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Osteological analysis of
graves 174, 181 and 195
from Skriðuklaustur monastery

Grave 174

Introduction: Grave 174 was excavated in early July and removed from the grave pit on the 15th of July 2010. After the remains were removed they were set to the on-site lab. At some point between their removal and the 18th of August 2010, when I received the bones, they seem to have been cleaned. Whether this was field cleaning or lab cleaning is unknown, however there was a large amount of dirt remaining on the calvaria, especially on the inside.

Bones Present: (Image 1) Calvaria; Right Maxilla w/zygomatic; Fragmented Right Scapula (largest fragment containing the acromion process, glenoid fossa, and coracoid process); Right Humerus; Right Ulna; Right Radius; 6 Left Carpals (lunate, triquetral, trapezium, capitate, trapezoid); 1 Right Carpal (hamate); 1 Right MC2; 4 Left MC (2-5); 5 Left Proximal Phalanges; 4 Left Intermediate Phalanges; 5 Distal Phalanges; 1 Left Femur w/fragmented proximal and distal ends.

Condition of the Remains: The remains were well preserved. Although certain bones were fragmented, they were all sturdy and could be cleaned easily. The only exception is the femur, which was sensitive to brushing.

Age: There was heavy maxillary attrition. Based on tooth wear patterns from White (2000), the individual was 50+ years old. However, there is no actual dental attrition chart for Iceland, and this was compared to a prehistoric Native American population because this was all that was available. Based on Cranial Suture Fusion Sites, from P. Walker, in Buikstra & Ubelaker (1994), the individual would appear to be in the 50+ range. From the Vault sites, the score was 19, falling into the 51.5 Mean Age (Standard Deviation 12.6). From the Lateral- Anterior Sites, the score was 16, falling into the 56.2 Mean Age (Standard Deviation 8.5).

Conclusion: Maxillary Attrition= 50+ years old

Vault Closure= 51.5 +/- 12.6 years old

Lateral-Anterior Closure= 56.2 +/- 8.5 years old

The individual from Grave 174 can be categorized as 50+ years old, or as an Old Adult.

Sex: Based on cranial features from Walker in Buikstra & Ubelaker (1994), Grave 174 scored the following:

Nuchal Crest: 4-5

Mastoid Process: 2-3

Supra Orbital Margin: 5

Glabella: 4-5

Mental Eminence: N/A

Conclusion: Based on the generally high and robust features of the cranium, it would appear that the cranium belongs to that of a MALE. However, given the pathology that causes growth and robustness of the skeleton in general, it may have affected these scores.

Stature: Due to the recovery of the femur without the distal or proximal epiphyses, no stature was estimated. From the humerus, an estimation could have been made, but given the morphology caused by the pathology, any estimation would be no more than a guess.

Pathology: The femur shows marked thickening and lamination of the cortical bone. The femur (Image 12-13, 17) has become quite enlarged, however, the femur does not display any signs of bowing, which would be expected from Paget's Disease. The phalanges of the left hand show marked thickening as well (Image 2), which is uncommon for Paget's Disease, but not impossible. The humerus (Image 7-8), radius (Image 5-6) and ulna (Image 3-4) each show marked signs of thickening. There may be possible secondary osteoarthritis caused from the thickening (Image 19-22). The scapula, although fragmentary shows signs of remodeling (Image 9-11). The calvaria (Image 14-16) shows possible lesions that seem similar to examples



1) Grave 174, All Remains, Anatomical Position



2) Grave 174, Left Hand, Palmar View



3) Grave 174, Right Ulna, Medial View



4) Grave 174, Right Ulna, Lateral View



5) Grave 174, Right Radius, Anterior



6) Grave 174, Right Radius, Posterior



7) Grave 174, Right Humerus, Anterior

of Paget's Disease in other specimen (World History of Health Organization website). The process may have spread across the coronal suture that appears to be totally obliterated, although this could also be from the advanced age of the individual. For more conclusive evidence of Paget's Disease, the calvaria should be x-rayed to look for cortical thickness of the bone (specifically osteoporosis circumscripta), which would be expected to show markedly increased radiolucency. The thinned tables may exhibit a porous surface, which may be visible from a superior view of the calvaria. Alternatively the calvaria could be cross-sectioned to check for thickening and/or nodular bony masses in the diploe.

Conclusions: The remains of Grave 174 show strong evidence suggesting Paget's Disease in the remains that were uncovered. This fits with the statistics, which are that it is more common in Europeans, 90% of patients are over the age of 40, and that it is more common in males than females.

Trauma: The distal and proximal epiphyses of the femur were broken postmortem (Image 17), most likely due to poor preservation during excavation. The same can be said for the facial region for the face. An upper right M2 seems to have been lost some time postmortem, however, it appears that the upper right M3 was lost antemortem since there are signs of alveolar healing (Image 18). One the posterior surface of the femur, it would appear that there was recent damage caused by cleaning. The pathology surrounding the femur seems to be in a weakened condition.

