Osteobiography of Ancient Egyptian Mummified Remains, 900-790 BC

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CHAPTER ONE

Introduction

Ancient Egyptian art and artifacts have enamored scientists for well over a century. The information that has been uncovered has not only aided in our understanding of an enormous part of humankind's most ancient past, but has also reached an unprecedented popularity in recent popular culture. Ancient Egypt is very popular because of its unique history of an enormous group of people defining their own unique culture, their ability to amass gigantic, lasting pieces of architecture, and for being one of the first, most intense forms of political hierarchy. The information that has been gained from the continuous research into this part of the past has enabled us to better understand social class systems, nutrition, overall health in relation to cultivation practices, and ancient disease processes. Understanding the past can help improve our modern-day practices and correct concurrent issues that many parts of the world still face today.

In order to gain a more complete picture of someone’s life in the ancient world, bioarcheologists try to produce osteobiographies on mummified individuals all over the world. Osteobiographies have become incredibly useful for evaluation of ancient culture. Because the majority of efforts have been transfixed on the higher-class population, evaluations into lower-class individuals have recently become a popular avenue of study, revealing drastic differences in the way of life of people belonging to each of these lower social levels in the Egyptian hierarchy. The goal of this thesis is to use osteobiographical methods to explore the life and death of the mummy residing at the W.H. Over Museum.
Methods and results include radiocarbon dating, analysis of botanicals, osteological methods of aging, sexing, and stature, and preliminary pathological analyses.

In an article discussing an osteobiography of a high-status burial from Mexico, anthropologists Mayes and Barber states that, “With its focus on individual lives, osteobiography makes it possible to determine how social and environmental differences impinged on human health and affected everyday life at a very small scale” (Mayes and Barber 2008). Osteobiographies can allow us to assess an individual to learn more about their life, health, social status, and culture in which the person lives. Learning past history in an accurate and meaningful way should be an endeavor important to any anthropologist or historical scientist. Assessing the biological remains of an individual can reveal much of this information and may even reveal other information not known about a specific culture or time period.

Comparisons between class systems are always helpful when understanding the complexity of past cultural societies tendencies towards hierarchical divides or political structures affecting social status or class. Furthermore, Mayes and Barber also state that: “Osteoarchaeology is a particularly effective means of examining status and social hierarchies because both are strongly implicated in individual and population health” (Mayes and Baber 2008). The implications for this type of research are vast and can work to aid our understanding of ancient nutrition, health, and disease giving us a better picture of the obstacles this ancient culture faced, how they survived, and still thrived to be one of the most successful and influential cultures of our ancient past.

Osteoarchaeological information from analyses of human remains is arguably vital in order to obtain a complete picture of the ancient past, a task which cannot be
accomplished with artifact analysis alone. Human bone is extremely sensitive to metabolic indiscretion and a multitude of disease processes. Sabrina Agarwal discusses that the indications and goals for the study of ancient human remains stating that this multidisciplinary field “has concentrated on the examination of variation in morphology related to influences such as activity, disease, and nutrition (Argawal 2016).” Evaluation of nutrition and disease is particularly important because they allow researchers to trace pathogens through time and understanding nutrition and diet can also help when determining plant and animal domestication, subsistence practices, and geographic activity. When comparing the differences between social status in relation to health and disease, a better grasp what it meant to live in royalty, or to live as a commoner when the world was very different that it is today may be obtained.

For the remaining portion of this thesis, this researcher’s evaluation of a set of mummified remains will be discussed. A determination of the time period, social class, and overall health of the individual will reconstruct the pre-, peri-, and post-mortem histories of an ancient Egyptian woman living during the Third Intermediate Period. An assessment of social class along with the culture of this dynasty in Egypt will aid in creating the osteobiography of this woman and will aid in the evaluation of possible pathologies residing on her skeletal remains. A glimpse into her life will lead to further discussion of Egyptian health and disease during this time period, aiming to discuss the paleopathology of the ancient world. The evaluation of this individual’s economic class will give insight into social status in relation to health and disease through a rare sample in the current osteobiographical data of Egyptian individuals.
CHAPTER TWO

