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Onderzoeksrapport

Een vergeten massagraf van Duitse soldaten in de ‘Wytschaete Bogen’. Een toevalsvondst in Wijtschate-Galgestraat (Heuvelland, West-Vlaanderen)

Agentschap
Onroerend
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COLOFON

TITEL
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REEKS
Onderzoeksrapporten agentschap Onroerend Erfgoed nr. 101

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Agentschap
Onroerend
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EEN VERGETEN MASSAGRAF VAN DUITSE SOLDATEN IN DE ‘WYTSCHAETE BOGEN’. TOEVALSVONDST IN WIJTSCHATE-GALGESTRAAT (HEUVELLAND, WEST-VLAANDEREN)

MARC DEWILDE, NICHOLAS MÁRQUEZ-GRANT, EMMA SAUNDERS, ROLAND WESSLING, FRANKY WYFFELS

Vlaanderen
is erfgoed

INHOUD

1 ADMINISTRATIEVE FICHE

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Bewaarplaats vondsten en monsters	Idem
Dossiernummer	2015/188
Site-code	WIJ-GA-15
Locatie (provincie, gemeente, deelgemeente, plaats) Wijtschate-Galgestraat	West-Vlaanderen, Heuvelland, Wijtschate, Galgestraat
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Administratief toezicht	Steven Mortier (agentschap Onroerend Erfgoed)

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Tekenwerk en plannen	Franky Wyffels

2 INLEIDING

Bodemsanering (omwille van mazoutvervuiling), voorafgaand aan de bouw van huizen en een opslagplaats veroorzaakte ingrijpende graafwerken aan de Komenstraat-Galgestraat, op de grens van Mesen en Wijtschate. Daarbij stootte men onverwachts op een lijkkist en menselijk botmateriaal.
Jan Decorte, intergemeentelijk archeoloog van CO7, zag de ernst van de situatie in en zette prompt de toevalsvondstprocedure in werking (fig. 1).

Fig.1 Het agentschap, versterkt met Jan Decorte, in actie!

3 LIGGING EN BODEMGESTELDHEID

De vindplaats ligt in de oksel van de Komenstraat en de Galgestraat. De plek staat ook als de Ieperhoek bekend (fig. 2 en 3).
De vindplaats is kadastraal vastgelegd als Heuvelland, 1ste Afd., Sie D, 181l.

Het terrein maakt deel uit van het grote complex matig natte leem met textuur B horizont (Ada), dat Mesen en omgeving bodemkundig typeert.

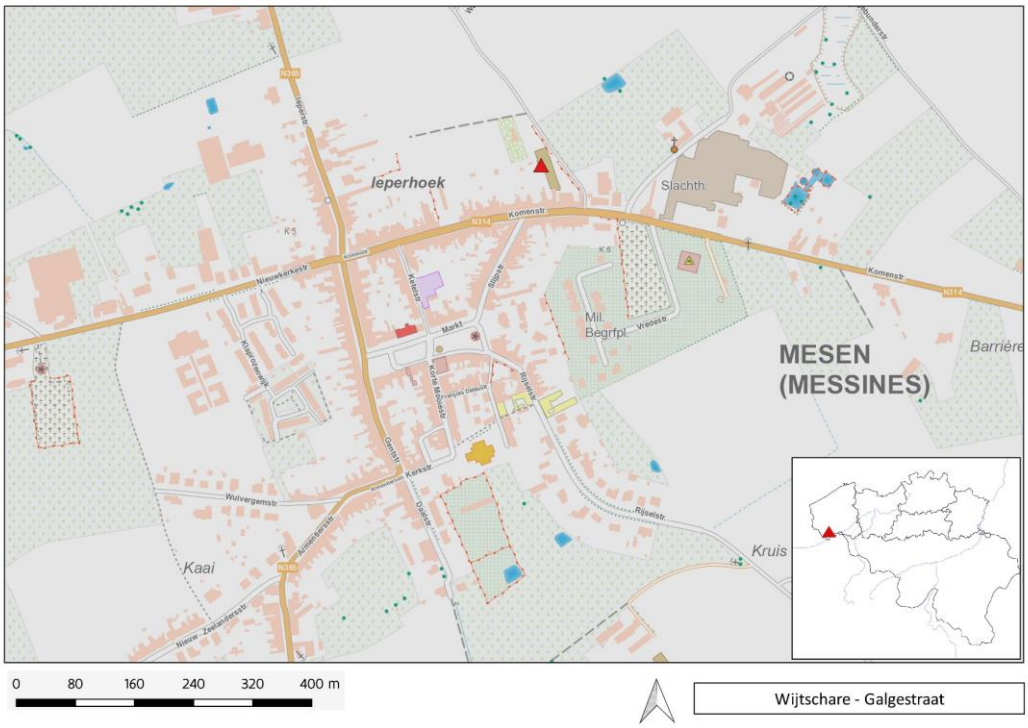


Fig. 2 Situering (rode driehoek) van de toevalsvondst op de topografische kaart.

Fig. 3 Luchtfoto, genomen vóór de afbraak van de loods en de verwijdering van de opslagtanks voor brandstof.

De vindplaats ligt aan de oostzijde van de hoogte van Mesen, die de zuidelijke uitloper vormt van de hoogte van Wijtschate, op een hoogte van 65 m T.A.W. (fig. 4).

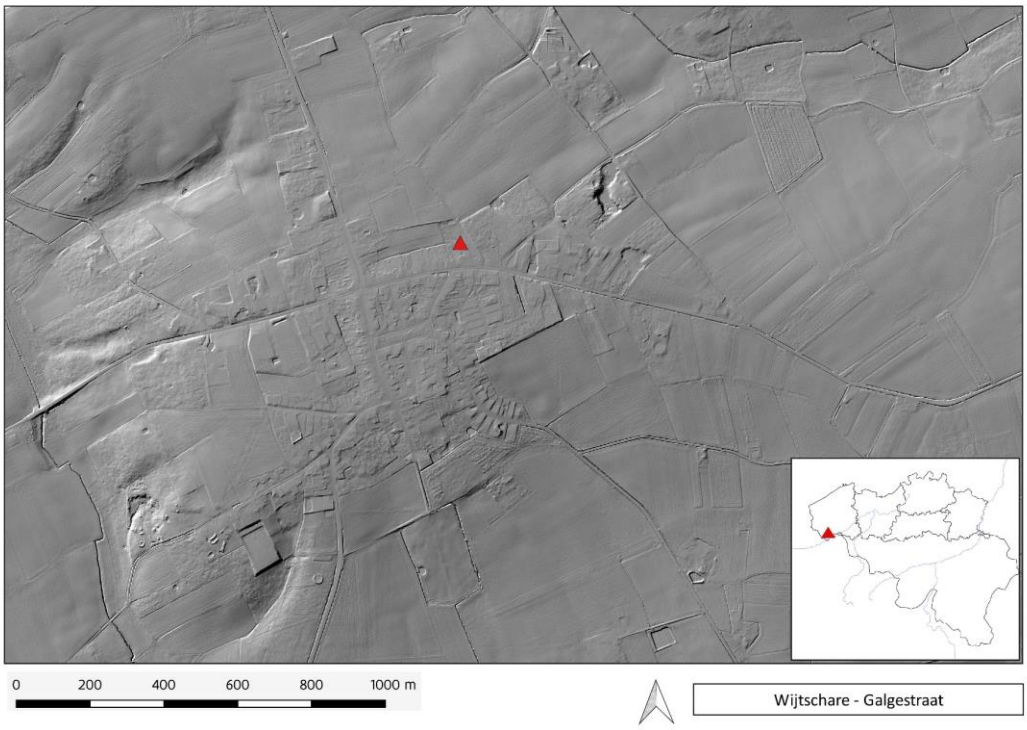


Fig. 4 DHM van Mesen en omgeving.

4 HISTORISCHE EN ARCHEOLOGISCHE INFORMATIE

De heuvelrug van Mesen is bij het begin van de oorlog fel betwist terrein. Van 21 oktober 1914 tot 1 november gaan de Britten, die stellingen ingenomen hebben ten oosten van de stad, tot het uiterste om hun posities te behouden. Ze krijgen het hard te verduren onder onophoudelijke aanvallen en zware beschietingen. Uiteindelijk worden ze teruggedrongen tot in de huizen aan de westzijde van de stad en ten slotte tot in het dal van de Steenbeek, in lager gelegen posities. De London Scottish lijden daarbij zware verliezen. Op 6 en 7 november ondernemen Britten en Fransen nog enkele pogingen om de stad te heroveren. Tevergeefs! De situatie zou voor langere tijd dezelfde blijven. (fig. 5) Vanaf dat moment is er sprake van de Ypres Salient en de aansluitende Messines Ridge, de Duitsers hebben het over de Yper Bogen en de Wytschaete Bogen. Ter hoogte van Ieper en Wijtschate-Mesen is immers telkens sprake van een uitstulping van de frontlijn.

De Duitsers zouden tot midden 1917 nooit echt meer in verlegenheid gebracht worden, al is er wel sprake van voortdurende schermutselingen. Dat veranderde drastisch op 7 juni 1917. De ontploffing van 19 dieptemijnen tussen Hill 60 (Zillebeke) en Saint-Yvon (Ploegsteert) veroorzaakte toen de totale destabilisatie van het Duitse front over een kleine 20 km.
De Nieuw-Zeelanders, die deze sector kregen toegewezen, voerden in de algehele verwarring een succesvolle aanval uit, namen Mesen in en bereikten uiteindelijk op 14 juni 1917 de Oosttaverne-linie, zo'n 2,5 km ten oosten van Mesen.

Bij het lenteoffensief van 9 tot 29 april 1918 wisten de Duitsers op één dag tijd -10 april- Mesen opnieuw te veroveren[1].

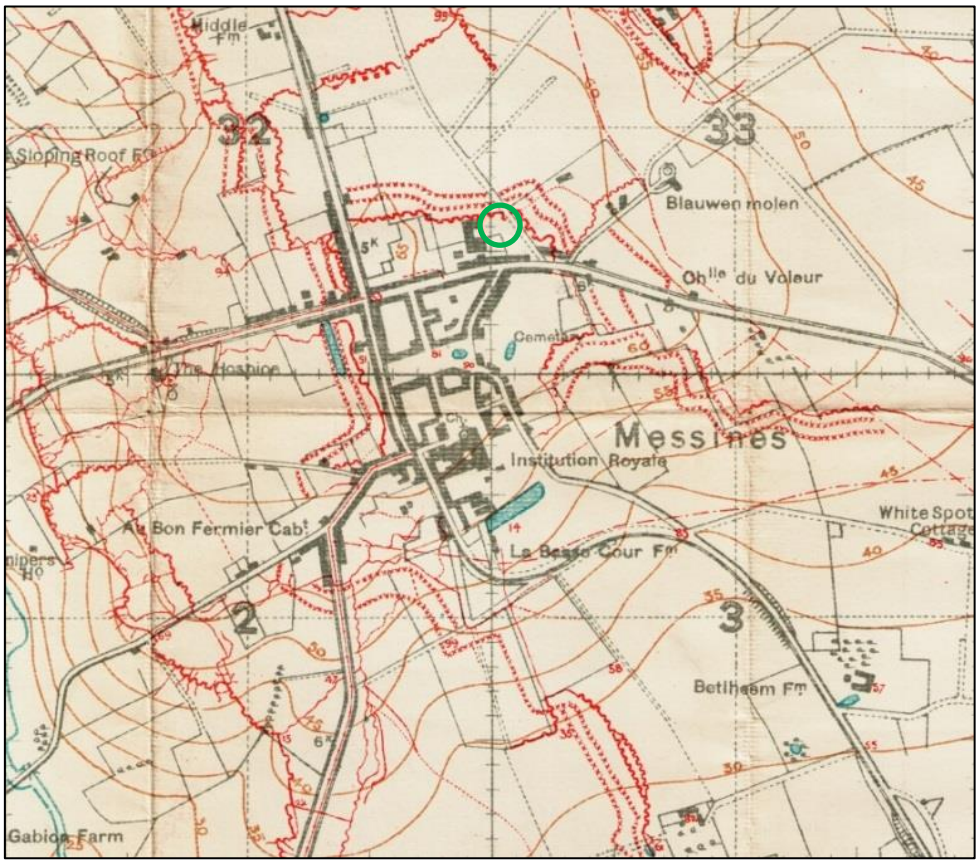


Fig. 5 Duitse stellingen in en rond Mesen op een Engelse loopgravenkaart (9 april 1915).

Ter hoogte van de vindplaats zijn op de loopgravenkaarten en luchtfoto's geen militaire installaties te zien. Ten oosten en ten noorden ervan maakt een goed uitgebouwde verbindingsloopgraaf, door de Britten Oxonian Trench gedoopt, een hoek.
Zeer interessant is alleszins dat er vlakbij al in september 1915 een kerkhof (Cemetery) kan herkend worden[2]. Het ligt aan de zuidkant van de Komenstraat, ter hoogte van de Gapaardstraat, zo'n 400 m ten zuidoosten van de vindplaats (fig. 4). Het staat bekend als Messines German Cemetery N° 2[3] of Meesen II of Messines an der Ziegelei[4]. Na de oorlog zijn de 67, aldaar begraven Duitsers overgebracht naar Houthem Duitse begraafplaats[5], de 7 Britten naar Sanctuary Wood Cemetery in Zillebeke.

[1] Verdegem e.a. 2013, 20-26; Oldham 2000, 13-21, 77-87, 116.
[2] Dit kerkhof ligt aan de basis van het huidig stedelijk kerkhof.
[3] Scott 1992, 108.
[4] Dank aan Aurèle Sercu voor deze informatie.
De Ziegelei slaat op de steen- en buizenbakkerij, iets verderop in de Gapaardstraat.
[5] X. 1938 (?), 35.

5 VELDWERK

Het veldwerk[6] werd uitgevoerd van 5 tot 11 mei 2015 (machtiging 2015/188).
In totaal werden 22 Duitse gesneuvelden geborgen, waarvan er 10 een identificatieplaatje bijhadden (fig. 6).
In een bijgewerkte obustrechter[7] (fig.7) waren de gesneuvelden zowel in kisten, als in volle grond -onder kistdeksels en een kistbodem- begraven.

Fig. 6 Het agentschap begint het onderzoek onder het goedkeurend oog van de lokale politie.

De bovenste laag bestaat uit 7 kistbegravingen (1-6, 21) (fig. 8). Daarvan waren er 5, al dan niet geschrankt naast mekaar gelegd (N-Z). Haaks erop was er aan beide zijden nog een kist bijgeplaatst (O-W). Daarvoor was de rand van de obustrechter enigszins bijgewerkt. In de onderste laag waren op 2, tegenover elkaar liggende randen van de put 1 (7) en 2 kisten (19-20) neergelaten (N-Z) (fig. 9). Daartussen waren 12 gesneuvelden in volle grond bijgezet (8-18, 22) (fig. 10). Die ruimte was met kistdeksels en een kistbodem afgedekt. Ze waren naast elkaar, geschrankt en over elkaar heen gelegd (N-Z). Eén soldaat (22) was anders georiënteerd. Hij lag onder de noordelijke haakse kist uit de bovenste laag.

[6] De medewerking van de uitvoerende firma Petillon bvba was voortreffelijk. Vooral met kraanman Eddy Dejonkheere kon voortdurend overlegd worden. Ook met de politie van het arrondissement Ieper was de verstandhouding optimaal. Cubeco Steven Reynaert en de stad Mesen stonden ons bereidwillig bij.
[7] De aangetroffen shrapnelbrokken wezen duidelijk op een zware inslag. Ook de profieldoorsnede van de put was niet anders te verklaren.

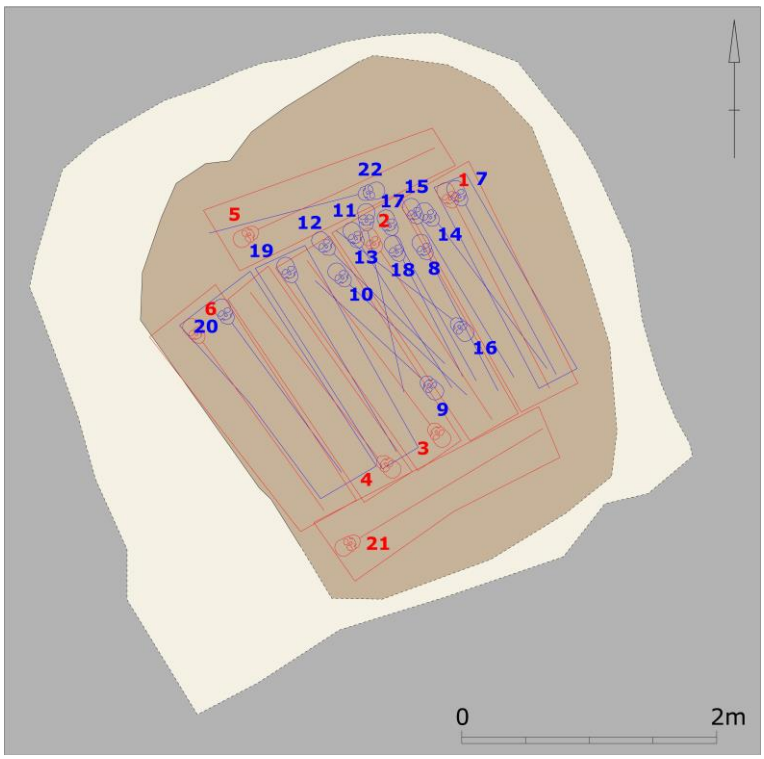


Fig. 7 Totaalbeeld van de bijzettingen. Rood: bovenste laag, blauw: onderste laag. De kuil was aan de westzijde aangesneden bij de werken.

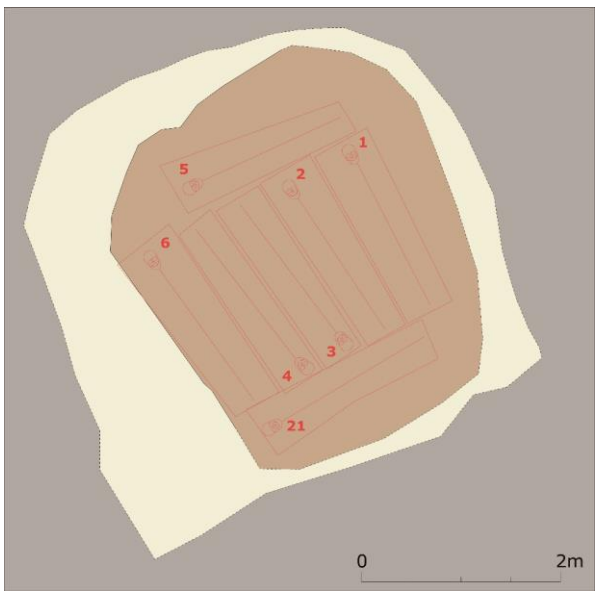


Fig. 8 Bovenste laag Tekening en foto, waarop 5 nog niet vrij lag.

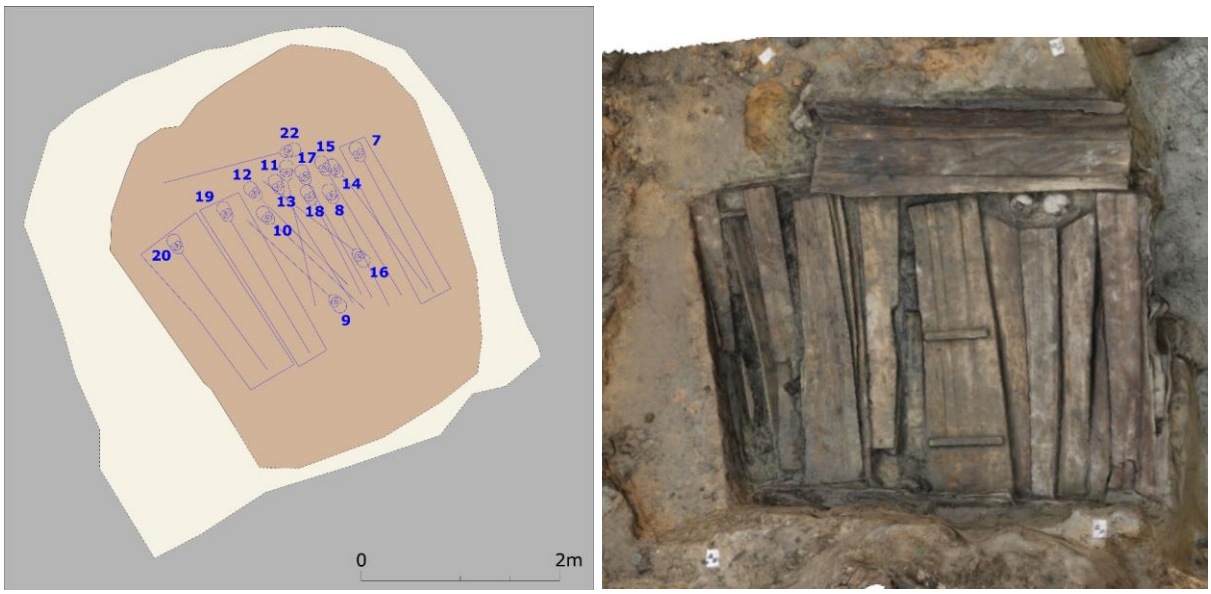


Fig. 9 Onderste laag Tekening en foto

Fig. 10 Verschillende gesneuvelden naast en over elkaar

De lijkkisten zijn in doorsnede zeshoekig (afgeknotte driehoek -deksel- geplaatst op een trapezium -kist-) en in grondplan lichtjes conisch (0,56/7 op 0,4 m). De bodem bestaat uit 3 of 4 planken, die door 3 dwarslatjes bijeen gehouden worden, en is iets groter dan de eigenlijke lijkkist. De zijkanten bestaan uit telkens 2 planken. De deksels zijn meestal uit 3 planken samengesteld (fig. 11, 12 en 13). Ze meten 2 m. De maximale breedte varieert van 0,4 tot 0,54 m. De hoogte bedraagt 0,4 m.

Fig. 11 Enkele kisten (18 en 19) konden na afloop gerecupereerd worden.