Summary: The individual buried in Grave 174 was an elderly man (for the Middle Ages) over 50 years old who suffered from an advanced case of Paget's disease that he had likely lived with for a number of years. Given that Paget's disease usually causes bowing of the legs because they are the weight bearers of the body, it is likely that the individual was not highly or very mobile.



8) Grave 174, Right Humerus, Posterior



9) Grave 174, Right Scapula, Superior, Anterior Down



10) Grave 174, Right Scapula, Posterior, Lateral to the Right



11) Grave 174, Right Scapula,



12) Grave 174, Left Femur, Posterior



13) Grave 174, Left Femur, Anterior



14) Grave 174, Cranium, Superior



15) Grave 174, Cranium, Posterior



16) Grave 174, Grave 174, Anterior



17) Grave 174, Left Femur,



18) Grave 174, Right Maxillary Dentition



19) Grave 174, Right Humerus, posterior, distal left



20) Grave 174, Right Humerus, anterior, distal left



21) Grave 174, Right Radius, Distal, Distal Left, Posterior



22) Grave 174, Right Radius, Distal, Distal Left, Anterior

Grave 181

Introduction: Grave 181 was excavated from a coffin on the 27th of July 2010. The remains were removed that same day. They were sent to the field lab and between the date mentioned and the 18th of August 2010 the remains were cleaned. On that day I received the bones for analysis and documentation.

Bones Present: (Image 1) Frontal; Right and Left Maxilla; Anterior portion of the Mandible; Left and Right External Auditory Meatus; Fragments of the Temporals, Parietals, Occipital, Sphenoid; Left and Right Femur; Left and Right Malleus; Upper Right M3, M2, M1, PM4, PM3, C, I2; Upper Left M1, PM4, PM3, C, I2, I1; Lower Right M3, M2, M1, PM4, PM3, C, I2, I1; Lower Left M3, M2, M1, PM4, PM3, C, I2, I1

Condition of the Remains: The remains were in an extremely fragmented state ranging from approximately 1-10 cm large. The teeth were falling out of the alveolar sockets and the maxillas in general were too fragile to handle. The frontal bone was unusually thin.

Age: There was heavy maxillary attrition. Based on tooth wear patterns from White (2000), the individual was 50+ years old. However, there is no actual dental attrition chart for Iceland, and this was compared to a prehistoric Native American population because this was all that was available. There were no other remains that would be able to indicate age.

Conclusion: Although the diet of the individual could have accelerated the tooth wear, the amount of attrition would suggest an individual of around 50 years of age.

Sex: Based on cranial features from Walker in Buikstra & Ubelaker (1994), Grave 174 scored the following:

Nuchal Crest: N/A

Mastoid Process: 1

Supra Orbital Margin: 2-3

Glabella: 2

Mental Eminence: N/A

Conclusion: Based on the available remains, I would suggest that this is a "Likely/Possible Female", although it should be mentioned that this is based on only 3 of 5 traits available. However, Likely/Possible Female is a fair assumption.

Stature: The femurs were both too damaged to determine or estimate a possible stature for the individual.

Pathology: The lesion on the frontal bone (Image 3) may be associated with a form of tertiary syphilis, however, this is only one point on the frontal bone and the complete bone would give us a better understanding. Lesions such as this can also be found in comparative samples with syphilis, however there could be many causes for a lesion such as this. The lesion could also have been caused by a small blow to the head causing necrosis of the surrounding impact area.

The frontal bone as a whole displays an unusually thin cross section and is in fragile state. The shape of the frontal bone in general seems to have a deformity causing a general depression. The cause of this cannot be known since we do not have the complete skull or frontal. The upper right I1 was lost antemortem and there appears to be more alveolar resorption in the maxillary area (Image 2). Although fragmented, the nasal aperture may have signs of resorption (Images 4-5). This is typically a sign of leprosy however, other individual infections, including syphilis could cause this.

Conclusion: This individual suffered from either necrosis of the bone above the left orbital as a result from an impact trauma or from some form of infection, possibly syphilis, but without more remains the cause cannot be determined.



1) Grave 181, All Remains



2) Grave 181, Maxilla Alveolar Resorption



3) Grave 181, Frontal, Depression



4) Grave 181, Right Maxilla, Widened Nasal Aperture, Alveolar Resorption



5) Grave 181, Left Maxilla, Widened Nasal Aperture, Alveolar Resorption

Trauma: Due to the poor conditions from which the bones were recovered, there is significant, yet unavoidable, excavator damage to the proximal and distal epiphyses of both femurs. The fragile state of the maxillas has also led to further postmortem damage. It is worth noting, that while there were no upper left M2 and M3 recovered, it cannot be said with any certainty that these were lost antemortem since the alveolar sockets are destroyed. However, the upper right I1 seems to have been lost antemortem since the alveolar socket shows signs of healing.

Summary: The individual buried in Grave 181 was likely a female who was 50+ years old and suffered from some form of cranial deformity and possible facial deformation that could possibly have been caused by syphilis. There is an open possibility that she was affected with syphilis, but without more of the remains, it cannot be determined for certain.

