

Determination of Intersex Humans in Human Remains

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### **Introduction:**

The identification of human remains is very important in the medicolegal system. Identification efforts can help determine if remains were involved in a possible crime, can identify someone who was classified as missing, or even identify those who were involved in mass casualties. Forensic anthropologists are experts in determining the sex of human skeletal remains by observing bone characteristics such as the acetabulum on the pelvic bone. They also can observe other bones such as the femur, the mandible, and other parts of the skull. Using certain determinants, a forensic anthropologist can correctly identify male and female remains. However, forensic anthropologists' use of the binary male and female is to classify human remains, doesn't consider that there are humans who are born intersex. If not considered, the identification may become a bigger problem in the future when a possible ID of a person is over. When it comes to sex identification in human remains, the way a person lived is important. They may not have been female or male as a forensic anthropologist may determine them to be. Anthropologists assigning a biological sex needs to consider whether a person's remains may not have matched with a person's gender when they were alive.

Being born intersex means that some people have genitalia and/or a reproductive system that does not fall into the typical male or female category. When they grow over time, some don't identify with their external anatomy or don't know they are intersex at all due to their view of who they are. It is possible that bones not belonging to the two binaries may vary from normal development in the case of intersex humans. When forensic anthropologists find human remains, they can almost always identify sex right away if certain bones are present. Sometimes, though, after analysis, remains would be classified as ambiguous or undetermined (A/U) using established identification standards. These standards classify certain features of bones that were present as either male or female, but if a bone does not exactly have strict male or strict female characteristics, it is A/U which can leave some remains incorrectly identified. Some forensic

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anthropologists believe that the A/U category could be for those people who were not strictly male or female when alive. Without standards or guideless for A/U, those who are born intersex fall through the cracks after death and leave behind only a memory of who they were.

### **Abstract:**

Currently, there isn't much research on whether forensic anthropologists include the identification of intersex humans in human remains. Forensic anthropologists tend to have varied training that is related to identifying skeletal remains, but there isn't much research about how to identify intersex humans after death or whether they have come across intersex in skeletal remains at all, besides those they have classified as ambiguous. In this paper, I will be researching various skeletal remains to see if the identification methods are accurate in identifying intersex. I will also research ambiguous and undetermined remains to see if there is a correlation among them that made them fall into that category. I will then observe primary and secondary sexual characteristics that are used in the standard identification methods of humans.

With this research, I hope the results will show that those who are born intersex, need guidelines on how to identify them after death. There should be a discussion with subject matter experts on what criteria surrounds identification of intersex after death. There is not much to base my research on; however, I do think my research could lead to possible updated established guidelines or a new set of guidelines for those who were intersex. I think as time continues to pass and society continues to grow, we are now starting to consider other aspects of gender and how that correlates with biological sex. Those who are intersex may have a hard time identifying as either male or female and I think it's important we start to consider those who don't fit into the default binary of male or female.

### **Background:**

Research done on intersex identification in human remains is minimal. According to Bearman (2016), those who identify as intersex or those who determined ambiguous, aren't

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really identified by forensic anthropologists. There are a few different methods used to identify sex. One method of identification is determining primary and secondary sex characteristics. Primary sexual characteristics are present at birth and are either male or female. Secondary sexual characteristics can be bone size and shape such as the pelvic bone. Generally, the overall size of the pelvic bone in males is bigger and taller than female pelvic bones. An adult female pelvic bone is usually wider and shorter to account for the birth canal. The pubic arch (subpubic angle) of the pelvic bone is usually smaller in males and larger in females. The acetabulum where the femur articulates is larger in males and smaller in females. According to the Garvin and Klales 2017, to be 95% accurate in sex identification, forensic anthropologists rely on the Prentice method, which consists of analyzing three features of the pelvic bone: the ventral arc, the subpubic concavity of the ischiopubic ramus, and the medial aspect of the ischiopubic ramus. The ventral arc is present in females and faint or absent in males. The concavity of the ramus is present in females and absent in males and the medial aspect is usually sharper and narrower in females while males are wider and blunter (Garvin, 2018). The pelvic bone is used as the most dependable identifier of sex if it is present in the skeletal remains that were discovered. When it comes to possible intersex remains, however, there is no research related to whether these features are present and if so, there is no discussion as to whether there is discrepancy between physical and visual (social) portrayal.

