	-1.1622	.7082
	SLP	SLP	-.60100	.28615	.363	-1.4668	.2648
		CJH	.43833*	.12618	.014	.0566	.8201
		CHI	.77500*	.21855	.011	.1137	1.4363
		IBF	.17267	.28615	.997	-.6931	1.0385
		MHW	.40144	.24318	.650	-.3343	1.1372
		MSL	.37400	.20234	.520	-.2382	.9862
Bonferroni	CJH	BSA	.60100	.28615	.363	-.2648	1.4668
		CHI	.33667	.19077	1.000	-.2622	.9356
		IBF	-.26567	.26554	1.000	-1.0993	.5680
		MHW	-.03689	.21855	1.000	-.7230	.6492
		MSL	-.06433	.17196	1.000	-.6042	.4755
		BSA	.16267	.26554	1.000	-.6710	.9963

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	CHI	SLP	-.43833*	.12618	.018	-.8345	-.0422
		CJH	-.33667	.19077	1.000	-.9356	.2622
		IBF	-.60233	.31993	1.000	-1.6067	.4020
		MHW	-.37356	.28215	1.000	-1.2593	.5122
		MSL	-.40100	.24781	1.000	-1.1790	.3770
		BSA	-.17400	.31993	1.000	-1.1784	.8304
	IBF	SLP	-.77500*	.21855	.014	-1.4611	-.0889
		CJH	.26567	.26554	1.000	-.5680	1.0993
		CHI	.60233	.31993	1.000	-.4020	1.6067
		MHW	.22878	.33723	1.000	-.8299	1.2875
		MSL	.20133	.30908	1.000	-.7690	1.1717
		BSA	.42833	.36942	1.000	-.7314	1.5881
	MHW	SLP	-.17267	.28615	1.000	-1.0710	.7257
		CJH	.03689	.21855	1.000	-.6492	.7230
		CHI	.37356	.28215	1.000	-.5122	1.2593
		IBF	-.22878	.33723	1.000	-1.2875	.8299
		MSL	-.02744	.26979	1.000	-.8744	.8195
		BSA	.19956	.33723	1.000	-.8592	1.2583
	MSL	SLP	-.40144	.24318	1.000	-1.1649	.3620
		CJH	.06433	.17196	1.000	-.4755	.6042
		CHI	.40100	.24781	1.000	-.3770	1.1790
		IBF	-.20133	.30908	1.000	-1.1717	.7690
		MHW	.02744	.26979	1.000	-.8195	.8744
		BSA	.22700	.30908	1.000	-.7433	1.1973
	BSA	SLP	-.37400	.20234	1.000	-1.0092	.2612
		CJH	-.16267	.26554	1.000	-.9963	.6710
		CHI	.17400	.31993	1.000	-.8304	1.1784
		IBF	-.42833	.36942	1.000	-1.5881	.7314
		MHW	-.19956	.33723	1.000	-1.2583	.8592
		MSL	-.22700	.30908	1.000	-1.1973	.7433
		SLP	-.60100	.28615	.817	-1.4993	.2973

Dependent Variable	(I) SiteAb	(J) SiteAb	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
	SLP	CJH	.43833*	.12618	.018	.0422	.8345
		CHI	.77500*	.21855	.014	.0889	1.4611
		IBF	.17267	.28615	1.000	-.7257	1.0710
		MHW	.40144	.24318	1.000	-.3620	1.1649
		MSL	.37400	.20234	1.000	-.2612	1.0092
		BSA	.60100	.28615	.817	-.2973	1.4993

AT 272. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by site types from the late(-high-late) medieval period. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *course* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Monastery/friary	$\Delta^{13}\text{C}$	2	0.3773	0.3773	0.47518	0.04	0.71	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	0.6723	-0.6723	0.82834	-1.26	-0.09	-	-	-	-	-
Leprosarium	$\Delta^{13}\text{C}$	20	0.3362	0.2623	0.44111	-0.61	1.20	0.169	0.137	0.961	20	0.555
	$\Delta^{15}\text{N}$	20	0.4353	0.1500	1.28161	-2.00	3.31	0.572	0.476	0.962	20	0.584
Hospital	$\Delta^{13}\text{C}$	60	0.1117	0.1000	0.36411	-0.60	1.00	0.197	-0.038	0.096	60	0.200*
	$\Delta^{15}\text{N}$	60	0.5817	0.5500	-2.70	3.50	3.50	0.093	0.503	0.110	60	0.066
Other/normal site	$\Delta^{13}\text{C}$	4	-0.2250	-0.2500	0.09574	-0.30	-0.10	0.855	-1.289	0.863	4	0.272
	$\Delta^{15}\text{N}$	4	0.6750	0.7000	0.15000	0.50	0.80	-0.370	-3.901	0.849	4	0.224

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 273. Homogeneity of variance test for rib $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values for late(-high-late) medieval site types.

		Levene Statistic	df1	df2	Sig.
$\delta^{13}\text{C}$ (‰)	Based on Mean	1.675	3	82	.179
	Based on Median	1.549	3	82	.208
	Based on Median and with adjusted df	1.549	3	77.060	.209
	Based on trimmed mean	1.678	3	82	.178
$\delta^{15}\text{N}$ (‰)	Based on Mean	1.440	3	82	.237
	Based on Median	1.322	3	82	.273
	Based on Median and with adjusted df	1.322	3	76.542	.273
	Based on trimmed mean	1.432	3	82	.239

AT 274. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\Delta^{13}\text{C}$ values per late(-high-late) medieval site type.

Dependent Variable	(I) Site type	(J) Site type	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
			(I-J)			Lower Bound	Upper Bound
$\Delta^{13}\text{C}$ (‰) Tukey HSD	Monastery/Friary	Leprosarium	.04115	.28100	.999	-.6958	.7781
		Hospital	.26567	.27235	.764	-.4486	.9799
		Other	.60233	.32813	.264	-.2582	1.4629
	Leprosarium	Monastery/Friary	-.04115	.28100	.999	-.7781	.6958
		Hospital	.22452	.09783	.108	-.0320	.4811
		Other	.56118*	.20753	.041	.0169	1.1054
	Hospital	Monastery/Friary	-.26567	.27235	.764	-.9799	.4486
		Leprosarium	-.22452	.09783	.108	-.4811	.0320
		Other	.33667	.19566	.320	-.1765	.8498
	Other	Monastery/Friary	-.60233	.32813	.264	-1.4629	.2582
		Leprosarium	-.56118*	.20753	.041	-1.1054	-.0169
		Hospital	-.33667	.19566	.320	-.8498	.1765
Bonferroni	Monastery/Friary	Leprosarium	.04115	.28100	1.000	-.7186	.8009
		Hospital	.26567	.27235	1.000	-.4707	1.0020
		Other	.60233	.32813	.420	-.2849	1.4895

	Leprosarium	Monastery/Friary	-.04115	.28100	1.000	-.8009	.7186
		Hospital	.22452	.09783	.146	-.0400	.4890
		Other	.56118*	.20753	.050	.0001	1.1223
	Hospital	Monastery/Friary	-.26567	.27235	1.000	-1.0020	.4707
		Leprosarium	-.22452	.09783	.146	-.4890	.0400
		Other	.33667	.19566	.535	-.1924	.8657
	Other	Monastery/Friary	-.60233	.32813	.420	-1.4895	.2849
		Leprosarium	-.56118*	.20753	.050	-1.1223	-.0001
		Hospital	-.33667	.19566	.535	-.8657	.1924

*. The mean difference is significant at the 0.05 level.

A. 4.4.3.1.2. Variation between leprosaria

AT 275. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by leprosaria. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
BSA	$\Delta^{13}\text{C}$	2	-0.0510	-0.0510	0.00047	-0.05	-0.05	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	-0.5136	-0.5136	0.09640	-0.58	-0.45	-	-	-	-	-
<i>JTN</i>	$\Delta^{13}\text{C}$	10	0.2358	0.3372	0.35928	-0.23	0.66	-0.248	-1.883	0.870	10	0.099
	$\Delta^{15}\text{N}$	10	<i>0.4368</i>	<i>0.2145</i>	<i>0.49629</i>	<i>-0.05</i>	<i>1.37</i>	<i>1.210</i>	<i>0.183</i>	<i>0.826</i>	<i>10</i>	<i>0.030</i>
MHW	$\Delta^{13}\text{C}$	3	0.1486	0.1317	0.06923	0.09	0.22	1.032	-	.955	3	.593
	$\Delta^{15}\text{N}$	3	-0.1692	0.0017	0.82079	-1.06	0.55	-0.896	-	.967	3	.654
MMW	$\Delta^{13}\text{C}$	10	-0.1667	-0.2788	0.51010	-0.86	0.58	0.166	-1.555	0.935	10	0.499
	$\Delta^{15}\text{N}$	10	0.0395	-0.0727	0.86085	-1.58	1.43	-0.240	0.389	0.981	10	0.968
MSL	$\Delta^{13}\text{C}$	5	0.1760	0.0733	0.62679	-0.61	1.05	0.304	-0.150	.991	5	.982
	$\Delta^{15}\text{N}$	5	1.1880	1.3183	1.38205	-0.16	3.31	0.887	0.575	.906	5	.445
SLP	$\Delta^{13}\text{C}$	10	0.5500	0.6000	0.35355	0.10	1.20	0.519	-0.066	.918	10	.337
	$\Delta^{15}\text{N}$	10	0.4300	0.3500	1.35323	-2.00	2.70	0.057	0.459	.961	10	.800

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 276. Homogeneity of variance test for rib $\Delta^{13}\text{C}$ values for late(-high-late) medieval site types.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	2.820	5	54	.025
	Based on Median	1.800	5	54	.128
	Based on Median and with adjusted df	1.800	5	45.634	.132
	Based on trimmed mean	2.770	5	54	.027

AT 277. Post-hoc Dunn's test results for $\Delta^{13}\text{C}$ values for all leprosaria compared.

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
MMW-BSA	.200	13.518	.015	.988	1.000
MMW-MHW	9.700	11.488	.844	.398	1.000
MMW-MSL	-9.900	9.559	-1.036	.300	1.000
MMW-JTN	11.900	7.805	1.525	.127	1.000
MMW-SLP	-19.800	6.373	-3.107	.002	.028
BSA-MHW	-9.500	15.931	-.596	.551	1.000
BSA-MSL	-9.700	14.601	-.664	.506	1.000
BSA-JTN	-11.700	13.518	-.866	.387	1.000
BSA-SLP	-19.600	12.745	-1.538	.124	1.000
MHW-MSL	-.200	12.745	-.016	.987	1.000
MHW-JTN	2.200	11.488	.192	.848	1.000
MHW-SLP	-10.100	10.568	-.956	.339	1.000

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
MSL-JTN	2.000	9.559	.209	.834	1.000
MSL-SLP	-9.900	8.430	-1.174	.240	1.000
JTN-SLP	-7.900	6.373	-1.240	.215	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

A. 4.4.3.1.3 Dietary changes in life and HD

AT 278. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by HD severity/diagnosis certainty. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No HD</i>	$\Delta^{13}\text{C}$	178	-0.0682	-0.1000	04.43289	-1.20	1.05	0.157	0.153	.083	177	0.004
	$\Delta^{15}\text{N}$	178	0.0754	0.1000	1.22761	-2.81	3.50	-0.007	0.327	.076	177	0.015
Possible HD	$\Delta^{13}\text{C}$	15	0.0940	-0.737	0.55118	-0.60	1.10	0.506	-0.868	.921	15	.199
	$\Delta^{15}\text{N}$	15	0.5047	0.300	0.9794	-0.88	1.50	-0.259	-1.598	.887	15	.061
Probable HD	$\Delta^{13}\text{C}$	16	-0.0181	-0.678	0.41310	-0.72	0.66	0.324	-0.645	.951	16	.501
	$\Delta^{15}\text{N}$	16	-0.0619	0.0093	1.12795	-2.70	2.20	-0.205	1.463	.958	16	.632
Pathogn. HD	$\Delta^{13}\text{C}$	25	0.2964	0.2000	0.43424	-0.53	1.20	0.290	-0.436	.977	25	.810
	$\Delta^{15}\text{N}$	25	-0.0647	0.0000	0.67785	-1.26	1.60	0.288	0.273	.982	25	.913
<i>Unlikely to have HD</i>	$\Delta^{13}\text{C}$	178	-0.0682	-0.1000	0.43289	-1.20	1.05	0.157	0.153	.083	177	.004
	$\Delta^{15}\text{N}$	178	0.0754	0.1000	1.22761	-2.81	3.50	-0.007	0.327	.076	177	.015