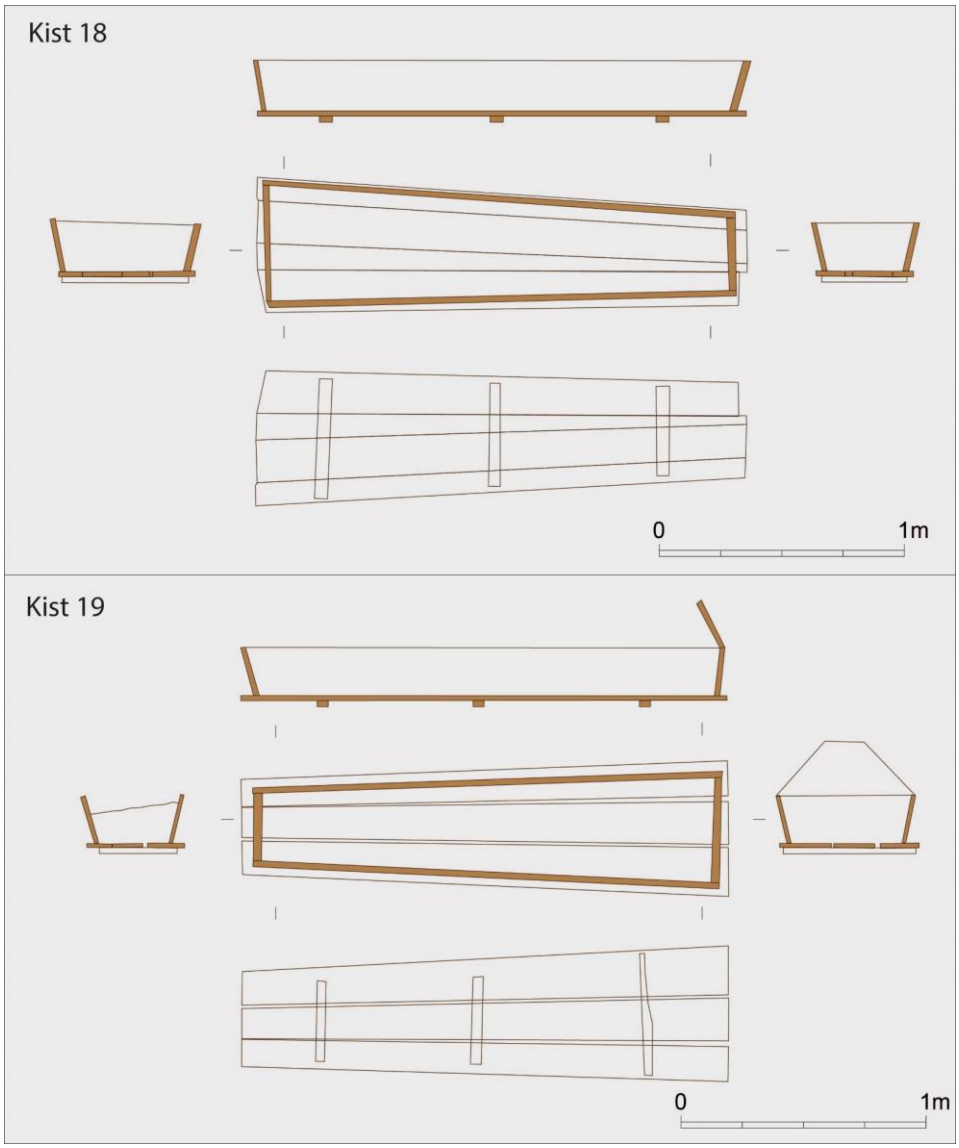


Fig. 12 Doorsnedes, boven- en onderaanzicht van de kisten

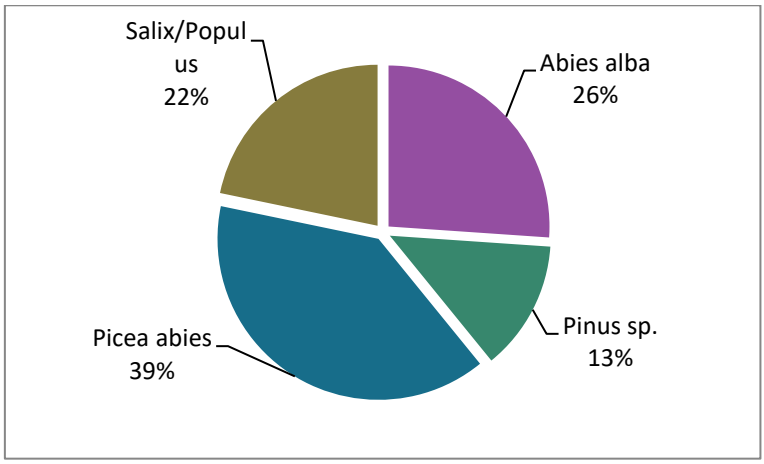
De soldaten waren in hun uitrusting begraven. Weliswaar ontbrak hun gordel en hun helm. Eén soldaat had z'n helm nog op. Waarschijnlijk stond dit in verband met z'n verwondingen. In enkele kisten komt stro voor.

De houtdeterminatie geeft aan dat voor de aanmaak van de grafkisten verschillende houtsoorten in aanmerking kwamen. Tegelijk kunnen ook over de mogelijke herkomst ervan uitspraken gedaan worden[8]. De bemonstering (23 stalen) gebeurde op 9 van de 10 kisten en mag dus representatief genoemd worden. Fijnspar (39 %) en zilverspar (26 %) domineren. Wilg/populier (21 %) is een verrassing. Grove den (13 %) vult aan.

Site	Spoor	Context	Houtsoort	Opmerking	Breedte (cm)	Dikte (cm)	Dendro
ME-GA-15	kist 1	skelet 1	*Abies alba*	-	4,5	2	-
ME-GA-15	kist 1	skelet 1	*Abies alba*	-	4	2	-
ME-GA-15	kist 2	skelet 2	*Abies alba*	-	20	2,5	HEGA15.01
ME-GA-15	kist 2	skelet 2	*Pinus* sp.	-	20	2	HEGA15.02
ME-GA-15	kist 3	skelet 3	*Picea abies*	-	19	3	-
ME-GA-15	kist 3	skelet 3	*Picea abies*	-	23	2	-
ME-GA-15	kist 3	skelet 3	*Abies alba*	-	19	2,5	HEGA15.03
ME-GA-15	kist 4	skelet 4	*Pinus* sp.	-	15	2,5	-
ME-GA-15	kist 4	skelet 4	*Abies alba*	-	17	2	-
ME-GA-15	kist 4	skelet 4	*Pinus sp.*	-	20	2	-
ME-GA-15	kist 4	skelet 4	*Abies alba*	-	14	2	HEGA15.04
ME-GA-15	kist 5	skelet 5	*Picea abies*	-	20	2	-
ME-GA-15	kist 5	skelet 5	*Picea abies*	-	20	2	-
ME-GA-15	kist 6	skelet 6	*Picea abies*	-	10	2,5	-
ME-GA-15	kist 6	skelet 6	*Picea abies*	-	9,5	2	-
ME-GA-15	kist 6	skelet 6	*Picea abies*	-	10	2,5	-
ME-GA-15	kist 7	skelet 7	*Salix/Populus*	-	15	2	-
ME-GA-15	kist 7	skelet 7	*Salix/Populus*	-	20	2,5	-
ME-GA-15	kist 7	skelet 7	*Salix/Populus*	-	20	2	-
ME-GA-15	kist 8	skelet 8	*Picea abies*	-	12,5	2,5	-
ME-GA-15	kist 8	skelet 8	*Picea abies*	-	10	2,5	-
ME-GA-15	kist 21	skelet 21	*Salix/Populus*	-	19	2	-
ME-GA-15	kist 21	skelet 21	*Salix/Populus*	-	7,5	2	-

[8] Haneca 2016, 54-55.

Abies alba	6	zilverspar
Pinus sp.	3	grove den
Picea abies	9	fijnspar
Salix/Populus	5	wilg/populier
totaal:	**23**	



Salix/Populus: wilg/populier; Picea abies: fijnspar; Abies alba: zilverspar; Pinus sp.: grove den

Fijnspar en zilverspar zijn uitheemse soorten (Scandinavië en Centraal-Europa), maar werden sedert 1850 massaal aangeplant in Wallonië. Tijdens de oorlog bleek een groot gedeelte ervan kaprijp. Ook grove den[9] was al in de 19de eeuw voor de mijnbouw massaal aangeplant op armere gronden. Wilg/populier komt weliswaar lokaal voor, maar zal in 1917 in volle frontzone niet meer voorhanden geweest zijn en is dus evengoed aangevoerd. In 3 gevallen zijn verschillende houtsoorten gebruikt voor eenzelfde kist. Dit geeft aan dat de houtvoorraad in de werkplaatsen in de achterhoede voortdurend werd aangevuld vanuit verschillende plantages.

[9] Verdwenen in Vlaanderen rond 1600.

Fig. 13 Bij de ruiming van een voorlopig kerkhof openen Duitse soldaten een doodskist. De transportkisten staan klaar. De locatie is niet bekend.
(https://www.flickr.com/photos/drakegoodman/22515871009/;)

Tenslotte kan nog gewezen worden op de vondst van wat verspreid Gallo-Romeins dakpanmateriaal.

Bespreking

Het zijn de krijgshandelingen van eind april tot begin juni 1917, die deze collectieve begraving hebben veroorzaakt. Enerzijds verdwenen de Duitsers op 7 juni 1917 tijdelijk uit deze sector. Anderzijds werd bij een soldaat een zilveren hangertje gevonden, waarop “Gott Schütze Dich 14.4.17” gegraveerd staat. Op het herdenkingsmonument van Wohlbach (Sachsen) staat Otto Weidhaas, gesneuveld op 30 mei 1917. Otto Weidhaas is een van de 10 gesneuvelden, waarop een naamplaatje is gevonden. In het Kriegstagebuch van de Sanitäts-Kompagnie 48, die bij de 40. Infanterie-Division dienst deed, wordt daarnaast aangegeven dat ze vanaf 1 juni 1917 de gesneuvelden niet meer afvoerden, maar ter plaatse begroeven[10].
Het lijkt er dan ook sterk op dat dit massagraf begin juni 1917 tot stand is gekomen.

Hoe moet dit onbekend massagraf geïnterpreteerd worden[11]?
Het was ongetwijfeld niet als definitieve bijzetting bedoeld. Waarschijnlijk is het zo dat het er op een gegeven moment door beschietingen en schermutselingen zeer hevig aan toe ging en de gesneuvelden voorlopig werden begraven met de bedoeling ze in rustiger tijden opnieuw op te graven en passend aan de aarde toe te vertrouwen op een militaire begraafplaats? Of lag het in de bedoeling om hier een nieuwe begraafplaats op te starten en is het er niet van gekomen? Feit is alleszins dat een aantal van hen reeds in grafkisten was

[10] Informatie J. Vancoillie (‘der abtransport der Gefallenen aus vorderer Linie infolge der sich von Tag zu Tag immer heftiger entwickelnden Kämpfe durch die Kompagnie nicht mehr ausgeführt sondern werden durch ihre Truppenteile unmittelbar hinter den Stellungen bestrattet’)
[11] Verdegem et al. 2018, 79-81.

gelegd en dat ook kistdeksels gebruikt zijn om de gesneuvelden, die in de volle grond begraven werden, af te dekken. De eerste lijken snel neergelegd te zijn, overhaast, … alsof ze onder vuur lagen. De rest is met overleg, bedachtzaam gebeurd.
De gesneuvelden zijn alleszins bijeengebracht, want ze zijn op verschillende plaatsen in de buurt gevallen (Wijtschate, Mesen, Wulvergem), op opeenvolgende data (29 en 30 mei 1917). Vermoedelijk was er dan ook een verbandpost in de onmiddellijke omgeving.
Ook het feit dat sommige gesneuvelden in een kist waren gelegd en andere niet, is niet eenduidig te verklaren, als er al een betekenis achter schuil gaat.
In 14 gevallen is de gesneuvelde in een tentzeil gehuld.
In 4 gevallen is sprake van een verwijderd ereteken. Vermoedelijk gaat het daarbij over een IJzeren Kruis 1ste of 2de Klasse.
In 2 gevallen is het zakhorloge verwijderd. Een sleuteltje om het horloge op te winden bij soldaat 20 en een bevestigingsring bij soldaat 9 wijzen in die richting.
Naast persoonlijke sieraden komen rookgerief, potloden, zakmessen en geld voor. Niet alleen de vijandelijke vuurkracht werd gevreesd, in één geval werd ook een condoom nodig geacht.
Soldaat 4 is vermoedelijk een (onder)officier. Naast een benen fluitje had hij 2 zilveren kettingen en een zilveren medaille bij. Ook soldaat 15 valt op. Hij droeg een gouden ketting en een zilveren hangertje. Soldaat 20 staat voor een gevarieerd aanbod (een zilveren, patriottische ring met Duits Kruis, een pijp, zakmessen, een geldbeurs met 9 muntjes, een potlood, een lepelbak en een verwijderd zakhorloge).

Dat 10 soldaten een identificatieplaatje bijhadden is zonder meer uniek te noemen.
Ze behoren tot het 15. Königlich Sächsisches Infanterie-Regiment Nr. 181 en bijna uitsluitend tot klasse 1916. Eén uitzondering is van de klasse 1915.

Ook het fysisch-antropologisch onderzoek leverde verrassende resultaten op.
Omdat heel wat skeletten peri mortem-traumata[12] vertoonden, veroorzaakt door granaatvuur of kogels, haalde fysisch-antropologe Kim Quintelier buitenlands expertise in huis. Ze deed een beroep op de forensische ploeg van Cranfield University[13]. Hun rapport is hierna integraal overgenomen.
Dertien verschillende individuen vertoonden dergelijke letsels. Zesmaal werden barsten in de voetbeentjes en de knieschijven geconstateerd; viermaal kwamen vlinderbreuken aan de ribben voor. Ook breuken van de lange beenderen kunnen aan ontploffingen te wijten zijn. Ten slotte is er ook bot gevonden, waarin stukjes shrapnel vastzaten. Ze hadden een stervormige breuk veroorzaakt.
Blootstelling aan ontploffingen wordt als bijzonderste oorzaak aangegeven.
Bij Otto Weidhaas (°12/12/1897, gesneuveld bij Wijtschate op 29 mei 1917[14]) was de helm niet verwijderd. Bij nog twee andere gesneuvelden (soldaat 8 en 12) werden helmresten (voering, bevestiging) geconstateerd. Vermoedelijk heeft dat met de impact te maken, waaraan ze zijn blootgesteld. Bij Weidhaas werden geen andere traumata vastgesteld.

[12] Vlakbij of op het moment van de dood veroorzaakt.
[13] Met dan aan kolonel SBH buiten dienst Yvan Vandenbosch, die bemiddelde bij de Volksbund Deutsche Kriegsgräberfürsorge om het skeletmateriaal langer beschikbaar te hebben.
[14] http://www.volksbund … Hier vond Jan Decorte ook informatie over Willy Roth, Kurt Schönherr, Walter Bonitz en Gerhard Meyer.

Willy Roth (°25/11/1897) vertoonde peri mortem-traumata op de linkerhand en de linkervoet. Hij was nog geen twintig jaar, toen hij op 30 mei 1917 vermist raakte bij Mesen.
Bij Otto Seidel (°13/05/1889) vallen geen peri mortem-traumata op. Hij viel bij Wulvergem op 31 mei 1917.
Rudolf Riedel (°30/05/1897) was er het ergst aan toe. Men herkende peri mortem-traumata op de linker onderarm, het linker bovenbeen, het rechter spaakbeen, de heup en de linkervoet.
Bij Kurt Schönherr (°27/01/1894) komen er geen voor. Hij vond de dood bij Mesen op 29 mei 1917.
De ribben van Franz Jeidlev (°?) vertonen enkele peri-mortem-traumata.
Bij Roman Wasniewski (°07/08/1897) zijn peri mortem-traumata te zien op de rechter boven- en onderarm.
Walter Bonitz (°02/09/1895) had peri mortem-traumata op de ribben en de linkervoet. Hij kwam om bij Wijtschate op 29 mei 1917.
Gerhard Meyer (°31/11/1892) was 24 jaar oud toen hij sneuvelde bij Wijtschate. Hij vertoont geen peri mortem-traumata.

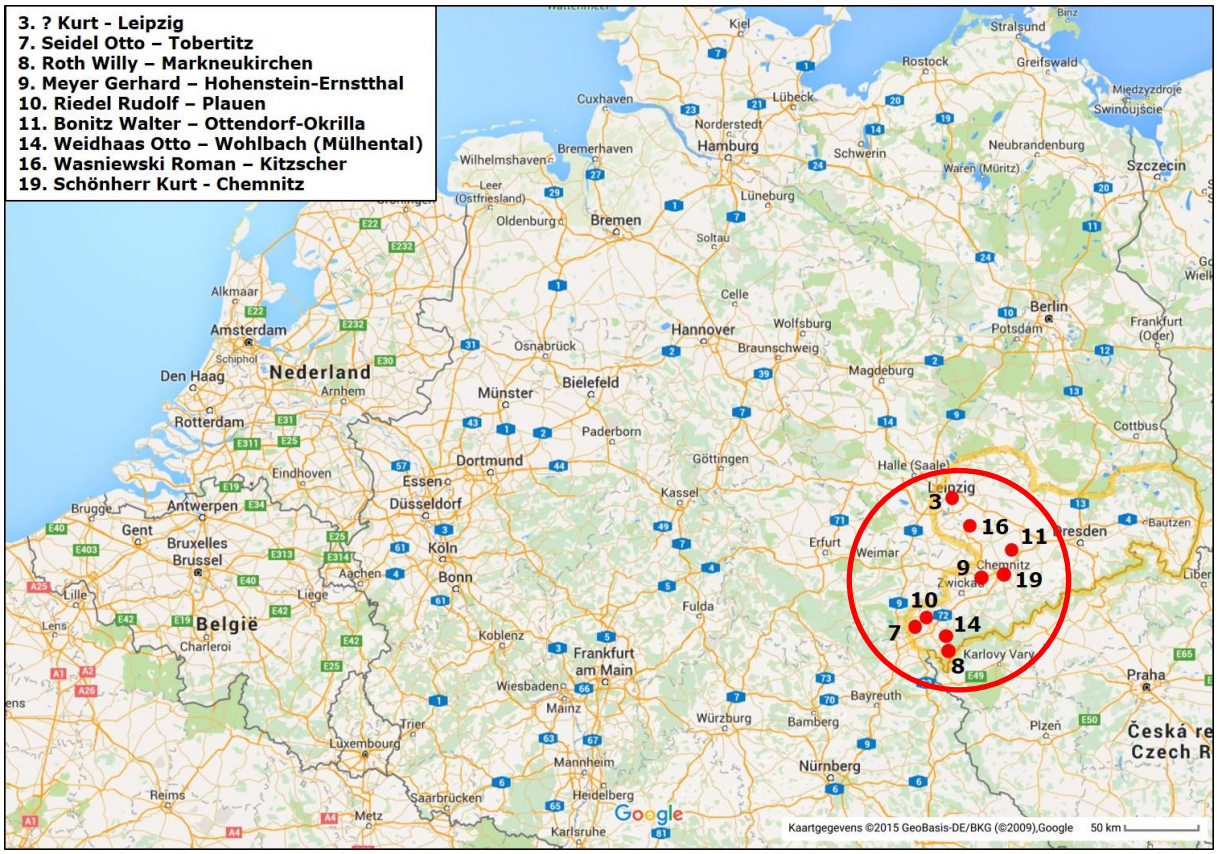


Fig. 14 Kaartje, waarop de herkomst van 9 geïdentificeerde soldaten is aangegeven. Van Franz Yeidlev is de geboorteplaats onleesbaar! Ze komen uit het westelijk deel van de deelstaat Saksen, in vogelvlucht 700 km ten oosten van Ieper (geel omrand).

4 knopen in bot (Ø: 1,3 cm) met 2 gaten en standaard knoop ‘kroon” (Ø: 2,1 cm)

Volledig metalen zakmes (lengte: 12,85 cm, breedte: 2,1 tot 3 cm) ((https://www.worthpoint.com/worthopedia/ww1-german-soldiers-pocket-trench-knife-mercator)

2 fragmenten van een epaulet met knoop nummer 13 (links) en 2 standaard knoophaken van de achterzijde Feldrock uniform ‘kroon’ (rechts).

Fragment van een wollen kous, Verschillende fragmenten van lederen bretellussen, Fragmenten uniform met linker- en rechterzijhaak (gordelsteun)

Linker- en rechterinfanterielaars met spijkerzool en lederen tag ‘BA XIX 14 28/5’

Daarnaast nog een Mauserclip type 2 en 2 zinken broeksknopen (Ø: 1,7 cm) met 3 en 4 gaten.

Soldaat 2

Fragment loopgraafaansteker (https://www.pinterest.com.au/pin/555490935268905655)
Weer en wind konden de vlam niet doven. Let op het bevestigingsoog.

Zilveren, patriottische ring met wapenschild ‘1914-17’

3 fragmenten koperen zijhaak Britse uniformjas

Linker- en rechterveterschoen met lederen tag “BA XIX 14 30/7”

6 zinken knopen (Ø: 1,2 cm) met 2 gaten
6 zinken knopen (Ø: 1,8 cm) met 4 gaten
Zinken knoop (Ø: 1,6 cm) met 3 gaten
3 fragmenten van ijzeren spangespen broek Feldrock
2 fragmenten bevestigingsogen van standaard knopen
Fragment lederen bretellus
Lederen verbinding van achterzijde bretellen
Verschillende uniformfragmenten Feldrock
Fragment van een kous van linker- en rechtervoet

Soldaat 3: Kurt …….

Kurt
Leipzig = R. E..nt
str 27 10.11.97 2. Ers
J.R. 107 1. Re Kr. Dep. Nr. 1?
XIX
181.R.9.K
273A

Naamplaatje (September 1915 pattern discs)

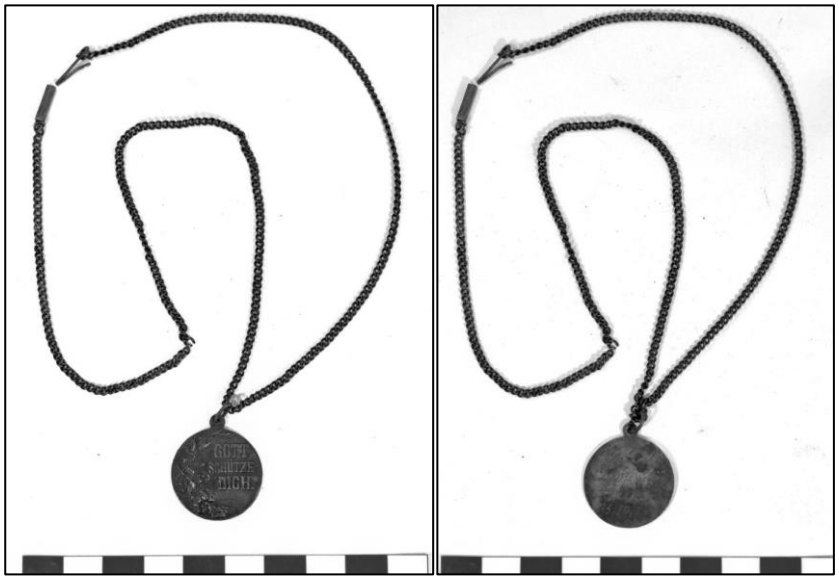
IJzeren omhulsel van een zakhorloge

Prop papier (mogelijk afkomstig van een boekje)

Linker- en rechter infanterielaars met spijkerzool en 2 treklussen; binnenzijde stempel ’8/7’

4 zinken knopen (Ø: 1,8 cm) met 4 gaten
Koperen knoop (Ø: 1,7 cm) met 3 gaten
2 zinken knopen (Ø: 1,3 cm) met 2 gaten
Fragment epaulet met koperen knoop nummer 13
3 standaard knopen ‘kroon’ (Ø: 2 cm)
2 fragmenten van een zijhaak Feldrock uniformjas
1 fragment standaard knoophaak en een standaard knoophaak ‘kroon’ van achterzijde Feldrock uniformjas
3 kogelpunten (Ø: 0,8 cm, 0,8 cm en 0,8 cm)
IJzeren spijker of beitel (lengte: 0,9 cm, vierkante kop: 0,1 cm)
7 fragmenten van lederen bretellussen
2 standaard knopen ‘Kroon’ (Ø: 2 cm)
Fragment epaulet met knoop nummer 13
Fragmenten Feldrock uniform met rode bies
Lederen verbindingsstuk van een bretel met restant van gesp/ring
Fragment linker en rechter wollen kous en binnenvoering van een laars
4 spijkers (Ø: 0,4 cm)
Spijker (lengte: 8,8 cm en doorsnede 1,1 cm bij 1,1 cm)

Soldaat 4



Zilveren ketting met hangertje (Ø: 2,3 cm) met inscriptie “GOTT SCHÜTZE DICH” op de voorzijde en inscriptie “In Liebe v. Deinen Treuen Grete 23.10.15” op de achterzijde.

