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Sex Estimation Using Morphological Traits of the Skull

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Abstract

Estimating the sex of an individual from skeletal remains can help in their identification. There are many methods that can be implemented to help assess the sex, but when only a skull is available, common morphological traits of the cranium and mandible can be used. Ten morphological traits were used to estimate the sex of the unknown skull. Using these ten characteristics, I was able to accurately conclude whether the skull came from a male or female individual.

Introduction

Forensic anthropologists use many methods to help discover the identity of an unknown individual. In addition to estimation of ancestry and age, sex is also an important factor in identification. These estimations, including sex estimation, can be made from particular traits on the human skull, both morphological and metric. It is important for a forensic anthropologist to try to estimate sex for the most effective identification of an unknown person.

Methods

An adult skull of unknown sex was provided by the Anthropology Department at Western Oregon University for this research project. Morphological traits were used, rather than metric, in an effort to estimate the sex of the skull. The morphological traits used were those defined by Bass (1971), Byers (2008), and White (2000).

1. Overall size and ruggedness: Male skulls tend to be more rugged and larger than those of females. Female skulls tend to be smaller and more gracile.
2. Size of teeth: The teeth of a human skull are generally larger in males and smaller in females (Figure 1a).
3. Chin: Typically, chins of male skulls are more broad and square, while in females they are more narrow and pointed (Figure 1b).
4. Nuchal area: Found at the back of the skull, the nuchal area is more distinct in male skulls, and rounder and smoother in female skulls (Figure 2a).
5. Mastoid process: This feature is found just posterior and inferior to the external auditory meatus. Typically, the mastoid process has more volume in males than in females (Figure 2b).

6. Posterior zygomatic process: This feature usually extends past the external auditory meatus in male skulls, while not extending past the external auditory meatus in female skulls (Figure 2c).
7. Supra-orbital margin: This is the upper ridge of the eye orbital. In male skulls, this ridge is thick and rounded, while thinner and sharper in female skulls (Figure 2d).
8. Frontal bone: Observing the entire forehead region, the frontal bone is slanted with browridges in males. In females, the frontal bone is rounded with less apparent browridges (Figure 2e).
9. Supra-orbital ridge/glabella (browridges): This feature is most easily seen from a profile view of the skull. In male skulls this feature is more prominent. In female skulls this feature is less prominent and the area is smooth (Figure 2f).
10. Vault bossing: Observing the top of the skull, bossing is less often seen in male skulls as in female skulls (Figure 3).