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Likely to	$\Delta^{13}\text{C}$	56	0.1523	0.0573	0.47431	1.20	1.92	0.309	-0.650	.108	56	.155
have HD	$\Delta^{15}\text{N}$	56	0.0886	0.0647	0.89387	-2.70	2.20	-0.100	0.716	.079	56	.200*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 279. Post-hoc Dunn's test results for $\Delta^{13}\text{C}$ values the HD diagnosis certainty/severity level

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
No-Probable	-5.481	17.570	-.312	.755	1.000
No-Possible	-14.527	18.099	-.803	.422	1.000
No-Pathognomonic	-51.094	14.380	-3.553	<.001	.002
Probable-Possible	9.046	24.189	.374	.708	1.000
Probable-Pathognomonic	-45.613	21.548	-2.117	.034	.206
Possible-Pathognomonic	-36.567	21.982	-1.664	.096	.577

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is ,050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

AT 280. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by RS presence. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
<i>No RS</i>	$\Delta^{13}\text{C}$	132	-0.0468	-0.1000	0.40394	-1.20	1.00	0.343	0.142	0.093	132	0.007
	$\Delta^{15}\text{N}$	132	0.2923	0.3000	1.04242	-2.70	2.50	0.178	0.944	0.079	132	0.043
RS present	$\Delta^{13}\text{C}$	42	0.1915	0.1528	0.42236	-0.72	1.20	0.108	-0.286	0.986	42	0.869
	$\Delta^{15}\text{N}$	42	0.1421	0.0868	0.83582	-0.126	2.20	0.389	-0.331	0.970	42	0.327

AT 281. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by ANS score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\Delta^{13}\text{C}$	90	0.0041	0.0000	0.39548	-0.86	1.00	0.264	-0.407	.082	90	.183
	$\Delta^{15}\text{N}$	90	0.3128	0.2500	1.10114	-2.70	3.50	0.254	0.851	.092	90	.055
1	$\Delta^{13}\text{C}$	9	-0.1452	-0.1850	0.36373	-0.72	0.41	0.026	-0.521	.977	9	.947
	$\Delta^{15}\text{N}$	9	0.0008	-0.2263	0.84180	-1.19	1.32	0.325	-1.103	.945	9	.631
2	$\Delta^{13}\text{C}$	9	0.3239	0.3957	0.47114	-0.47	1.00	-0.367	-0.687	.973	9	.920
	$\Delta^{15}\text{N}$	9	0.2644	0.0796	0.88370	-1.26	1.43	-0.348	-0.570	.955	9	.746
3	$\Delta^{13}\text{C}$	7	0.1440	0.1257	0.21213	-0.10	0.51	0.753	0.164	.955	7	.772
	$\Delta^{15}\text{N}$	7	-0.2399	-0.0866	0.66357	-1.20	0.54	-0.468	-1.398	.930	7	.549

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 282. Homogeneity of variance test for $\Delta^{13}\text{C}$ values for ANS scores.

	Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰) Based on Mean	1.368	3	111	.256
Based on Median	1.312	3	111	.274
Based on Median and with adjusted df	1.312	3	107.378	.274
Based on trimmed mean	1.367	3	111	.257
$\Delta^{15}\text{N}$ (‰) Based on Mean	.460	3	111	.711
Based on Median	.540	3	111	.656
Based on Median and with adjusted df	.540	3	104.203	.656
Based on trimmed mean	.455	3	111	.714

AT 283. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by APM score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\Delta^{13}\text{C}$	96	0.0380	0.0000	0.39637	-0.70	1.00	0.223	-0.737	0.084	96	0.089
	$\Delta^{15}\text{N}$	96	0.3455	0.3000	1.07545	-0.270	3.50	0.234	0.872	0.076	96	0.200*
1	$\Delta^{13}\text{C}$	11	-0.2341	-0.1227	0.34035	-0.86	0.13	-0.831	-0.646	0.890	11	0.137
	$\Delta^{15}\text{N}$	11	-0.3711	-0.5417	0.75088	-1.58	1.32	0.835	1.951	0.945	11	0.585
2	$\Delta^{13}\text{C}$	12	0.4335	0.4500	0.42950	-0.19	1.20	0.288	-0.782	0.959	12	0.773
	$\Delta^{15}\text{N}$	12	0.0896	0.2500	0.78060	-1.26	1.23	-0.540	-0.390	0.935	12	0.439
3	$\Delta^{13}\text{C}$	2	0.1958	0.1958	0.41837	-0.10	0.49	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	0.1077	0.1077	1.84932	-1.20	1.42	-	-	-	-	-

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 284. Homogeneity of variance test for $\Delta^{13}\text{C}$ values for APM scores.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	.264	3	117	.851
	Based on Median	.389	3	117	.761
	Based on Median and with adjusted df	.389	3	115.740	.761
	Based on trimmed mean	.289	3	117	.833
$\Delta^{15}\text{N}$ (‰)	Based on Mean	1.179	3	117	.321
	Based on Median	1.243	3	117	.297
	Based on Median and with adjusted df	1.243	3	111.738	.298
	Based on trimmed mean	1.190	3	117	.317

AT 285. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by PPMN score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\Delta^{13}\text{C}$	95	0.0062	0.0000	0.39776	-0.86	1.00	0.222	-0.550	0.085	95	0.090
	$\Delta^{15}\text{N}$	95	0.3021	0.2000	1.08357	-2.70	3.50	0.272	0.910	0.087	95	0.075
1	$\Delta^{13}\text{C}$	16	0.0302	-0.0257	0.42102	-0.72	0.71	0.276	-0.613	0.938	16	0.321
	$\Delta^{15}\text{N}$	16	0.1355	0.0329	0.84166	-1.26	1.42	0.300	-0.960	0.929	16	0.238
2	$\Delta^{13}\text{C}$	13	<i>0.2696</i>	<i>0.0920</i>	<i>0.42647</i>	<i>-0.19</i>	<i>1.20</i>	<i>1.284</i>	<i>0.774</i>	<i>0.851</i>	<i>13</i>	<i>0.029</i>
	$\Delta^{15}\text{N}$	13	-0.0659	0.0000	0.82890	-1.20	1.60	0.383	-0.074	0.959	13	0.740
3	$\Delta^{13}\text{C}$	1	0.18	-	-	-	-	-	-	-	-	-
	$\Delta^{15}\text{N}$	1	0.54	-	-	-	-	-	-	-	-	-

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 286. Homogeneity of variance test for $\Delta^{15}\text{N}$ values for PPMN scores.

		Levene Statistic	df1	df2	Sig.
$\Delta^{15}\text{N}$ (‰)	Based on Mean	.596	2	121	.553
	Based on Median	.637	2	121	.531
	Based on Median and with adjusted df	.637	2	114.607	.531
	Based on trimmed mean	.574	2	121	.565

AT 287. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by PPMO score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\Delta^{13}\text{C}$	90	-0.0016	0.000	0.39319	-0.86	1.00	0.290	-0.368	0.087	90	0.090
	$\Delta^{15}\text{N}$	90	0.3200	0.3000	1.10078	-2.70	3.50	0.238	0.851	0.091	90	0.066
1	$\Delta^{13}\text{C}$	19	0.1131	0.0000	0.37274	-0.47	0.71	0.178	-1.235	0.946	19	0.343
	$\Delta^{15}\text{N}$	19	-0.0841	-0.2000	0.82865	-1.26	1.37	0.507	-0.715	0.928	19	0.158
2	$\Delta^{13}\text{C}$	12	0.2332	0.0827	0.47357	-0.53	1.20	0.471	0.141	0.949	12	0.619
	$\Delta^{15}\text{N}$	12	0.2695	0.1775	0.90760	-1.20	2.20	0.632	0.925	0.958	12	0.759
3	$\Delta^{13}\text{C}$	1	-0.72	-	-	-	-	-	-	-	-	-
	$\Delta^{15}\text{N}$	1	-0.23	-	-	-	-	-	-	-	-	-
4	$\Delta^{13}\text{C}$	1	0.18	-	-	-	-	-	-	-	-	-
	$\Delta^{15}\text{N}$	1	0.54	-	-	-	-	-	-	-	-	-

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 288. Homogeneity of variance test for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values for PPMO scores.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	.566	2	118	.569
	Based on Median	.238	2	118	.789
	Based on Median and with adjusted df	.238	2	111.002	.789
	Based on trimmed mean	.527	2	118	.592
$\Delta^{15}\text{N}$ (‰)	Based on Mean	.630	2	118	.535
	Based on Median	.675	2	118	.511
	Based on Median and with adjusted df	.675	2	112.183	.511
	Based on trimmed mean	.639	2	118	.530

AT 289. Descriptive statistics and normality tests for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values categorised by NPI score. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
0	$\Delta^{13}\text{C}$	92	0.0142	0.0000	0.40288	-0.86	1.00	0.250	-0.555	.090	92	.066
	$\Delta^{15}\text{N}$	92	0.3380	0.3000	1.09369	-2.70	3.50	0.197	0.856	.087	92	.083
1	$\Delta^{13}\text{C}$	6	0.0000	0.0512	0.44539	-0.72	0.41	-0.808	-0.284	.877	6	.254
	$\Delta^{15}\text{N}$	6	-0.0166	0.0491	0.70739	-1.19	0.99	0.512	1.913	.941	6	.667
2	$\Delta^{13}\text{C}$	12	0.1935	0.0460	0.54660	-0.53	1.20	0.586	-0.429	.937	12	.465
	$\Delta^{15}\text{N}$	12	-0.0471	-0.3708	0.79976	-0.80	1.60	0.978	-0.074	.866	12	.058
3	$\Delta^{13}\text{C}$	6	0.2031	0.1707	0.43009	-0.38	0.71	-0.043	-1.506	.947	6	.716
	$\Delta^{15}\text{N}$	6	-0.2930	-0.4130	0.96494	-0.126	1.23	0.664	-0.569	.926	6	.548

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
4	$\Delta^{13}\text{C}$	1	0.18	-	-	-	-	-	-	-	-	-
	$\Delta^{15}\text{N}$	1	0.54	-	-	-	-	-	-	-	-	-
5	$\Delta^{13}\text{C}$	2	0.0015	0.0015	0.17560	-0.12	0.13	-	-	-	-	-
	$\Delta^{15}\text{N}$	2	0.1655	0.1655	1.63035	-0.99	1.32	-	-	-	-	-

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 290. Homogeneity of variance test for $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values for NPI scores.

		Levene Statistic	df1	df2	Sig.
$\Delta^{13}\text{C}$ (‰)	Based on Mean	.877	4	113	.480
	Based on Median	.682	4	113	.606
	Based on Median and with adjusted df	.682	4	96.333	.606
	Based on trimmed mean	.847	4	113	.498
$\Delta^{15}\text{N}$ (‰)	Based on Mean	.651	4	113	.627
	Based on Median	.689	4	113	.601
	Based on Median and with adjusted df	.689	4	107.618	.601
	Based on trimmed mean	.668	4	113	.616

AT 291. Post-hoc Tukey HSD and Bonferroni for ANOVA comparison of $\Delta^{13}\text{C}$ and $\Delta^{15}\text{N}$ values per APM score.