Ronde zilveren medaille (Ø: 2,8 cm) met op de achterzijde een straalpatroon en op de voorzijde “Gotte Schütze Dich 14.4.17” en een anagram AG

2 koperen kraagknopen “Sachsen” (Ø: 2,8 cm)

Fragment van de spangesp van een bretel

Fragment benen fluitje (Ø: 2,1 cm, bewaarde lengte: 6,5 cm
(https://www.warsendshop.com/products/ncos-whistles)


Fragment Feldrock uniformbroek van linker- en rechterbeen

4 standaard knopen ‘kroon’ (Ø: 2 cm)
2 standaard taille knoophaken ‘kroon’
Koperen zijhaak van Feldrock uniformjas
7 zinken knopen (Ø: 1,7 cm) met 3 gaten
3 zinken knopen Ø: 1,8 cm) met 4 gaten
Knoop in bot (Ø: 1,5 cm) met 4 gaten
2 knopen (Ø: 1,1 cm) met 4 gaten
Koperen tentzeil-oogring (Ø: 3,1 cm)
6 koperen tentzeil-oogringen (Ø: 1,9 cm)
Afgevuurde kogelpunt (Ø: 0,8 cm)
5 lederen bretellussen met 2 zinken knopen (Ø: 1,9 cm) met 4 gaten en elastische touwtjes van bretellen
Klein zinken ringetje of fragment van een knoop (Ø: 1,1 cm)
Fragmenten Feldrock uniform
Fragmenten van een ampul

Fragment van een Feldrock uniform broek met ijzeren spangesp (lengte: 3,44 cm, breedte: 2,7cm, dikte: 0,35 cm)

Soldaat 5

Potlood (Ø: 0,8 cm, bewaarde lengte: 6 cm) met opschrift “KOH-I-NOOR en COPYING-INH”(links), potlood (Ø: 0,8 cm, bewaarde lengte: 7 cm) zonder opschrift(rechts).

Linker en rechter infanterielaars met spijkerzool en lederen tag ‘BA XIX 16 28/6’

Koperen zijhaak van Feldrock uniform met 8 gaten op achterplaat

2 standaard knoophaken van de achterzijde Feldrock uniform ‘Kroon’
3 standaard Feldrock uniform knopen ‘kroon’ (Ø: 1,8 cm)
Zinken bretelknoop (Ø: 1,8 cm) met 4 gaten
Houten knoop (Ø: 1,4 cm) met 4 gaten
Kogelpunt met loden kern (Ø: 0,9 cm, lengte: 3,2 cm, lengte kern: 2 cm, Ø: 0,7 cm)
Fragment van een Feldrock uniform met restant van een koperen zijhaak
Geplooide ijzeren plaat. Versteviging stok of bajonetschede? (lengte: 4,26 cm, breedte: 2 cm)
Verschillende fragmenten van een Feldrock uniform

Soldaat 6

Zinken kapje met oog van een ??fluitje (Ø: 1,6 cm, lengte: 2,2 cm)

Linker en rechter infanterielaars met spijkerzool en lederen tag ‘BA XIX 16 16.104.R 26/8’

Koperen tentzeil-oogring (Ø: 2,9 cm)
4 koperen tentzeil-oogringen (Ø: 1,8 cm)
2 koperen Feldrock broeksknopen (Ø: 1,7 cm) met 3 gaten
Standaard Feldrock uniformknoop ‘kroon’ (Ø: 1,8 cm)
Fragmenten van een Feldrock uniform
Lederen verbindingsstuk van een bretel
Angel bretelgesp
Fragment spijker (Ø: 0,3 cm, lengte: 4,4 cm)

Soldaat 7: Otto Seidel

OTTO SEIDEL
TOBERTITZ 13.5
1. Ers. Batll I.R. 134
I.R. 134 37 171

13.05.89
Gefreiter – Sachsen 422

Zinken naamplaatje (November 1916 pattern discs)

4 koperen tentzeil-oogringen (Ø: 3,3 cm) (links) en 15 koperen tentzeil-oogringen (Ø: 1,9 cm) (rechts) (Kraus 2004, 621)

Zilver/zwart lint van medaille IJzeren kruis (Iron Cross) (lengte: 8 cm, breedte: 3 cm) (http://quanonline.com/military/military_reference/german/imperial/medals/primc.php)

Koperen ring (Ø: 2,2 cm,??? 0,4 cm breed), zonder versiering of inscriptie

2 koperen kraagknopen “Sachsen” (Ø: 2,5 cm)

Verschillende fragmenten van Feldrock uniformbroek

Linker en rechter infanterielaars met spijkerzool en lederen tag ‘BA XIX 15 29/6’

30 zinken knopen (Ø: 1,7 cm) met 3 gaten
Koperen zijhaak van Feldrock uniform
Witte porseleinen knoop (Ø: 1,1 cm) met 2 gaten
2 standaard Feldrock uniformknopen ‘kroon’ (Ø: 2,1 cm)
2 epauletknopen (Ø: 1,8 cm) met nummer 3
4 zinken knopen (Ø: 1,6 cm) met 4 gaten en kartonnen kern
3 dubbele lederen bretellussen
2 lederen bretelkoppelingen met restant van de ijzeren bevestiging

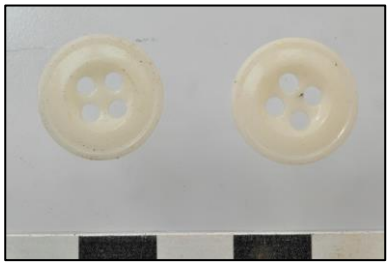
Soldaat 8: Willy Roth

WILLY ROTH
MARKNEUKIRCHEN I.V. BERGSTR. 62
25.11.97
BATR IR 134 1 RUKR.UE 391

J.R. 181 1. K. Nr 795

Zinken naamplaatje (November 1916 pattern discs)

Koperen munt 1 Pfennig



2 witte porseleinen knopen (Ø: 1,7 cm) met 4 gaten

Potlood (Ø: 0,8 cm, lengte:6,4 cm)

Houten schroefstummel pijp met jachtscène, ketel (Ø: 2,8 cm, hoogte: 5 cm), kop bolle zak (Ø: 2,25 cm), steel (Ø: 1,4 cm)

Vouwset van lepel en vork (http://www.5throhr-kbilr.com/sturm/images/unif-gear/essbesteck3.JPG)

Linker en rechter soldatenschoen/-bottine met spijkerzool en lederen tag ‘BA XIX 16 8/8’

2 zinken knopen (Ø: 1,8m) met 3 gaten
7 zinken knopen (Ø: 1,8 cm) met 4 gaten
2 standaard Feldrock uniform knopen ‘kroon’ (Ø: 1,9 cm)
Fragment rand ‘stahlhelm’
Lederen bevestigingslap met bretellus
linker en rechter wollen sok
Verschillende fragmenten van Feldrock uniform

Soldaat 9: Gerhard Meyer

Gerhard Meyer
Hohenstein – F. Karlstr. 25
31.11.92

J.R. 181 2.K. Nr. 465

Zinken naamplaatje (November 1916 pattern discs)

EYER GER
OBELN

181
2
465

Zinken naamplaatje (1879 pattern discs)

Bevestigingsslotje van zakhorloge met ketting (zakhorloge en ketting ontbreken)

Epaulet met knoop nummer 2 (Ø: 1,1 cm) en geborduurd nummer 1

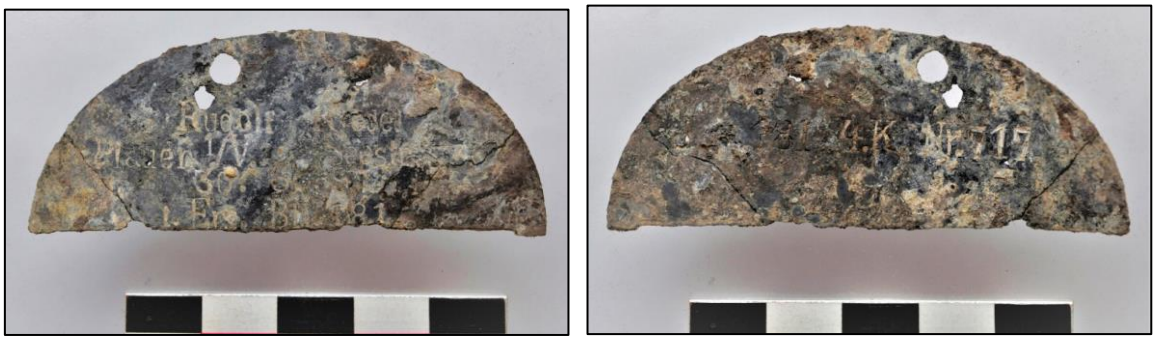
Vierkant lederen beursje (8,2 cm bij 7,9 cm, dikte: 0,2 cm) met koperen drukslotje (geen inhoud) en bovenaan 2 perforaties voor een touwtje

Fragmenten Feldrock uniform met rode bies

Linker en rechter infanterielaars met spijkerzool en lederen tag ‘BA XII 15 103.R 29/6’

2 standaard knoophaken van de achterzijde Feldrock uniform ‘kroon’
Koperen tentzeil-oogringen (Ø: 3,3 cm)
3 koperen tentzeil-oogringen (Ø: 1,9 cm)
6 standaard Feldrock uniformknopen ‘kroon’ (Ø: 2 cm)
3 zinken knopen (Ø: 1,8 cm) met 4 gaten
13 zinken knopen (Ø: 1,7 cm) met 3 gaten
Witte porseleinen knoop (Ø: 1,1 cm) met 4 gaten
Elastische touwtjes van bretellen met restant spangesp
Lederen verbindingsstukken en bretellussen

Soldaat 10: Rudolf Riedel



Rudolf Riedel
Plauen 1 N. Seestr.
30.5.97
1 Ers BA 181

J. … 181 4.K. Nr. 717

Zinken naamplaatje

Linker en rechter infanterielaars met spijkerzool en 2 treklussen, aan de binnenzijde stempel ‘K14’

Zinken tentzeil-oogringen (Ø: 3,3 cm) en zinken tentzeil-oogringen (Ø: 0,19 cm)
Zinken knoop (Ø: 1,9 cm) met 4 gaten
13 zinken knopen (Ø: 1,7 cm) met 4 gaten
Elastische touwtjes van bretellen met restant van een spangesp
Fragmenten Feldrock uniformbroek

Soldaat 11: Walter Bonitz:

Walter Bonitz
Ottendorf 1/Sa
(2). 9. 95.
II. Ers. BA ….. 8

J.R. 181 3K. Nr. 624

Zinken naamplaatje (November 1916 pattern discs)


Rechter infanterielaars met spijkerzool en lederen tag (tag ontbreekt)

2 koperen tentzeil-oogringen (Ø: 3,4 cm)
3 koperen tentzeil-oogringen (Ø: 1,9 cm)
2 standaard taille knoophaken van de achterzijde Feldrock uniform ‘kroon’
Koperen zijhaak Feldrock uniformjas
Standaard Feldrock uniformknoop ‘kroon’ (Ø: 2,5 cm)
2 standaard Feldrock uniformknopen ‘kroon’ (Ø: 1,9 cm)
4 zinken knoop (Ø: 1,7 m) met 3 gaten
Fragment wollen sok
5 fragmenten Feldrock uniform jas en -broek

Soldaat 12

2 koperen sluithaakjes van kraag Feldrock uniformjas


Fragment medaillelint (breedte: 1,8m) (https://militaryantiquesmuseum.com/medals-ml785-wwi-german-2-place-medal-bar-1.10067.18.military-antiques)

Kinriem met spangesp en oog van staalhelm (lengte: 37 cm, breedte: 1,6 cm, dikte: 0,2 cm) (Kraus 2004, 102)

Linker en rechter infanterielaars met spijkerzool en lederen tag ‘BA XIX 15 27/8’ (de treklussen ontbreken)

3 koperen tentzeil-oogringen (Ø: 3,3 cm)
9 koperen tentzeil-oogringen (Ø: 1,9 cm)
21 zinken knopen (Ø: 1,7 cm) met 3 gaten
5 zinken knopen (Ø: 1,8 cm) met 4 gaten
5 zinken knopen (Ø: 1,7 cm) met 3 gaten
8 zinken knopen (Ø: 1,7 cm) met 4 gaten
Standaard taille knoophaak ‘kroon’ en fragment standaard GS taille knoophaak ‘kroon’
8 standaard Feldrock uniformknopen ‘kroon’ (Ø: 1,8,5 cm)
Koperen zijhaak Feldrock uniformjas
Verschillende lederen verbindingstukken en lussen van bretellen
Fragmenten van linker en rechter wollen kous
Papieren fragment van een document of boekje
Fragment Feldrock uniform

Soldaat 13: Franz Yeidlev

Yeidlev Franz
E.lme. Baden
2
I Ers Batl – Nr 181

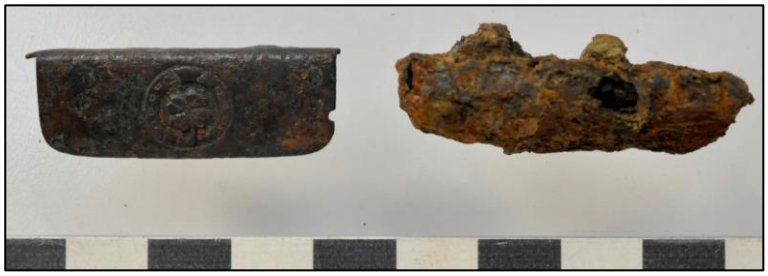
J.R. 181 … K Nr.42 A

Zinken naamplaatje (November 1916 pattern discs)

Koperen ring (Ø: 2 cm), versierd met een hartje

Potlood (Ø: 0,8 cm, lengte: 4,1 cm) zonder markeringen

Potlood, zeshoekig (Ø: 0,8 cm, lengte: 4,9 cm) met markering “ICHELANGELO Nº 2”



2 koperen versierde (hoefijzer en bloem) sluitgespen van bretel (lengte: 3,8 cm, breedte: 1,4 cm)

Rubberen condoom

Zilver/zwart lint van medaille IJzeren kruis (Iron Cross) (lengte: 9,4cm, breedte: 2,9 cm)
(http://quanonline.com/military/military_reference/german/imperial/medals/primc.php)


Linker en rechter infanterielaars met spijkerzool en 2 treklussen, binnenzijde stempel ‘28/8 en inscriptie op onderzijde zool ‘28/8’, hielinscriptie ’B 28 III XII’ onderaan.

Koperen tentzeil-oogring (Ø: 3,4 cm)
5 koperen tentzeil-oogringen (Ø: 1,9 cm)
14 zinken knopen (Ø: 1,7 cm) met 3 gaten
3 zinken knopen (Ø: 1,8 cm) met 4 gaten
4 zinken knopen (Ø: 1,2 cm) met 2 gaten
3 zinken knopen (Ø: 1,7 cm) met 2 gaten
Standaard taille knoophaak ‘kroon’ en fragment standaard taille knoophaak ‘kroon’
6 standaard Feldrock uniformknopen ‘kroon’ (Ø: 1,9 cm)
Bakelieten knoop (Ø: 1,8 cm) met 4 gaten
Koperen zijhaak Feldrock uniformjas
IJzeren Feldrock broeksgesp met 2 angels (lengte: 3,5 cm, breedte: 2,5m, dikte: 0,4 cm)
Leer van bretelbevestiging, bestaande uit koppelstukken en lussen
Enkele touwfragmenten
Wollen kous

Soldaat 14: Otto Weidhaas


Otto Weidhaas
Wohlbach
12.12.97


ERS. BATL.
107. 2. K. 1152
134. 3. K. ?849

Zinken naamplaatje (November 1916 pattern discs))

Bakelieten pijp met koperen ring op het uiteinde van de steel, kop (Ø: 2,4 cm, totale lengte: 6,9 cm)

Fragment staalhelm met lederen binnenband en lederen kinriem (Kraus 2004, 102)

Linker en rechter infanterielaars met spijkerzool en 2 treklussen, binnenzijde stempel ‘28/8’, hielstuk rechter laars ontbreekt

Lederen verbindingsstukken en lussen van bretel
Linker wollen sok en fragment van rechter wollen sok
Fragmenten Feldrock broek
Koperen zijhaak Feldrock uniformjas
2 fragmenten standaard taille knoophaken van achterzijde Feldrock uniform ‘kroon’
2 zinken knopen (Ø: 1,7 cm) met 3 gaten
Zinken knoop (Ø: 1,8 cm) met 4 gaten
Witte porseleinen knoop (Ø: 1 cm) met 4 gaten

Soldaat 15

Kleine gouden ketting met 2 sluitogen (lengte: 9,5 cm)

Zilveren hangertje (Ø: 1,8 cm, dikte: 0,1 cm), versierd met een bloem en de inscriptie “Dies Blümlein Spricht”

Koperen D-vormige gesp van een kogeltas

Potlood (Ø: 0,8 cm, lengte: 6,3 cm) met metalen kapje op het uiteinde

Restanten van een luciferdoosje met lucifers

Lederen geldbeursje (lengte: 9,3 cm, breedte: 6,7 cm) met een zinken?? munt van 1 Pfennig (Ø: 2,2 cm)

Koperen kruitbuis van een shrapnelgranaat

Linker en rechter infanterielaars met spijkerzool en lederen tag met inscriptie ‘BA XIX 16 30/5’ (de treklussen ontbreken)

2 steelfragmenten van witte kleipijp (Ø: 0,6 cm)

2 zijhaken van Feldrock uniform met 8 gaten op de plaat aan de achterkant
Koperen tentzeil-oogring (Ø: 3,4 cm)
6 koperen tentzeil-oogringen (Ø: 1,9 cm)
Uniformfragment met 2 standaard knopen ‘kroon’ (Ø: 2 cm)
8 standaard knopen ‘kroon’ (Ø: 2 cm)
14 zinken knopen van tentzeil-oogringen (Ø: 1,7 cm) met 3 gaten
3 zinken broeksknopen (Ø: 1,8 cm) met 4 gaten
Zinken knoop (Ø: 1,7 cm) met 4 gaten
2 benen knopen (Ø: 1,3 cm) met 2 gaten
2 steelfragmenten van witte kleipijp (Ø: 0,6 cm)
6 fragmenten van bretelgespen
2 fragmenten standaard taille knoophaak van de achterzijde Feldrock uniform ‘kroon’ en een volledige taille knoophaak
Verschillende fragmenten van Feldrock uniform broek en jas
Fragment binnenvoering laars
Lederen fragmenten van bretellen, bestaand uit lussen en verbindingstukken

Soldaat 16: Roman Wasniewski

Roman Wasniewski
Kitscher
7.8.97
1. Ers. BTL. I.R. 133

J.R. 181. 12. K. Nr. 78

Zinken naamplaatje (November 1916 pattern discs)


Hangertje in tin-zink legering; voorzijde: Jezusbuste met aureool, achterzijde: Maria met kind en opschrift “REGINA SACR SCAPULARIS O.P.N.”

Koperen kraagknoop (Ø: 2,6 cm) “Sachsen”


Verkoperde ring, versierd met een Maltezer kruis (Ø: 2,2 cm)


Linker en rechter infanterielaars met spijkerzool en 2 treklussen, inscriptie op de onderzijde van de zool ‘28/5’

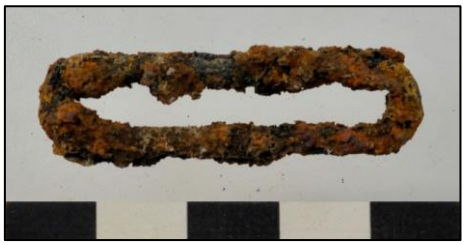
14 zinken tentzeil-knopen (Ø: 1,7 cm) met 3 gaten
Zinken broeksknoop (Ø: 1,9 cm) met 4 gaten
Zinken knoop (Ø: 1,4 cm) met 4 gaten
Knoop (Ø: 1,1 cm) met 2 gaten
8 standaard GS knopen ‘kroon’ (Ø: 2,1 cm)
Zinken knoop (Ø: 1,7 cm) met 4 gaten
Fragmenten standaard taille knoophaak van achterzijde Feldrock uniform
IJzeren spangesp van bretel
Bruin-zwart gestreepte uniformstof
Lederen fragmenten van bretellen

Soldaat 17

Fragmenten Feldrock uniform
Fragment van een wollen kous

Soldaat 18


Zilveren patriottische ring, aan beide zijden versierd met een bladmotief; centraal op de ring een Maltezer kruis (Ø: 2 cm)



Ovalen bretelring (4,2 cm bij 1,1 cm en 0,3 cm dik)

Dubbele ringgesp zonder angel (4 cm bij 2,3 cm en 0,3 cm dik)

Houten mondstuk (roer) van pijp (lengte: 5,2 cm, Ø: 1,6 cm)

Porseleinen knoop (Ø: 1,6 cm) met 4 gaten
Standaard taille knoophaak van achterzijde Feldrock uniform ‘kroon’
3 koperen zijhaken Feldrock uniformjas
Standaard knoop ‘kroon (Ø: 1,9 cm)
5 zinken tentzeilknopen (Ø: 1,7 cm) met 3 gaten
3 zinken broeksknopen (Ø: 1,8 cm) met 4 gaten
3 zinken broeksknopen (Ø: 1,7 cm) met 4 gaten
Koperen tentzeil-oogring (Ø: 2 cm)
Lederen fragmenten van bretellen, bestaande uit lussen en verbindingstukken
Wollen linker kous
Verschillende fragmenten Feldrock uniformbroek en -jas

Soldaat 19: Kurt Schönherr

Kurt Schönherr
Chemnitz Glauchauerstr 9
27.1.94

JR 181 3 MOK 32

Zinken naamplaatje (November 1916 pattern discs))

Koperen kraagknoop (Ø: 2,5 cm) “Sachsen”

Zilver/zwart lint van medaille IJzeren kruis (Iron Cross) (lengte: 8 cm, breedte: 3 cm)

Linker en rechter infanterielaars met spijkerzool en lederen tag met inscriptie ‘BA XIX 16 28/7’ (de treklussen ontbreken); wollen binnenzool

Standaard knoop ‘kroon’ (Ø: 1,8 cm)
12 standaard knopen ‘kroon’ (Ø: 2 cm)
6 zwarte bakelieten knopen (Ø: 1,9 cm) met 4 gaten
2 zinken tentzeilknopen (Ø: 1,7 cm) met 3 gaten
8 zinken tentzeilknopen (Ø: 1,8 cm) met 3 gaten
Zinken knoop (Ø: 1,1 cm)
Fragment stoffen riem van broek met ijzeren spangesp
2 fragmenten standaard taille knoophaken van achterzijde Feldrock uniform
2 zijhaken van Feldrock uniform met 8 gaten op achterplaat
2 spanplaatjes van bretelgesp
2 fragmenten bretelgesp
4 zinken broeks/bretelknopen (Ø: 1,8 cm) met 3 gaten
2 fragmenten lederen verbindingsstukken van bretel
Fragment linker en rechter kous en broekspijp
2 fragmenten spijker
Restant hersenen

Soldaat 20


Zilveren patriottische ring; wapenschild, maltezer kruis in stempel ‘800’

Beschermkapje voor de loop van een Mauser geweer

Epauletknoop (Ø: 1,9 cm), nummer 1

Mauser patroon clip type 1

2 fragmenten van één zinken lepel

Aniline potlood (Ø: 0,9 cm, lengte: 5,8 cm); opschrift 1020 * 20 ‘othello’

Mondstuk(roer) van pijp (Ø: 1,3m, lengte: 3,6 cm)

Zakmes met houten handvat (lengte: 12 cm, breedte: 3,3 cm)

Zakmes met houten handvat en kurkentrekker (lengte: 11,3 cm, breedte: 2,7cm)

Lederen geldbeursje (10,3 cm bij 6,9 cm); 9 munten (1 Pfennig 1901 (koper), 2x 5 Pfennig 1900 en 1889 (zilver), 4x 10 Pfennig 1917 (koper), 2 cent (koper) en 25 cent 1917? (zink)

Koperen sleuteltje zakhorloge (lengte: 1,9 cm, breedte: 1 cm, dikte: 0,1 cm)

Linker en rechter infanterielaars met spijkerzool en lederen tag met inscriptie ‘BA XIX 16 134.R 28/7’ (de treklussen ontbreken)
2 zijhaken van Feldrock uniform
2 standaard taille knoophaken van achterzijde Feldrock uniform
5 standaard knopen ‘kroon’ (Ø: 2 cm)
Koperen tentzeil-oogring (Ø: 1,8 cm)
4 zinken tentzeilknopen (Ø: 1,8 cm) met 3 gaten
2 zinken tentzeilknopen (Ø: 1 cm) met 2 gaten
Zinken knoop (Ø: 1,7 cm)
Kogelpunt (Ø: 0,8 cm, lengte: 3,3 cm), afgevuurd
4 lichtkogels (Ø: 2,8 cm/11 inch)
Lederen lussen en verbindingstukken van bretellen
Spijker van kist (Ø: 0,3 cm, lengte: 6,4 cm)

Soldaat 21

2 fragmenten manchet Feldrock met rode bies en standaard GS knoop ‘kroon’ (Ø: 2,1 cm) (Kraus 2004, 142)

Fragment linker en rechter schoen (bottine) met spijkerzool; hoefijzer op de hiel

11 standaard knopen ‘kroon’ (Ø: 2 cm)
Standaard knoop ‘kroon’ (Ø: 2 cm)
2 zinken tentzeil-knopen (Ø: 1,7 cm) met 3 gaten
Benen knoop (Ø: 1,7 cm) met 2 gaten
2 fragmenten Feldrock uniform met rode bies met zijhaak en taille knoophaak ‘kroon’
Fragmenten Feldrock uniformbroek en -jas
Fragment rechter wollen kous

Soldaat 22


Koperen spansluiting van bretelgesp, versierd met driehoeken


Zakmes, zijkanten in bot, bestaande uit een mes en een kurkentrekker (lengte: 12 cm, breedte: 3,5 cm, dikte: 2,5 cm)

Papierfragmenten

Linker en rechter infanterielaars met spijkerzool en lederen tag met inscriptie ‘BA XIX 15 30/5’ (de treklussen ontbreken)

3 koperen tentzeil-oogringen (Ø: 3,1 cm)
8 koperen tentzeil-oogringen (Ø: 2 cm)
22 zinken tentzeil-knopen (Ø: 1,7 cm) met 3 gaten
Zijhaak van Feldrock uniform
Standaard taille knoophaak van achterzijde Feldrock uniform ‘kroon’
Fragmenten bretelgesp
Spangesp achterzijde Feldrock broek
3 standaard knopen ‘kroon’ (Ø: 2 cm)
Porseleinen knoop (Ø: 1 cm) met 4 gaten
Kogelpunt (Ø: 0,8 cm, lengte: 3,3 cm - afgevuurd)
Fragment Feldrock epaulet
Lederen fragment bretel
Verschillende fragmenten Feldrock uniform

6 BESLUIT

Bekeken vanuit de begravingsgewoonten van gesneuvelde soldaten tijdens de Eerste Wereldoorlog, is hier duidelijk sprake van een geïmproviseerde begraving, die niet het gewenste verlengstuk heeft gekregen. De overbrenging naar een reguliere begraafplaats heeft door omstandigheden niet kunnen plaatsvinden.