Background

*Egyptian Mummy Trade and Egyptomania*

Interest in ancient Egyptian artifacts, including mummified remains, reached an unprecedented height in the 19th and early 20th centuries. The Victorian era saw a huge boom of press releases and articles being written about the wonders of ancient Egypt. Travelers were now interested in gaining access to all of Egypt’s sights and scenes. They did this by personally experiencing everything they were reading about in the news and writing about it in their own travel logs. Tessa T. Baber discusses this phenomenon stating, “This ardent obsession, now known under the popular term “Egyptomania,” was greatly influenced by the news of archeological discoveries made in Egypt and the exhibition of ancient mummies and artifacts in museums across the globe” (Baber 2016). To add to the public fervor for adventure due to scientists reporting their finds, these scholars were acquiring artifacts at a high rate in order to create museum exhibits so as to attract visitors to their museum. This was done in order to generate revenue and increased publicity of Egyptian artifacts which allowed them to continue their research in the sands of Egypt. Unfortunately, because of the publicity boom surrounding the archaeologists’ efforts to study the ancient world, looting became a frequent side effect of this mania which consisted of various unethical practices for the acquisition of ancient Egyptian artifacts.
The looting of Egyptian sites created a severe problem in regards to the scientific and ethical approaches for the study of ancient artifacts, including mummified remains, in this area. People, local and foreign, were so transfixed on acquiring these interesting, vibrant artifacts in any way they could in order to sell them to generate a profit. The looters had no ethical responsibility to the site they were robbing as they took numerous artifacts and mummified remains out of context, giving no thought or care to maintaining the integrity or safety of the artifacts, greatly inhibiting Egyptian archaeology. Baber addresses looting attitudes in by discussing that looting attitudes were not always respectful. Victorian travelers were more often than not obsessed with possessing a part of ancient Egyptian culture, a sentiment that induced many travelers to procure, or even smuggle, antiquities home as mementos of their trip (Baber 2016). Taking an artifact out of context can completely alter an archaeologist’s interpretation of the artifact or site. For example, if a treasure is taken from a tomb, we may not understand why it was special to a specific site. Was it placed in a person’s hand before burial, if so why is it then significant? Also, the ability to use relative dating is completely obscured and useless if any artifacts are taken out of their context. Also, looting behavior led the way for artifacts to be damaged because looters did not understand how to properly protect artifacts from further damaged, such as can be caused by environment or physical contact. Of course, if one was not an archaeologist or curator for a museum, they would not possess the techniques to correctly and safely transport artifacts, and many were damaged in the process of their travels to their new location of residence.

With the trauma looters were inflicting on Egyptian sites, rules of ethics and behavior regarding this area began to emerge. Sir William Matthew Flinders Petrie was...
vital in creating and upholding new ethical standards for Egyptian archaeology. Petrie took great care in his research into ancient Egyptian history and emboldened the need for documentation in an otherwise destructive process. In his article titled *Archaeology in Egypt*, Petrie states:

> The first duty of an excavator is then to consider, not his immediate wants and wishes, but the responsibility which he undertakes in opening up a place, and destroying forever the evidences of object, and their collocation. He should always remember that if he does not diligently observe and note all that can be seen as work goes on, the information is being wantonly thrown away by him, and he is doing perhaps vastly more harm than good (Petrie 1888).

Early treasure seeking efforts in Egypt have caused many deleterious effects to the information we could have gained, had the proper methods of archaeology and context been obeyed. Thievery has unfortunately forced many museums to rescue artifacts, including mummies, from private collections in order to preserve them from further harm. Taken out of context when they were removed from their original geographic territory, it is now up to researchers to try to place these individuals in the correct historical time period in order to tell their story when and wherever possible. In addition, we can also provide a sense of ethical justice to the individual whose cultural standards were interrupted by these past, unethical looting practices, as will be discussed in the next section.

*Journey to the W.H. Over Museum*

The W.H. Over Museum was founded on the University of South Dakota campus in 1883 by an act of South Dakota Legislature. The museum has been instrumental in preserving artifacts, most of which are Native American. They have also worked to repatriate hundreds of artifacts and continue to house a massive collection of ancient
culture. One of the main goals of the museum has been to accurately display artifacts and history as a “Walk Through Time” and provide the best context for the artifacts they display. By researching the mummy found at this museum, an inference about her life, social status, and health can be made in order to tell this individual’s story which can provide even more context for the museum. Known cultural norms for her time period definitely did not include the removal of her sarcophagus from her chosen resting place, so as to be brought to a museum in South Dakota. While the W.H. Over has been complacent in every legal and ethical guideline available to them, they still consider it an extremely important task to finding out who this person was, where she came from, and what her life was like. Failing to answer these questions provides no justice to this person, now laying at rest in a foreign country.

The W.H. Over Museum received a letter from a R.R. Jenner in 1950 about their interest in selling the mummy to the museum. There were two mummies that this owner was trying to sell as a set for $250. They also offered to sell them separately, listing the “Daughter of Rameses” for $250 (Jenner 1950). Little is known about this private collector, except that he was trying to sell the collection because his father was getting too old and owned an amusement park and museum. There is only a small amount of background information about the museum which has long been closed, therefore the remaining records are scarce. What little documentation has been found described the “museum” as being little more than a road side, sideshow museum existing as a branch of a carnival amusement park located in Loup City, Nebraska.