Dependent Variable	(I) APM	(J) APM	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
$\Delta^{13}\text{C}$ (‰) Tukey HSD	0	1	.27211	.12585	.140	-.0559	.6001
		2	-.39551*	.12105	.008	-.7110	-.0800
		3	-.15782	.28246	.944	-.8940	.5784
	1	0	-.27211	.12585	.140	-.6001	.0559
		2	-.66762*	.16503	.0005	-1.0977	-.2375
		3	-.42992	.30391	.493	-1.2220	.3622
	2	0	.39551*	.12105	.008	.0800	.7110
		1	.66762*	.16503	.0005	.2375	1.0977
		3	.23769	.30196	.860	-.5493	1.0247
	3	0	.15782	.28246	.944	-.5784	.8940
		1	.42992	.30391	.493	-.3622	1.2220
		2	-.23769	.30196	.860	-1.0247	.5493
Bonferroni	0	1	.27211	.12585	.196	-.0657	.6099
		2	-.39551*	.12105	.009	-.7204	-.0706
		3	-.15782	.28246	1.000	-.9159	.6003
	1	0	-.27211	.12585	.196	-.6099	.0657
		2	-.66762*	.16503	<.001	-1.1105	-.2247
		3	-.42992	.30391	.959	-1.2456	.3857
	2	0	.39551*	.12105	.009	.0706	.7204

Δ15N (‰)	Tukey HSD	3	1	.66762*	.16503	<.001	.2247	1.1105
			3	.23769	.30196	1.000	-.5727	1.0481
			0	.15782	.28246	1.000	-.6003	.9159
			1	.42992	.30391	.959	-.3857	1.2456
			2	-.23769	.30196	1.000	-1.0481	.5727
		0	1	.71665	.32986	.137	-.1431	1.5764
			2	.25588	.31729	.851	-.5711	1.0828
			3	.23786	.74033	.988	-1.6917	2.1674
		1	0	-.71665	.32986	.137	-1.5764	.1431
			2	-.46077	.43256	.711	-1.5882	.6666
			3	-.47879	.79657	.932	-2.5549	1.5974
		2	0	-.25588	.31729	.851	-1.0828	.5711
			1	.46077	.43256	.711	-.6666	1.5882
			3	-.01802	.79145	1.000	-2.0808	2.0448
		3	0	-.23786	.74033	.988	-2.1674	1.6917
			1	.47879	.79657	.932	-1.5974	2.5549
			2	.01802	.79145	1.000	-2.0448	2.0808
Bonferroni	0		1	.71665	.32986	.191	-.1686	1.6019
			2	.25588	.31729	1.000	-.5957	1.1074
			3	.23786	.74033	1.000	-1.7491	2.2248
	1		0	-.71665	.32986	.191	-1.6019	.1686
			2	-.46077	.43256	1.000	-1.6217	.7001

	2	3	-.47879	.79657	1.000	-2.6167	1.6591
		0	-.25588	.31729	1.000	-1.1074	.5957
		1	.46077	.43256	1.000	-.7001	1.6217
		3	-.01802	.79145	1.000	-2.1422	2.1061
	3	0	-.23786	.74033	1.000	-2.2248	1.7491
		1	.47879	.79657	1.000	-1.6591	2.6167
		2	.01802	.79145	1.000	-2.1061	2.1422

*. The mean difference is significant at the 0.05 level.

A. 4.4.3.2. HD versus non-HD comparison

A.4.4.3.2.3 RFN

AT 292. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for RFN cases within and outside study. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Within study	$\delta^{13}\text{C}$	2	-19.3637	-19.3637	0.13671	-19.46	-19.27	-	-	-	-	-
	$\delta^{15}\text{N}$	2	11.2239	11.2239	0.03221	11.20	11.25	-	-	-	-	-
Comparative	$\delta^{13}\text{C}$	19	-19.8161	-19.8100	0.20904	-20.34	-19.46	-0.647	0.863	0.970	19	0.783
	$\delta^{15}\text{N}$	19	11.0113	11.0300	0.83250	9.45	12.40	-0.014	0.795	0.975	19	0.872

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.3.2.4 IBF

AT 293. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for IBF cases within and outside study. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Within study	$\delta^{13}\text{C}$	2	-19.4452	-19.4452	0.45986	-19.77	-19.12	-	-	-	-	-
	$\delta^{15}\text{N}$	2	12.1498	12.1498	0.41304	11.86	12.44	-	-	-	-	-
Comparative	$\delta^{13}\text{C}$	16	-20.0531	-20.1575	0.44032	-20.92	-19.27	0.161	-0.188	0.960	16	0.668
	$\delta^{15}\text{N}$	16	13.6897	13.7250	0.49126	12.89	14.86	0.704	0.951	0.958	16	0.617

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 294. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for HCH cases and other monastic sites within and outside study. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Within study	$\delta^{13}\text{C}$	2	-19.4452	-19.4452	0.45986	-19.77	-19.12	-	-	-	-	-
	$\delta^{15}\text{N}$	2	12.1498	12.1498	0.41304	11.86	12.44	-	-	-	-	-
Comparative	$\delta^{13}\text{C}$	54	-20.3882	-20.2575	0.95868	-23.10	-18.24	-0.787	2.117	0.145	54	0.006
	$\delta^{15}\text{N}$	54	12.9064	13.0625	1.06605	9.05	14.86	-1.313	2.652	0.119	54	0.056

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.3.2.5 HCH

AT 295. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for HCH cases within and outside study. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Within study	$\delta^{13}\text{C}$	4	-19.3252	-19.2790	0.44987	-19.91	-18.83	-0.573	0.894	.981	4	.911
	$\delta^{15}\text{N}$	4	11.1453	11.5586	1.16897	9.46	12.00	-1.585	2.354	.713	4	.016
Comparative	$\delta^{13}\text{C}$	4	-20.6838	-20.9125	0.53159	-21.02	-19.89	1.944	3.832	.833	4	.176
	$\delta^{15}\text{N}$	4	11.2687	10.1950	0.67478	10.68	12.24	1.468	2.539	.881	4	.343

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

AT 296. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for HCH cases categorised by HD diagnosis. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
No HD	$\delta^{13}\text{C}$	6	-20.3053	-20.4103	0.75213	-21.02	-19.19	0.509	-1.537	0.855	6	0.172
	$\delta^{15}\text{N}$	6	11.0898	11.0800	0.99896	9.46	12.24	-0.643	0.440	0.945	6	0.700
Likely to	$\delta^{13}\text{C}$	2	-19.1020	-19.1020	0.38137	-19.37	-18.83	-	-			
have HD	$\delta^{15}\text{N}$	2	11.5586	11.5586	0.42034	11.26	11.86	-	-			

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

A. 4.4.3.2.6 SGB

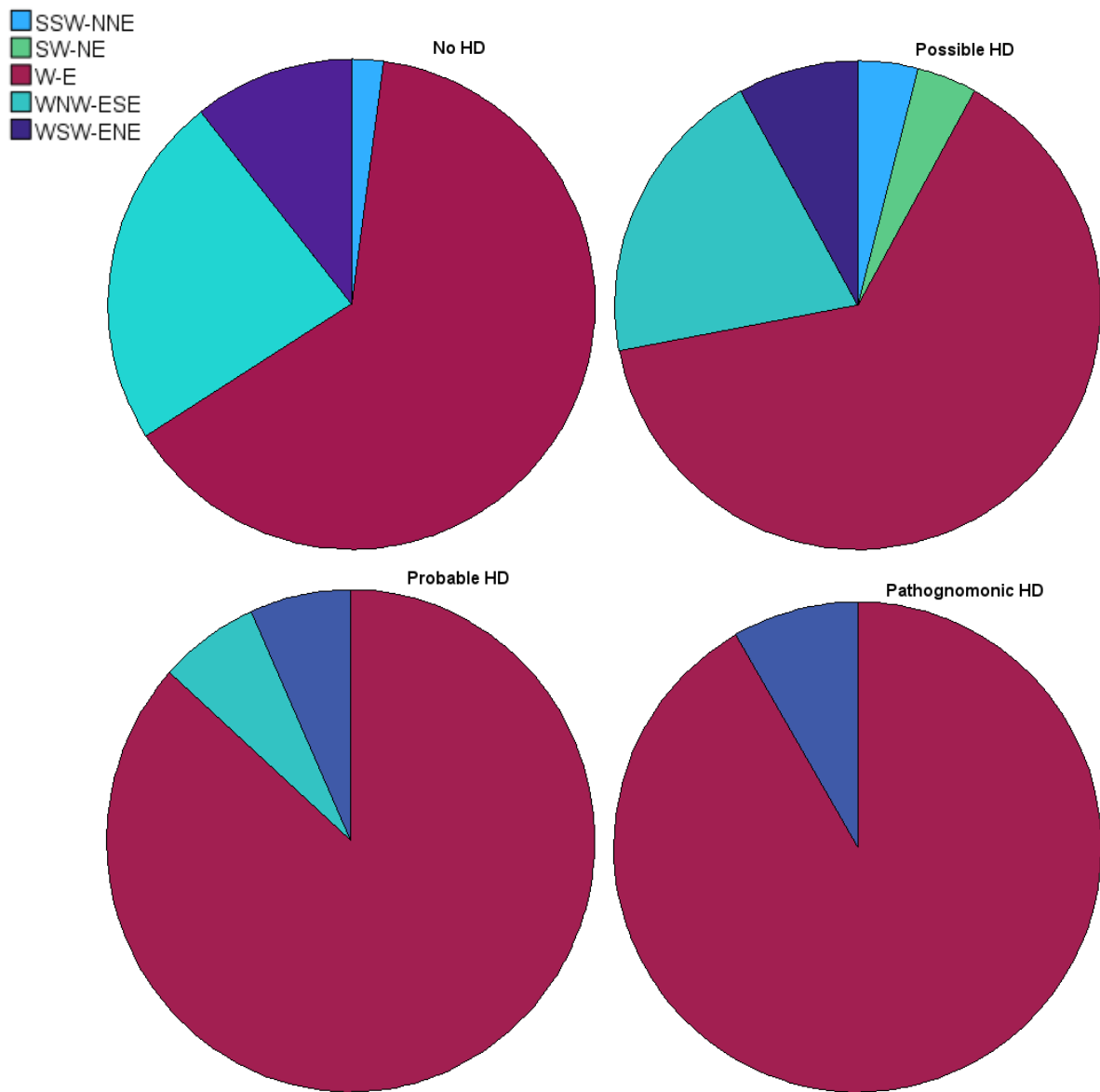
AT 297. Descriptive statistics and normality tests for $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values for SGB cases within and outside study. Kolmogorov-Smirnov (KS) test reported when $n > 50$; Shapiro-Wilk (SW) test reported when $n < 50$. Rows in *cursive* are not normally distributed.

		Descriptive statistics								Kolmogorov-Smirnov ^a /Shapiro-Wilk		
		<i>n</i>	$\bar{x}$	Median	Std	Min	Max	Skewness	Kurtosis	KS/W	df	<i>p</i>
Within study	$\delta^{13}\text{C}$	3	-20.3116	-19.7650	0.98589	-21.45	-19.72	-17.28	-	.769	3	.044
	$\delta^{15}\text{N}$	3	11.0875	10.8100	1.32393	9.92	12.53	0.902	-	.938	17	.297
Comparative	$\delta^{13}\text{C}$	17	-19.1176	-19.0000	0.53061	-20.10	-18.30	-0.466	-0.900	.967	3	.651
	$\delta^{15}\text{N}$	17	12.5294	12.5000	0.76874	10.90	13.80	-0.552	0.021	.949	17	.441

A. 4.5. Burial practices

AT 298. Distribution of burial direction among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=99$; $\chi^2=10.218$, $df=12$, $p=0.597$, Cramer's $V=0.185$.