In mei 2015 zijn ze alsnog aan het licht gekomen. Op 16 oktober 2015 hebben ze de eeuwige rust gevonden in het Deutscher Soldatenfriedhof in Langemark (fig. 15). Ze werden bijgezet in het Kameradengrab, waarin bijna 25.000 niet-geïdentificeerde gesneuvelden begraven liggen.

Fig. 15 Herbegraving in het Kameradengrab in Langemark.

De gesneuvelden zijn in uniform, maar ontdaan van hun gordel, bijgezet. In een enkel geval had de gesneuvelde nog z'n helm op. Sommige hadden nog persoonlijke bezittingen bij. Uitzonderlijk horen daar gouden of zilveren kettingen, hangertjes of ringen bij. Eretekens en zakhorloges waren wel verwijderd.

Op 10 gesneuvelden vond men ter hoogte van de borststreek een identificatieplaatje. De touwtjes waren vergaan. Op de plaatjes waren naam, adres, geboortedatum, stamnummer en andere regimentsinformatie aangebracht. De meeste waren prille twintigers; sommigen waren zelfs nog geen 20 jaar oud! Uitzondering vormden 2 dertigers.
Bijna allen behoorden ze tot het 15. Königlich Sächsisches Infanterie-Regiment Nr. 181, dat in Chemnitz in Oost-Duitsland gelegerd was.

Het fysisch-antropologisch onderzoek, uitgevoerd door Cranfield University, had een grote toegevoegde waarde door het vaststellen van heel wat peri mortem-traumata.
Bij recente toevalsvondsten in Poelkapelle zijn trouwens opnieuw talrijke peri mortem-traumata opgedoken. Het lijkt erop dat de oorlog in 1917 verhardt, de beschietingen intenser worden en de explosieven krachtiger en dodelijker.

7 GERAADPLEEGDE LITERATUUR

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Report on the examination of human remains:

22 Casualties from the First World War

Cranfield Forensic Institute

5th May 2016

ANTHROPOLOGICAL EXAMINATION OF 22 GERMAN SOLDIERS WHO FELL NEAR MESSINES, BELGIUM

ANTHROPOLOGISCHE UNTERSUCHUNG VON 22 DEUTSCHEN SOLDATEN, WELCHE NAHE MESSINES, BELGIEN, FIELEN

	Name	Position	Signature	Date
Author	Emma Saunders	PhD candidate in Anthropology		06/05/2016
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all of the **Cranfield Forensic Institute (CFI)**

Our Case Reference Number: FHA15

Flanders Heritage Agency Ref Number: ME-GA-15

Non-technical Summary/Nicht-technische Zusammenfassung

In September 2015, a team from Cranfield Forensic Institute (CFI), led by lecturers Nicholas Márquez-Grant and Roland Wessling and five experienced graduates of the Forensic MSc Programme at CFI, completed the analysis of skeletal remains of 22 presumed German WWI casualties. The investigations took place on the invitation of and at the premises of the Flanders Heritage Agency, Zellik, Brussels.

The anthropological examination aimed to confirm the number of individuals, and obtain information on their identity such as their age when they died, whether they are all males, obtain their height and any other information on their physical features. In addition, observations were made on whether or not the casualties had suffered any injuries.

The anthropological methods and techniques used during the examination were exclusively at internationally agreed best practice level. Details of the examination results can be found in each individual section in the report.

In conclusion, all 22 were confirmed to have been male. The ages ranged between approximately 15 and 45 years of age at the time of death. On average, the individuals were just under 170cm tall. Ten of the 22 had presumed identities and the examination found no inconsistencies between what was known of them in life and what their skeletal remains presented.

Amongst the 22 skeletons, there were very few bone-related diseases detectable but their teeth, on the other hand, showed considerable amount of common conditions, that indicate poor oral hygiene in the period before their death and perhaps reflect their diet too.

The data collected during the examination is of course only of any value with regard to identification if there is data from the individuals when they were alive. However, the anthropological data is now available and information of soldiers can still be discovered in archives in future years to then be compared with the findings of this report.

Im September 2015 führte ein Team des Cranfield Forensic Institute (CFI), geleitet von den Dozenten Nicholas Márquez-Grant und Roland Wessling, und fünf erfahrene Absolventen des forensischen MSc Programmes der CFI, eine Untersuchung von den sterblichen Überresten von 22 vermutlichen deutschen Soldaten durch. Die Untersuchung wurde auf Anfrage der und auf dem Gelände der Flanders Heritage Agency, Zellik, Brussels, durchgeführt.

Die anthropologische Untersuchung zielte darauf hinaus, die Anzahl der Individuen zu bestätigen, Informationen hinsichtlich deren Identität zu sammeln, wie z.B. Alter als sie starben, ob sie tatsächlich männlich waren, deren Körpergröße und andere mögliche physische Eigenschaften. Darüber hinaus wurde untersucht, ob die Opfer irgendwelche Verletzungen erlitten hatten.

Die anthropologischen Methoden und Techniken, die benutzt wurden, sind ausschließlich im höchsten international anerkannten Level zu finden. Details zu den Ergebnissen der Untersuchungen können in den jeweiligen Sektionen des Berichts gefunden werden.

Zusammenfassend kann gesagt werden, dass all 22 als männlich beschrieben werden können. The Alter lagen zum Todeszeitpunkt ungefähr zwischen 15 und 45 Jahren. Im Durchschnitt waren die Individuen etwas unter 170cm groß. Zehn der 22 hatten vermutete Identitäten und die Untersuchungen fanden keinerlei Abweichungen zwischen dem, was von ihnen im Leben bekannt war und was aus ihren Knochen gelesen werden konnte.

Innerhalb der Gruppe der 22 waren sehr wenige Knochenkrankheiten, aber desto mehr Zahnkrankheiten, zu finden, die auf schlechte Zahnhygiene und möglicherweise auf ihre Ernährung in ihrem letzten Lebensabschnitt schließen lässt.

Das Sammeln der Daten während der Untersuchungen ist natürlich nur dann von Nutzen, wenn auch Informationen über sie vorhanden sind, als sie am Leben waren. Nichtsdestotrotz, die anthropologischen Daten sind nun vorhanden und falls in Zukunft Informationen über die Soldaten in Archiven gefunden werden, können die Ergebnisse dieses Berichts mit ihnen verglichen werden.

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Table of Figures

1 Information

This report outlines the anthropological analysis undertaken on the remains of 22 German World War I soldiers who were excavated from a mass grave around Messines. These soldiers are believed to have died in June 1917.

The purpose of the examination was to help with the identification of the deceased and identify something about their lives and assess any bone injuries they may have sustained perimortem.

1.1 Background

The deposition of the skeletal remains was unusual for a battlefield burial as several of the bodies: B008 (SK01), B009 (SK02), B010 (SK03), B004 (SK04), B011 (SK05), B007 (SK06), B012 (SK07), B013 (SK19), B014 (SK20), B015 (SK21) and B003 (SK22) were buried in individual wooden coffins, while others were without coffins and commingled. It is our understanding from information provided by archaeologists at Flanders Heritage Agency that this difference in burial could potentially be due to rank.

Many artefacts were identified with the remains including boots, penknife, rings, buttons, epaulettes, pencil, necklace and fragments of helmets, which assisted in the identification process. Nametags were identified on 11 of the skeletons amongst many artefacts which aided in the identification process. The artefacts were examined by Flanders Heritage Agency.

1.2 Request

We were requested by Kim Quintelier of the Flanders Heritage Agency if we could assist in the examination of the human remains and to provide any information on pathology, perimortem trauma and any other evidence which may be related to identifying the deceased prior to their reburial.

The remains were examined between the 21st and 25th September 2015, between the hours of 0900 and 1700 at the Flanders Heritage Agency, Zellik, Brussels.

1.3 Team Members

The anthropological examination was led by Dr Nicholas Márquez-Grant and supervised also by Roland Wessling. Roland Wessling supervised the team and ensured proper documentation (photography, chain of custody, 3D laser scanning) of the remains. The anthropology team from Cranfield University also comprised the following graduates: Emma Saunders, Jennifer Seward, Jessica Bolton, Claudine Abegg and Katherine Edwards

1.4 Anthropological examination

Our anthropological analysis was carried out on the 22 skeletons identified. Our skeleton numbers assigned during the examination of the remains are provided, followed by the Flanders Heritage Agency (from now on, FHA) skeletal references numbers in brackets.

- Our Ref: Bxxx (REC SKxx)

The purpose of the anthropological examination was to determine the minimum number of individuals present and to ensure that the bones/teeth belonged to the same individual in the case of any additional remains or commingling. The analysis also aimed to obtain as complete a biological profile as possible, which might assist in the identification of the deceased. This included the estimation of age-at-death, sex and

obtaining other information such as stature. Additionally, any sign of skeletal pathology and trauma was also recorded for each skeleton.

2 Technical Note One: Methods employed

The anthropological methods employed are well accepted standards within the physical/forensic anthropology community and employed internationally. The methods and their references are outlined below:

> This examination followed the guidelines set out by Buikstra and Ubelaker (1994) as well as those by Brickley and Mckinley (2004).

Age-at-death was estimated using, where possible, dental development and skeletal maturity (e.g. see Scheuer and Black, 2000), the pubic symphysis (Suchey-Brooks, 1990), the sternal en of the fourth rib (İşcan et al. 1984), the auricular surface of the innominate (os coxae) bone (methods of Lovejoy et al. 1985, and Buckberry and Chamberlain,2002). Observations on age related pathology were also taken into consideration.

Biological sex was based on the assessment of chatracteristics of the pelvis and skull, following the guidelines by Buikstra and Ubelaker (1994).

Stature was obtained using Trotter and Gleser's (Trotter, 1970) 'White Male' formulae applied to measurements of various long bones. Where possible the preferred bone to be measured was the femur and the maximum length was employed.

All the documentation, including the recording forms and photographs have been duplicated and are retained securely at Cranfield Forensic Institute, Cranfield University, Defence Academy of the United Kingdom, Shrivenham SN6 8LA.

3 Results

The results of the anthropological examination are presented below individually according to skeleton. Each description includes a brief outline of the completeness and condition of the remains, age-at-death (an age range is given), sex and any other information where possible, such as stature or unique identifying features.

Detailed information is available on request and is contained in the recording forms. This information contains a detailed skeletal (including dental) inventory, the anatomical regions and landmarks used in age and sex estimation, bone measurements, detailed anatomical variations and palaeopathological observation.

Appendix One provides a diagrammatic representation of skeletal areas that were affected by perimortem trauma, taking the sample as a total. Appendix Two provides a detailed summary of the dental information obtained for each individual. Appendix Three provides a summary of pathological conditions present in the skeletons, and Appendix Four includes a list of references.

3.1 B003 (SK22)

This skeleton is >75% complete. The carpal bones of the left hand, many phalanges of the hands and feet and the proximal ends (epiphyses) of the fibulae are missing. The skeleton is overall well preserved, with little weathering and fragmentation, and where the latter occurs is mainly to the facial bones and ribs. Additionally, brain tissue was found to be present in the cranium. There are some areas of blue staining on the surface of many of the bones, particularly the cranium and distal right femur, one possibility for this

staining is vivianite (Dupras & Schultz, 2002). There is also orange staining on the left proximal humerus, right proximal ulna, as well as both patellae, with a likelihood that this is due to iron corrosion.

Figure 1: Stitched overview of B003 (SK22)

Various traits were observed to allow an estimation of sex and were indicative of a probable male. An age over 18-20 years can be estimated, as shown by epiphyseal fusion of the long bones and partial fusion of the clavicle. The 3rd molar has erupted, also suggesting an age over 18-20 years. In addition, the age estimated from the pubic symphysis provides an age of 25.4 years with a range of 19-34 years (see Figure 2), which is roughly supported also by the auricular surface (25-29 years). There is no obvious age related pathology present on this skeleton. The overall age range from these observations suggests an age range of 20-30 years, with a wide range of 18-35 years. The estimated stature from the left femur (46.4cm) was calculated to be 171cm with an interval between 168cm and 175cm.

There is a vast amount of dental information recorded for this skeleton. For the maxilla all the dentition is present and in situ except for the right 2nd molar and left 1st molar which are loose, as well as the right 3rd molar which is not present (agenesis?). Ante-mortem tooth loss is observable on the mandible at the location of the left 1st molar and the right 2nd molar. Dental caries, enamel hypoplasia and periapical cavities are also present.

In terms of pathology, there is no observable maxillary sinusitis, cribra orbitalia or signs of degenerative joint disease and osteoarthritis; however ectocranial pitting is present on the parietal bones. Schmorl's nodes are present on the superior surface of all lumbar vertebrae (L1-L5) and the inferior surface lumbar vertebrae of L1, L2 and L5. They are also observable on the thoracic vertebrae, in particular on the superior surfaces of T5, T9, and T10 and the inferior surfaces of T5, T6, T8, T9 and T10. Bone growth (osteophytosis) is observable on the left upper articular surface of the 6th thoracic vertebrae and ankylosis is observed on the posterior surface of the spinous process and transverse process of thoracic vertebrae 4 and 5. There is also fusion of the 5th distal and intermediate phalanges of the right foot.

Figure 2: Left pubic symphysis used in age estimation (B003)

Potential perimortem trauma is apparent on several bones of this skeleton, particularly on the left calcaneus which has fissure fractures found medially. These fractures can also be seen on the body and neck of the left and right talus and cuboid. Similar cracks

are also seen on the left and right distal fibula running inferiorly to superiorly, as well as around the body of both patellae. These potentially may be a result of blast.

3.2 B004 (SK04)

This skeleton is between 50-75% complete and moderately fragmented. Many of the metatarsals and foot phalanges are absent, as well as several facial bones. The skull, vertebrae, pelvis and distal femur are fragmented and splintering is clear on many of the ribs. There are several small fragments of unidentified trabecular bone. The condition of the cortical bone is fair, with weathering particularly affecting the epiphysis of many of the long bones. There is blackening to the surface of the teeth, particularly of the mandibular dentition. A blackened staining is also present on the right parietal bone and a localised pronounced blackened stain is present on the left parietal by the coronal suture. A localised area of adhered dark coloured material is also present on the left parietal bone. Red/orange staining is clear on the superior surface of the right clavicle and the head of the left and right femur likely to be due to iron staining.

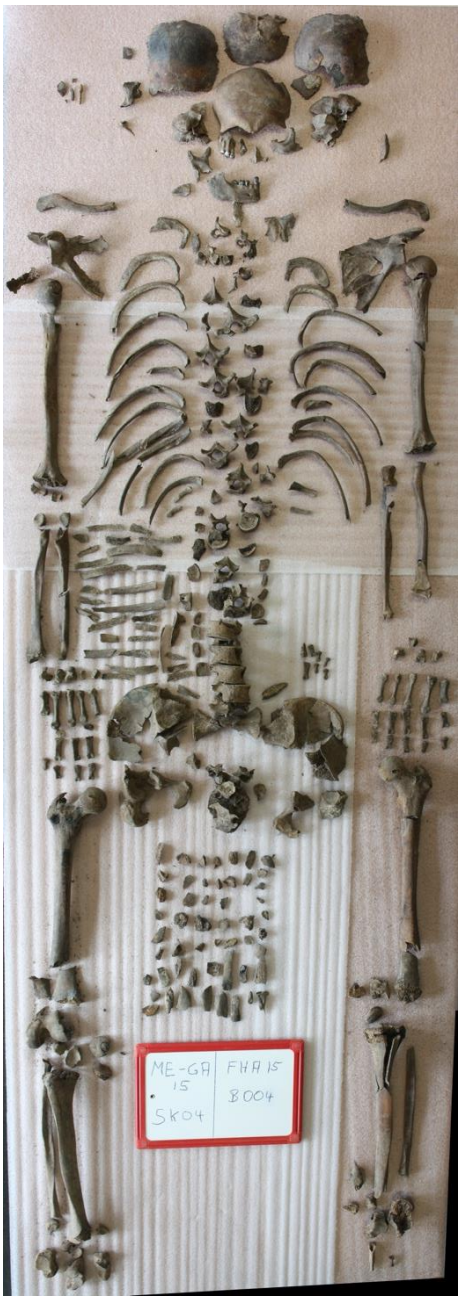

Figure 3: Stitched overview of B004 (SK04)

Various traits were observed in order to estimate sex, however due to the degree of fragmentation, particularly to the pelvis and skull many areas of interest were damaged. Nevertheless, the observable traits are indicative of a probable male/male individual.

An age estimation of over 18-20 years is evidenced by epiphyseal fusion of the long bones. The iliac crest is >80% fused suggesting an age over 21 years, however the medial epiphysis of the clavicle was not complete fused suggesting less than 25 years. The age estimation from the pubic symphysis gave an age range of 19-34 years, which is agreed by observations of the auricular surface (21-38 years). Only one sternal rib end was available, number unknown (3-10), which provided an age estimation of 20-28 years. There are no apparent age related pathological conditions on this skeleton. From the available observations, the age range is likely to be 21-25 years, with a wider age range of 18-30 years. Due to post-mortem damage to many of the long bones only the radius was measured for stature (24.0cm) which provides an estimate of 169cm, with a range between 165cm and 174cm.

The left maxilla and left mandible, and all their associated dentition were missing. Of the right maxilla the only teeth present are the 2nd incisor, canine, 1st premolar and 2nd premolar. While for the right mandible the canine, 2nd premolar, 1st and 2nd molar are present and in-situ; and the 3rd molar unerupted. All of this dentition had observable blackened discolouration to the labial and buccal surface as well as dental calculus to the lingual surface. No enamel hypoplasia or dental caries were observed.

There is no cribra orbitalia or periostitis present; however there are Schmorl's nodes on the superior surfaces of two lumbar vertebrae and three thoracic vertebrae. A healed (antemortem) fracture is also evident on onemetatarsal and showing widening and malalignment . There is no clear sign of osteoarthritis or degenerative joint disease on any of the main joint surfaces.

There are several potential areas of perimortem trauma, including a transverse fracture to the distal portion of the shaft of the left radius, a transverse fracture to the proximal portion of the left femur below the lesser trochanter, comminuted fractures to the mid-shaft of the left tibia and fissure fractures to the left and right talus. These may have resulted from a blast.

3.3 B005 (SK11)

This skeleton is >75% complete. Many of the facial bones, the left clavicle, right scapula and all the bones of the left hand are missing. The skeleton has low levels of fragmentation except for the skull, ribs and pelvis. The cortical bone surface is well preserved with little post-mortem erosion. There are several areas of blue staining on the frontal and basilar portions of the occipital bone and left temporal fragment likely to be due to vivianite staining. Similar staining is also observed on several left ribs, the vertebrae, the left and right femur, tibia and fibula as well as the pelvis, left calcaneus and right talus. There is also orange staining, due to iron, present on many bones such as the frontal, right parietal and occipital, as well as the long bones, left patella, left scapula, left and right calcaneus and many of the right tarsals. A localised area of blackened and green staining, potentially due to copper, 38mm x 12mm can be observed on the postero-medial and distal shaft of the right humerus. Additional to the staining there is also textile traces adhered to the humeral head and the right 2nd and 3rd ribs as well as the first left rib.

Figure 4: Stitched overview of B005 (SK11)

There are several observable traits that indicate the sex of the individual to be male. Epiphyseal fusion of the long bones suggests an age over 18/20 years and the partial fusion of the medial epiphysis of the clavicle suggests an age over 21 years but below 25/29 years confirmed by the non-fusion of S1-S2 segments of the sacrum. Observations of the pubic symphysis provides an age range of 19-34 years, with the auricular surface suggesting an age range of 25-34 years. The sternal end of the rib provides an age range of 17-19 years. Additionally, there are no age related pathological conditions. An age range of 20-25 years and a wide range of 18-30 years is given for this skeleton. Based on the length of the femur (46cm) a stature of 170cm with a range between 166cm and 174cm is given.

There is no dentition present for this individual due to the absence of the mandible and maxilla.

In terms of pathological conditions, there is no observable cribra orbitalia, periostitis or osteoarthritis. Several fractures have been recorded including a possible clay-shoveler's fracture (antemortem trauma) to the spinous process of T1, along with four left ribs showing perimortem fractures, with one complete butterfly fracture. Fissure fractures are also seen on the left tarsals of this skeleton, similar to those seen in previous remains, which may be suggestive of blast trauma. Schmorl's nodes are also observable on five thoracic vertebrae (four superior surfaces and five inferior surfaces) as well as three lumbar vertebrae, affecting both the superior and inferior surfaces.