The mummy was purchased by the W.H. Over in 1950 and a University of South Dakota Bulletin titled *Egyptian Mummy On Display In Museum* states that, “Jenner
claims that the mummy is a small Egyptian woman entombed sometimes in the 19th Dynasty. The article goes on to explain that the artifact arrived in fifty pieces which took a month and a half to piece together and that the museum would like to pursue further study into the mummy. Photographs of the outside of the coffin and the artwork on the inside of the coffin were sent to the Oriental Institute in Chicago to see if the hieroglyphs could be translated (Jenner 1950). The Oriental Institute in Chicago was the first attempt at trying to gain more information about the sarcophagus in order to establish a time period for this individual. They tentatively thought that the coffin represented a Ptolemaic Era coffin but could not be sure because of the crudely drawn images damaged throughout time. They suggested that there may be more than one individual interred in the coffin and suggested that since Egyptians tended to recycle coffins, or in some cases skeletal elements (Gillihan 1950). It was suggested that the coffin be refurbished in order to try to make better sense of the hieroglyphs and to further repair the coffin from previous damages.
CHAPTER THREE

Methods

Recovery and Analysis of Skeletal Remains

Mummification practices have been known to have changed dramatically across the dynasties of ancient Egypt. As the result of Egyptomania, which was discussed previously, the treatment of Egyptian artifacts, including human remains was not always performed in an ethical manner. This is shown by the integrity of the sarcophagus and mummy to be discussed in this osteobiography. Due to the state of this individual’s skeletal remains and coffin, the museum has done an excellent job of protecting the artifact from further harm but placing it in a glass case. By doing so, the mummy has been protected from humidity and from further human interaction. Considerations for storage and display need to be made that this mummy was subjected to a long history of damage done in antiquity, prior to its arrival at the W.H. Over museum.

After obtaining permissions from W.H. Over museum to pursue research into their set of mummified remains, the sarcophagus was removed from its case in order to be photograph and analyze the skeletal elements. Due to the poor treatment of this mummy prior to its arrival at the Over museum, the bandages were severely damaged and numerous holes were observed. The skull was unwrapped and laying at the neck of the bandages. The remaining skeletal structure appeared to be within the mummified bundle
leading to the question of whether the skull was authentic to the rest of the mummified remains or if the remains could represent more than one individual.

After careful, partial, manual excavation of the rest of the skeletal elements from the mummy wrappings were carried out and around 37.86% of the skeletal elements for this individual were recovered. The remains themselves were comingled and were not interred in standard anatomical position inside the mummy wrapping. The skull of a rodent was also found and removed from inside the mummy wrappings. More could still reside within the bandages; however the bandages would require being further dissected in order to aid in removal and it was deemed unethical to pursue. Table 1 shows a basic inventory of the skeletal remains with NISP, MNE, and basic pathology and modification observations.
Methods for Age, Stature, and Sex

The taphonomy of the skeletal remains and the skull were observed to determine if these remains could represent more than one individual. Ageing assessments were determined using methods of observation including cranial suture fusion sites and diaphysis and epiphyseal unions as laid out in the *Human Bone Manual* (White and

<table>
<thead>
<tr>
<th>Bone</th>
<th>NISP</th>
<th>MNE</th>
<th>Pathology/Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skull</td>
<td>1</td>
<td>1</td>
<td>Cribra Orbitalia/Portal Hyperostosis</td>
</tr>
<tr>
<td>Mandible</td>
<td>1</td>
<td>1</td>
<td>Only incisors, canines</td>
</tr>
<tr>
<td>Right Clavicle</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Clavicle</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Vertebrae</td>
<td>23</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Right Ribs</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Left Ribs</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Right Scapula</td>
<td>1</td>
<td>1</td>
<td>Partial</td>
</tr>
<tr>
<td>Left Scapula</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Right Humerus</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Left Humerus</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sternum</td>
<td>2</td>
<td>1</td>
<td>Manubrium, Corpus Sternal</td>
</tr>
<tr>
<td>Right Pelvis</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Pelvis</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sacrum</td>
<td>1</td>
<td>1</td>
<td>Dark brown organic material</td>
</tr>
<tr>
<td>Right Femur</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Femur</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Right Tibia</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Tibia</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Right Patella</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Patella</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Right Fibula</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Fibula</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Right Tarsal Bones</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Left Tarsal Bones</td>
<td>13</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Right Carpal Bones</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Inventory Chart for Mummified Skeletal Elements
Folkens 2005) and by cranial suture fusion sites laid out in *Introduction to Forensic Anthropology* (Byers 2017). Pubic symphyseal observations were also used, consisting of the Suchey-Brooks pubic symphysis scoring system and Todd’s system involving observation of auricular changes to the pubic symphyseal surfaces. Dental attrition could not be used to aid in aging because of the poor dental health of this individual and will be discussed further in the results section. Pathological lesions were also assessed using the *Human Bone Manual* to understand possible causes of any pathological lesions represented on this individual.