Grave 195

Introduction: Excavation of Grave 195 began on 11/08/2010 and was finished 17/08/2010. The burial pit was located in Area A. The remains were not in a coffin and the skull was found in a relatively upright position (Image 1). After the removal of the remains, they were sent to the field lab where they remained until I received them on 18/08/2010. At that point the remains had mostly been cleaned already, with the exception of the skull. Documentation in the lab was finished on 19/08/2010.

Bones Present: (Image 2) One Fragmented Skull: Cranium; Mandible; Left Maxilla; Complete Dentition
One Fragmented Postcranial Skeleton: Fragmented Scapula (mostly glenoid fossa with medial margin); left & right clavical; left & right first rib; various right & left fragmented ribs; C-1- 3; fragmented cervical, thoracic, and lumbar vertebrae; left & right humerus, radius, ulna, femur, tibia, and fibula; fragmented left & right tarsals; five left metatarsals; one left MT1 proximal phalange; two left distal foot phalanges; five right metatarsals; five right proximal foot phalanges; one right middle foot phalange; right foot sesmoid bone; fragmented pelvis (right & left ilium, pubis, ischium); four right MC; eight right phalanges; three right carpals; four left MC; eight left phalanges

Condition of the Remains: The remains of Grave 195 were in good condition, with the exception of most of the epiphyses of long bones missing. The perinasal area of the cranium was fragile and damages, resulting in the loss of teeth upon removal from the burial pit. There was extensive root damage to the cranial vault.

Dentition: Complete 32 tooth set. Possible alveolar resorption at the upper left PM3 (Image 3). During excavation all of the upper incisors and upper right canine came out. This could have been due to poor preservation, or it could have been caused by a pathology affecting that area.

Age: Dental: There is no outright visible tooth wear. No dentine is exposed on the molars, but the incisors are worn and some dentine is exposed. Some wear on the first lower left molar. The third molar has erupted. Based on the attrition, the individual was approximately 25-30 years old, although diet may have accelerated or slowed the amount of attrition.

Non-Dental: Based on the cranial sutures, the scores were the following:

Vault Composite Score: 1-2. Age: 30.5, Standard Deviation 9.6

Lateral-Anterior Sutural Score: 1. Age 32, Standard Deviation 8.3

It should be kept in mind that there were some taphonomic forces at action that applied pressures to the cranium causing slight breakage of the skull, mainly along symphises and sutures. While this will slightly obscure the scores, it does make notable that none of the suture were fully fused. Instead of breaking they came apart in their entirety. This lead to a scoring of 0 for open sutures to 1 for minimal closure.

Summary: The individual was approximately 25-30 years of age, with 25-35 being a safer estimation.

Sex: Skull: Based on cranial features from Walker in Buikstra & Ubelaker (1994), Grave 195 scored the following:

Nuchal Crest: 3

Mastoid Process: 2

Supra-Orbital Margin: 1

Glabella: 1-2

Mental Eminence: n/a (to fragile to handle, broken at the mental protuberance).

Based on the above taken scores, from the skull, it would be a female. All categories are well in the gracile region of the scoring system. Although there is always a possibility of this being a gracile male, the skull strongly suggests Female.

Pelvis: Based on the remaining pubic fragments, there appears to be a ventral arc present. Although this area of the pubis is fragile and slightly damaged, there still appears that one is present. The sciatic notch is wide, suggesting female. The subpubic cavity would also suggest female.

Summary: Given the combined results of the Skull and the Pelvis, it can be said that this is a female.



1) Grave 195, Burial Pit with Remains



2) Grave 195, All Remains



3) Grave 195, Left Maxilla, Lateral, Alveolar Resorption



4) Grave 195, Right Foot

Stature: There were no long bones to estimate stature with any amount of accuracy. Nor are there accurate regression formulas available for estimation.

Pathology: The proximal phalange of MC2 on the right foot seems to be smaller than normal (Image 4). The shaft is tapered more than is usual, however, since the other phalanges are not present for comparison, this could just be a morphological variation of the individual. The frontal bone displays lesions (caries sicca) (Image 5). The left maxilla displays alveolar resorption in the anterior region. This could explain the loss of teeth during excavation, due to the fragile state caused by resorption (Image 8). The left tibia seems to be affected by diffuse nongummatous osteoperiostitis that has left the tibia thick and heavy (Image 6). The entire surface (that remains) seems to have been infected. This is especially noticeable when compared to the right tibia (Image 7).



5) Grave 195, Cranium, Anterior



6) Grave 195, Left Tibia, Anterior, Distal Right



7) Grave 195, Left & Right Tibia, Anterior, Distal Right



8) Grave 195, Tooth Loss During Excavation

Summary: The combination of frontal lesions, affected perinasal resorption of the maxilla, and diffuse nongummatous osteoperiostitis of the left femur suggests a form of treponemal infection. Given the geographical context, this means the pathology is more than likely treponemal pallina (syphilis).

Conclusions: The remains of Grave 195 were of a female aged between 25-35 who suffered from or had syphilis at the time of death.