3.4 B006 (SK16)

This skeleton is between 50 and 75% complete, although nearing 50%. Many of the facial bones, sternal body and bones of the hands are missing. The skeleton has low level of fragmentation, and where it is present it is mostly focused on the skull. The bones are well preserved with only slight erosion to the bone surface, concentrated, but only slightly, at the epiphyseal areas of the long bones. There are some areas of blue staining on the right femur, tibia and fibula, likely due to vivianite staining. There are also areas of orange staining to the proximal femur, the condyles of the left and right distal femur and proximal tibia, potentially due to iron staining. In addition to this there is blackening to the distal tibiae, fibulae and foot bones. . A similar blackened appearance is present on the parietal bones towards the sagittal suture. An additional lower left canine that does not correspond to this individual is also present, suggesting some degree of commingling with the remains of another casualty.

Figure 5: Stitched overview of B006 (SK16)

A number of sex estimation traits can be observed, with the traits present on the skull being indicative of a male, while the pelvis is more ambiguous, suggesting probable male. The long bone epiphysis were incompletely fused and the incomplete fusion of the medial clavicle suggests a younger age (below the age of 25 years). The iliac crest and annular rings of the cervical and lumbar vertebrae are also unfused or in the early stages of fusion providing an age of below 20-23 years. The age estimation from the pubic symphysis implies an age of 18.5 years with a range of 15-23 years while observations of the auricular surface appears suggests an older age range of 25-29 years. There are no age related pathological conditions on this skeleton. From a combination of these observations an age range of 18-23 years is given with a wide range of 15-25 years. Based on the maximal femoral measurement (45.0cm) stature is calculated to be 168cm with a range between 165cm and 171cm.

This skeleton displayed wormian bones at the occipital suture.

There is a large amount of dental information available with this skeleton. For the maxilla, all the right dentition is present and loose except for the 1st premolar, which has been lost ante-mortem. There is missing

data for the 2nd premolar and 2nd molar. Additionally all the left maxillary dentition is present except for four teeth (2nd premolar to the 3rd molar) which provide missing data. The mandibular dentition is largely present but loose. The left mandibular 1st incisor, 1st and 2nd molar have been lost ante-mortem, while the 2nd premolar has been lost post-mortem. There is missing data for right 2nd mandibular molar. There are several hypoplastic defects, such as, a potential mulberry molar in the upper right 1st molar and notches on the mandibular incisors, both traits that could aid in identification.

In terms of pathology there is no observable cribra orbitalia, ostearthritis or periostitis. The inferior surface of the medical clavicle is particularly porous, with extremely pronounced muscle attachments. There are various conditions to the vertebrae including Schmorl's nodes on the 9th thoracic vertebrae and the inferior surface of the 3rd lumbar vertebrae, as well as an additional 6th lumbar vertebrae and lumbarisation of the sacrum.

In terms of perimortem trauma, at the midshaft of the right humerus there is potential projectile trauma on the lateral surface with a circular entry hole measuring 8.8 x 9.8mm, and associated radiating fractures. The right distal humerus also has potential perimortem trauma in the form of comminuted fractures and the proximal third of the right ulna also shows perimortem fractures, both potentially due to blast. Potential perimortem fractures are also seen on the parietal bones. Metal fragments are also associated with these areas of trauma.

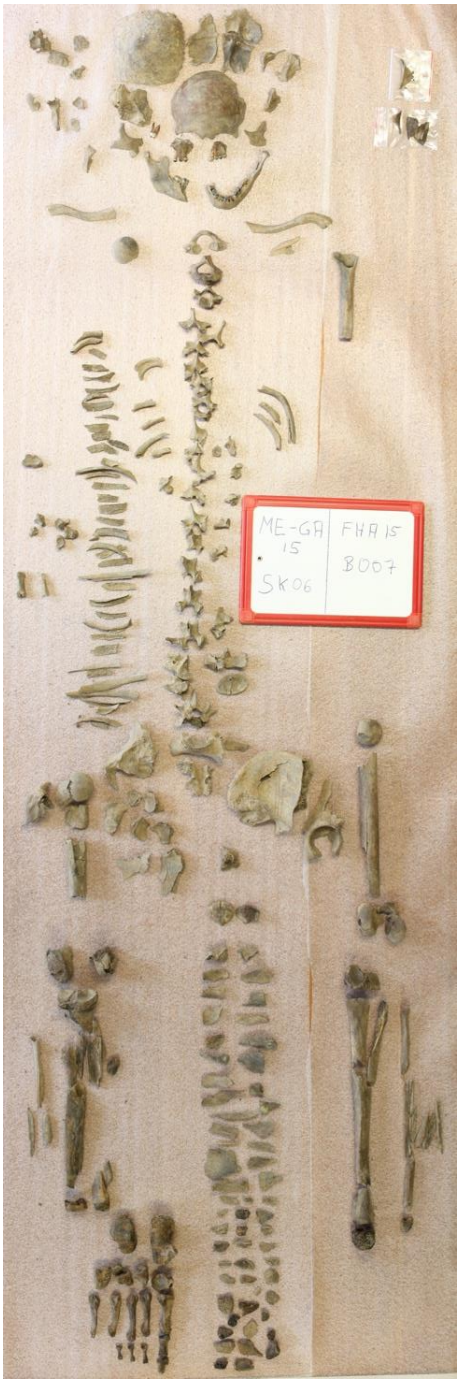

Figure 6: Stitched overview of B007 (SK06)

3.5 B007 (SK06)

This skeleton is between 50-25% complete, although nearing 25%. The skeleton is highly fragmented with very few complete elements, with the exception of the bones of the right foot, which are well preserved. Blue discolouration is present on the left frontal bone at the orbit, potentially due to vivianite staining. There are also a high number of unidentifiable fragments, including splinters of long bones, potentially femur or tibia and many fragments of trabecular bone.

Due to the level of missing elements and fragmentation few sex estimation traits could be observed; however, those that were present are more characteristic of male individuals. Few age estimation criteria could be observed also due to the level of fragmentation. The epiphyses of the long bones were badly damaged or not present. The annular rings of the cervical and lumber vertebrae were in the early stages of fusion and the iliac crest had only recently fused. Observations of the auricular surface gave an age range of 30-34 years. There was no observable age related pathology. Through these observations an age range of 18-34 years is given, with a narrower range between 18 and 30 years.

The maxillary and mandibular dentition are present; however there are several teeth missing post-mortem and some that are missing

but it is unknown whether their absence is antemortem or perimortem due to the fragmentary condition of the bone. Dentition which has been lost post-mortem include the maxillary right 1st and 2nd incisors and from the mandible the left and right 1st incisors, right 2nd incisor, left canine and the right 2nd premolar and 1st molar. There is missing data for the maxillary right 1st and 2nd molars and left 1st incisor, 1st, 2nd, 3rd molars, due to fragmentation. Calculus and grey discolouration of the teeth is also present.

In terms of pathology, there was no periostitis or cribra orbitalia present. The posterior right parietal showed slight deformation in shape as well as shine, pitting, flaking and discolouration to the exterior surface. The high level of fragmentation of the remains could obscure some signs of trauma. The acetabulum is highly fractured with a hole to the inferior internal wall with radiating fractures to the ilium. The iliac blade has a compression fractures running anterior to posterior from a central perforation. The right calcaneus has a crack running through the articulating facet, with a similar fracture seen in the metatarsals 4 and 5. The shafts of the right and left tibia have perimortem comminuted fractures. It is a possibility that blast trauma caused the fractures on this skeleton.

Three small pieces of wood and animal long bone fragments were additional elements associated with these remains.

3.6 B008 (SK01)

This skeleton is between 50-75% complete. The remains are highly fragmented, particularly the cranium, vertebrae and pelvis. There is a significant amount of splintering to the ribs. Many of the facial bones, the sternum and vertebrae are missing. There is erosion to the bone surface, with exposure of rtrabecular bone on certain elements, particularly the bones of the left foot and hand, the proximal and distal epiphyses of the long bones, the patellae and sacrum. There are some areas of orange staining, particularly to the bones of the left and right ulna, radius, humerus, scapula,clavicle, femur, tibia, fibula and foot bones. This staining may be a result of iron corrosion. Black staining is also sparsely present on the long bones including the right ulna, right humerus, right scapula, left femur, right tibia, .

Due to the level of fragmentation, few traits employed to estimate sex are observable, therefore only an ambiguous-possible male result could be obtained. The complete fusion of the epiphysis of the long bones suggests an age over 18/20 years, while the non-fusion of the medial clavicle would suggest an age under 25 years. The pubic symphyses are not present, however the auricular surface suggests an age range of 25-29 years and the sternal rib end suggests 17-19 years (the number and position of the rib used is unknown). Only a wide age range of 18-25 years could be determined. Based on the length of the right radius (23.5cm), the estimated stature is 167cm with a range between 172cm and 163cm.

Figure 7: Stitched overview of B008 (SK01)

Mandibular and maxillary dentition is present but loose. The upper right 1st and 2nd premolars, 3rd molar and left 2nd incisor, 1st premolar (root), 2nd premolar, 1st, 2nd and 3rd molars are present. The missing teeth have been lost post-mortem except for the upper right 1st molar where the socket shows signs of remodelling associated with ante-mortem tooth loss. Of the mandibular dentition, both 1st incisors and canines, the left 1st premolar, right 2nd premolar and both 2nd and 3rd molars are present. Dental caries were observed on much of the dentition. Both the maxillary and mandibular teeth have calculus. Black staining on the dentition is also observable.

In terms of pathology, cribra orbitalia is observable in the left orbit and spina bifida occulta is present at S3 to S5. There is no observable osteoarthritis or degenerative joint disease on the joints that are complete enough to discern. A callus, measuring 55mm x 22mm, is also seen on the medial surface of the midshaft of right femur suggestive of an ante-mortem fracture. Schmorl's nodes were noted on 5 of 9 thoracic vertebral bodies with one (1/8) superior surface and six (6/8)/8 inferior surfaces affected. One perimortem butterfly fracture is present on the left tibial shaft.

3.7 B009 (SK02)

This skeleton is over 90% complete. There is a low level of fragmentation and where present it is primarily focused on the ribs and vertebrae. Theere is weathering to the cortical bone especially at the areas of the epiphyses and there is splintering of the ribs. Blue discolouration is present on the occipital bone, potentially due to vivianite staining. Black discolouration is present on the right tarsals and metatarsals. There is as also a localised circular area measuring 40mm x 30mm on the anterior body of the right scapula anterior body and a similar blackened area on the right ilium.

A number of sex estimation traits can be observed and are indicative of probable male/ male. The complete fusion of the long bones suggests an age over 18/20 years. The partial fusion of the clavicle suggests an age under 25-29 years and the fusion of iliac crest suggests an age over 21-23 years. An assessment of the pubic symphysis indicates an age range of 21-46 years and the auricular surface a range of 21-38 years. There is no age related pathology; however there is ante-mortem tooth loss. These observations provide a wide age range of 20-30 years, with a narrower range likely to be between 21 and 25. Many of the long bones were still complete; therefore several measurements were taken to estimate the stature. The length of the femur (48.3cm) provides a stature of 176cm with a range between 173cm and 180cm.

The dentition is present is in situ; however there is a large amount of ante-mortem tooth loss: the upper right 2nd incisors, 1st right upper molar, the 1st and 2nd left upper molars and the 1st and 2nd left and right lower molars. There is blackened discolouration to the surface of the maxillary and mandibular dentition. Chipping is also present on the occlusal surface of the 1st left maxillary incisor. Dental

Figure 8: Stitched overview of B009 (SK02)

caries is present on two teeth (upper left 1st incisor and lower left 2nd premolar). There is little if any calculus present. There are some potential traits that would be incorporated in the identification process and these include a diastema between the upper 1st left and right incisors and the absence of the upper right 2nd incisor which had been lost during life.

In terms of pathology there is no observable cribra orbitalia, osteoarthritis or periostitis. There is a characteristic shape of the skull at the level of the parietals, potentially due to premature fusion of the sagittal suture. Schmorl's nodes are present on 4 of 5 observed thoracic vertebrae (only the inferior surfaces). Potential perimortem trauma is present on several of the skeletal elements. The latter includes a butterfly fracture to the lateral aspect of the mid-shaft of the left fibula, a comminuted fracture to the left tibia shaft (at the same level as the butterfly fracture to the fibula), fissure fractures, as seen on several other skeletons, which are present on the metatarsals (right MT1, left MT1, MT3 and MT5), left and right talus and calcanei. Similar fissure fractures are seen along the medial edge of the left and right patella as well as on the left distal humerus and the left proximal femur.

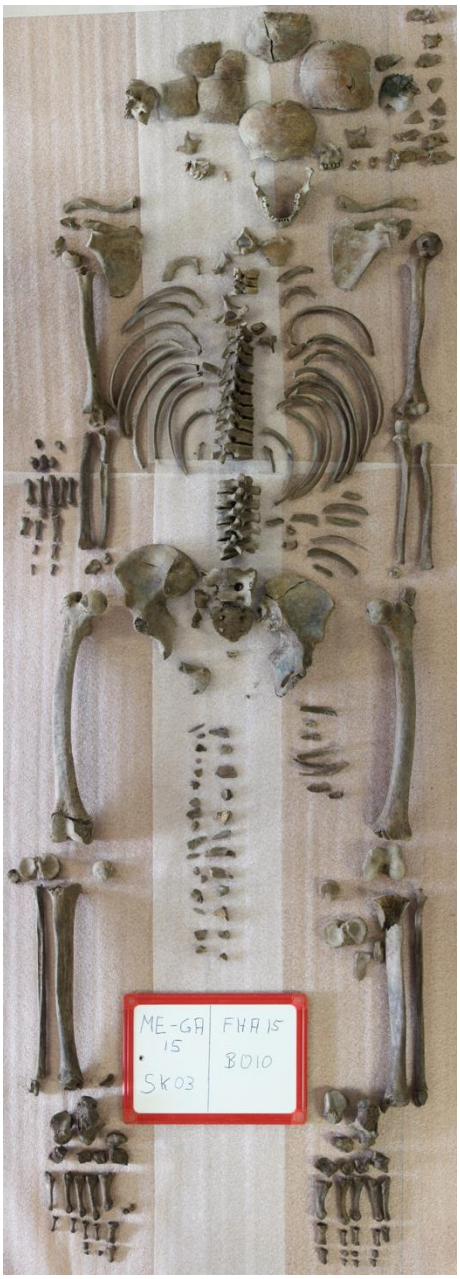

Figure 9: Stitched overview of B010 (SK03)

3.8 B010 (SK03)

This skeleton is over 90% complete. The bones of the left hand are absent. There is a low level of fragmentation and the bone surface is well preserved with little weathering. Blackened staining is present on the left temporal bone, the left ilium and ischium. The left and right distal tibia and foot bones are stained darker than the rest of the skeleton. Slight mottled blue staining is also present on the left tibia and scapula potentially due to vivianite staining.

A number of sex estimation traits are observable and are indicative of a probable male. The incomplete union of the long bone epiphyses (see Figure 10) suggests an age under 18-20 years. Additionally, the medial clavicle, annular rings of the vertebrae and the iliac crest are also unfused. The pubic symphysis and auricular surfaces give age ranges of 15-23 years and 20-24 years respectively, while the sternal rib ends suggest a range of 17-19 years. A combination of these observations gives an age range of 16-20 years and a wide range of 15-25 years. The femoral length (42.4 cm), including epiphyses, allows a stature estimation of 162cm with a range between 159cm and 165cm.


Figure 10: Unfused distal epiphyses of ulna and radius (B010)

Much of the maxillary and mandibular dentition is present and in situ. The following teeth that have been

lost post-mortem: the upper right 2nd incisor and canine, and lower left and right 1st and 2nd incisors. There is no evident ante-mortem tooth loss. Dental caries are present on both the maxillary and mandibular dentition including pit and fissure caries, small and large coronal caries. Chipping to the surface of the dentition are present on the left and right 1st upper incisors, lower right and left 1st molars. Blackened staining is present on the surface of the teeth. Calculus is present on the maxillary dentition but not on the mandibular. Enamel hypoplasia is recorded on several teeth from the mandible and maxilla.

In terms of pathology, there is no cribra orbitalia, periostitis or osteoarthritis present on this skeleton. Schmorl's nodes are observed on 3 out of 10 visible thoracic vertebrae, affecting two superior surfaces and three inferior surfaces. Perimortem trauma is seen in the form of butterfly fractures to left ribs. Potential butterfly fractures are seen on the right ribs.

3.9 B011 (SK05)

This skeleton is over 75% complete. Many of the cranial bones are missing. There is low level fragmentation, and when present is mainly focused on the ribs, sacrum and innominates. The bones are well preserved, with weathering only concentrated around the epiphysis of the long bones. Blue staining is present on the skull, in particular on the temporal bones. The right patella and ribs also present blue staining, potentially caused by vivianite. Purple staining is observable on the 1st left metacarpal.

Figure 11: Stitched overview of B011 (SK05)

Through the observation of a number of sex estimation traits, it was possible to determine that this individual is probable male/male. Due to the complete fusion of the epiphysis of many of the long bones as well as the eruption of the third molar, an age estimation of over the age of 18/20 years is likely. Additionally, the complete fusion of the iliac crest (>20-23 years) as well as of the medial clavicle suggests an age over 25-29 years.. Analysis of the pubic symphysis found a mean age of 35.2 years with an age range of 23-57 years; while the auricular surface found a slightly older range of 40-44 years. There is no age related pathology such as osteoarthritis, although there is slight lipping on the medial end of the clavicles and on the acetabulum. There is also ante-mortem tooth loss. Combining these observations a most likely age range of 30-45 years is given with a wide range of 23-57 years. Measurements of left femur (44.8cm) found a stature of 168cm with a range between 164cm and 171cm.

Much of the maxillary dentition is missing; the cause of this absence is unknown due to fragmentation and absence of the bone. Only the right 2nd premolar, 2nd molar, 3rd molar and left 1st incisor, 2nd molar and 3rd molar are present. Additionally, the right and left 1st molars have been lost ante-mortem. More of the mandibular dentition is present. The only absent dentition includes the left 1st and 2nd molars, the right 2nd premolar and 1st molar, all of which were lost ante-mortem. The lower right canine was lost post-

mortem. It is unknown if the right 3rd molar has been lost ante-mortem or is absent due to agenesis. The maxillary dentition is coated with mud and has black discolouration, making observations of enamel hypoplasia difficult. Dental caries are present in some of the dentition and a filling is present in the occlusal surface of the upper left 2nd molar. The lower right 1st premolar shows slight rotation of the buccal surface distally. The occlusal surfaces of the mandibular incisors are worn exposing the dentine.

In terms of pathology there is no observable cribra orbitalia or periostitis. Spina bifida occulta is seen on the sacrum at the level of S2- S5. Schmorl's nodes are present on inferior and superior body surfaces of three thoracic vertebrae (T8 to T10). The node present on T9 is particularly extensive, covering half of the vertebral body. Potential degenerative joint disease is seen on the neck facets of right ribs (ribs 3-10), evidenced by osteophytosis and contour deformation. There is no obvious perimortem trauma on this skeleton.

3.10 B012 (SK07)

This skeleton is over 90% complete. The skeleton is well preserved with low level of fragmentation apart from to the skull and many of the facial bones which are missing. There is some erosion and post-mortem damage focused at the epiphyses of many of the long bones (left humerus, radius, ulna, fibula and right radius, fibula) as well as the tarsals. A localised area of black staining measuring 16.8 x 11.5mm is present on the left parietal bone. There is also orange staining to the left and right femur, and blue staining the right femur, both forms of staining focused on the condyles, potentially due to iron and vivionite staining respectively. A similar blue staining is also seen on many of the tarsal bones.

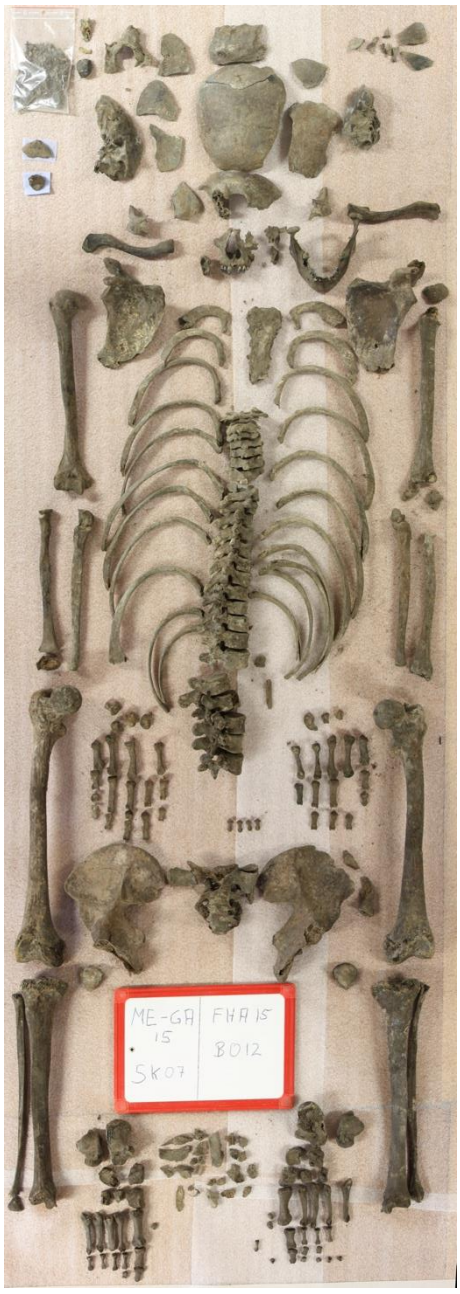

Figure 12: Stitched overview of B012 (SK07)

Additional elements are present with this skeleton, including a proximal ulna head and an acromion.

Several sex estimation traits can be observed and are indicative of a male. The complete fusion of the long bone epiphyses suggests an age over 18/20 years, the closure of the iliac crest suggests an age over 21-23 years and the complete fusion of the medial clavicle suggests an age over 25-29 years. The pubic symphysis was not observable, however observations of the auricular surfaces provide an age range of 30 to 39 years. There is ante-mortem tooth loss but no other age related pathology. Through a combination of these observations an age range of 30-39 years is estimated with a wide range of 25-40 years. Measurements of the left femur (46.5cm) provide a stature estimate of 172cm with a range between 168cm and 175cm.

There is a large amount of dental information available with this skeleton. All the maxillary dentition is either present or lost ante-mortem, other than the left 1st incisor which is absent post-mortem. Similarly all the mandibular dentition is present or lost ante-mortem. Ante-mortem tooth loss is observable due to resorption and remodelling of the alveolar bone of the sockets of the upper right

Figure 13: Fused thoracic vertebrae (T1 & T2) (B012)

2nd molar, upper left 1st molar, lower left 1st and 2nd molars and lower right 1st and 2nd molars. Dental caries and enamel hypoplasia is present in the maxillary and mandibular dentition. Calculus is present on the maxillary canines, incisors and left 3rd molar, but there is none present on the mandibular dentition. A slightly chipped surface is seen on the mesial crown of the 1st right maxillary incisor, this tooth is also slightly rotated medially. There is dentine exposure through wear on the mandibular incisors. There is black staining on all the teeth.

In terms of pathology there is no obvious periostitis, cribra orbitalia, degenerative joint disease or osteoarthritis. There is, however, fusion of the first and second thoracic vertebrae (see Figure 13), involving the left side of the vertebral bodies and the left transverse processes. There is also a callus present on the diaphysis of the 2nd right metatarsal, which is likely due to healed ante-mortem trauma. Spicules are present on the medial aspect of the left distal humerus measuring 1mm x 2mm. The capitulum of the right humerus also shows signs of osteochondritis dissecans. Schmorl's nodes can also be seen on one of 12 thoracic vertebrae. There is no evidence of perimortem trauma on any of the skeletal elements present.

3.11 B013 (SK19)

This skeleton is greater than 75% complete. Many of the facial bones and hand phalanges are missing. The skeleton is well preserved with low level of fragmentation with the exception of the skull, which is highly fragmented. Brain matter is also present with this skeleton. Black staining is present on the tarsals, metatarsals and foot phalanges, while orange staining can be seen on the shaft of the left and right femur and on the left femoral head. This staining is likely the result of iron corrosion.