Stature estimation was determined using a new technique developed by Raxter et al. in their article titled *Stature Estimation in Ancient Egyptians: A New Technique Based on Anatomical Reconstruction of Stature*. Age and genetics have also changed throughout time so a regression equation for ancient Egyptian stature was deemed necessary and the Raxter equation was the best calculated when including standard deviation and age related changes affecting stature. Calculations were produced using the data in Table 2 and all calculations were taken in centimeter measurements as indicated in the table. The available data set included a left humerus, right and left tibiae, and right and left femora. Measurements were taken of these long bones and then calculations of the same sided tibiae and femora were taken and compared to the humerus to provide the best possible stature estimation range.
Sex assessment was carried out with continued use of methods in the *Human Bone Manual* and consisted of using the Phenice method of pelvic observation. The greater sciatic notch was also observed as an indicator of sex. The overall gracility and robusticity was noted as it pertains to sex assessment. The mastoid process and the features of the skull were noted, although because of contamination of the skull, unreliability of using the skull as a primary source of sex assessment, and subsequent radiocarbon dating, the predominant conclusions of sex are based on the pelvic observations. Results are based on the Phenice method of the pelvis and the conclusions based on sex exclude the skull features.

**Assessment of Social Status, Paleopathology, and Dating Methods**

Context for social status of this individual has been inferred from laboratory observation of the mummification method used for this person and through observation of the surrounding artifact, the coffin itself. The only context that remains for this individual is the coffin and the state of the remains themselves. Determining the type or mummification and the type of coffin may speak directly to social status for this individual. The coffin in question has been assessed using documentation from

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**Table 2: Stature Estimation for Ancient Egyptian Females (Raxter et. al 2008)**

<table>
<thead>
<tr>
<th>Females</th>
<th>Femur_m</th>
<th>37</th>
<th>2.340 (fem_m) + 56.99</th>
<th>2.517</th>
<th>0.891</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femur_b</td>
<td>37</td>
<td>2.341 (fem_b) + 57.63</td>
<td>2.511</td>
<td>0.892</td>
<td></td>
</tr>
<tr>
<td>Tibia_m</td>
<td>37</td>
<td>2.699 (tib_m) + 61.08</td>
<td>1.921</td>
<td>0.938</td>
<td></td>
</tr>
<tr>
<td>Tibia_i</td>
<td>37</td>
<td>2.700 (tib_i) + 61.89</td>
<td>1.983</td>
<td>0.940</td>
<td></td>
</tr>
<tr>
<td>Humerus_m</td>
<td>30</td>
<td>2.827 (hum) + 70.94</td>
<td>2.732</td>
<td>0.806</td>
<td></td>
</tr>
<tr>
<td>Radius_m</td>
<td>38</td>
<td>2.509 (rad) + 96.73</td>
<td>4.057</td>
<td>0.580</td>
<td></td>
</tr>
<tr>
<td>Femur_m + tibia_m</td>
<td>37</td>
<td>1.313 (fem_m + tib) + 54.36</td>
<td>1.988</td>
<td>0.935</td>
<td></td>
</tr>
<tr>
<td>Femur_i + tibia_i</td>
<td>37</td>
<td>1.312 (fem_i + tib_i) + 55.27</td>
<td>1.961</td>
<td>0.936</td>
<td></td>
</tr>
<tr>
<td>Humerus_m + radius_m</td>
<td>24</td>
<td>1.291 (hum + rad) + 86.41</td>
<td>3.247</td>
<td>0.640</td>
<td></td>
</tr>
</tbody>
</table>

* To estimate the stature of individuals 30 years of age and older, subtract 0.06 (age in years – 30) (Trotter and Gleser, 1952).

* Subscript m, maximum length (including intercondylar spines in tibia); subscript b, bicondylar length; subscript l, length measured to the lateral condyle of the tibia.
photographic analyses of Egyptologists at the Oriental Institute in Chicago. Samples of the coffin wood, including a sample consisting of part of the art inside the coffin were sent off for analyses to Dr. Lee Newsom, a paleoethnobotanist at Pennsylvania State University, to determine a more precise composition of the coffin. The coffin itself, before analyses, was thought to represent a “stock model coffin which was suggested to be made of a low-grade wood and covered in plaster for painting” (Gillihan 1950).

After looking at the color taphonomy of the skull in relation to the rest of the skeletal remains, the skull seemed to be the most suspect in regard to authenticity. However, since the skull was not wrapped with the rest of the remains, this may have affected color taphonomy. It was inferred that if the skull came back as dating to the appropriate time period, that the rest of the remains would most likely represent one person. A sample from the skull was taken by the laboratory at CAIS, University of Georgia for Carbon 14 AMS dating. A small section of the mastoid process was removed in order to gain the best and most uncontaminated sample. A 1mg sample of collagen was obtained from the right mastoid process. The occipital condyles were considered but laboratory specialists in Georgia were concerned they may not get enough of a sample and would need to sample the mastoid process if they could not. As seen in Figure 1, to prevent as little damage to the skull as possible, it was decided to sample the mastoid process only and a sample from the right mastoid process taken. The results of all of these methods will be discussed further in the results section.
Figure 1: Sampling Location for UGAMS, University of Georgia
CHAPTER FOUR