Figure 1. Anterior view

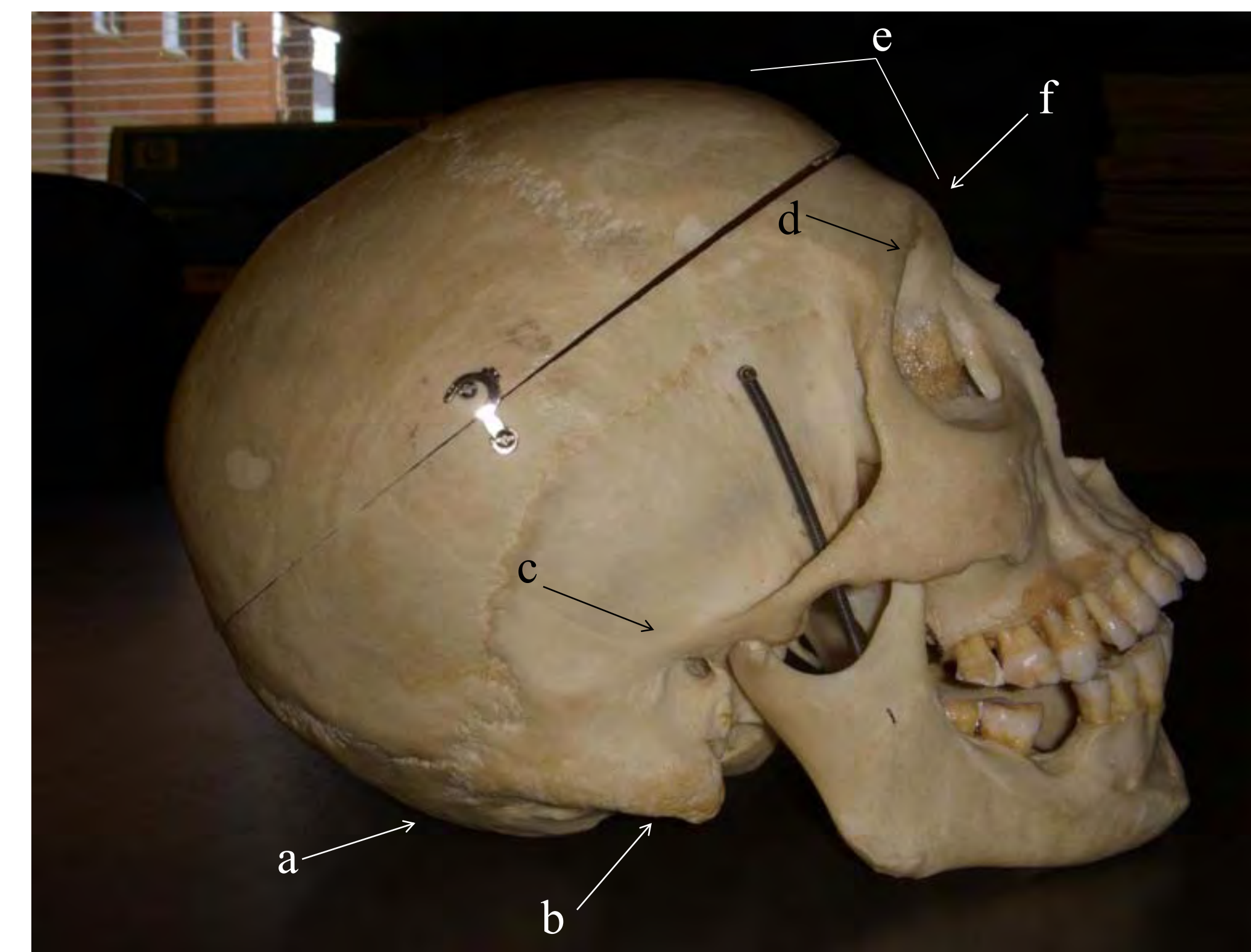


Figure 2. Lateral view



Figure 3. Superior View

Results

The overall size and ruggedness of the unknown skull is relatively small and gracile. These are female characteristics. The nuchal area has a bony projection and a moderate edge, which made the feature indeterminable between male or female. The frontal bone is high and rounded, suggesting that the skull belonged to a female individual. The mastoid process is small with little projection, also pointing toward being female. Another female weighted trait of this particular skull is the supra-orbital margin because it is moderately sharp. The supra-orbital ridge/glabella is smooth with little projection, and the vault bossing is seen, though it is not overwhelming in size. Both of these suggest the skull is of female origin. The chin is broad which more common in males, but is moderately rounded as seen in many females. This particular morphological trait did not suggest a male or female individual definitively. The final two morphological traits both led me to believe the individual was female. The sizes of the teeth are relatively small, and the posterior zygomatic process does not extend past the exterior auditory meatus. The majority of the morphological traits suggest that this particular skull belonged to a female individual.

Conclusions

This experiment presents ten morphological traits that can aid in the estimation of sex of a human skull. Based on the ten morphological traits used in this experiment, it can be estimated that the individual is female. There were some overlapping characteristics, including those of the nuchal area (Figure 2a) and the chin (Figure 1b). Setting aside the two neutral traits, the other eight morphological traits suggest that this unknown skull is most likely female. Although the morphological traits suggested the skull is female, this experiment could be supported by the use of metric traits as well. Overall the application of methods used in this experiment were straightforward and the results were clear and indisputable. Considering this was the first time I have ever estimated the sex of a skull, my experience should be considered in the accuracy of the final results. However, accuracy and reliability of the method were tested by Dr. Misty Weitzel's confirmation of the skull as female.

References

1. Bass, William M. 1971 Human Osteology: A Laboratory and Field Manual of the Human Skeleton. United States of America: Library of Congress
2. Byers, Steven N. 2008 Introduction to Forensic Anthropology. United States of America: Pearson Education, Inc.
3. White, Tim D. 2000 Human Osteology. San Diego: Academic Press