Through the observation of a number of sex estimation traits, particularly on the pelvis due to the high level of fragmentation of the skull, this skeleton is considered to be that of a male. An age over 18/20 years is likely due to complete fusion of the epiphyses of the long bones. The medial clavicle is roughly 60% fused and S1-S2 had not complete fused at the time of death; however the iliac crest is fused suggesting an age over 20-23 years. Observations of the pubic symphysis and auricular surfaces give an age range of 18-21 years and 16-19 years respectively. Observations of a left sternal rib end provide an age range of 12-23 years. There are no age related pathologies present apart from ante-mortem tooth loss. Through a

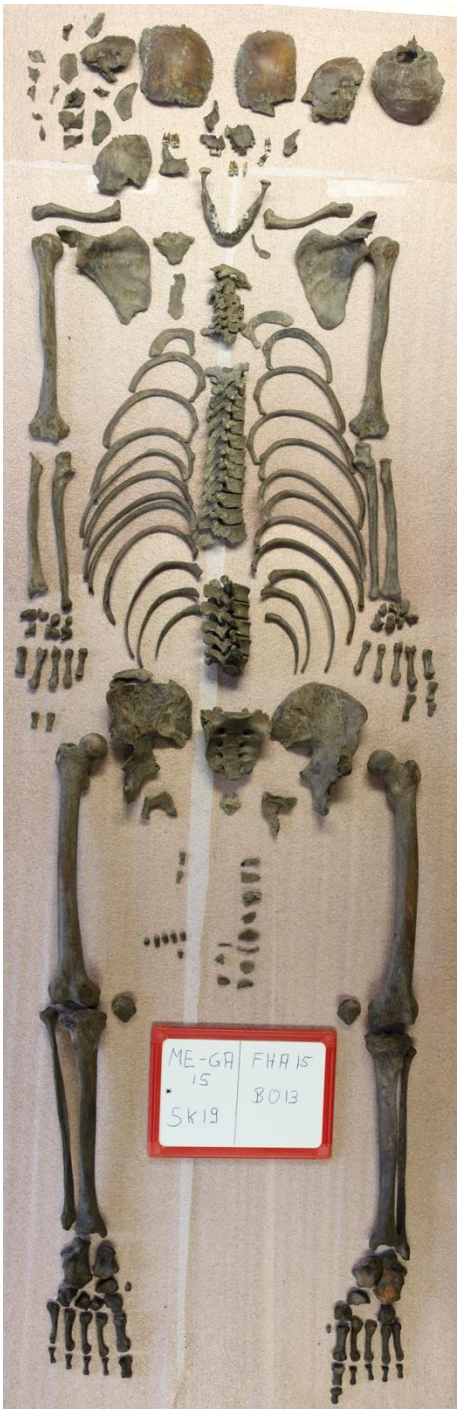

Figure 14: Stitched overview of B013 (SK19)

combination of these observations the individual seems to have been in his early 20s, with a narrow age range likely to be between 20-25 years, and a wide range of 18-30 years. Measurements of the right femur (44.6cm) provide an estimation of 167cm for stature with a range of 164cm to 170cm.

The dental information for the maxilla is limited due to the high level of fragmentation of the bone. Maxillary dentition that is present includes, left and right 1st incisors, left 2nd incisor, left 1st premolar, left and right 2nd premolar and right 1st,2nd and 3rd molars. All the mandibular dentition is present and in situ except for the left 1st molar, which has been lost ante-mortem and both 3rd molars, potentially absent due to agenesis. Dental caries is present on the maxillary and mandibular dentition. Carious lesions present on the labial surface of the maxillary right and left 1st incisors are particularly distinctive and may have the potential to aid identification. Other distinctive dental features include a potential mulberry molar (left 3rd molar), wear to the dentine on the occlusal surfaces and overcrowding of the mandibular incisors. Black discolouration is present on the right and left maxillary central incisors. This discolouration is also present on the mandibular dentition. Calculus is also on much of the mandibular teeth, while there is little presence of it on the maxillary dentition.

In terms of pathology there is no periostitis, cribra orbitalia or osteoarthritis present. Schmorl's nodes can be seen on three out of 12 of the thoracic vertebrae, and affecting a total of two superior surfaces and two inferior surfaces. A spicule is present on the medial aspect of the distal third of the left humerus and marginal osteophyte formation is present on the ilium and sacrum auricular surfaces. There is no observable perimortem trauma on this skeleton.

3.12 B014 (SK20)

This skeleton is greater than 75% complete. Only the left parietal is present from the skull, while the mandible, sternum, cervical vertebrae, many of the carpals, hand and foot phalanges are absent. The skeleton is well preserved apart from fragmentation to the pelvis. Weathering and post-mortem damage is focused at the epiphyses of the long bones, with both femora having post-mortem fractures. There is blue staining likely to be due to vivianite on the right femur, tibia and calcaneus and orange staining from iron, to the left humerus and both femora. Black fabric is adhered to the right patella, right distal femur and proximal right tibia.

Sex estimation was based on observations of the pelvis, which was suggestive of a male skeleton. Many of the epiphyses of the long bones are either unfused or partially fused suggesting an age under 20 years. The clavicle, annular rings and iliac crest are also unfused and would agree with this younger age range. Observations of the right pubic symphysis provides a mean age of 18.5 years with an interval of 15-23 years; and observations of the auricular surface an age range of 25-29 years. Additionally there are no age related pathological conditions. Through a combination of these

Figure 15: Stitched overview of B014 (SK20)

observations an age range of 17-20 years can be estimated (wider age range 15-20 years). Measurements of the right femur (49cm) suggests a stature of 178cm with a range between 174cm and 181cm.

There is no dentition present for this skeleton and in terms of pathology there is no criba orbitalia or osteoarthritis. There is however, periostitis to the proximal anterior right humeral shaft and on the anterior-posterior left femur which also shows slight bowing. Schmorl's nodes are present on the thoracic vertebrae (5/10) with three (3/10) inferior surfaces affected and five (5/10) superior surfaces affected. Perimortem trauma is present and includes a butterfly fracture to the right distal femur and a comminuted fracture to the left distal femur.

3.13 B015 (SK21)

This skeleton is between 50% and 75% complete. Many of the cranial bones, the sternum, many ribs, the lumbar vertebrae, the sacrum, many of the carpals, metacarpals and hand phalanges are missing. The skeleton is highly fragmented particularly the skull, pelvis, the distal end of the left and right femur, the epiphyses of the long bones and the ribs. A localised area of red staining is present on the occipital bone. The bone surface is fairly well preserved, with weathering only significantly present at the epiphyses of the long bones, particularly on the right humerus and the right tibia.

Figure 16: Stitched overview of B015 (SK21)

Due to the highly level of fragmentation in the skull and pelvis, only a few sex estimation traits can be observed, however, these are indicative of probable male/male. Through observations of the level of fusion of the epiphyses of the long bones an age over 18-20 years is likely. The sternal end of the clavicle is 60% fused, this partial fusion suggesting an age below 25 years. The iliac crest and annular rings of the vertebrae are also unfused or were in an active stage of fusion at the time of death, suggesting an age range also lower than 25 years, and likely under 21-23 years. Observations of the auricular surface would suggest an age range of 25-29 years. There is no age related pathology on this skeleton apart from ante-mortem tooth loss of the upper left 2nd premolar. By combining the results of these observations an age range of 18-25 years can be estimated, with a narrower age range likely to be more consistent with a range of 18-21 years. Stature could not be calculated as there is no complete long bone to take reliable measurements.

Much of the maxillary dentition is present but loose. Only the left and right 2nd incisors are missing post-mortem, while the left 1st incisor, 1st molar and 2nd molar are not present but the cause is unknown due to fragmentation of the bone. Resorption and remodelling of the alveolar bone, at the location of the left maxillary 2nd premolar, evidences ante-mortem tooth loss. The mandibular left and right 1st and 2nd incisors, the right 1st premolar and 2nd molar are absent post-mortem. The maxillary 3rd molars are

partially erupted while the mandibular 3rd molars are either unerupted or not present due to agenesis. Dental caries and enamel hypoplasia are present on several of the teeth, along with calculus.

In terms of pathology there is no osteoarthritis or periostitis present. There are no orbits present so observations for cribra orbitalia cannot be made. There is possible ante-mortem trauma to the distal third of the left radial shaft. This is shown by slight angulation but it is well healed. An x-ray will be required to confirm this. There is no apparent perimortem trauma.

3.14 B016 (SK09)

The skeleton is over 90% complete. Only 6 thoracic vertebrae are missing and the left os coxae is fragmented. The bones are well preserved and only little weathering present. There is orange staining, potentially due to iron, present on the right scapula, on the right ulna and radius, the distal shaft of the right humerus, on the right femoral condyles, the right and left tarsals. Additionally, the sternum, left humeral head, left femoral head and the parietal and occipital bones of the skull had similar orange staining. Black staining is present on several elements including the right and left humeral heads, the proximal ulna, the right and left os coxae, the sacrum, tarsals, as well as both tibiae and fibulae. Fabric is adhered to the plantar aspect of the right 2nd metatarsal and on the inferior aspect of the left scapular spine.

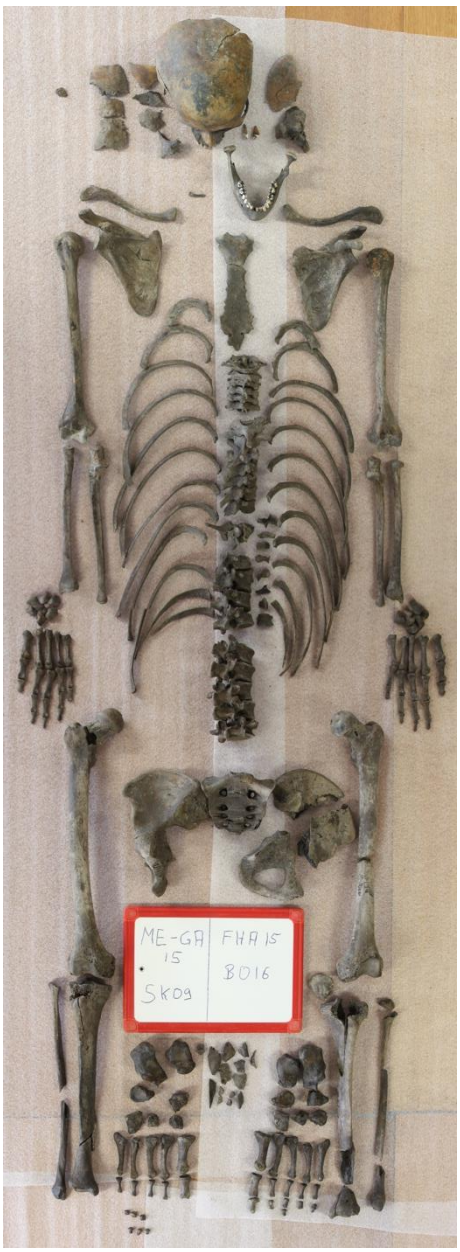

Figure 17: Stitched overview of B016 (SK09)

A number of sex estimation traits can be observed and are indicative of a male. The individual was likely to have been over the age of 18/20 years as evidenced by the complete fusion of the epiphyses of the long bones, complemented by the eruption of the 3rd molar. The only bone with incomplete fusion is the medial clavicle, which is partially fused, suggesting an age likely under 25 years.. Observations of the pubic symphysis, auricular surface and sternal rib ends suggest age ranges of 21-46, 25-29 and 24-28 years respectively. From the available observations a wide age range of 18-30 years is suggested and a more likely narrower age range of 20-25 years. Measurements of the right femur (43.7cm) provide a stature of 165.41cm with a range between 162cm and 168cm.

The maxillary dentition is predominantly in situ, with only the right and left 1st incisor and the left 3rd molar being loose and the left 2nd incisor lost post-mortem. The mandibular dentition is also mostly in situ with the exception of right 1st incisor which has been lost post-mortem. There is missing data for the right third molar. There is black discolouration of the surface to many of the teeth. Dental caries, calculus and enamel hypoplasia are present. A metal filling is present in the maxillary right 1st molar.

Figure 18: Possible perimortem (blast?) trauma on distal left tibia (B016)

In terms of pathology there is potentially healed periostitis as evidenced by striated lamellar bone on the left and right femur, the tibiae and fibulae. There is no degenerative joint disease or osteoarthritis present. The left and right orbits are not present therefore cribra orbitalia could not be observed. Schmorl's nodes are observable on 2 of 8 thoracic vertebrae (affecting 2 inferior and one superior surfaces) and on 3 of 5 lumbar vertebrae affecting the superior surfaces. Possible perimortem trauma can be seen in the form of hinging fractures to the anterior aspect of S4 and on the left tibia (see Figure 18), butterfly fractures to both tibiae and oblique fractures to the shaft of both fibulas. There is also a fissure on the right distal tibia.

3.15 B017 (SK10)

This skeleton is greater than 90% complete. Many of the carpal bones, hand phalanges, the left navicular, cuboid, cuneiforms, metatarsals and foot phalanges are missing. The skeleton has low fragmentation except for the lower limb bones, which are largely fragmented. There is orange staining to localised areas such as the lateral portion of the distal end of the radius, the right acetabulum, the head and condyles of the right and left femur, the right calcaneous, talus and medial cuneiforms, the left talus potentially due to iron staining. Additionally there is black staining to the bones of the foot and the distal shaft of the tibia and fibula and a localised area of similar staining to the right ilium.

A number of sex estimation traits were observed and are indicative of a male. With regard to age-at-death, some long bone epiphyses have completed their maturation but others were still fusing at the time of death. The later, in conjunction with a partially erupted third molar, the incomplete fusion of the medial clavicle and iliac crest may be suggestive of an individual likely equal or under the age of 20 years. Observations of the pubic symphysis suggest an age range of 15-23 years, while the auricular surface suggests 20-24 years. There is no age related pathology present; however there is ante-mortem tooth loss. From the available observations the age range for this skeleton is likely to be 15-25 years with a most likely age between 18 and 21 years. Measurements of the right humerus (31.6cm) provide a stature of 167.78cm and an interval of 163-171cm.

Figure 19: Stitched overview of B017 (SK10)

Figure 20: Enamel hypoplasia is evident on this dentition (B017)

There is a vast amount of dental information. Most of the maxillary dentition is present and in situ, except for the right 1st premolar and 1st molar, and the left 1st premolar and 1st molar which have been lost ante-mortem. Similarly most of the mandibular dentition is present and in situ except for the left 1st and 2nd molars, which have been lost ante-mortem and the left 3rd molar which is not present (a radiograph would clarify whether there is non-eruption, agenesis or ante-mortem loss here). Two fillings are present in the maxillary dentition in the right 2nd molar and left 2nd molar. Enamel hypoplasia (see Figure 20) is clear on both the maxillary and mandibular dentition. The upper 2nd left incisor has slight mesial rotation. Additionally, black discolouration is present on the right mandibular dentition.

In terms of pathology there is no obvious cribra orbitalia, osteoarthritis, periostitis or Schmorl's nodes. There is possible woven bone on the medial aspect of the mid-shaft of the left femur. Perimortem trauma can also be observed on this skeleton. The latter includes oblique fractures on the medial aspect of the left distal radius which are associated with a metallic encrustation (see Figure 21), which may, pending expert opinion, possibly pertain to a fired projectile (bullet?). There is also perimortem damage potentially due to shrapnel to the right proximal shaft of the femur, with associated orange staining the medullary cavity. Possible shrapnel is also present on the right medial malleolus of the tibia and there is also metal imbedded in the left calcaneus.

Figure 21: Detail of metallic encrustation on left distal radius (B017)

3.16 B018 (SK08)

This skeleton is over 75% complete. Many of the ribs are missing as well as the left ulna. There is little fragmentation except to the skull and the pelvis. The bone surface is well preserved, with some weathering occurring at the epiphyses. There is blue staining on various elements including small localised areas on the left parietal, the right scapula, left radius, left femur and left tibia. The bones of the foot and the distal third of the shaft of the tibiae and fibulae are stained darker than the other skeletal elements. There are also addition elements including a right patella, an unfused distal radial epiphyses and two intermediate hand phalanges.

Several sex estimation traits can be observed and are indicative of a male. Long bone epiphyseal fusion are in the very early stages of fusion or unfused, suggesting an age under 18-20 years. The clavicle, iliac crest and annular rings of the vertebrae are also unfused. Observations of the pubic symphysis are indicative of a mean age of 18.5 years with a range of 15-23 years, however observations of the auricular surface are indicative of an age range of 25-29 years. The lower third molars are unerupted. There are no age related pathologies. An age range of 15-20 years (likely 15-18 years) with a wide range of 15-25 years is estimated from these observations.

A large amount of dentition has been lost post-mortem, both from the maxilla and the mandible. For the maxilla the right 1st and 2nd premolars, 1st and 2nd molars and left 1st molar are present and in situ. For the mandible the left 2nd premolar, left 1st and 2nd molars and the right canine, right 1st and 2nd molars are present. The mandibular 3rd molars are unerupted, while the remainder of the dentition has been lost post-mortem. Enamel hypoplasia is present on many teeth. The occlusal surfaces of the present dentition have black staining.

In terms of pathology there is no cribra orbitalia or osteoarthritis present. There is porosity to the left proximal humerus and a lytic lesion to the anterior aspect of the right proximal humerus. Additionally, there are lesions to the medial and lateral aspects of the left and right clavicles. Possible periostitis, indicated by the presence of woven bone, is also observable on the shaft of the right and left tibia and the proximal and distal aspects of the right femur. The 4th left metatarsal is slightly distorted in shape in terms of bulging of the shaft, potentially due to osteitis. Schmorl's nodes are present on 3 of 12 thoracic vertebrae and one of 5 lumbar vertebrae, as well as on the body of S1. In terms of perimortem trauma there is a comminuted fracture to the left 2nd intermediate hand phalange and there are also fractures to the bones of the foot which includes a fracture to the left talus and a fracture to the 4th left metatarsal.

Figure 22: Stitched overview of B018 (SK08)

In addition to the skeletal elements there is also a small piece of corroded metal associated with this skeleton.

3.17 B019 (SK17)

This skeleton is less than 25% complete. Many bones are missing including the right clavicle, both scapulae, both humeri, the left radius, right ulna, all vertebrae (except C1 and C2), all ribs, all the bones of the hand, the sacrum, both ossa coxa and both femora. The skull is highly fragmented. Fragmentation is also present on the left tibia and fibula. The bone surface is relatively well preserved, with little weathering. Orange staining likely due to metal corrosion, is present on the left talus and blue staining, potentially as a result of vivianite, is present on the left fibula and the left maxilla. The bones of the foot are stained darker in colour than the other bones. There is purple staining to the right frontal bone at the level of the coronal suture.

Due to the absence of the pelvic bones, sex estimation observations were taken from the skull alone, which has traits characteristic with a male individual although caution is warranted due to the young age of this individual. An age younger than 18-20 years is likely due to the lack of fusion of the epiphysis of the long bones which are observable (proximal radius, distal ulna, distal femur, proximal tibia and fibula) with complete closure observed at the proximal ulna, distal tibia and distal fibula. The 3rd molars have erupted however. Additionally the incomplete fusion of the medial end of the clavicle is suggestive of an age likely under 21-25 years. There is no age related pathology present. From the available observations, the age range for this individual is likely to be between 15-20 years with a narrow range of 16-18 years. There were no complete elements present to allow stature estimations to be made.

There is a vast amount of dental information present. For the maxilla the right 2nd incisor, canine, 1st and 2nd premolars and 1st and 2nd molars are present. Additionally the left 1st and 2nd premolar roots, 1st, 2nd and 3rd molars are present. The right 1st incisor, left 1st and 2nd incisor and canine have been lost post-mortem. For the mandible the left 1st and 2nd incisor, canine, 2nd premolar, 1st and 2nd molars are present (missing data for the 3rd molars). The right 1st and 2nd incisors, canine, 1st premolar, 2nd and 3rd molars are also present. There is no ante-mortem tooth loss. Dental caries, calculus and black discolouration is present on much of the dentition. Chipping is also present on several of the teeth, including maxillary left 1st, 2nd premolar and 1st molar, as well as, the mandibular right 2nd and 3rd molars.

Figure 24: Possible shrapnel/bullet fragment on left talus with associated perimortem bone trauma (B019)

Figure 23: Stitched overview of B019 (SK17)

In terms of pathology there is no osteoarthritis, cribra orbitalia, periostitis or degenerative joint disease that can be observed. Perimortem trauma can be observed on the left talus in the form of fractures extending from a localised area where shrapnel/metal is encrusted in the bone. Fragments of long bones,

potentially tibia/femur appear to be adhered to or encrusted in a large fragment of metal, potentially shrapnel or metal rigging, with black fabric also attached. Further analysis would be required to further determine the origin.

3.18 B020 (SK12)

This skeleton is over 90% complete. The skeleton is generally well preserved, although fragmentation is present affecting mainly ng the skull and the right and left os coxae. There are some areas of orange staining, likely to be due to iron, on many of the skeletal elements including the right clavicle, the left scapula, the distal and proximal ends of the left humerus, the right ulna and radius, thoracic vertebrae, the right metatarsals, the left and right femoral heads, both tibiae, the left calcaneous and talus,, , and metatarsals. This staining is also evident on the right mandible, the right maxilla and the left and right parietals. A small section of fabric is adhered to the right humeral neck. Black staining is present on the right clavicle, the right scapula, right humerus, and distal ends of the left and right tibia and fibula.

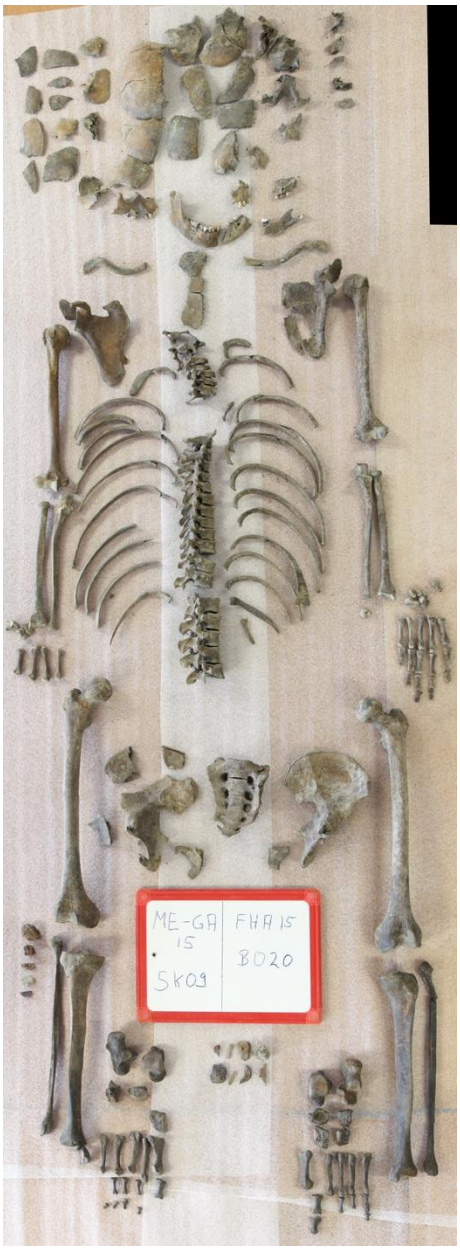

Figure 25: Stitched overview of B020 (SK12)

A number of sex estimation traits can be observed and are indicative of a male individual. Indicators of age-at-death appear to suggest an individual under or around the age of 18-20 years, as is evident by the incomplete epiphyseal fusion of the upper limb long bones. In addition the clavicle is partly fused suggesting an age under 25 years, and the fusion of the iliac crest is also incomplete suggesting an age under 23 years. Observations of the pubic symphysis, the auricular surface and the sternal end of the ribs suggest an age range of 18-19 years, 25-29 years and 17-19 years respectively. Additionally, there is no age related pathology present. Through combining these observations an age range of 17-23 years has been estimated. Measurements of the left femur (40.7cm) provide a stature of 157.56cm with a range of 154cm to 160cm.