Results

Age, Stature, and Sex

Age range estimations were made based off of a number of methods laid out in the *Human Bone Manual* by White and Pieter and in *Introduction to Forensic Anthropology* by Byers. Using the Todd’s system of symphyseal analyses, this individual was placed into stage VI, indicating an age range of 30-35 years upon time of death. The auricular observations of the pubic symphyses were noted using the Suchey-Brooks method. Using the updated and more precise Suchey-Brooks method, observations of both symphyses showed a smoother symphyseal face but still showed distinct ridges, the more prominent being on the left pubic symphyseal. However, absence of lipping on both dorsal margins were also observed thus placing this individual into the Phase 3 category, those the left pubic symphyseal could be placed in either Phase 3 or 4. Figure 2 and 3 shows these changes. Factoring both, the decision was made to categorize this individual as predominately Phase 3 therefore indicating an age range of 21-53 with a mean age of 30.7 years old.

The cranial suture lines and closure rates were also observed and composite scores were taken of each suture line. The results have placed this individual in an age range of 23 to 60 years of age. A further estimation was taken using Stage 1-6 suture line closure further placing this individual into an age range of 25-35 years of age.
No one method of age estimation is completely accurate and each represent their own issues of bias which is why diaphysis and epiphyseal unions were also considered for age estimation. All bone epiphyses are fused indicating that this individual was at least 28 years of age at her time of death. Using the data from a combination of these methods, an educated, yet conservative, age range for this individual would be 28-35 years of age.

The sex of this individual represents that of a woman. The appearance of the skeleton after being placed back into standard anatomical position was gracile in nature. The term gracility is used because the density of the bones is less than what would be represented by a robust male with larger bone structure. Sexual dimorphism leads us to make educated guesses when looking at a full set of human remains. Again, using the *Human Bone Manual*, the greater sciatic notch was also observed and noted with a widening angle of 2 out of a scale of 1-5, indicating a probable female (Byers 2017). Further observations made using the Phenice method yielded a subpubic concavity and a sharper medial aspect of the ischiopubic ramus (Byers 2017). The pelvis itself when put back into standard anatomic position was observed as having the larger, rounder, more heart shaped appearance that is more typical in females. Therefore, this individual has been identified as female. Child birth cannot be determined at this time but may be a question that can be answered in the future with further research and analysis.

The stature of this individual was only able to be determined using stature calculations. This is due to the lack of an available in situ measurement since the bones were not represented in the bandages as being in standard anatomical position, but in a random manner such as the left tibia being the first bone removed from the neck of the
bandage and not lower from where the femora were found. As stated in the Raxter regression equation, all measurements were converted to centimeter measurements and then converted to feet and inches for stature height. The calculation results can be reviewed in Table 3. A conservative estimation of stature was determined for this individual as being between 4 ft 11.8 inches to 5 ft 1.8 inches.

<table>
<thead>
<tr>
<th>Bone</th>
<th>Measurement</th>
<th>Conversion</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Humerus</td>
<td>295 mm</td>
<td>29.5 cm</td>
<td>4 ft 11 inches to 5 ft 1.8 inches</td>
</tr>
<tr>
<td>Left Tibia + Left Femur</td>
<td>Tibia: 344 mm, Femur: 414 mm</td>
<td>34.4 cm, 41.4 cm</td>
<td>4 ft 11.8 inches to 5 ft 1.4 inches</td>
</tr>
<tr>
<td>Right Tibia + Right Femur</td>
<td>Tibia: 345 mm, Femur: 408 mm</td>
<td>34.5 cm, 40.8 cm</td>
<td>4 ft 11.6 inches to 5 ft 1.1 inches</td>
</tr>
</tbody>
</table>

Table 3: Bone Measurements and Stature Calculation Results
Figure 2: Right Pubic Symphysis of Pubis

Figure 3: Left Pubic Symphysis of Pubis
Pathological Analyses

Observations of different disease processes on bone can provide us with a glimpse into the daily life of this individual. Bone is extremely sensitive to metabolic indiscretion, infectious disease processes, and other disease processes not representing pathogenic conditions. These processes can provide information such as an individual living and dealing with infectious disease processes, overall health and nutrition, and environmental issues present in the geographic region in which this person resided.

After being placed back into standard anatomic position, observations were made in relation to any sort of pathological lesions. Pathologies relation to dental health such as caries, abscesses, hypoplasias, alveolar resorption and dental attrition can help to determine aspects of diet, and may also serve as a gauge of overall health (Goodman & Martin 2002). The dental health of this individual was poor, resulting in dentition not being able to be used as an aging method. There were no teeth found within the coffin and based on the analyses of the maxilla and mandible, this individual died having lost most of her teeth, as seen in Figure 6 and 7. The horizontal ramus of the mandible was void of any premolars or molars. The bone itself has resorbed and healed producing a smooth corpus revealing that this person lost these teeth early enough in her life for the bone to completely heal. Only upper and lower incisors and canines remained perimortem.