In secondary sex characteristics, intersex may come a little into play of identification. Some secondary sexual characteristics can be found on the skull. Features on the anterior and posterior side of the skull can be used for sex identification. Several features-the nuchal crest, mastoid process, supraorbital margin, the glabella and the mental eminence-can be visually scored on a level from 1-5 with 1 being very female and 5 being very male. These features are not 100% accurate for identifying sex, but since they are scored on a scale, some features fall in

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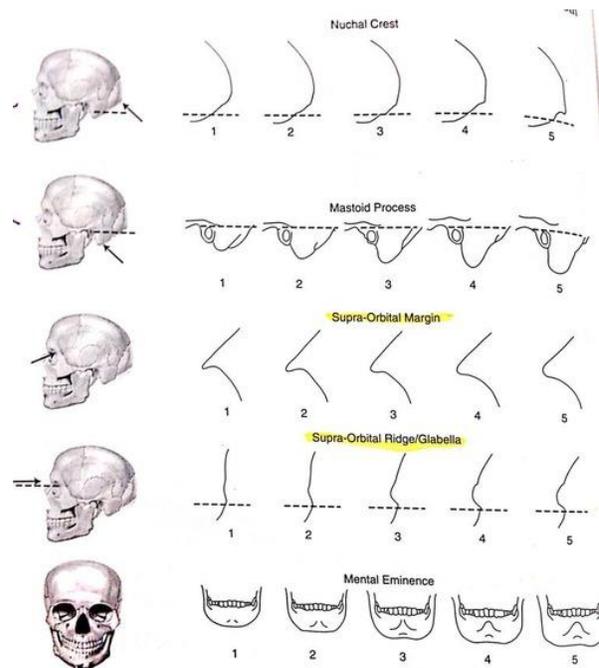
the middle as a 3 and is considered ambiguous. This can possibly refer to those who are intersex, but forensic anthropologists have not said for sure.

When forensic anthropologists try to determine an identification of remains, they tend to look at contextual clues as well. Contextual clues can help determine if the remains are recent or not and can help in identifying ways that the person may have died. In one case of Viking warriors, forensic anthropologists first determined that the case of Bj 581 were found to be male due to material and historical records

(Hedenstierna-Jonson C, 2017). Osteological documentation was reporting Bj 581 to be female.

Forensic anthropologists performed a genome-wide sequencing to determine once and for all that Bj 581 was female. Context clues of typical warrior style clothing and other artifacts were first used to determine the remains were male and it showed that these clues aren't always accurate. Most of what people know of Vikings is that they were male warriors and not female due to historical records. The remains of Bj 581 were discovered to be a female warrior which were possibly unheard of until this case. This brings into question of how forensic anthropologists identify human remains based on observations and how it correlates with the biological profile that is determined with usually a high percentage of accuracy.

Since these aren't defining answers to whether skeletal remains are 100% either male or female, it leaves those who are classified as ambiguous or undetermined out of identification efforts. In some cases, forensic anthropologists can't rely on the pelvic bone to determine sex identification, so they use the skull and other features present. Those features on the scale aren't



**FIGURE 8.13** Variations on cranial characteristics used to attribute sex: (1) female, (2) probable female, (3) indeterminate, (4) probable male, and (5) male. (From Figure 4 of Buikstra, J. E., Ubelaker, D. H. [1994] *Standards for Data Collection from Human Skeletal Remains*. Fayetteville, AR: Arkansas Archeological Survey Research Series, 44; with permission.)