In terms of the dentition, for the maxilla the right 2nd incisor, canine, 1st premolar, 2nd molar and 3rd molar are present but loose. The left maxillay 2nd incisor, canine, 1st and 2nd premolar and 1st, 2nd and 3rd molars are also present with the incisor, canine and 3rd molar found loose. For the mandible, the right 2nd incisor, 1st and 2nd premolar and 1st, 2nd and 3rd molars are present with the 2nd incisor and 2nd molar found loose. On the left the 1st and 2nd incisor, canine, 1st and 2nd premolar and the 1st, 2nd and 3rd premolars are present with only the 1st and 2nd molar in situ. Calculus, linear enamel hypoplasia and dental caries are present on this dentition. There is overcrowding of the mandibular left premolars. Additionally, there is black staining to many of the teeth.

In terms of pathology the skull is too fragmented to make observations of cribra orbitalia. Schmorl's nodes are not present on the cervical (0/7), thoracic (0/12) or lumbar (0/5) vertebrae and there is no periostitis or spina bifida present. Possible lytic lesions are present on the posterior shaft of the right femur, above the

Figure 26: 3rd metatarsal with woven bone and possible perimortem fracture (B020)

medial epicondyle. The left and right 3rd metatarsal also have woven bone present (see Figure 26) on the dorsal shaft, with a perimortem fracture likely to have occurred in a direction from dorsal to plantar. In terms of perimortem trauma there are fissure fractures to the spinous processes of one lumbar and two thoracic vertebrae. The ribs show signs of possible perimortem trauma with splintering at the neck of the 11th right rib and butterfly fractures on of two left ribs. Furthermore, three left ribs show splintering on the visceral surface of the mid-shaft. The 11th left rib has a fissure fracture at the neck.

3.19 B021 (SK13)

This skeleton is more than 75% complete. Many of the cranial bones, the sternum and all the left ribs are missing. The bone surface is well preserved, with little erosion present. There is a large amount of staining similar to that seen on the other skeletons. Orange staining is present on the maxilla, the left and right humerus, the left and right ulna, the radii, femora, tibiae and fibulae as well as on the tarsal bones and the base of all the metatarsals. Blue staining is present on the condyles of the left and right femur and on both tibiae as well as on the auricular surface and acetabulum of the left and right os coxae. There are two localised areas of black staining on the shaft of the left humerus; one of which measures 10.79mmx6.79mm and the other which measures 49.46mmx15.84mm.

A duplicated triquetral bone is present with this skeleton, suggesting commingled remains.

A number of sex estimation traits can be observed, particularly on the pelvis, and are indicative of a male individual. The complete fusion of the epiphysis of the long bones suggests an age over 18-20 years. In addition the clavicular medial epiphysis is 80% fused suggesting an age under 25-29 years and the iliac crest is completely fused indicative of an age over 20-23 years. Observations of the pubic symphysis, the auricular surface and sternal rib ends suggest age ranges of 19-46 years, 25-34 years and 24-28 years respectively. Ante-mortem tooth loss is the only form of age related pathology present on this skeleton. Through a combination of these observations a wide age range of 18-35 years, with a most likely narrow range to be of 20-30 years. Based on the length of the left femur (41.7cm) the estimated stature is 160.65cm with a range of 157cm to 163cm.

Figure 27: Stitched overview of B021 (SK13)

Figure 28: Distinct dental feature that might assist in identification (B021)

There is a large amount of dental information present. For the maxillary dentition, all the left teeth are present and in situ except for the 2nd premolar, which was lost ante-mortem. The 3rd molar was also absent but it is unclear if this is due to agenesis. On the right maxilla, the 1st and 2nd incisors, the canine, and the 1st premolar are present in situ, while the 2nd molar is loose. There is missing data (no alveolar bone preserved) for the right 3rd molar so its status is unknown. With regard to the mandibular dentition, the left 1st and 2nd incisors, 2nd premolar and 2nd molar are present and in situ, while the canine and 1st premolar were lost post-mortem and the 1st and 2nd molars were lost ante-mortem. On the right all the dentition is present except the 1st and 2nd molars which were lost ante-mortem. Both 3rd molars were erupted on the mandible. There is black staining present on all the teeth and dentine exposure due to wear is observable on the maxillary and mandibular incisors. In terms of distinctive features there is overcrowding of the maxillary central incisors (see Figure 28), distal rotation of the mandibular 1st premolar as well as a metal filling on the maxillary left 1st premolar. An additional canine from another individual is present with this skeleton.

Figure 29: Schmorl's nodes on thoracic vertebrae (B021); a common feature in this assemblage

Figure 30: Perimortem trauma on ribs (B021)

In terms of pathology there is no observable osteoarthritis or spina bifida. It is not possible to observe cribra orbitalia as the orbits are not present. Localised pitting is present on the left and right distal fibula. Schmorl's nodes (see Figure 29) are present on 3 of 5 lumbar vertebrae (affecting 3 superior and 3 inferior surfaces) and 6 of 12

thoracic vertebrae (affecting 5 superior and 6 inferior surfaces). None (0/5) of the cervical vertebrae were affected. There are signs of perimortem trauma present on several skeletal elements: a butterfly fracture to the right 8th and 9th ribs (see Figure 30), towards the sternal ends. A fracture on the right fibula appears has been recorded, but appears to be more consistent with a post-mortem fracture.

3.20 B022 (SK14)

This skeleton is 25-50% complete, although nearing 25%. The sternum, all the ribs, both scapulae, the right humerus, the left radius, most of the right radius, all the hand bones, the tibiae, fibulae and all the foot bones are missing. There is good preservation and little weathering of the bones, except the bodies of the 2nd-5th and 8th thoracic vertebrae which are more affected by taphonomic alterations. There is slight blue staining on the occipital bone and on the proximal left femur, potentially due to vivianite. There is also black staining on the right distal femoral shaft.

Figure 31: Stitched overview of B022 (SK14)

A number of sex estimation traits can be observed and are indicative of a probable male. The long bones that are present, have fully fused epiphyses suggesting an age over 18-20 years; however, the medial epiphysis of the clavicle is only partially fused suggesting an age under 25/29 years. The 3rd molars have erupted Observations of the pubic symphysis and auricular surfaces provide age ranges of 19-40 years and 25-29 years respectively. The only form of age related pathology is ante-mortem tooth loss. From the available observations the age range is likely to be between 20-25 years with a wide range of 18-30 years.

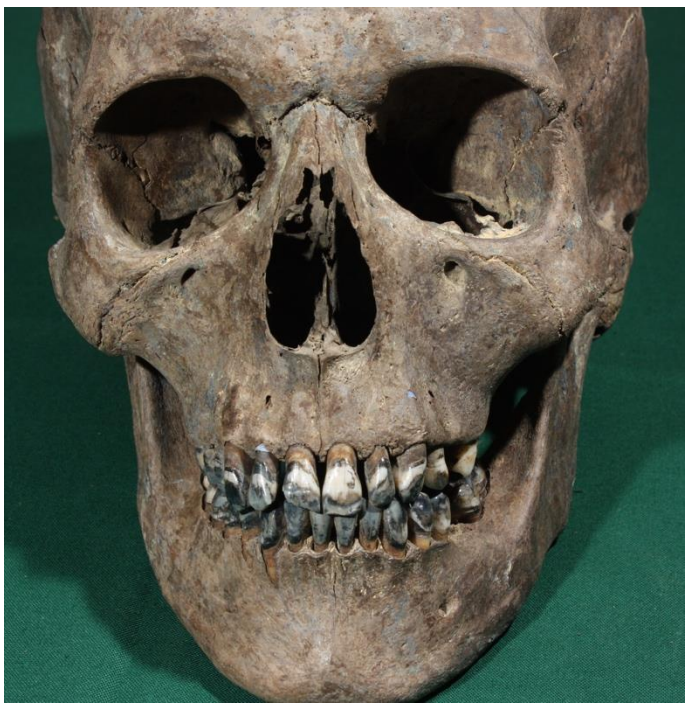

Figure 32: Well preserved facial bones and dentition (B022)

Based on the length of the right femur (44.8cm), the estimated stature is 168.03cm with a range of 164cm to 171cm.

All the maxillary dentition is present except for the 2nd right premolar, left and right 3rd molars, which have been lost post-mortem. The mandibular dentition is complete with the exception of the left 1st molar which has been lost ante-mortem. Dental caries is present in many of the teeth and black discolouration is present on the occlusal, labial and buccal surfaces. In terms of distinctive features there is a chip on the distal corner of the occlusal surface

of the 1st left maxillary incisor. Additionally, extensive wear is present on the occlusal surfaces of the mandibular incisors and canines.

There is no osteoarthritis, cribra orbitalia or periostitis present on this skeleton. There are no Schmorl's nodes on any of the vertebrae observed (three cervical vertebrae observed and all thoracic and lumbar ones). There are many post-mortem fractures however; but no obvious perimortem trauma on any of the skeletal elements.

Additional elements are present associated with the skeleton including eight metal fragments, six of which may be identified as helmet fragments and two as shrapnel.

3.21 B023 (SK15)

This skeleton is more than 75% complete. Many of the cranial bones, sternum and bones of the hands, the proximal portion of the right radius and the distal portion of the ulna are missing. There is little fragmentation except to the scapulae and to the skull. Brain matter is present in this skeleton. The bone surface is well preserved with little weathering, mostly focused on the distal femora and proximal tibiae. There is black staining no the foot bones and the distal tibiae and fibulae. There is blue staining to the long bones of the left side. There is orange staining on the left and right femur, both tibiae and to small portions of the skull, potentially due to iron staining. Adhered to the cranium there is an area of brown, smooth organic material potentially from the inside of a helmet or retained scalp.

Figure 33: Stitched overview of B023 (SK1405)

Additional elements are also found with the skeleton in the form of a proximal foot phalanx, which is physically and taphonomically very different to the others.

A number of sex estimation traits can be observed and are indicative of a male individual. The individual was likely to be around the age of 18-20 years as evident by the epiphyseal fusion of the long bones. The medial epiphysis of the clavicle is only partially fused suggesting an age under 25-29 years. The heads of the ribs are unfused and the iliac crest is also unfused suggesting an age under 20-23 years. Additionally, observations of the pubic symphysis and the auricular surface suggest a mean age of 18.5 years with a range of 15-23 years and a range of 20-24 years respectively. There is no age related pathology. From the available observations, the age range is 17-20 years, with a wide range of 17-25 years. Based on the length of the left femur (50.4cm) the estimated stature is 181.36cm with a range of 178cm to 184cm.

There is a large amount of dental information available. For the maxilla the right 2nd premolar and 1st molar are present but loose and the left 1st, 2nd premolar and 1st molar are present. It is not possible to determine how the right 1st and 2nd incisors and 3rd molar as well as the left 1st incisor, 2nd and 3rd molars have been lost as the bone is

not present therefore this data is missing; while the other dentition has been lost post-mortem. For the mandible all the dentition is present and in situ with the exception of the left 1st incisors, right 1st and 2nd incisors and right 3rd molar, which have been lost post mortem as well as the right 2nd molar which has been lost ante-mortem. There are also dental caries, calculus and enamel hypoplasia on several teeth as well as black discolouration present on all the mandibular dentition.

There is no periostitis or osteoarthritis. Cribra orbitalia cannot be observed due to the absence of the orbital roofs. There is woven bone present on the posterior aspect of the proximal left tibia. Additionally, Schmorl's nodes are only present on vertebra T9 (1 of 12 thoracic vertebrae). There is no obvious perimortem trauma.

3.22 B024 (SK18)

This skeleton is more than 75% complete. The bones of the hand, the distal aspects of the left and right femur and several ribs are missing. There is little fragmentation except to the cervical vertebrae. The surface of the bone is well preserved but there is erosion present on the surface of the tarsal bones so that the trabecular bone is exposed, to the surface of the long bones and the vertebral bodies. Blue staining, potentially due to vivianite, is present on the left and right tibia, left proximal fibula, left and right femur, both scapulae, humeri, ulnae and radii,. Orange staining, is present on the cranium, mandible, and on the right and left proximal ulna and radius. There is also black staining throughout the skeleton particularly around the bones of the foot.

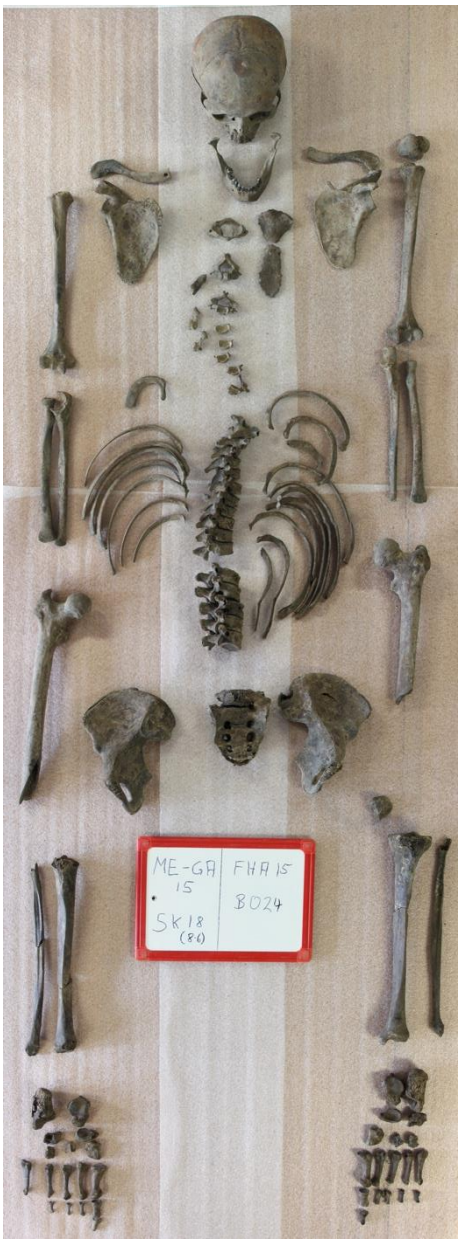

Figure 34: Stitched overview of B024 (SK18)

A number of sex estimation traits can be observed and are indicative of a male individual. Not all the epiphyses of the long bones are completely fused, especially at the distal humerus, radius and ulna, suggesting an age under 18-20 years. The annular rings have not completed maturation yet as is the iliac crest and ischial tuberosity of the innominates or ossa coxa. The latter suggest and age range between 16 and 23 years. The pubic symphysis, the auricular surface and the sternal rib ends provide potential age ranges of 15-23 years, 20-24 years and 17-19 years respectively. There are no age related pathologies present. Considering all these observations together, it is likely that the individual falls withins an age range of 16-25 years and a narrower range of 17-20 years. Measurements of the left humerus, (32.9cm) provides a stature estimation of 171.78cm with a range of 167cm to 175cm.

All the maxillary dentition is present except the left 1st premolar that is absent ante-mortem and both 3rd molars which are either unerupted or absent (agenesis). Much of the mandibular dentition is also present with only the left 1st and 2nd molars being lost ante-mortem and the left and right 3rd molars absent potentially due to agenesis. On the mandibular dentition there is grooving present on the lingual surface of incisors and canines. There are dental caries and enamel hypoplasia present on much of the dentition as well as black staining.

In terms of pathology there is no cribra orbitalia, periostitis or osteoarthritis present. There is spina bifida occulta present as well as lytic lesions on the medial diaphysis of the right clavicle measuring 6.58mmx7.71mm surrounded by porosity and woven bone. Pitting is also present on the right humerus at the deltoid tuberosity in an area measuring 29.34mmx8.56mm. Schmorl's nodes are present on 2 of 8 thoracic vertebrae (affecting 2 inferior and 1 superior surfaces) but none observed on the cervical (0/6) or lumbar (0/5) vertebrae. There is lumbarisation of S1. Perimortem trauma in the form of two butterfly fractures are present on two left ribs (10th and 11th).

3.23 Anthropological Analysis Summary

The remains of a minimum of 22 German casualties from World War One were examined anthropologically. The information that could be obtained with regard to sex, age-at-death, height and unique identifying features varied between the different skeletons depending on the level of preservation, which was mostly very good. Most of the age and sex related traits on the skeletal remains are based on indicators from the pelvis and skull, depending on the level of fragmentation and presence of areas of interest. It was difficult/not possible to gain an age estimation from the 4th rib due to the lack of sternal ends on the most part and the high level of fragmentation. Likewise, stature estimation was performed on those with complete long bones; however fractures were common to these elements. It was instructed that no skeletal samples were to be taken for DNA Purposes.

Overall, the remains were well preserved however there was a varying degree of weathering and completeness, most likely due to the different ways of burial. The outer (cortical) surface of most of the bones had some erosion. The bones had already been cleaned prior to our examination.

In general, the biological profiles for these skeletons indicate males with ages between a wide age range of 15-45 years. The average height for the skeletal population is 168.99cm (5ft 5"). Potential identifications were made for several of the remains based on associated artefacts and many of these identifications are consistent with the biological profiles formed. Table 1 shows a summary of the biological profiles for each of the skeletal remains, potential identifications made and whether the biological profile obtained from the anthropological analysis (primarily age-at-death) was consistent with this.

Table 1: Summary of biological profiles and potential identifications for each of the skeletal remains.

	Age range (years)	Sex	Average Stature	Potential identity	Identity consistency
B003 (SK22)	Narrow: 20-30 Wide: 18-35	Male	171.84cm (5ft 6”)		
B004 (SK04)	Narrow: 21-25 Wide: 18-30	Male	169.73cm (5ft 6”)		
B005 (SK11)	Narrow: 20-25 Wide: 18-30	Male	170.89cm (5ft 6”)	Walter Bonitz	consistent
B006 (SK16)	Narrow: 18-23 Wide: 15-25	Male?	168.51cm (5ft 5”)	Ronbin Wasulwsk	consistent
B007 (SK06)	Narrow: 18-30 Wide: 18-34	Male?	-		
B008 (SK01)	18-25	?/Male?	167.84cm (5ft 5”)		
B009 (SK02)	Narrow: 21-25 Wide: 20-30	Male?/Male	176.84cm (5ft 8”)		
B010 (SK03)	Narrow: 16-20 Wide: 15-25	Male?	162.32cm (5ft 3”)	Kurt	consistent
B011 (SK05)	Narrow: 30-45 Wide: 23-57	Male?/ Male	168.03cm (5ft 5”)		
B012 (SK07)	Narrow: 30-39 Wide: 25-40	Male	172.08cm (5ft 6”)	Otto Seidel	
B013 (SK19)	Narrow: 20-25 Wide: 18-30	Male	167.56cm (5ft 5”)	Kurt Schonherr	consistent
B014 (SK20)	Narrow: 17-20 Wide: 15-20	Male	178.03cm (5ft 8”)		
B015 (SK21)	Narrow: 18-21 Wide: 18-25	Male? /Male	-		
B016 (SK09)	Narrow: 20-25 Wide: 18-30	Male	165.41cm (5ft 4”)	Gerhard Meyer	consistent
B017 (SK10)	Narrow: 18-21 Wide: 15-25	Male	167.78cm (5ft 5”)	Rudolf Riedel	consistent
B018 (SK08)	Narrow: 15-20 Wide: 15-25	Male	164.70cm (5ft 4”)	Willy Roth	consistent
B019 (SK17)	Narrow: 16-18 Wide: 15-20	Male	-		
B020 (SK12)	17-23	Male	157.56cm (5ft 1”)		
B021 (SK13)	Narrow: 20-30 Wide: 18-35	Male	160.65cm (5ft 3”)	Jo..o.. Franz	
B022 (SK14)	Narrow: 20-25 Wide: 18-30	Male	168.03cm (5ft 5”)	Otto Weidhaas	consistent
B023 (SK15)	Narrow: 17-20 Wide: 17-25	Male	181.36cm (5ft 10”)		
B024 (SK18)	Narrow: 17-20 Wide: 16-25	Male	171.78cm (5ft 6”)		

There are several additional commingled bones (B025) that were not able to be attributed to any of the bodies. They were initially believed to be associated with B006, B018, B019, B022, B023, and B024 due to the commingled context of their burial and the missing elements, particularly bones of the hands, but this could not be confirmed.

The additional bones identified include:

- Fragments of left and right 1st-5th metacarpals. Matches have been attempted for 5th metacarpals with B013 (SK19), B003 (SK22) and B014 (SK20) but no positive match attributed to any of these bodies.
- Tarsals and metatarsals
- Fragments of sternal body
- Sacral fragments representing S2, S3 and S4
- Cervical and thoracic vertebrae. One cervical vertebrae C1 is potentially associated with B009 (SK02)
- Several rib fragments
- Metacarpal fragments of unknown side and number.
- Fragments of proximal, intermediate and distal hand and foot phalanges (1st-5th).
- Left and right carpals
- Fragments of acetabulum
- Two femur fragments
- Two fragments of distal tibia(e)

Most of these unassociated elements and fragments do not show any sign of trauma or pathology. A left rib (group 3rd-10th) shows a potential butterfly fracture, four left ribs (3rd-10th) also show perimortem fractures including hinge fractures towards the sternal ends. These perimortem fractures are all found at the same location along the rib potentially indicating that they are from the same skeleton and created during the same mechanism of injury.

4 Conclusion

The biological profiles obtained for these skeletal remains indicate, as expected, all were male and between the ages of 15-45 years. The age-at-death estimations obtained are consistent with the ages obtained from the archaeological, historical and archival research undertaken by the Flanders Heritage Agency. In terms of taphonomy, blue staining, potentially due to vivianite from the soil and orange staining, likely to be due to iron, is present on many of the remains. Areas of localised iron staining are present on several skeletal elements with associated metal fragments, likely to be shrapnel.

There are signs of perimortem trauma on many of the skeletons, as would be expected from soldiers who died during World War I. Figure 1 shows an overall pattern for the locations of potential perimortem trauma taking all the skeletons into consideration. A large number of bodies (B003, B004, B005, B007, B009 and B018) have similar fissure fractures found on the tarsal bones and patellae, believed to be perimortem blast injury. Perimortem butterfly fractures to the ribs are also seen on bodies B005, B010, B020 and B021. This form of fracture is commonly noted in cases of blast injury (Christensen & Smith 2013), Christensen et al., 2012), or blunt force trauma, such as being hit or being thrown against an object (Lovell, 1997). Potential perimortem fractures, likely due to blast, can be observed on several of the long bones, particularly on the tibiae. In addition, shrapnel was found embedded in several bones with associated radiating fractures, this was particularly clear on the left distal radius and right tibial medial malleolus of B017 (SK10).

There are very little observable signs of pathological conditions present on these skeletal remains, Table 22 gives a summary of the potential conditions present. There are very few signs of degenerative diseases, particularly osteoarthritis and DJD, which is expected due to the young age range. Contrary to this dental

disease is common, with a large amount of observable dental caries and ante-mortem tooth loss. This, however, could be indicative of poor oral hygiene practices highlighted by the level of dental calculus and periapical cavities present and prior to the war. Enamel hypoplasia, which can reflect living conditions during childhood, is clear on the dentition of several of the remains, however, due to the black discolouration this was unobservable for many. Further information on the dentition present can be found in Appendix 2, Tables 2-21. Schmorl's nodes are the most common form of pathology, present on at least one vertebral body of 20/22 of the skeletons, this is also expected as these individual were soldiers and this form of pathology to our knowledge is commonly seen in this profession.