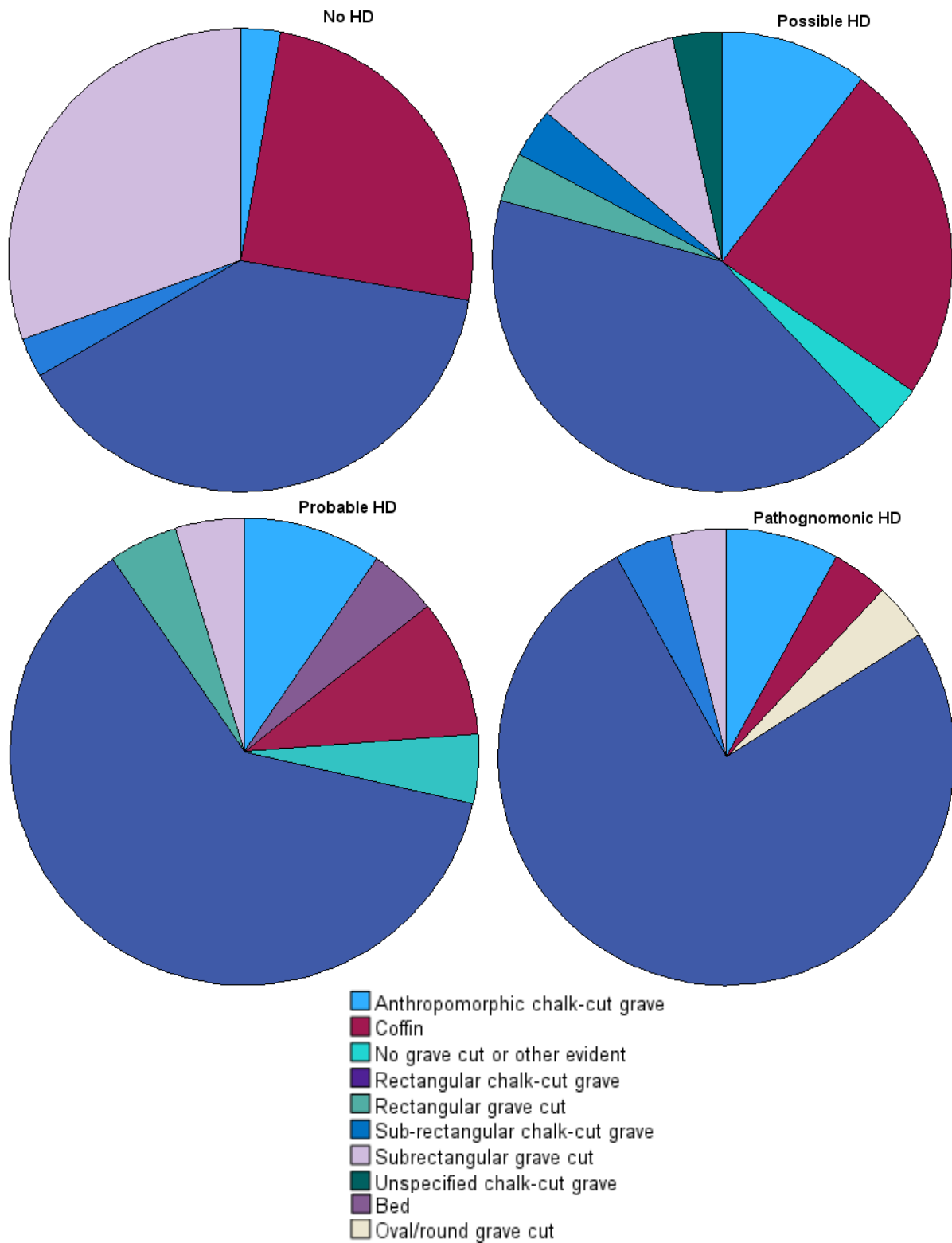
		No HD	Possible HD	Probable HD	Pathogno monic HD	<i>Total</i>
SSW- NNE	Count	1	1	0	0	2
	z-score	.1	.8	-.6	-.5	
SW-NE	Count	0	1	0	0	1
	z-score	-1.0	1.7	-.4	-.4	
W-E	Count	30	16	13	11	70
	z-score	-1.4	-.9	1.5	1.7	
WNW- ESE	Count	11	5	1	0	17
	z-score	1.6	.4	-1.2	-1.7	
WSW- ENE	Count	5	2	1	1	9
	z-score	.5	-.2	-.4	-.1	
<i>Total</i>		47	25	15	12	99



AF 98. Pie charts of burial direction per HD severity/certainty level.

AT 299. Distribution of grave types among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=111$; $\chi^2=38.405$, $df=27$, $p=0.072$, Cramer's $V=0.340$.

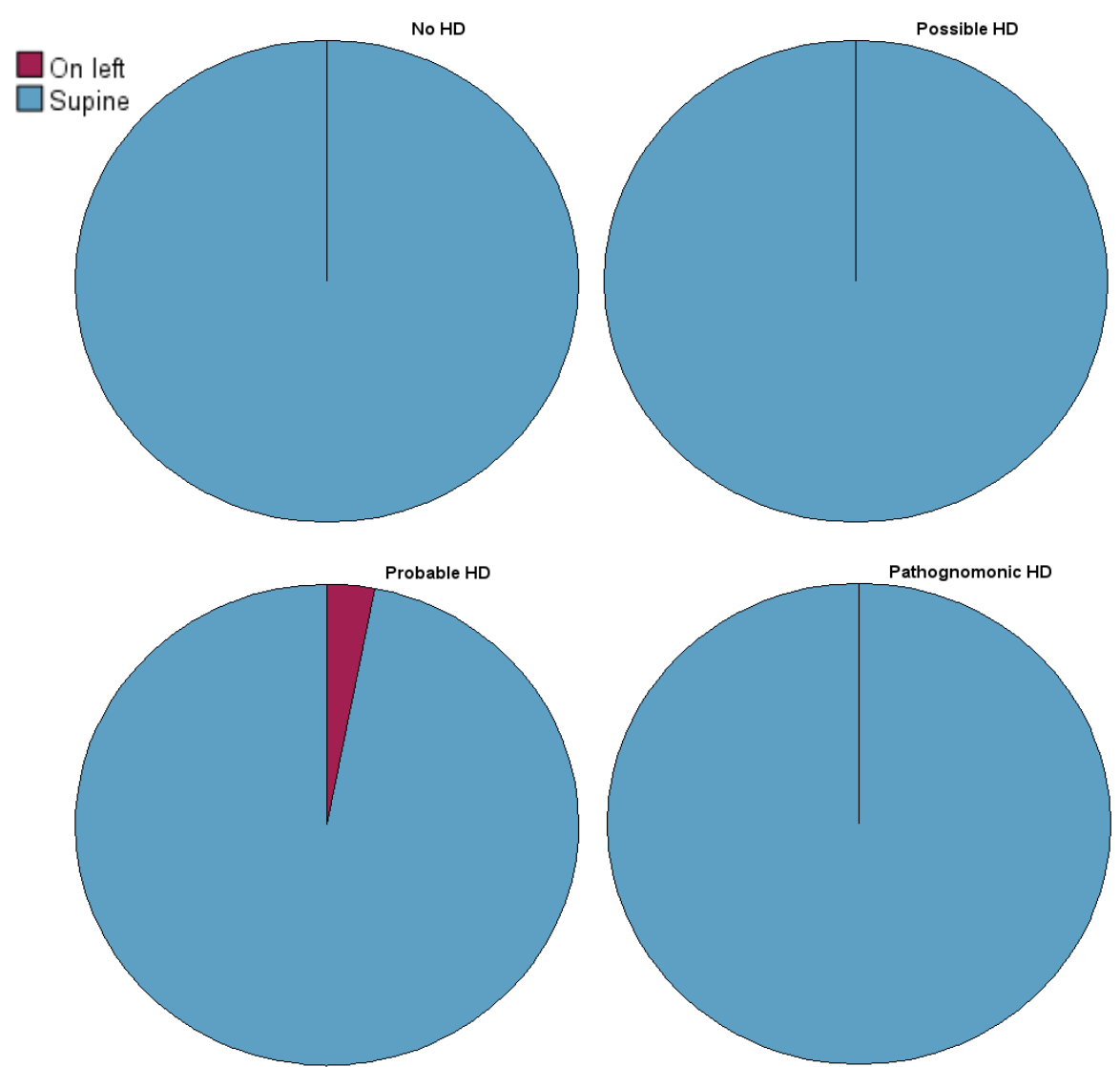
		No HD	Possible HD	Probabl e HD	Pathogn . HD	<i>Total</i>
Anthropomorphic chalk-cut grave	Count	1	3	2	2	8
	Z-score	-1.3	.8	.5	.2	
Bed	Count	0	0	1	0	1
	Z-score	-.7	-.6	2.1	-.5	
Coffin	Count	9	7	2	1	19
	Z-score	1.5	1.2	-1.0	-2.0	
No grave cut or other evident	Count	0	1	1	0	2
	Z-score	-1.0	.8	1.1	-.8	
Oval/round grave cut	Count	0	0	0	1	1
	Z-score	-.7	-.6	-.5	1.9	
Rectangular chalk- cut grave	Count	14	12	13	19	58
	Z-score	-2.0	-1.4	1.0	2.7	
Rectangular grave cut	Count	0	1	1	0	2
	Z-score	-1.0	.8	1.1	-.8	
Sub-rectangular chalk-cut grave	Count	1	1	0	1	3
	Z-score	.0	.3	-.8	.5	
Subrectangular grave cut	Count	11	3	1	1	16
	Z-score	3.4	-.7	-1.4	-1.7	
Unspecified chalk- cut grave	Count	0	1	0	0	1
	Z-score	-.7	1.7	-.5	-.5	
<i>Total</i>		36	29	21	25	111



AF 99. Pie charts of grave type per HD severity/certainty level.

AT 300. Distribution of body position among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=198$; $\chi^2=5.025$, $df=3$, $p=0.170$, Cramer's $V=0.159$.

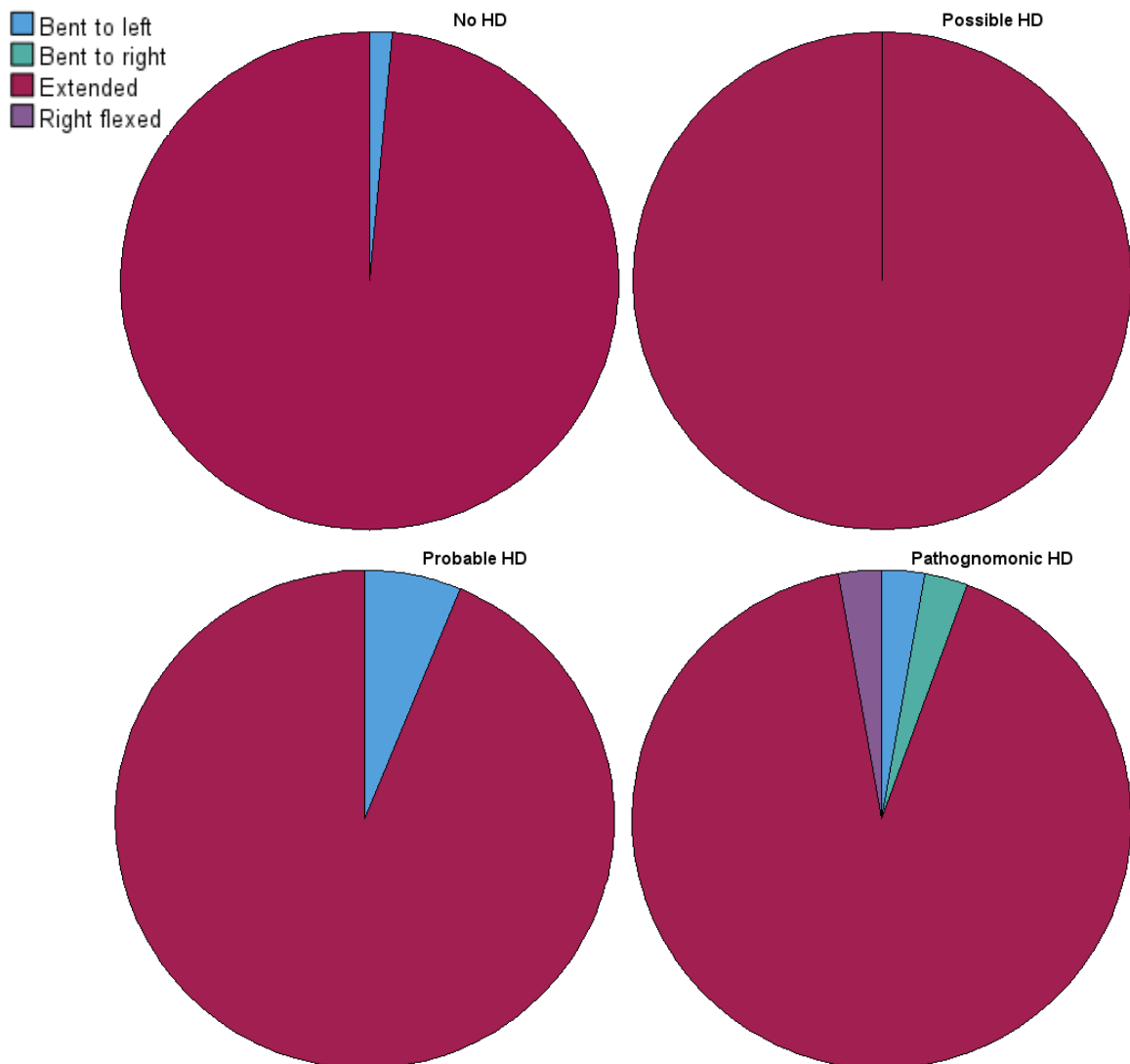
		No HD	Possible HD	Probable HD	Pathogn. HD	Total
On left	Count	0	0	1	0	1
	Z-score	-.8	-.6	2.2	-.5	
Supine	Count	79	50	32	36	197
	Z-score	.8	.6	-2.2	.5	
Total		79	50	33	36	198