The overall health of this individual was assessed to be good and no advanced or obvious pathological lesions were observed on any of the long bones or axial skeletal
parts. A fracture on the left iliac wing, near the iliac pillar is observed but determined to have happened in antiquity as a post-mortem trauma, as no signs of healing are observed. On the skull itself, glue is present on the condylar processes from someone attempting to glue the mandible to the skull. Also, there is glue and bandage material present just above the right orbit from an attempt to glue bandage material to the skull. The only pathological finding present on the skull resides in both left and right orbits and could represent cribra orbitalia; however, this is not conclusive and could be porotic lesions due to normal vascular blood supply. The palate of the maxilla shows advanced porotic lesions, as well, and could also represent cribra orbitalia or porotic hyperostosis. Figure 4 shows the orbital lesions and Figure 5 shows the maxilla palate changes with advanced porotic lesions throughout the entire palate. If this does represent cribra orbitalia, this individual was in the beginning stages of this pathological condition which could indicate anemia or other metabolic disease processes commonly found in ancient Egyptian individuals. This also will be discussed further in the discussion section.
Figure 4: Frontal View of Orbital Lesions

Figure 5: Superior View of Skull Showing Palate Lesions
Figure 6: Inferior View of Mandible Showing Dentition

Figure 7: Lateral Oblique View of Mandible Showing Premature Tooth Loss and Smooth Ramus
Radiocarbon Dating Results and Preliminary Coffin Wood Analysis

Authenticity of this set of remains and the coffin in which they are interred has been a debatable fact in need of clarification before any future study could be done. Because of the immense amount of Renaissance era reconstructions due to Egyptomania previously discussed, it was decided that the skull should be sent off for radiocarbon dating. Figure 8 shows the calibrated results that place the time period for this individual with a 95.4% probability of being dated at 900-790 cal BC, placing this individual in the Third Intermediate Period (Haddon 2019).

Because the Oriental Institute was already confident that the artwork on the outside and inside of the coffin was authentic, it was decided to not radiocarbon date the coffin wood at this time (Gillihan 1950). Wood and a sample of the painted plaster was sent off to Professor Lee Newsom, an anthropology professor at Pennsylvania State University for analysis. She analyzed the botanical remains in the laboratory and took photomicrographs of the wood and plaster in order to see if she could figure out the most likely species being represented by the samples. Figure 9 and 10 show photomicrographs of the plaster and her results indicated that the painted/plastered surface was:

“a coarse burlap-like textile or cordage was laid on a pulverized fiber matrix, with the plaster applied over the textile or cordage. The fiber matrix is predominately graminoids (grasses, sedges, reeds)– maybe exclusively that– and looks a lot like dung (camel dung?). I have no idea how any of this was done. The cordage is beautiful, single twist (s-twist I think), and does not suggest cotton; it looks a lot like flax (Linum sp.) based on the fiber characteristics” (Newsom 1).

Regarding the coffin wood, Newsom Suggested that the sample most likely indicated Tamarisk, but stated that: “However, the presence of a branch juncture (knot) and generally distorted axial alignment may explain the discrepancy, inherent anatomical
variation” (1). Further analysis would need to be performed in order to narrow down the coffin wood but the preliminary findings are nonetheless interesting and may provide a glimpse into social class of this individual.

Figure 8: Radiocarbon Dating Calibration Curve for Skull
Figure 9: Photomicrograph of Fibrous Plaster Showing Graminoids and Possible Camel Dung

Figure 10: S-Twist Cordage from Painted Wood/Plaster Sample
CHAPTER FIVE

Discussion

The Third Intermediate Period in Egypt represented an infamous dark age in Egyptian history. The kingdom was split, once again, into a North and South kingdom with princesses vying on who would rule as King in either territory. In her book, *The Story of Egypt*, Joann Fletcher describes this time stating, “By 800 BC there were three pharaohs in Egypt, the Karnak clergy admitting that the land had sunk into confusion at this time” (Fletcher 2016). The Karnak clergy was Egypt’s form of a polity which kept track of the elite hierarchy and, thus, who should rule or had a birth right to rule. She describes a time in which burials received less attention and many mummies were interred in tombs at random. The ancient laws that had once governed the land were in disarray and this had a profound effect on many aspects of the Egyptian kingdom during this time (Fletcher 2016). How this may have affected social status during the time is unclear, however there is still a need to explore this concept as it relates directly to any ancient individual in any ancient world. Social status is an ancient notion that exists even today and that needs to be understood to be able to put any person into context.

Social status in ancient Egypt consisted of the Elites, or royals, and the peasant class. There remains a big problem in archaeology when it comes to the study of peasant class individuals. The peasant class differed from the royals in that they were working class individuals, their diets were vastly different, and they were subject to a poorer environment and poorer working conditions than the Egyptian royal Elite. Understanding
this divide is difficult because of how burial practices for the peasants differed from that of the peasant class. Koichiro Wada, an Egyptian Archaeologists sums up this problem in an article titled *Provincial Society and Cemetery Organization in the New Kingdom* stating,

> Although the ancient Egyptians in general hoped to preserve their bodies for the afterlife, ideal burial grounds, such as low desert terrain, tended to be used by wealthy people. Consequently, lower social classes tended to be buried in the cemeteries that formed on the outskirts of settlements. As a result of this division, most lower-class cemeteries have been lost by the expansion of cultivated land, shifts in settlement, and annual accumulation. This means that most cemetery data provide a restricted picture of society (Wada 2007).