5 Appendices

Appendix 1 – Perimortem Trauma

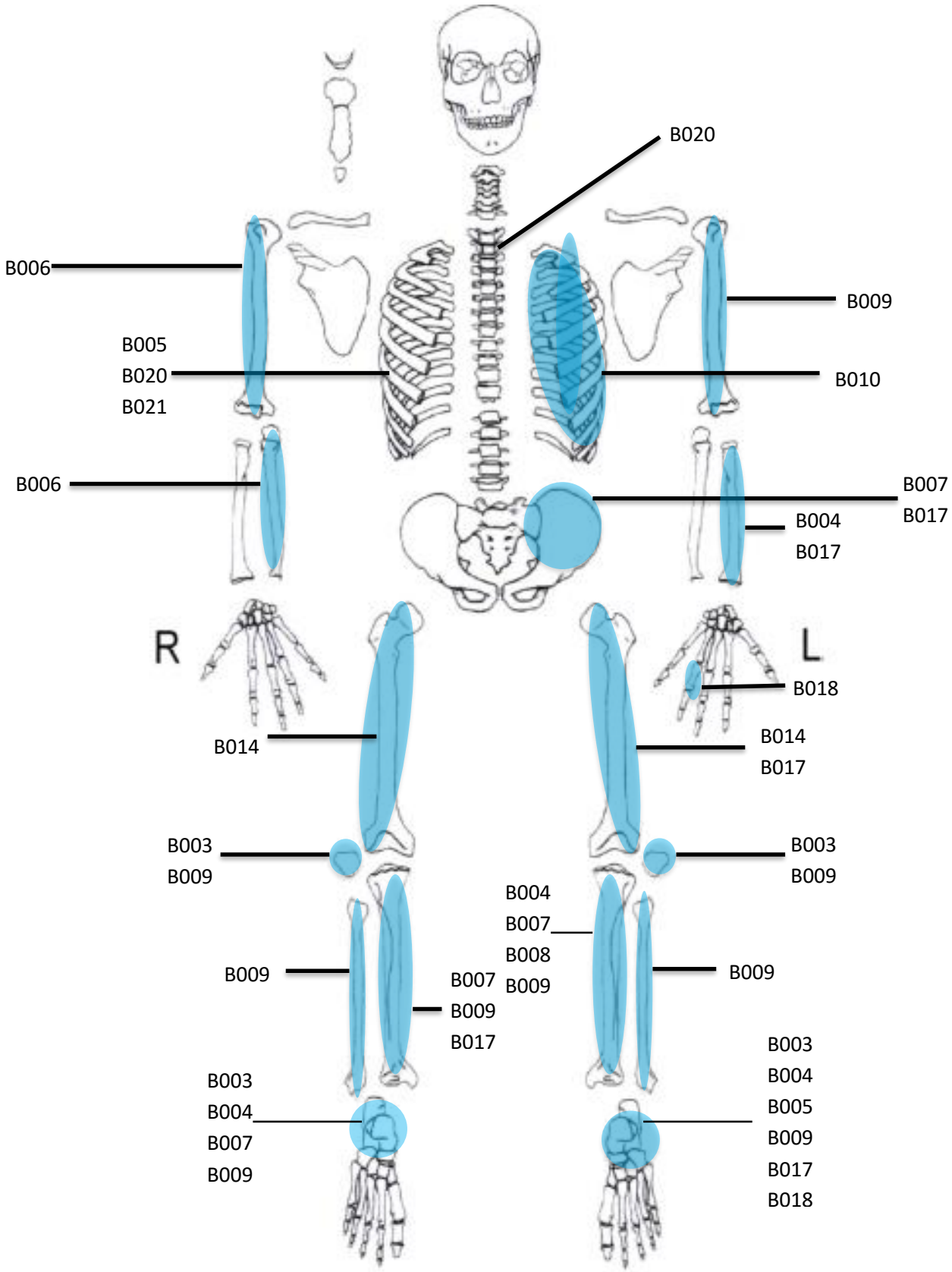

Figure 35: Perimortem fracture locations.

Appendix 2 – Dental information

Index for dental information

IS- in situ
L- Loose
PM- post-mortem
AM-ante-mortem
MD- missing data
X- Not present
O- unable to observe

Location
M- mesial
D-distal
Lg – lingual
Lb- labial
B- Buccal
O- occlusal
R- root
C- crown

Observations (Obs)
Dis- discolouration
Cr- crowding
Rt- rotation
F- filling
Rp- resorption
Rd- remodelling
At- attrition
Fx- fracture
Ch- chip
W- Wear
Ue- Unerupted
Ag- agenesis

Pathology
EH- enamel hypoplasia
DC- dental caries
PC- periapical cavityDc- caries
Cc- calculus
Pit- pitting caries
Mul- mulberry molar

Table 2: Dental information B003 SK22

Obs			PC	PC	Ch								PC	Rp Rd		
DC	-	Gr	Gr	Gr	O	O	O	O	O	O	O	Gr	Gr	X	Gr	O
EH	-	X	X	X	EH	EH	EH	EH	EH	EH	EH	X	X	X	X	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	MD	L	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	L	IS	IS
	L	AM	L	IS	IS	PM	IS	IS	L	IS	IS	IS	IS	IS	L	L
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	-	X	EH	EH	-	EH	X	O	O	EH	EH	O	X	X	X
DC	Oc pit	-	Gr	Oc pit	O	-	O	O	O	O	O	Oc	O	X	Gr	Oc
Obs		Rp Rd						Cc								

Table 3: Dental Information B004 SK04

Obs				Dis	Dis, Ch	Dis	Dis	-	-	-	-	-	-	-	-	-
DC	-	-	-	X	X	X	X	-	-	-	-	-	-	-	-	-
EH	-	-	-	X	X	X	X	-	-	-	-	-	-	-	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	MD	MD	MD	L	IS	IS	L	MD	MD	MD	MD	MD	MD	MD	MD	MD
	Ue	IS	IS	IS	PM	IS	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	X	X	X	X	EH	-	-	-	-	-	-	-	-	-	-
DC	X	X	X	X	X	X	-	-	-	-	-	-	-	-	-	-
Obs	-	Dis, Cc	Dis, Cc	Dis, Cc	Dis, Cc	Dis, Cc	-	-	-	-	-	-	-	-	-	-

Table 4: Dental Information B006 SK16

Obs	Cc	-	Mul	-	-	Cc	Cc	Cc	Cc	Cc	Cc	Pc	-	-	-	-
DC	Oc pit	-	O	-	-	O	M, C	O	M, C	O	O	Gr	-	-	-	-
EH	O	-	EH	-	-	O	O	EH	EH	O	EH	X	-	-	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	L	MD	L	MD	AM	L	L	L	L	L	L	IS	MD	MD	MD	MD
	L	MD	IS	L	L	L	L	L	AM	L	L	L	AM	AM	AM	L
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	O	-	EH	O	O	O	EH	X	X	EH	EH	O	-	-	-	O
DC	O	-	Gr	M, Oc	O	O	O	O	X	O	O	O	-	-	-	Oc
Obs			Cc	Cc	Cc	Ch, Cc	W, Cc	W, Cc	Rp Rd	Cc	Cc	Cc	Rp Rd	Rp Rd	Rp Rd	

Table 5: Dental Information B007 SK06

Obs	Cc, Dis	-	-	Cc, Dis	Cc, Dis	Cc, Dis	-	-	-	Cc, Dis	Dis	Dis	Dis			
DC	O	-	-	O	O	O	-	-	-	O	O	O	O	-	-	-
EH	O	-	-	X	X	X	-	-	-	O	O	O	O	-	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	L	MD	MD	L	IS	IS	PM	PM	MD	L	L	IS	IS	MD	MD	MD
	MD	IS	PM	PM	IS	L	PM	PM	PM	IS	PM	IS	IS	AM	L	MD
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	O	-	-	X	X	-	-	-	X	-	X	X	-	O	-
DC	-	O	-	-	X	O	-	-	-	O	-	O	O	-	O	-
Obs		Cc, Dis			Cc, Dis	Cc, Dis				Cc, Dis		Dis	Dis	Rp Rd	Cc, Dis	

Table 6: Dental Information B008 SK01

Obs	Cc, Dis		Rd Rp	Dis	Dis					Dis		Dis	Dis	Cc, Dis	Cc, Dis	Cc, Dis
DC	X	-	-	Oc Pit	M	-	-	-	-	Oc	-	Gr	Gr	X	Gr	X
EH	X	-	-	X	X	-	-	-	-	X	-	X	X	X	X	X
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	L	MD	AM	L	L	PM	PM	PM	PM	L	PM	IS	L	L	L	L
	L	L	PM	L	PM	L	PM	L	L	PM	L	L	MD	AM	IS	L
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	X	-	X	-	X	-	X	X	-	X	EH	-	-	X	O
DC	X	X	-	Pit	-	O	-	X	O	-	O	O	-	-	Gr	O
Obs	Dis	Dis		Dis, Cc		Dis, Cc		Dis, Cc	Dis		Dis	Dis, Cc		Rd Rp	Dis, Cc	Dis, Cc

Table 7: Dental information B009 SK02

Obs		Dis	Rd Rp	Dis	Dis	Dis		Dis, dias	Dis, dias, Ch			Dis	Dis	Rd Rp	Rd Rp	Dis
DC	-	O	-	O	O	X	-	O	D, C	-	-	O	O	-	-	O
EH	-	O	-	O	O	X	-	O	O	-	-	O	O	-	-	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	MD	IS	AM	IS	IS	L	AM	L	L	PM	PM	IS	IS	AM	AM	L
	Ue?	AM	AM	IS	IS	PM	L	L	L	PM	PM	IS	IS	AM	AM	Ue?
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	-	-	O	O	-	O	O	X	-	-	O	O	-	-	-
DC	-	-	-	O	O	-	O	O	X	-	-	O	MC	-	-	-
Obs		Rp Rd	Rp Rd				Dis	Dis						Rd Rp	Rd Rp	

Table 8: Dental information B010 SK03

Obs		Dis	Dis	Cc, Dis	Cc, Ch, Dis		Ch, Dis	Ch, Dis	Ch, Cc, ED, Dis	Cc, Ch, Dis	Cc, Dis	Cc, Dis	Dis	Cc, Dis	Dis	Dis
DC	-	Oc pit	O	O	O	-	-	D	O	M	M, Oc	O	O	Oc	Oc	O
EH	-	O	O	O	X	-	-	EH	CH	X	X	O	EH	X	O	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	MD	L	IS	IS	IS	PM	PM	IS	L	IS	IS	IS	IS	IS	L	L
	IS	IS	IS	IS	IS	IS	PM	PM	PM	PM	IS	IS	IS	Is	IS	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	O	O	X	O	O	O	-	-	-	-	EH	O	O	X	O	O
DC	O	Oc	O	O	O	O	-	-	-	-	O	O	O	O	Oc	O
Obs	Dis	Dis	Dis, Ch	Dis	Dis	Dis					Dis	Dis	Dis	Dis, Ch	Dis	Dis

Table 9: Dental information B011 SK05

Obs	Dis	Dis, Cc	Rd Rp	Dis					Dis					Rd Rp	Ch, F, Dis	Dis
DC	O	O	X	M	-	-	-	-	D	-	-	-	-	-	D	O
EH	0	0	X	X	-	-	-	-	O	-	-	-	-	-	X	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	L	IS	AM	L	MD	MD	MD	MD	L	MD	MD	MD	MD	AM	L	IS
	AM/Ag	IS	AM	Am	L	Pm	L	L	L	L	L	L	L	AM	AM	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	O	-	-	O	-	O	O	X	X	EH	O	X	-	-	O
DC	-	OC/M	-	-	O	-	O	O	O	O	O	O	O	-	-	O
Obs	Rp Rd	Dis	Rp Rd	Rp Rd	Dis, Rt		Dis	Dis	Dis	Dis	Dis	Dis	Dis	Rp Rd	Rp Rd	Cc, Dis

Table 10: Dental Information B012 SK07

Obs		Cc	Rm			Cc		Ch, Rt		Cc	Cc	Cc		Rd		Cc
DC	-	Oc pit	X	Oc pit	O	O	O	O	-	O	O	D	Gr	X	Oc	Oc pit
EH	-	O	X	X	O	EH	EH	EH	-	O	O	O	O	X	X	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	Ue	IS	AM	IS	IS	L	L	L	PM	L	L	IS	IS	AM	IS	IS
	IS	AM	AM	L	IS	L	L	L	L	L	L	IS	L	AM	AM	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	O	-	-	O	EH	EH	EH	EH	EH	EH	O	EH	EH	-	-	O
DC	O	-	-	O	O	O	O	O	O	O	O	O	O	-	-	Oc pit
Obs	Cc, Dis	Rd	Rp Rd	W, Cc, Dis	W, Dis	Dis	W, Dis	W, Cc, Dis	Cc, W, Dis	Ch, W, Dis	Dis	W, dis	W, dis	Rd	Rd	Dis

Table 11: Dental information B013 SK19

Obs	Mul mol							Dis	Dis							
DC	Oc, pit	B, C	X	X	-	-	-	Lb, C	Lb, C & D,C	M, C	-	O	X	-	-	-
EH	X	O	X	X	-	-	-	O	O	O	-	O	X	-	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	L	L	IS	L	PM	MD	MD	L	L	L	MD	L	L	MD	MD	MD
	Ag	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	AM	IS	Ag
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	X	X	X	X	X	X	X	X	X	O	X	X	-	X	-
DC	-	M, Gr	M, Lg						O	O	O	D, Gr	M, C	-	Oc pit	-
Obs		Dis				At, Dis, Cc	At, Dis, Cc	At, Dis, Cc,	At, Dis, Cc	At, Dis, Cc	At, Dis, Cc			Rd		

Table 12: Dental Information B015 SK21

Obs	R3/4		Cc	Cc	Cc	Cc		Ch, Pc			Cc	Pc				R3/4 Dis
DC	-	O	Oc Pit	O	O	O	-	O	-	-	O	O	-	-	-	-
EH	-	EH	EH	X	EH	EH	-	EH	-	-	EH	O	-	-	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	UE	L	L	L	L	L	PM	L	MD	PM	L	IS	AM	MD	MD	Ue
	Ag	PM	IS	L	PM	L	PM	PM	PM	PM	L	L	L	IS	IS	Ag
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	-	EH	X	-	EH	-	-	-	-	EH	EH	EH	O	EH	-
DC	-	-	Oc pits	O	-	O	-	-	-	-	O	O	O	Oc pit	Oc pit	-
Obs			Cc	Cc		Cc					Cc	Cc	Cc	Cc	Cc	

Table 13: Dental Information B016 SK09

Obs	Dis	Dis	Dis, F	Dis	Dis	Dis	Dis	Dis				Dis	Dis	Dis, F	Dis	Dis
DC	Oc	Oc pit	Oc	O	O	O	O	O	O	O	O	O	O	O	Oc	Oc
EH	O	O	O	EH	O	O	O	O	O	EH	O	X	X	O	O	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	IS	IS	IS	IS	IS	IS	IS	L	L	PM	IS	IS	IS	IS	IS	L
	MD	IS	IS	IS	IS	IS	IS	PM	IS	IS	IS	IS	IS	IS	IS	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	O	X	EH	EH	EH	O	-	O	O	O	EH	EH	X	O	X
DC	-	Oc	Oc	O	O	O	O	-	O	O	O	O	O	gross	O	gross
Obs		F	Dis	Dis	Dis	Dis			Cc	Cc	Cc	Cc	Cc	Cc, Dis, F	Cc, Dis	Cc, Dis

Table 14: Dental Information B017 SK10

Obs		F						Dis, dias	dias	M Rt					F	Ue
DC	X	Oc pit	-	Oc pit	-	X	gross	M, C & D,C	M,C& D,C	X	X	-	Oc pit	-	X	X
EH	X	X	-	X	-	EH	EH	EH	EH	EH	EH	-	EH	-	EH	X
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	IS	IS	AM	IS	AM	IS	IS	IS	IS	IS	IS	AM	IS	AM	IS	IS
	IS	IS	root	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	AM	AM	MD
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	X	-	EH	EH	EH	EH	EH	EH	EH	EH	EH	EH	-	-	-
DC	X	X	X	Oc pit	X	X	X	X	X	X	X	D C	M C & D C	-	-	-
Obs	Ue	Dis	Dis		Dis	Dis	Dis	Dis	Dis							

Table 15: Dental Information B018 SK08

Obs		Dis	Ch, Dis	Dis	Dis									Ch, Dis		
DC	-	O	O	O	O	-	-	-	-	-	-	-	-	O	-	-
EH	-	O	EH	EH	EH	-	-	-	-	-	-	-	-	EH	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	Ag/ Ue	IS	IS	IS	IS	PM	PM	PM	PM	PM	PM	PM	PM	IS	PM	PM
	Ag/ Ue	IS	IS	PM	PM	IS	PM	PM	PM	PM	PM	PM	IS	IS	IS	Ag/ Ue
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	O	EH	-	-	EH	-	-	-	-	-	-	O	EH	O	-
DC	-	O	O	-	-	O	-	-	-	-	-	-	O	O	O	-
Obs		Dis	Dis			Dis							Dis	Dis	Dis	

Table 16: Dental Information B019 SK17

Obs	Cc	Cc	Cc	Cc	Cc	Cc	Cc					Fx	Fx	Fx		
DC	Oc pit	Oc pit	Oc pit	O	O	O	O	-	-	-	-	X	X	Oc pit	Oc pit	Oc pit
EH	O	X	X	X	X	X	O	-	-	-	-	O	O	X	X	X
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	L	IS	IS	IS	IS	IS	IS	PM	PM	PM	PM	IS root	IS root	IS	IS	IS
	IS	IS	MD	MD	IS	IS	IS	IS	IS	IS	IS	PM	IS	IS	IS	MD
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	X	-	-	O	O	O	O	X	X	EH	-	X	O	X	-
DC	X	X	-	-	X	X	X	X	O	O	O	-	O	O	O	-
Obs	Cc, Fx	Cc, Fx			Cc	Cc	Cc	Cc	Cc	Cc	Cc		Cc	Ch	Fx	

Table 17: Dental Information B020 SK12

Obs	R 3/4					Dis	Dis, Cc			Dis, Cc	Cc	Cc	Dis, Cc	Cc		R 3/4
DC	X	Oc pit	-	-	O	O	O	-	-	O	O	D C	O	Gr	Oc	X
EH	X	O	-	-	EH	EH	EH	-	-	EH	EH	O	X	X	O	O
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	Ue	L	PM	PM	L	L	L	PM	PM	L	L	IS	IS	IS	IS	Ue
	Ue	L	IS	IS	IS	PM	L	PM	L	L	L	L	L	IS root	IS	Ue
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	O	O	O	O	-	EH	-	X	EH	EH	O	X	O	O	O
DC	O	O	Gr	O	O	-	O	-	O	O	O	O	D C	Gr	Oc pit	O
Obs		Dis	Cc, Dis	Dis	Dis	Dis	Dis		Ch, Dis	Dis	Dis		Cc, Dis,	Dis	Cc, Dis	

Table 18: Dental Information B021 SK13

Obs		W, Cc, Dis			Dis	Cc, Dis	W, Dis	W, Dis	Cc, Dis	Dis	Dis	F, Dis	Rp Rd	Dis	Dis	
DC	-	O	-	-	Oc pit	O	O	O	O	O	O	O	-	O	O	-
EH	-	O	-	-	O	O	O	O	O	O	O	O	-	O	O	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	MD	P	MD	MD	IS	IS	IS	IS	IS	IS	IS	IS	AM	IS	IS	Ag?
	IS	AM	AM	IS	IS	IS	L	L	IS	IS	PM	PM	IS	AM	AM	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	O	-	-	O	O	O	O	O	O	O	-	-	O	-	-	O
DC	Oc pit	-	-	Oc	X	O	O	O	O	O	-	-	O	-	-	Oc pit
Obs	Dis	Rp Rd	Rp Rd	Cc, Dis	Cc, Dis	Cc, Dis	Ch, W, Cc, Dis	W, Dis	W, Cc, Dis	Cc, Dis			Cc, Dis, D Rt	Rp Rd	Rp Rd	Cc

Table 19: Dental Information B022 SK14

Obs				-		Dis	Dis, Cc	Dis, Cc	Ch, Dis	Dis	Dis	Dis	Dis	Dis	Dis	
DC	-	Oc pit	Oc pit	-	Oc pit	X	X	X	X	X	X	X	X	Oc pit	Oc pit	-
EH	-	X	X	-	X	X	X	X	O	X	X	X	EH	X	X	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	PM	IS	IS	PM	IS	L	L	L	IS	L	IS	IS	IS	IS	IS	PM
	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	IS	AM	IS	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X
DC	Oc pit	X	Oc pit	X	X	X	X	X	X	X	X	X	X	-	Oc pit	Oc pit
Obs		Dis	Dis	Dis	Dis	Dis	W, Dis	W, Dis	W, Dis	W, Dis	W, Dis	Dis	Dis	Rd	Dis	Dis

Table 20: Dental Information B023 SK15

Obs												Cc		Cc		
DC	-	-	Oc pit	O	-	-	-	-	-	-	-	O	O	Oc pit	-	-
EH	-	-	O	O	-	-	-	-	-	-	-	EH	O	O	-	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	MD	PM	L	L	PM	PM	MD	MD	MD	PM	PM	IS	IS	L	MD	MD
	IS	AM	IS	IS	IS	IS	PM	PM	PM	L	IS	IS	IS	IS	IS	IS
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	O	-	O	O	EH	X	-	-	-	O	O	O	O	Gr	Gr	O
DC	O	-	Oc pit	O	O	O	-	-	-	O	O	O	O	O	O	O
		Rp Rd	Dis	Dis	Dis	Dis				Cc, Dis	Dis	Cc, Dis	Cc, Dis	Cc, Dis	Cc, Dis	

Table 21: Dental Information B024 SK18

Obs		Dis	F, Dis	Dis	Rp	Dis	Dis	Dis	Gv, Dis	Dis	Dis	Dis	Dis	W, Dis	Dis	
DC	-	Gr	Gr	O	-	Gr	M C, Lg C	D C	Pit	Pit, M C	M C	O	O	Oc	B pit	-
EH	-	O	X	O	-	EH	EH	EH	EH	EH	EH	O	O	X	O	-
	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Status	Ag/ Ue	IS	IS	IS	AM	L	L	L	L	L	L	IS	IS	IS	IS	Ag/ Ue
	Ag/ Ue	IS	IS	IS	IS	IS	IS	IS	L	IS	IS	IS	IS	AM	AM	Ag/ Ue
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EH	-	O	X	O	O	EH	EH	EH	EH	EH	EH	O	O	-	-	-
DC	-	O	Gr	B	O	O	O	O	O	O	O	O	O	-	-	-
		At, Dis		Dis	Pit, Dis	Pit, Gv,W, Dis	Pit, W, Dis	Pit, W, dis	Cc, W, dis	Gv, Dis	Gv, Dis	Gv, Dis	Gv, Dis	Rp	Rp	

Appendix 3 – Pathology Summary

Table 22: Summary of the potential pathological conditions observed on each of the skeletons.

	Cribra orbitalia	OA/DJD	Schmorl's nodes	Periostitis	Spina Bifida	Lytic lesions	Ante-mortem Trauma	Perimortem Trauma
B003 (SK22)			✓					✓
B004 (SK04)			✓				✓	✓
B005 (SK11)			✓					✓
B006 (SK16)			✓					
B007 (SK06)								✓
B008 (SK01)	✓		✓		✓			✓
B009 (SK02)			✓					✓
B010 (SK03)			✓					✓
B011 (SK05)			✓		✓			
B012 (SK07)			✓		✓			
B013 (SK19)			✓					
B014 (SK20)			✓	✓		✓		✓
B015 (SK21)							✓	
B016 (SK09)			✓	✓				
B017 (SK10)				✓				✓
B018 (SK08)			✓	✓		✓		✓
B019 (SK17)								✓
B020 (SK12)						✓		✓
B021 (SK13)			✓					✓?
B022 (SK14)		✓						
B023 (SK15)			✓					
B024 (SK18)			✓			✓		✓

Appendix 4 – Bibliography

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