AF 100. Pie charts of body position per HD severity/certainty level.

AT 301. Distribution of leg position among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=179$; $\chi^2=11.615$, $df=9$, $p=0.236$, Cramer's $V=0.147$.

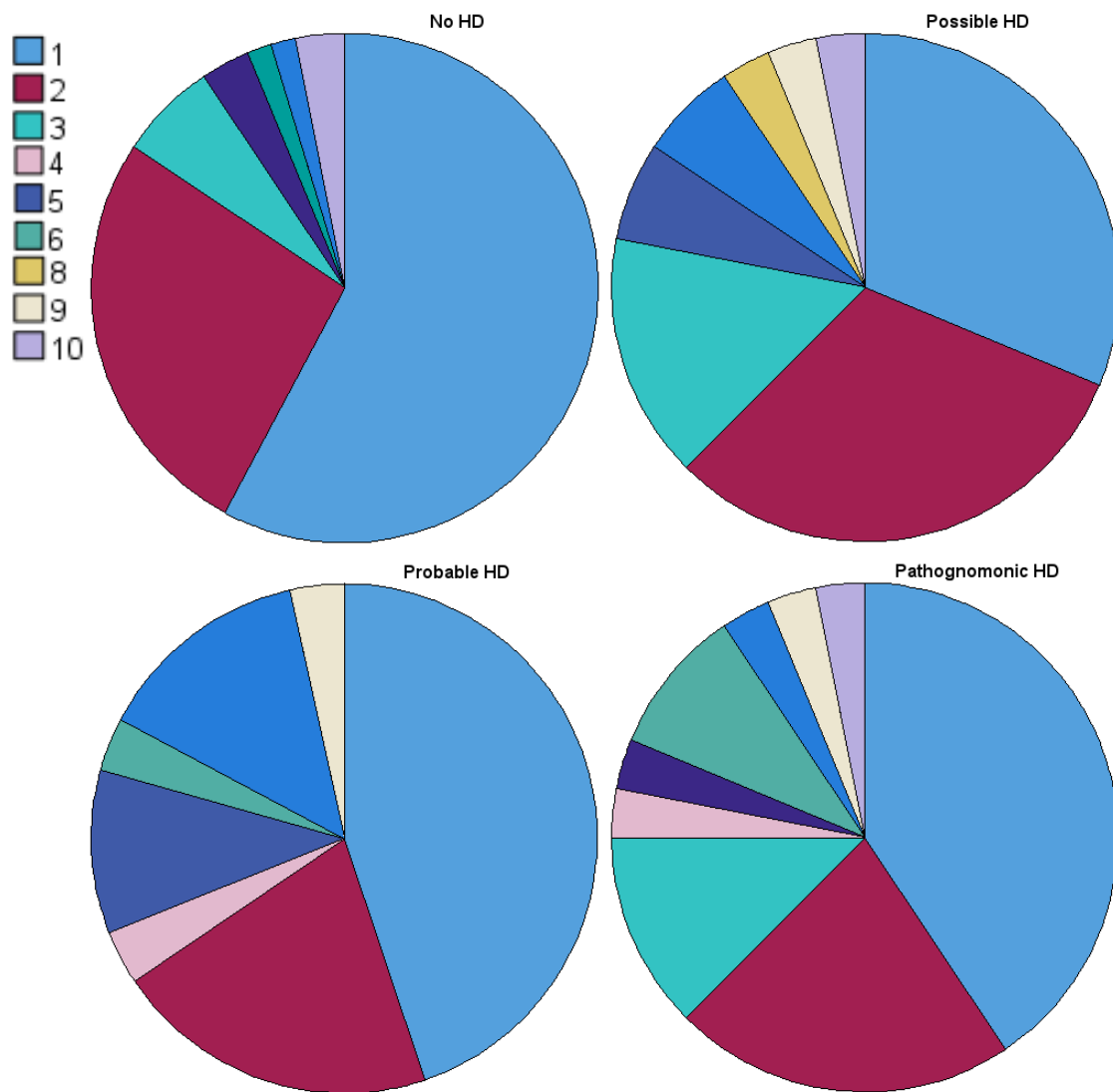
		No HD	Possible HD	Probable HD	Pathogn. HD	Total
Bent to left	Count	1	0	2	1	4
	Z-score	-.6	-1.1	1.7	.2	
Bent to right	Count	0	0	0	1	1
	Z-score	-.8	-.5	-.5	2.0	
Extended	Count	69	41	30	33	173
	Z-score	1.1	1.4	-1.0	-1.9	
Right flexed	Count	0	0	0	1	1
	Z-score	-.8	-.5	-.5	2.0	
Total		70	41	32	36	179



AF 101. Pie charts of legs position per HD severity/certainty level.

AT 302. Distribution of arm position among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=157$; $\chi^2=34.019$, $df=27$, $p=0.166$, Cramer's $V=0.269$.

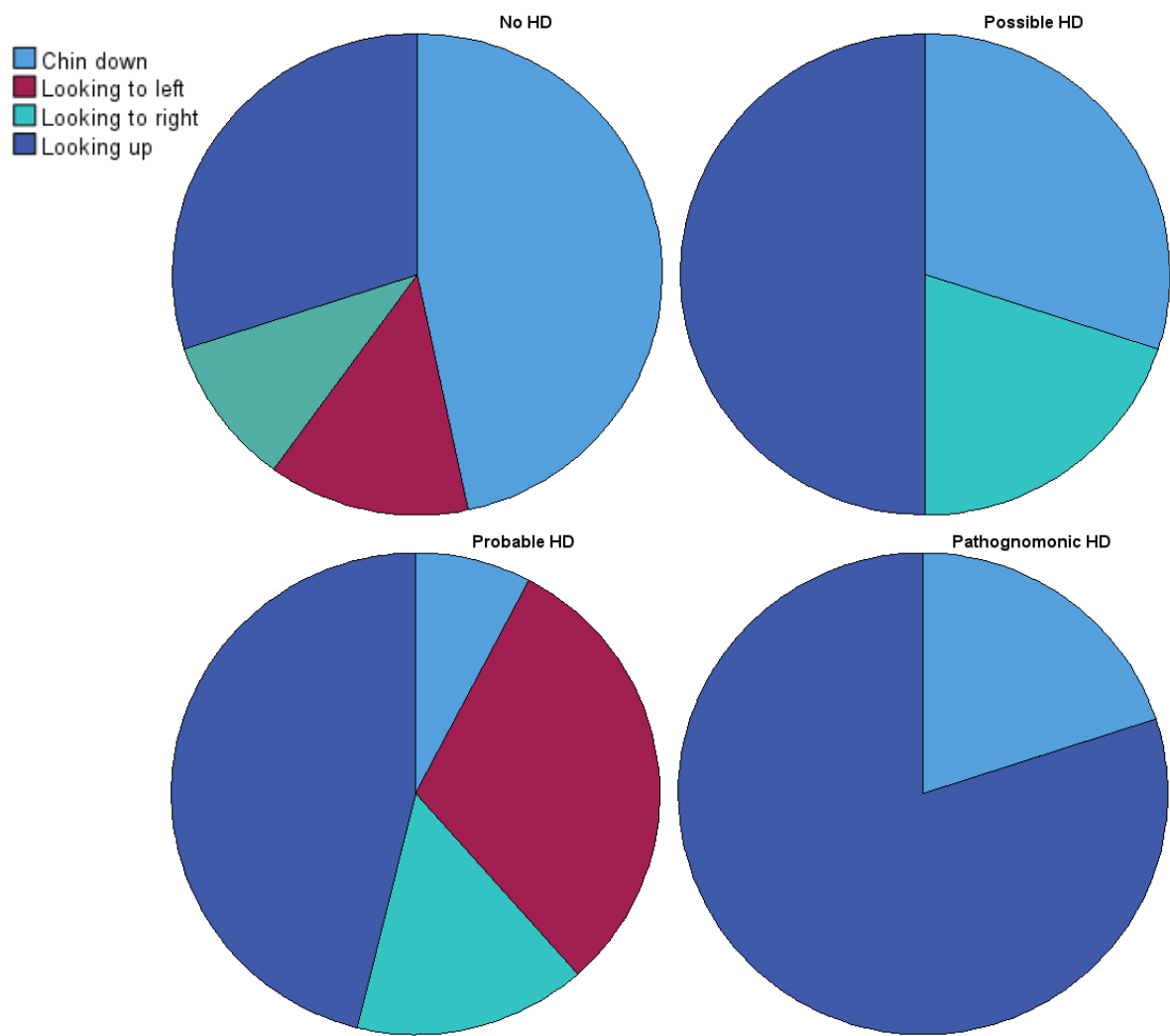
		No HD	Possible HD	Probable HD	Pathogn. HD	Total
1	Count	37	10	13	13	73
	Z-score	2.4	-1.9	-.2	-.7	
2	Count	17	10	6	7	40
	Z-score	.3	.8	-.7	-.5	
3	Count	4	5	0	4	13
	Z-score	-.8	1.7	-1.8	1.0	
4	Count	0	0	1	1	2
	Z-score	-1.2	-.7	1.2	1.0	
5	Count	2	2	3	1	8
	Z-score	-.9	.3	1.4	-.6	
6	Count	1	0	1	3	5
	Z-score	-1.0	-1.1	.1	2.2	
7	Count	1	2	4	1	8
	Z-score	-1.7	.3	2.4	-.6	
8	Count	0	1	0	0	1
	Z-score	-.8	2.0	-.5	-.5	
9	Count	0	1	1	1	3
	Z-score	-1.5	.6	.7	.6	
10	Count	2	1	0	1	4
	Z-score	.4	.2	-1.0	.2	
Total		64	32	29	32	157



AF 102. Pie charts of arm position per HD severity/certainty level.

AT 303. Distribution of skull position among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=63$; $\chi^2=17.210$, $df=9$, $p=0.046$, Cramer's $V=0.302$.