Unfortunately, this problem is ongoing and data from lower peasant class individuals is starting to gain headway in archaeology, but the sample for these individuals is low and may not give as complete of a picture as we have of the royal elite class.

Mummification practices have succumbed to dramatic changes across the dynasties of ancient Egypt. There is a stark contrast between methods used to preserve citizens of high economic status versus methods used to preserve those of low economic status. Mummification was an expensive process and how much care was taken to preserve the individual was dependent on that family’s financial capability. Saleem and Hawass, in their article *Variability in Brain Treatment During Mummification of Royal Egyptians Dated to the 18th–20th Dynasties: Mdct Findings Correlated with the Archaeologic Literature*, state: “According to Herodotus,

> the mummification process varied depending on the financial status of the person being mummified. Wealthy citizens had the most lavish mummification performed, whereas citizens in the middle and poor classes had mummification that was downgraded or was minimally performed” (Saleem and Hawass 2013).

The skeletal remains represented in this sarcophagus, residing at the W.H. Over were not
well preserved and therefore represent someone of lower economic status.

Mummification was an expensive endeavor and payment for services was required by the family of the individual. Kathlyn M. Cooney discusses the high cost of mummification citing coffin expense and embalming as the two main factors that contributed to the high cost of the process. Changes in the New Kingdom brought forth the ability for low cost burials to be purchased which included lower cost coffins. Coffin cost depended on the amount of and elaborateness of the decorations placed on or within the inside of the coffin. A family could also choose cheaper mummification and embalming methods (Cooney 2011). The absence of any flesh on the skeleton also points to a mummification practice of a lower embalming standard and thus lower financial cost (Cooney 2011).

This female individual would have been important enough for her family to pay to have her mummified, but only at the lower level standards of mummification. Both the skeletal and coffin wood analyses suggest placing this individual in the lower economic status, yet she would have been important enough for her family to have her mummified, albeit in a more inexpensive practice of mummification. This woman also would have been considered an elderly woman as the average lifespan of ancient Egyptians tended to be 32 years of age, further adding to her potential importance to her family and thus their willingness to pay for mummification process, albeit one of lower cost.

The botanical results from Lee Newsom suggest that Tamarisk is most likely the wood used for the coffin. Tamarisk is found abundantly in Egypt and the period of use matches this individual’s radiocarbon date. Bill Bauman, in his article titled *The Botanical Aspects of Ancient Egyptian Embalming and Burial*, states that “Tamarisk if a halophyte that may be found growing profusely in the salty deserts and along the sea
coasts. The wood is hard, tight, heavy, and workable and was used for walking sticks as early as the Middle Kingdom. It did not find its way into coffin construction until about the twentieth dynasty” (Bauman 1960). Because the authenticity of this coffin in relation to this individual has been questioned, this line of evidence suggests that it could match the time period of this individual. At the same time, it cannot be ignored that coffins were recycled and reused; therefore, further analysis would still be warranted. However, we could make a general hypothesis that the coffin is at least from the Third Intermediate Period because of the paleobotanical analyses being most consistent with tamarisk. Tamarisk has been cited for coffin use beginning in the twentieth dynasty and the Third Intermediate Period consists of the Twentieth to Twenty-Second dynastic periods. Because of the journey of this coffin and the resulting contamination resulting from damage in antiquity, an expert in ancient Egyptian botanicals or coffin curation should be considered as a resource for further study.

The paleopathology results tell us additional information about this individual. The dental health of this individual, unfortunately cannot be used as a measurement of social status. The overall dental health of ancient Egyptian individuals was extremely poor. R.J. Forshaw in an article titled Dental health and disease in ancient Egypt, discusses that “far from having healthy dentitions the ancient Egyptians suffered from extremely worn teeth, periodontal problems and numerous dental abscesses. Significantly, these disorders were not only experienced by the peasants, the overwhelming majority of the population, but also by the pharaohs and the elite of society” (Forshaw 2009). This individual, having lost a majority of her teeth, as seen in Figure 7 and 8, at a younger age, she would have definitely suffered from numerous
dental issues. While no evidence of tooth root abscesses has been assessed, it cannot be ruled out that this may have been an issue.

