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Core Objectives assignment for BIOL2101. Skeletal Forensics – What Are The Bones Telling You?

Learning Objectives:

1. Explore disarticulated skeletal evidence to determine how many bones you can identify (by anatomical name).
2. Determine as much forensic information from your disarticulated skeleton as possible.

I. Skeletal “Anthropology” (Forensics)

Background

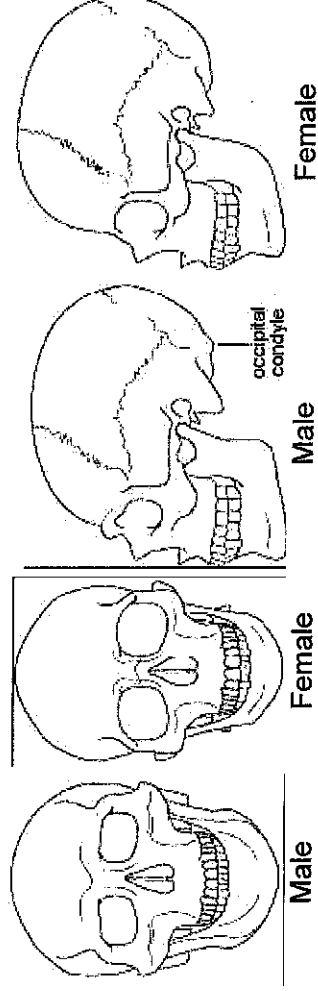
Scientists must first determine if the skeletal remains are animal or human. If human, they must then try to determine: growth rate, gender, and height of person.

Age of a Skeleton - Teeth that have or have not grown can also reveal the age of the skeleton, as young children will have not lost their milk teeth and at the age of 18, wisdom teeth first appear. During the teenage years, bones become thicker and larger and fuse together in a process known as 'ossification'. Ossification occurs in 800 points of the body and is the best guide to revealing the age of a child's skeleton. An example of ossification occurs in the arms, where at the age of six, the two bone plates form at either end of the outer forearm (radius).

At the 17 in males and 20 in females, the lower bone plate and the radius fuse together and soon after, the upper bone plate and radius fuse together. The bone in the body that finishes growing last is the collarbone, which ceases growth at 28 years. In the bones of the elderly, degeneration begins to occur.

Anthropologists will look for tiny spikes that start to appear on the edges of the vertebrae, the wearing of teeth due to age and joints that show signs of arthritis. All of the bones in the body will deteriorate with age.

Gender- When determining male and female in a skeleton, anthropologists look at the skull and hip bones, as there lie clues to the sex of the skeleton.



Sexual differences in cranial morphology

General architecture: In males, the overall construction of the skull is heavier and more rugged looking than that of the female skull.

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Eye openings: The orbits in the skull for the eyes are a bit squared in males, while in females they are more rounded.

Brow ridges: The supraorbital ridge of males is heavier and more pronounced than it is in females; in females the brow is smooth and flat.

Cheekbones: The cheekbones of males are heavier and more laterally arched; in females, the cheekbones are lighter, more compressed, and they tend to lack the lateral arching.

Occipital condyle: In males, the occipital bump at the rear base of the skull tends to be much more pronounced than it is in females, where it can be almost nonexistent.

Chin shape: The shape of a male's chin approximates the letter U, a female's the letter V.

Jaw line: The angle where the horizontal portion of the jaw curves upward into the ramus, or vertical part of the jaw, is much more angular in males than it is in females.

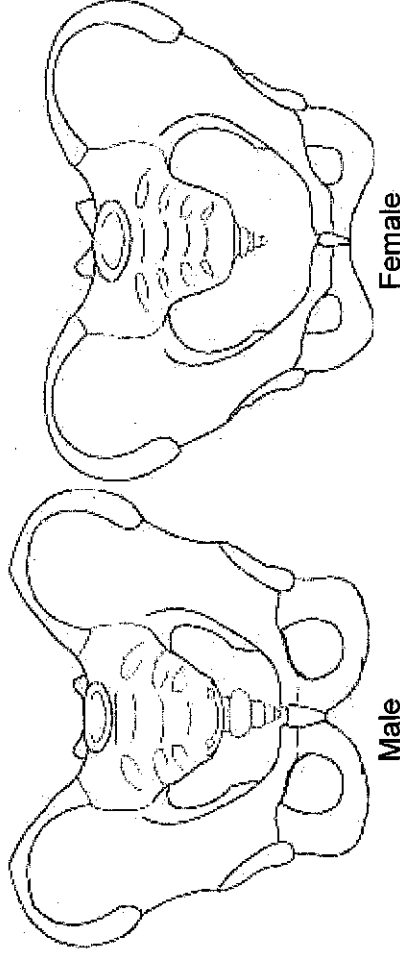
Sexual differences in pelvic morphology

General architecture: The width of the pelvic girdle is broader in females than it is in males. In females, the pelvic girdle surrounds a birth canal large enough for the fetus to pass. In males, the pelvic opening is less round and open.

Pelvic opening: The opening of the pelvis, called the pelvic inlet, is rounder and larger in females, while in males it tends to be narrow and more constricted.

Pubic arch: The joining of the bones at the bottom of the pelvis forms a broad angle in females, usually greater than 90° , while in males it is narrow, usually less than 90° .

Pubic bone: In males, the pubic bone is roughly triangular in shape; in females, it is rectangular.



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3. Sketch of Bones Identified (assembled as a body)

Evidence & Conclusion:

4. What can you determine from the bones?

a) Age estimate? Explain.

b) Gender? Why do you think is the gender? Explain.

c) What is the estimated height of the individual? (Complete Table)

Inferred Height From Femur

-----	Inferred Height from Femur	Actual Height Estimation
Subject #1		

Show Calculation Here (Estimating Height from Femur)

Length of Femur = _____ x _____ = _____

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Group Presentation: Present with your group your findings using the following questions as your guide.

III. Follow-Up Questions

1. How accurate were you in inferring height from femur length? Explain.

2. How would you distinguish a male from a female skull?

3. How would you distinguish a male from a female pelvis?

Summary and Conclusion

4. What did you learn from today's forensic lab? What was most beneficial/ interesting/ etc.? (Maybe something you did not already know?)