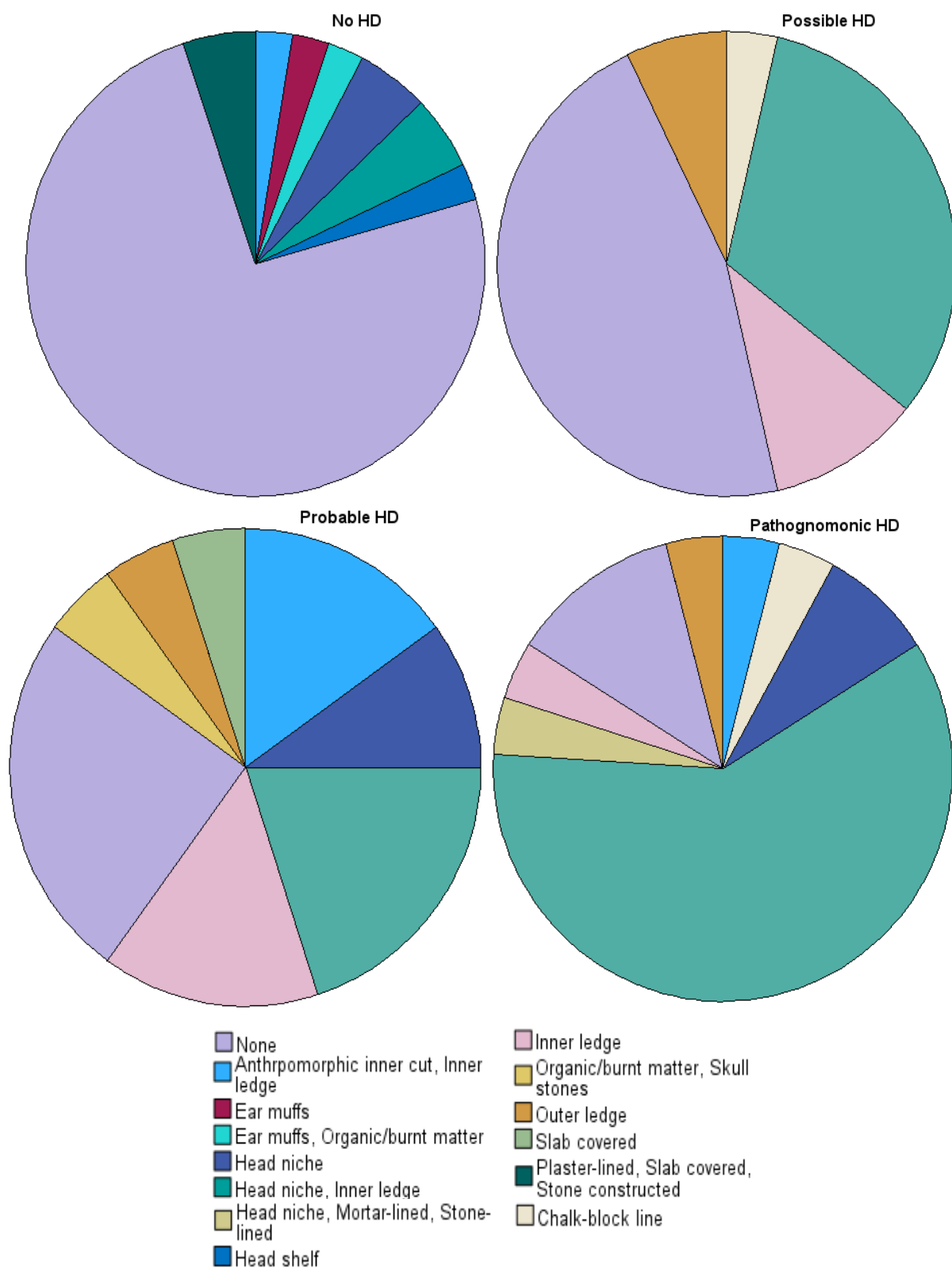
		No HD	Possible HD	Probable HD	Pathogn. HD	Total
Chin down	Count	14	3	1	2	20
	Z-score	2.4	-.1	-2.1	-.9	
Looking to left	Count	4	0	4	0	8
	Z-score	.1	-1.3	2.2	-1.3	
Looking to right	Count	3	2	2	0	7
	Z-score	-.3	1.0	.6	-1.2	
Looking up	Count	9	5	6	8	28
	Z-score	-2.2	.4	.1	2.5	
Total		30	10	13	10	63



AF 103. Pie charts of skull positions per HD severity/certainty level

AT 304. Distribution of grave additions among the different HD diagnosis certainty/severity levels, statistically insignificant; $n=113$; $\chi^2=77.009$, $df=42$, $p=0.00079$, Cramer's $V=0.477$.

		No HD	Possible HD	Probable HD	Pathogn. HD	Total
	Count	1	0	0	0	1
	Z-score	1.4	-.6	-.5	-.5	
Anthropomorphic inner cut, Inner ledge	Count	1	0	3	1	5
	Z-score	-.7	-1.3	2.5	-.1	
Chalk-block line	Count	0	1	0	1	2
	Z-score	-1.1	.8	-.7	1.0	
Ear muffs	Count	1	0	0	0	1
	Z-score	1.4	-.6	-.5	-.5	
Ear muffs, Organic/burnt matter	Count	1	0	0	0	1
	Z-score	1.4	-.6	-.5	-.5	
Head niche	Count	2	0	2	2	6
	Z-score	-.1	-1.4	1.0	.7	
Head niche, Inner ledge	Count	2	9	4	15	30
	Z-score	-3.8	.8	-.7	4.3	
Head niche, Mortar-lined, Stone-lined	Count	0	0	0	1	1
	Z-score	-.7	-.6	-.5	1.9	
Head shelf	Count	1	0	0	0	1
	Z-score	1.4	-.6	-.5	-.5	
Inner ledge	Count	0	3	3	1	7
	Z-score	-2.0	1.1	1.8	-.5	
None	Count	29	13	5	3	50
	Z-score	4.5	.3	-1.9	-3.7	
Organic/burnt matter, Skull stones	Count	0	0	1	0	1
	Z-score	-.7	-.6	2.2	-.5	
Outer ledge	Count	0	2	1	1	4
	Z-score	-1.5	1.2	.4	.1	
Plaster-lined, Slab covered, Stone constructed	Count	2	0	0	0	2
	Z-score	1.9	-.8	-.7	-.8	
Slab covered	Count	0	0	1	0	1
	Z-score	-.7	-.6	2.2	-.5	
<i>Total</i>		<i>40</i>	<i>28</i>	<i>20</i>	<i>25</i>	<i>113</i>



AF 104. Pie charts of grave additions per HD severity/certainty level.

A.4.6 Summary of results and life-course

AT 305. Biographical data of all UINs in this study that are complete enough for an HD diagnosis; dentine and rib data from previous studies included. Data is sorted by UIN and then by HD diagnosis from no to possible, probable, pathognomonic.