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100% accurate either. There could be a case where a skull where has features that are scored a 3 on the scale, but that is not classified as either male or female. In the Vikings case, they decided to undergo microscopic and elemental analysis of the remains, but that is destructive to the skeletal remains and should not be done unless necessary. As society continues to advance, forensic anthropologists must start making groundwork in identifying intersex or establish guidelines for identifying those who don't fit into a typical male or female biological profile.

In my research I found the National Institute of Standards and Technology. This organization, governed by the U.S Department of Commerce, established scientific working groups for forensic science fields. One science group is the Scientific Working Group for Forensic Anthropology (SWGANTH). They establish guidelines for determining the biological profile of individuals. These are supposed to be the best practices on how to approach identification of remains. However, there is not much to comb through on the process of approaching remains. They split each section of the biological profile and provided input on how to determine each one (SWANGTH, 2010). When it comes to sex, there was not much to use except for forensic anthropologists should consider the morphological differences between sexes. They do say that identifying sex should be "made independently of suspected or presumptive identification to avoid bias". This could help when it comes to rapid identification of remains, but when it comes to those who are born intersex, they are not considered as the first sex for identification. There is also the problem of identifying intersex after death, but with no soft tissue present (most likely), there are some difficulties when it comes to determining intersex. The guidelines do recommend a DNA analysis of the skeletal remains if the defining bones aren't present. This could pose another threat, however, of destroying the remains, so there isn't much to analyze that provides an accurate identification. These guidelines provide no context to those who are intersex. It also does not help in providing a way to start thinking about considering sex other than male or female. When it comes to other research, I couldn't find any more guidelines

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or standards that directly involve those who are intersex. Without these guidelines, it will become increasingly more difficult as those who are born intersex will die and possibly won't be identified.

### **Materials**

I used two complete ox coxae of individuals 16.9k and 16.3c to observe overall morphology and their preauricular sulcus. I also used their two correlating femurs to observe the linea aspera. I also used two mandibles that correlated with those individuals and a third control mandible to compare. I also observed the mental eminence of the chin. I then observed the gonial angle to compare in all three mandibles.

### **Methods**

The pelvic bone is used in identifying sex in skeletons often if present, but it needs to be evaluated specifically under the assumption of an "intersex" status. I will observe the pelvic bone in general for overall morphology related to males and females. On the pelvic bone are several features- acetabulum, the dorsal pubic pitting of the pubic symphysis, and the preauricular sulcus. I will observe the pubic symphysis and the preauricular surface because they can be influenced by hormones. I will measure the acetabulum. *Note: This feature is difficult to measure so data may not be 100% accurate.* I will then measure the widest diameter of the lunate first and then from the highest point of the lunate to its most anterior point. The femur in males are generally larger than females. For intersex, however, these measurements may be different. Those who might have the reproductive anatomy of a male might have smaller bones in relation to the female counterpart. Located on the femur are general muscle attachment sites that are known to differ between male and female. The linea aspera on the anterior side of the femur is typically larger in males than in females. This could be due to different load bearings that female and males carry. This also might vary in intersex. I will then measure the linea aspera by

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documenting the widest diameter at the mid shaft point in the anterior/posterior (front to back) direction and the medial/lateral (side to side) direction.

### Results:

In my experiments, I used two individuals titled 16.9k and 16.3c. I first looked at the overall morphological differences between the two os coxae. 16.9k's pelvic bones, when articulated, was bigger but narrower which is suggestive of a male. 16.3c's pelvic bone, when articulated, is smaller but wider which suggests a female. I then began to look at the femurs themselves. A femur belonging to a male is said to be bigger than a femur belonging to a female. 16.9k's femurs were longer in length and 16.3's femurs were shorter. I also measured the diameter of the femurs. 16.9k and 16.3c differed in their femur diameter in both directions. The width measurements of the femurs suggest that 16.9k might be a male. The width diameters also suggest that 16.3c might be female. I then measured the acetabulums, using a caliper of the two individuals. This is where the femoral head attaches to the pelvic bone. It is circular to provide for movement of the upper leg. The differences in the measurements helps to show how males and females differ in their body morphology.