Tooth wear could have also been a predominant concern because of the nature of the ancient Egyptian diet. Forshaw states that “the primary cause of this tooth wear was the chewing throughout life of a coarse, fibrous diet made even more abrasive by the introduction of inorganic particles, particularly into the bread, the staple food of the ancient Egyptians” (Forshaw 2009). Because sand storms were a frequent occurrence in ancient Egypt, grains of sand were commonly found mixed in with dietary foods, such as bread, and therefore chewed and ingested on a very regular basis. Samples of bread, the staple Egyptian diet, have been analyzed and shown to contain numerous impurities such as sand and soil contaminants. According to AR David, dental disease would have been increased by the consumption of bread because the granular material would have chipped away at the enamel of the teeth and led to cavities and, when left untreated, dental abscesses (David 1997). Because dental hygiene was relatively unpracticed during this time, the Egyptians would not have been avid brushers and flossers of teeth on any normal day. This, coupled with the consumption of contaminated bread, would have led to the extreme dental disease that is seen in many mummies being radiographed or CT scanned (David 1997). This would have been an extreme assault on dental health and could be a reason why this individual lost her teeth at a younger age. There are different disease processes that can also affect dental health and overall health of an individual, iron deficiency anemia.

The skull of this individual gives us the best information for pathology and there may be a presence of cribra orbitalia in the eye orbits of this skull. According to Michelle
Buzon, “Porotic hyperostosis and cribra orbitalia have been linked to iron-deficiency anemia, nutritional deficiencies, and parasitic infection” (Buzon 2006). Nutritional deficiencies could be a highly possible reason for the cribra orbitalia, especially given the dental health of this individual. Because of this person’s age, we may be able to exclude iron deficiency anemia as a cause for the cribra orbitalia that could be represented. If this is the beginning of porotic lesions, it most likely would have been caused by parasitic burden, a major problem in ancient Egypt.

Because common medicinal practices included ridding one of, or lessening, parasitic burden, perhaps it can be hypothesized that this person was able to keep her potential parasitic burden in check. It must be considered that reinfection was common because of poor agricultural practices surrounding animal domestication; but if this person was able to minimize the parasitic burden she was experiencing, this may account for the why the cribra orbitalia is minimal (Halioua and Ziskind 2005).

The diet of this individual can be inferred because of the indicators placing her in a lower socioeconomic status. The dietary habits of the upper class were vastly different from the lower class. Thompson et al. in their article "Atherosclerosis across 4000 years of human history: the Horus study of four ancient populations," discuss the dietary habits of the elite which included richer foods such as cattle, sheep, goats, pigs, figs, pomegranates, dates, honey, beer, and wine (Thompson et al 2013). This individual more likely was sustained on a diet mainly consisting of fish, which was considered a poor protein source not consumed by the elites. Fish was rich in essential omega-3 fatty acids and thus, at least in the regard of diet, the peasant class tended to be healthier in terms of obesity and diseases such as atherosclerosis. While we completely conclude the diet of
this individual, given her relatively good health and the context of her coffin, we can hypothesize that she was of this lower economic status and fish may have been a staple diet for her. Further research can be conducted in pursuit of this diet, which will be further discussed in the conclusion.

The rest of the skeletal remains in this sample represent someone who was in relatively good health for an ancient Egyptian. She obviously still succumbed to the low life expectancy of Egyptians, however she still would have been considered to be older and therefore probably did not suffer from some of the more dangerous, life threatening diseases found in this region such as malaria and tuberculosis. More intensive testing to determine the presence of malaria and tuberculosis infection now exists and future testing may be warranted to further rule out these possibilities; however, no pathologies are currently observed that relate to these infections.
Osteobiographies can yield information about how someone lived including health, disease, and social standing of an individual. The individual represented in this sample is considered to be a woman of lower economic status, although she still survived to what was considered an old age in ancient times. The health of this individual, despite poor dental health, has been determined to be good and although she was probably a person of low social status, there is no evidence she succumbed to most of the infectious or non-infectious disease processes that plagued Egypt in ancient times. Being a possible sample of a potentially lower-economic status individual, repatriation back to Egypt may be warranted to see if they would like to analyze the remains any further. Inferences about her working status could also be an avenue of continued study but can only be explored through verification of the aforementioned results by an Egyptologist or bioarcheologist specializing in ancient Egyptian mummies.

The story the skeletal remains has provided has been well researched and documented, however there are two elements that require future study for this project to be fully encompassed. Further analysis of the coffin wood needs to be performed by other paleoethnobotanist specialists familiar with ancient Egyptian botanicals. This research would help narrow down the time period of the coffin by specifying the species of Tamarisk wood and its domestication in Egypt along with its use in coffin wood. By
doing so it may aid in placing this person within her socio-economic class. Radiocarbon dating of the coffin wood is also recommended to help pinpoint a more accurate date in relation to the individual in the coffin. More analysis on the style of the coffin and the artwork on the exterior and interior would also help in determining age and socioeconomic status. In addition to the coffin, analysis of the seeds found within the mummy bandages would also be beneficial since it was beyond the scope of this research. With further results, the full history including the ante, peri, and post mortem history of this individual and the coffin itself, can be ascertained, which may produce results that greatly contribute to the future study of individuals of lower economic status in ancient Egypt.
References