UIN	Sex	Childhood experience					Adult experience								Life span					Treatment in death	
		EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
3								n	y	0				No							Burial ground
13	PF	4		168.8	-18.92	13.51		n	n	0	-18.79	12.44	y	No	y	y	y	y	y		Leprosarium
38									y	0				No							Leprosarium
39									y	0				No							Leprosarium
66	NA								n	0				No							Leprosarium
123								n	y	0				No							Leprosarium
180	M		n					y	n					No	y	y	y	y	y		Leprosarium
189	PM		n	171.8				n	n	0				No	y	y	y				Leprosarium
190	M		y				1	n	n	0				No	y	y	y				Leprosarium
191	F		y					y	n	0				No	y	y	y	y	y		Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
197	PF			157.8				n	n	0				No	y	y	y	y	y		Leprosarium
203	F	0	n					n	n					No	y	y					Hospital Cemetery
221	M		y				5	y	y	0				No	y	y	y	y	y		Leprosarium
225	F		y	158.3	-19.96	11.20	0	n	y	0	-20.18	11.15	n	No	y	y	y				Leprosarium
237	M	67	n	172.6			5	n	n	0	-19.19	12.00	n	No	y	y	y	y	y		Urban parish cemetery
242	M			164.1			8	n	y	0				No							Urban parish cemetery
246	M	5	y	171.6			8	y	n	0	-19.91	9.46	n	No	y	y	y	y	y		Urban parish cemetery
255	NA	0	n				0	n	n	0				No	y						Leprosarium
257	M		n	158.1			0	y	n	0				No	y	y	y	y			Leprosarium
258	F	0	y	159.4			2	y	n	0				No	y	y	y	y	y		Leprosarium
259	NA	0	n					n	n	0				No	y						Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
264	F	0	n	156.0			0	y	n	0	-18.80	9.80		No	y	y	y				Leprosarium
266	P M			171.1				n	n	0				No							Leprosarium
272	PF	0	y	164.3			0	n	n	0				No	y	y	y	y			Leprosarium
275	N A	0	y				0	n	n	0				No	y						Leprosarium
283	F	0	n	150.6				n	y	0	-17.80	11.50		No	y	y	y	y			Leprosarium
284	N A	0	n				0	n	y	0				No	y						Leprosarium
286	F		n	154.3				y	n	0				No	y	y	y	y	y		Leprosarium
288	F	0	y					n	n	0				No	y	y	y	y			Leprosarium
293	M	0	y				0	y	n	0				No	y	y	y	y			Leprosarium
299	P M			167.0				n	n	0				No							Leprosarium
305	P M	2	y	168.8	-20.08	12.37	2	y	y	0	-19.81	10.23	n	No	y	y	y	y	y		Burial ground
308	M	14	n	162.0			5	n	n	0	-19.60	10.20		No	y	y	y	y	y	n	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
310	M		n	168.5			3	y	n	5	-18.90	10.50		No	y	y	y	y	y	n	Leprosarium
313	P M	15	y	162.8			0	y	n	2	-19.50	9.60		No	y	y	y	y	y	n	Leprosarium
315	N A	40	y				0	n	y	0				No	y					+	Leprosarium
319	M	4	n	169.9			0	y	y	0	-18.40	11.90		No	y	y	y	y		++	Leprosarium
320	N A	0	n				0	n	n	0				No	y					++	Leprosarium
324	F	37	n	155.2			1	n	y	3	-19.30	10.30		No	y	y	y			+	Leprosarium
341	M	0		174.2			6	n	y	8	-19.60	10.30		No						n	Leprosarium
342	N A	0	n				0	n	n	0				No	y					+	Leprosarium
354	P M	53	n	176.2			2	n	n	0	-19.10	11.60		No	y	y	y			n	Leprosarium
365	N A	0	n				0	n	n	0				No	y					n	Leprosarium
368	N A	22	n				0	n	y	0				No	y	y				n	Leprosarium
373														No						n	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
377	NA	1	n				0	n	n	0				No	y					n	Leprosarium
378	M	33	n	164.2			2	y	n	6				No	y	y	y	y	y	n	Leprosarium
380	M	20	n	174.2			3	n	n	0				No	y	y	y			n	Leprosarium
382	NA	0	n				0		n					No	y					n	Leprosarium
383	NA	0	n				0		y					No	y					+	Leprosarium
385	NA	0	n				0		y					No	y					+	Leprosarium
388	M	20	n	171.1	-18.97	12.23	1	y	n	14	-18.64	11.94	n	No	y	y	y	y	y	n	Leprosarium
392	M	28	n	184.0			5	n	n	2				No	y	y	y	y	y	n	Leprosarium
393	NA	40	y				4	n	y	0				No	y					n	Leprosarium
394	M		n	165.6			7	y	n	9			n	No	y	y	y	y	y	n	Leprosarium
395	PF	1	n	156.1			2	y	n	0				No	y	y	y	y	y	n	Leprosarium
396	NA	0	n				0	n	n	0				No	y					n	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
397	NA	60	n				0	n	n	0				No	y	y				n	Leprosarium
398	PF	2	y	152.2			1	y	n	0				No	y	y	y	y	y	n	Leprosarium
400	NA	14	y				0	n	n	0				No	y					n	Leprosarium
402	F	28	n	156.5			0	n	n	2				No	y	y	y	y	y	n	Leprosarium
408	NA	17	n		-19.38	10.90	0	n	n	0	-20.24	9.32	n	No	y					n	Leprosarium
409	NA	0	n				0	n	y	0				No	y					n	Leprosarium
410	NA	9	y				0	n	y	0				No	y					n	Leprosarium
413	M	13	n	168.2				n	n	0				No	y	y	y	y	y	n	Leprosarium
415	NA	0	n				0	n	n	0				No	y					+	Leprosarium
416	NA	12	n				0	n	y	0				No	y					n	Leprosarium
417	NA	17	y				0	n	n	0				No	y	y				n	Leprosarium
421	PM		y	177.6			5	n	n	0				No	y	y	y	y	y		Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death		
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10 -20	20-30	30-40	40-50	Burial extras	Site type	
426	NA	0	y				0	n	n	0				No	y							Leprosarium
428	NA	0	y				0	n	n	0				No	y	y						Leprosarium
429	NA	0	y					n	n	0				No	y	y						Leprosarium
430	PM	0	n					n	n					No	y	y						Leprosarium
433	PM		n	170.5			0	y	n	0				No	y	y	y	y		n		Leprosarium
436	F		n				0	y	n	0				No	y	y	y					Leprosarium
438	NA	0	n				0	n	n	0				No	y	y						Leprosarium
443	PM		n	167.6			0	n	y	0				No	y	y	y					Leprosarium
449	M		n	179.8			5	y	n	0				No	y	y	y	y	y			Leprosarium
451	F		y	159.4			0	y	y	0				No	y	y	y	y	y			Leprosarium
456	F	0	n	162.2				n	n	0				No	y	y	y	y	y			Leprosarium
462	M		n				0	y	n	0				No	y	y						Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
465	F		n											No	y	y	y				Leprosarium
469	M		n	173.1			5	y	y	0	-19.40	10.80		No							Leprosarium
471	F		n	171.4			1	n	n	0				No	y	y	y	y	y		Leprosarium
474	P M	0	n	176.1			5	n	n	0				No	y	y	y				Leprosarium
476	P M			171.9				y	y	0				No							Leprosarium
479	N A	0	y				0	n	n	0				No	y						Leprosarium
481	F			162.5			4	n	n	0				No							Leprosarium
489	M						0	n	y	0				No	y	y					Leprosarium
490	M	0	n				4	y	n	1				No	y	y	y	y	y		Leprosarium
492	F	0	n	144.1			3	y	n	0				No	y	y	y	y	y		Leprosarium
494	F		n	163.7			0	y	n	0				No	y	y	y			+	Leprosarium
498	F			154.6			3	n	n	0				No							Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death		
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10 -20	20-30	30-40	40-50	Burial extras	Site type	
499	F			158.6				n	n	0				No								Leprosarium
502	F	0	y	175.5			0	y	y	1				No	y	y	y	y	y			Leprosarium
506	PM							n	y	0				No								Leprosarium
507								y	n	0				No								Leprosarium
508	PM	0					0	n	n	1				No	y	y				++		Leprosarium
509	NA	0	n				0	n	y	0				No	y							Leprosarium
515	PF			160.1				n	n	0	-19.10	12.00		No								Leprosarium
516	PF	0	y					n						No	y	y	y					Leprosarium
519	PF		y				0	n	y	0				No	y	y						Leprosarium
524	F		y					y						No	y	y	y					Leprosarium
529	PM							n	n	0				No								Leprosarium
533	M			167.6				n	n	0				No								Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death		
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10 -20	20-30	30-40	40-50	Burial extras	Site type	
534	NA	0	n				0	n	n	0				No	y							Leprosarium
536	F	0	n	153.1			0	n	n	0				No	y	y	y					Leprosarium
537	NA	0	y				0	n	n	0				No	y						++	Leprosarium
538	F	0	y	160.2			1	y	n	1				No	y	y	y	y				Leprosarium
540	F						0	y	y	0				No	y	y	y	y				Leprosarium
541	PM		y					n	n					No	y	y	y	y	y			Leprosarium
543	NA		n				0	n	n	0				No	y							Leprosarium
545	NA	0	n				0	n	n	0				No	y	y						Leprosarium
547	M			173.1				y	n	0				No								Leprosarium
548	M		n	156.9			0	y	n	0				No	y	y	y	y				Leprosarium
551	F	0	n	159.0			0	y	y	0				No	y	y	y	y	y			Leprosarium
552	M		n					y	n					No	y	y	y	y	y			Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
553	F	0	y	155.5			10	y	n	0				No	y	y	y	y	y		Leprosarium
554	F		n	160.1			10	n	n	0				No	y	y	y				Leprosarium
562	PF	0	y	160.6			0	n	n	0				No	y	y	y				Leprosarium
1	NA	89	n		-19.90166667	11.018	0	n	y	0	-20.31933333	10.63533333	n	Possible							Burial ground
5	PM	27			-19.61	9.67			y	0	-19.52	9.67	y	Possible	y	y					Leprosarium
9								n	y	0			y	Possible							Leprosarium
12								n	y	0				Possible							Leprosarium
14	I							n	y	0			n	Possible							Leprosarium
15								n	y					Possible							Leprosarium
18									y	0				Possible							Leprosarium
26									y					Possible							Leprosarium
43									y	0				Possible							Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
44									y	0				Possible							Leprosarium
45									y	0				Possible							Leprosarium
46								n	n					Possible							Leprosarium
60									y	0				Possible							Leprosarium
129	M	35		164.7	-19.15	12.34	0	n	n	0	-19.27	13.66	n	Possible	y	y	y				Leprosarium
131							0		y	0			y	Possible							Leprosarium
139								n	y	0				Possible							Leprosarium
156	F	29					0		n				y	Possible	y	y	y				Leprosarium
167	F	49			-19.78	11.85	0		y	0	-19.29	13.26	y	Possible	y	y	y				Leprosarium
172	F	16					0		y	0				Possible	y	y	y				Leprosarium
185	F		y	154.0			0	n	n	0				Possible	y	y	y	y			Leprosarium
192	P M		y	172.8			0	n	y	0				Possible	y	y					Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
196								n	y	0				Possible							Leprosarium
213	PF		y				0	n	y	0				Possible	y	y					Leprosarium
220	F	0	y	157.3	-19.24	11.52	5	n	y	0	-19.29	10.94	y	Possible	y	y	y				Leprosarium
232	P M	0	n	169.7	-19.33	11.66	1	y	y	2	-18.83	12.11		Possible	y	y	y	y	y		Leprosarium
240	P M	1					0						n	Possible	y	y					Urban parish cemetery
241	PF			170.5			0	n	n	2				Possible							Urban parish cemetery
254	F							n	y	0				Possible							Leprosarium
256	F			162.0			0	n	y	0				Possible	y	y					Leprosarium
260	PF	0	n	174.4			7	y	y	0				Possible	y	y	y				Leprosarium
267	F	0	y	158.7			3	y	y	0				Possible	y	y	y	y	y		Leprosarium
273	N A		y				0	n	y	0	-19.00	10.50		Possible	y						Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
28 2	F		n	150.4			0	n	y	0	-18.70	10.80		Possible	y	y	y				Leprosarium
28 5	F			152.2			0	y	y	0	-19.90	10.90		Possible	y	y	y	y			Leprosarium
29 8	P M							n	y	0				Possible							Leprosarium
30 2	N A	16	n		-20.04	10.05	0	n	y	0	-20.31	10.15	n	Possible	y						Burial ground
30 3	PF	5	y	161.5	-20.18	10.64	0	n	y	0	-20.29	10.11	n	Possible	y	y	y				Burial ground
30 6	P M	28	n		-20.10	10.61	0	n	y	0	-20.18	9.73	y	Possible	y	y					Burial ground
30 9	M	23	n	164.3			2	n	n	2	-18.60	11.60		Possible	y	y	y	y	y	n	Leprosarium
31 2	M	16	n	161.0			4	y	y	5	-19.20	11.50		Possible						n	Leprosarium
31 6	M	38	n	169.6			0	n	n	0	-18.80	11.00		Possible	y	y	y	y		+	Leprosarium
32 7	F	6	n	158.8			2	y	y	6	-19.10	11.00		Possible	y	y	y	y	y	+	Leprosarium
32 9								n	y	0				Possible						n	Leprosarium
33 3	M	48	y	158.9			5	n	y	0	-19.50	9.70		Possible	y	y	y			n	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
334	P M	1	n	167.7			8	n	y	0	-19.00	11.20		Possible	y	y	y			+	Leprosarium
337								n	y	0				Possible						+	Leprosarium
339								n	y	6				Possible						+	Leprosarium
344	N A							n	y	0				Possible						+	Leprosarium
345	PF	20	n	160.5			4	n	y	0	-19.30	11.80		Possible	y	y	y			+	Leprosarium
347	M	51	n	166.7			10	n	n	0	-19.40	10.30		Possible	y	y	y			+	Leprosarium
350	F	13	n	156.6			0	n	n	5	-19.80	8.70		Possible	y	y	y	y	y	+	Leprosarium
356	M	61	y	167.4			2	n	y	1	-19.10	11.20		Possible	y	y	y			+	Leprosarium
362	M	49	n	169.1			11	n	y	1	-19.90	9.40		Possible	y	y	y			+	Leprosarium
366	F	16	n	160.6			0	n	n	2				Possible	y	y	y	y	y	n	Leprosarium
369	M	3	n	164.6			0	n	n	2				Possible	y	y	y	y	y	n	Leprosarium
370	F	6	n	157.8	-19.03	11.32	0	y	n	5	-19.62	11.74	n	Possible	y	y	y	y	y	n	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
37 1	F	0	n	162.5	-18.73	10.69	0	n	n	0	-19.16	10.52	n	Possible	y	y	y	y	y	n	Leprosarium
37 2	M	2	y	168.7			3	y	n	18				Possible	y	y	y	y	y	n	Leprosarium
37 4	M		y	167.6			0	n	n	0				Possible	y	y	y			+	Leprosarium
37 5	M			170.7			1	n	y	1				Possible						+	Leprosarium
37 6	N A	17	y				0	n	y	0				Possible	y					n	Leprosarium
37 9	M	5	n	167.6	-19.55	11.75	1	n	n	0	-18.96	13.18	n	Possible	y	y	y	y	y	n	Leprosarium
38 6	M			168.3				n	y					Possible						+	Leprosarium
39 1	P M	0	n	157.8			8	n	n	0				Possible	y	y				+	Leprosarium
40 1	M	8	n	169.1	-19.25	10.37	12	n	n	0	-18.84	11.36	y	Possible	y	y	y			n	Leprosarium
40 4	F			148.2				n	y	0				Possible						+	Leprosarium
41 2	M	23	n	169.7			0	n	y	0				Possible	y	y	y			n	Leprosarium
41 9			n				0	n	y	0				Possible	y	y				n	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
431	P M	0	y				2	y	y	3	-19.50	10.40		Possible						n	Leprosarium
432			n				0	n	y	0	-19.50	10.50		Possible	y	y				+	Leprosarium
440	P M			163.0148				n	y	0				Possible							Leprosarium
458								n	y	0				Possible							Leprosarium
464	M	0	n				0	y	y	0				Possible	y	y	y	y			Leprosarium
484	F			150.4053			0	n	y	0				Possible	y	y					Leprosarium
487	M						0	n	y	0				Possible	y	y					Leprosarium
488							0	n	y	0				Possible	y	y					Leprosarium
491	N A							n	y	0				Possible							Leprosarium
497	P M		n				0	n	y	0				Possible	y	y					Leprosarium
517	N A	0	y					n						Possible	y	y					Leprosarium
518	F	0	n	150.2			4	y	y	0				Possible	y	y	y				Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
520	F							n	n	0	-20.60	11.40		Possible							Leprosarium
530								n	y	0				Possible							Leprosarium
558	P M			170.0				n	y	0				Possible							Leprosarium
2	M	12	n	164.5	- 19.2943333 3	12.187		y	y	2			n	Probable	y	y	y	y			Monastery cemetery
6	M	49	n		-19.38	10.48		n	y	0	-19.16	11.04	n	Probable	y	y	y	y	y		Leprosarium
63	I	18			-19.47	13.43		n	n	0	-19.40	13.49	y	Probable	y	y	y	y	y		Leprosarium
64	P M	8	n					n						Probable	y	y	y	y	y		Leprosarium
175	F	0	n	172.3	-20.40	11.40	0	n	y	5	-20.40	11.40		Probable	y	y	y	y	y		Inhumation cemetery
182	M			166.4			0	n	y	0				Probable	y	y	y	y			Leprosarium
214	F	0	n				0	n	n	0				Probable	y	y					Leprosarium
222	M	0	y	168.4			0	n	y	0				Probable	y	y	y				Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
223	F	0	n	160.4	-19.63	10.48	2	y	n	0	-18.99	11.71	n	Probable	y	y	y	y	y	++	Leprosarium
224	NA		n		-18.95	11.24	0	n	y	0	-19.09	11.30	y	Probable	y	y					Leprosarium
226	M		n	165.5	-18.78	11.79	1	n	n	0	-18.51	12.02	n	Probable	y	y	y				Leprosarium
229	PF		y	162.3	-19.51	10.16	4	n	y	0	-18.86	11.53	y	Probable	y	y	y				Leprosarium
234	F	0	y	154.7	-18.6275	12.40170833	0	y	y	3			n	Probable	y	y	y	y	y		Monastery cemetery
238	F	35	y	168.3			5	y	y	0	-18.83	11.86	n	Probable	y	y	y	y			Urban parish cemetery
239	M	5	n	168.5			4	y	n	0			n	Probable	y	y	y	y	y		Urban parish cemetery
247	PM	26	y	171.1				y	y	0	-19.27	11.20	n	Probable	y	y	y	y	y		Parish cemetery
249	PM	12	n	176.1			6	n	n	0	-21.45	9.92	n	Probable	y	y	y	y	y		Hospital Cemetery
265	PM		n	170.5			9	n	y	0	-18.20	11.40		Probable	y	y					Leprosarium
300	NA	38	n		-19.84	10.38	0	n	y	0	-20.31	9.72		Probable	y						Parish cemetery