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	16.9k	16.3c
Femur (Midshaft-Diameter)	23 mm	28mm
Femur (Medial-Lateral Direction)	26 mm	26 mm
Acetabulum (Diameter)	60 mm	54 mm
Acetabulum (Highest Point-End of Lunate)	32 mm	23 mm
Mandible (Gonial Angle)	Closer to 90 degrees	Further from 90 degrees
Mandible (Mental Eminence)	4	3

This measurement was difficult to take consider the intricate position of the acetabulum, so my measurements may not be 100% accurate. I measured from the highest point of the

acetabulum to the end point of the lunate. My highest point and my end point may vary from the next person's eye. The diameter of 16.9k is bigger than 16.3c which also suggests that 16.9k might be male. I then observed the linea aspera on the anterior side of the femur. The linea asperas were scored visually on a scale from minimal to moderate to pronounced. This helps to determine the muscle attachments and how much they were used while alive. I also observed the texture of the linea aspera. Males are said to use their legs in a more active way, so their linea asperas are said to be less pronounced but have a rougher texture to the use of the muscle.

Females are said to have sharper linea asperas from less use of the muscles. Individual 16.9k's

linea aspera was rough in texture and did not have a ridge feel to it. I marked it as moderate. 16.3c is sharper in texture and more pronounced. Only using the femurs, I



would classify 16.9k as a male and 16.3c as a female.

I then observed the three mandibles to see the differences in body



morphology. I observed the gonial angle on a scale of closer to 90 degrees and further from 90

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degrees. It is said to be further away from 90 degrees in females and closer to 90 degrees in males. I also observed the mental eminence on a visual scale from one to five with one being very female and five being very male. The first mandible was slim but bulky. The mental eminence was a bit difficult to score.

I placed it between a three and a five. Its gonial angle was further from 90 degrees. Both traits are reminiscent of both masculine and feminine traits. The second mandible was sturdy and seem to give off more masculine traits. The gonial angle was closer to 90 degrees and I marked the mental eminence at a four on the scale. The third mandible was slim overall, but its gonial angle was prominent and further away from 90 degrees. Each of the mandibles can be classified as a different person based on the observations I made. I classified the first mandible as ambiguous due to its mental eminence suggesting male and the gonial angle suggesting female. I classified the second mandible as male and



third as female using the gonial angles. Using the mandibles, however, I could not come up with a certain classification for the first mandible. Each forensic anthropologist using the number scale (1-5) could say a different number than the ones I used which attests to the outdated way of this standard.

### **Discussion:**

My results indicated that the established guidelines in place for forensic anthropologists are useful when it comes to identifying male and female. However, when an ambiguous individual might be present, the guidelines do not establish a method for identifying them. There will be challenges along the way as those who are intersex may not identify with their external anatomy. I think my results could be expanded with more samples. A wider number of samples

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could indicate what markers intersex remains may have in common. A higher number of samples would also provide more data as to what guidelines can be established for intersex remains.

Correct identification of intersex human remains still remains a challenge. The guidelines currently used by forensic anthropologists don't exactly cover those born intersex. The guidelines I did find in my research did not cover how to correctly identify those born intersex. A more detailed standard should be established for the methods of identifying sex. If someone lived differently than what their remains suggested, how can we start to identify markers for intersex? What can be a marker for intersex remains? As society continues to progress, we must start building upon guidelines to include those who are born this way.

### **Conclusions:**

I concluded that the determination of intersex humans is difficult to determine using the standard identification methods established already. In the case of the gonial angle, some forensic anthropologist report this to be extremely accurate in identifying sex, but in my experiments, I saw that the angle varied between all three of the mandibles. This could be an indicator that some remains are either very masculine or very feminine, but the ambiguous one could be determined as a possible intersex human. The guidelines established provided no context for those remains that might be intersex. As I mentioned before, the A/U category could be problematic for a correct identification of a person. If forensic anthropologists were to establish better guidelines, we can then move forward to a better identification effort than ambiguous or undetermined.

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### Citations

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