		Childhood experience					Adult experience								Life span					Treatment in death		
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10 -20	20-30	30-40	40-50	Burial extras	Site type	
301	NA	17	n		-20.02	10.56	0	n	y	0	-20.20	9.37	y	Probable	y	y						Burial ground
314	M	2	n	170.8			6	n	y	5	-19.70	9.40		Probable	y	y	y	y		n	Leprosarium	
322	M	17	y	179.0			9	n	y	0	-19.30	10.10		Probable	y	y	y			+	Leprosarium	
323	M	68	y	172.1			6	n	y	0	-19.00	10.30		Probable	y	y	y			+	Leprosarium	
328	PF	31	y	161.4			0	n	y	2	-19.10	10.50		Probable	y	y				+	Leprosarium	
330	M			164.0			9	n	n	3	-19.00	10.20		Probable						+	Leprosarium	
336	M	2	y	174.3			2	n	y	0	-19.60	10.60		Probable	y	y	y			+	Leprosarium	
338	F	19	y	170.4			0	y	y	3	-19.20	9.60		Probable	y	y	y	y	y	+	Leprosarium	
346	M	39	n	172.2			0	n	n	0	-19.70	10.60		Probable	y	y	y			+	Leprosarium	
352	NA	38	y				0	n	y	0				Probable	y	y				n	Leprosarium	
353	M	27	y	163.0			6	n	y	0	-19.00	10.50		Probable	y	y				+	Leprosarium	
357	M	3	n	175.4	-18.78	11.01	0	n	n	1	-19.16	10.28	y	Probable	y	y	y	y	y	++	Leprosarium	

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
360	M	32	n	157.2			0	n	y	1	-18.80	11.00		Probable	y	y	y	y		+	Leprosarium
387	P M	29	n	169.2	-18.69	10.45	12	n	n	0	-19.41	10.22	y	Probable	y	y	y			+	Leprosarium
390	M	15	n	174.2			1	y	y	0				Probable	y	y	y	y		+	Leprosarium
403	M	16	n	168.3			9	n	y	1				Probable						+	Leprosarium
405	M	7	n	168.4			5	n	n	0				Probable	y	y	y	y		n	Leprosarium
406	M	16	n	166.5			7	n	y	2				Probable	y	y	y	y		n	Leprosarium
411	M	6	n	173.0			8	y	y	3				Probable	y	y	y	y	y	n	Leprosarium
424	M	2	y	173.7	-19.37	10.10	7	n	y	0	-19.54	10.12	n	Probable	y	y					Leprosarium
437								n	y	0				Probable							Leprosarium
477	P M			165.9				n	y	0				Probable							Leprosarium
485	M						0	y	y	0				Probable	y	y	y				Leprosarium
486	N A	0	y				0	n	y	0				Probable	y	y					Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
513	NA							n	y	0				Probable							Leprosarium
523	F	0	n											Probable	y	y	y	y			Leprosarium
528	F		y	156.6			0	n	y	0				Probable	y	y	y	y			Leprosarium
532	PM		y	177.8			0	n	y	0				Probable	y	y	y				Leprosarium
549	PF		n	156.4			0	n	y	0				Probable	y	y	y				Leprosarium
561	I	0	n					n	n					Probable	y	y	y	y	y		Leprosarium
4	PF	12		161.9	-19.26	10.80	0	n	y	0	-19.78	10.26	y	Pathognomonic	y	y	y				Burial ground
19													y	Pathognomonic							Leprosarium
61	M	30	n					n	y				y	Pathognomonic	y	y	y	y	y		Leprosarium
176	M	0	n	174.5	-19.70	10.90	0	n	y	1	-19.40	11.20		Pathognomonic	y	y	y	y	y		Rural parish cemetery
201	F	28	y	156.4	-19.67	12.98	0	n	y	0	-19.54	11.99		Pathognomonic	y	y	y				Rural parish cemetery

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
20 ₂	M	35	y	160.7	-19.50	12.00	0	n	y	0	-19.80	11.40		Pathognomonic	y	y					Rural parish cemetery
21 ₁	F	0	n	154.3			0	n	n	0	-19.33	10.71		Pathognomonic	y	y	y	y			Leprosarium
21 ₈	F	0	n	160.6			0	n	y	0	-19.05	11.42	n	Pathognomonic	y	y	y				Leprosarium
21 ₉	F	0	y	152.2	-19.46	11.74	0	n	y	0	-19.51	11.30	n	Pathognomonic	y	y	y	y			Leprosarium
22 ₇	N A		n		-18.53	13.54	0	n	y	0	-18.14	13.62	y	Pathognomonic	y	y				++	Leprosarium
22 ₈	N A		y		-19.32	11.77	0	n	y	0	-19.36	11.92	n	Pathognomonic	y	y					Leprosarium
23 ₀	M		n	175.5	-19.24	12.47	0	y	y	2	-18.72	12.66	n	Pathognomonic	y	y	y	y	y		Leprosarium
23 ₁	PF	0	n	168.0	-19.32	10.46	0	n	y	0	-19.55	11.10	n	Pathognomonic	y	y	y	y	y		Leprosarium
23 ₃	M	25	y		-19.83	13.70	5	n	y	0	-19.12	12.44	y	Pathognomonic	y	y	y				Monastery cemetery
23 ₅	M	15	y	177.2	-19.81	11.94	10	n	y	5	-19.77	11.86	y	Pathognomonic	y	y	y	y	y		Monastery cemetery

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
236	M	0	n	169.6			0	y	y	0				Pathognomonic	y	y	y				Monastery cemetery
244	M	42	n	163.8				n	y	0	-19.37	11.26	n	Pathognomonic	y	y	y	y	y		Urban parish cemetery
248	M	21	n	174.6			2	n	y	0	-19.46	11.25	n	Pathognomonic	y	y	y				Parish cemetery
250	P M	20	n	168.748				n	y	0	-19.72	10.81	n	Pathognomonic							Hospital Cemetery
251	P M	34		175.1			0	y	y	0	-19.77	12.53	n	Pathognomonic	y	y	y				Hospital Cemetery
252	M	42	n	176.144				n	n	0				Pathognomonic	y	y					Burial ground
253	N A	77	y										n	Pathognomonic	y						Burial ground rural
261	F	0	y	160.0			1	n	y	0				Pathognomonic	y	y	y				Leprosarium
289	P M	0	n	173.0			10	n	y	0				Pathognomonic							Leprosarium
292	N A		n				0	n	y	0	-17.00	11.70		Pathognomonic	y	y					Leprosarium
304	N A	30	y		-20.07	10.21	0	n	y	0	-19.98	9.60	y	Pathognomonic	y	y					Burial ground

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
32 1	PF	32	y	161.6			0	n	y	1	-19.30	10.10		Pathognomonic	y	y				+	Leprosarium
32 5	P M	43	y	161.4			0	n	y	0	-19.20	10.40		Pathognomonic	y	y				+	Leprosarium
32 6	P M	1	n	169.2			6	n	y	1	-18.80	11.50		Pathognomonic	y	y	y	y		+	Leprosarium
33 1	F	5	n	158.9			0	n	y	1	-19.40	10.10		Pathognomonic	y	y	y	y	y	+	Leprosarium
33 2	M	47	y	169.2			0	n	y	0	-19.60	9.90		Pathognomonic	y	y				+	Leprosarium
33 5	N A	24	y				0	n	n	0				Pathognomonic	y	y				+	Leprosarium
34 3	I	23	y				0	n	y	0	-19.00	9.90		Pathognomonic	y	y	y			+	Leprosarium
34 8	N A	45	y				0	n	y	0				Pathognomonic	y	y				+	Leprosarium
34 9	M	36	y	173.5			10	n	y	0	-19.40	10.60		Pathognomonic	y	y	y	y		+	Leprosarium
35 5	M	32	n	167.3			2	n	n	8	-19.60	9.30		Pathognomonic	y	y	y	y	y	+	Leprosarium
35 9	N A	8	y				0	n	y	0				Pathognomonic	y	y				+	Leprosarium
36 1	N A	35	n				0	n	y	0				Pathognomonic	y	y				+	Leprosarium

		Childhood experience					Adult experience								Life span					Treatment in death	
UIN	Sex	EH	CO	Stature	Dentine d13C	Dentine d15N	SN	OA	Periostitis	Trauma	Rib d13C	Rib d15N	M. leprae	HD	0-10	10-20	20-30	30-40	40-50	Burial extras	Site type
363	P M	82	y				0	n	y	2	-19.80	9.50		Pathognomonic	y	y				+	Leprosarium
367	PF	22	n	160.0	-20.02	9.25	0	n	n	0	-19.84	9.79	n	Pathognomonic	y	y	y	y		n	Leprosarium
381	M	54	n	173.5			0	n	y	0				Pathognomonic	y	y	y	y		++	Leprosarium
384	F	22	n	167.3			3	n	y	0				Pathognomonic	y	y	y	y	y		Leprosarium
389	F	46	n	157.6			0	n	y	0				Pathognomonic	y	y	y			+	Leprosarium
399	F	35	n	165.8			0	n	n	0				Pathognomonic	y	y	y	y		+	Leprosarium
407	PF	0	y	165.1			2	n	y	0				Pathognomonic	y	y				n	Leprosarium
414	PF	21	n	160.5			1	n	y	0				Pathognomonic	y	y	y	y	y	+	Leprosarium
418	F	6	n	162.8			5	n	n	0				Pathognomonic	y	y	y	y		+	Leprosarium
420	M	51	n	176.5			8	n	y	2				Pathognomonic	y	y	y			+	Leprosarium
423	F	12	n	157.7			6	n	n	0				Pathognomonic	y	y	y	y			Leprosarium
434	M	0	y	168.9			8	n	y	1	-18.20	13.10		Pathognomonic						n	Leprosarium