

Lab- Forensic Anthropology Procedures

Sex Determination Using the Pelvic Bones, Skull, Femur, and Humerus

Before you begin, determine which member of your forensics team will determine sex, race, age, and height. **Honors-** Also, you will be taking pictures of all of your measurements and observations to create a final presentation.

Pelvis

Measurement of the Sub-Pubic Angle

1. Have a partner put together and hold the pelvic girdle (2 coxa and sacrum). Figure 1A
2. Using the protractor, place the center of the protractor at the center of the pubic symphysis, where the two pubic bones meet (Estimate location). Also, align the straight edge of the where the two pubic bones meet (Estimate location). Also, align the straight edge of the protractor so that it is parallel and runs the length of the inferior pubic ramus and ischial ramus. Figure 1B.
3. Measure the angle formed by the rami of both pelvic bones. Record your measurements in Table 1.

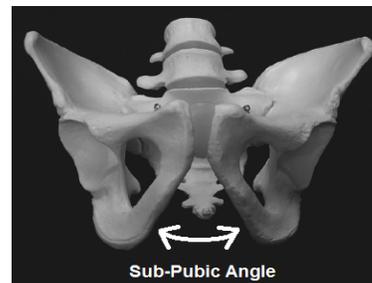


Figure 1A

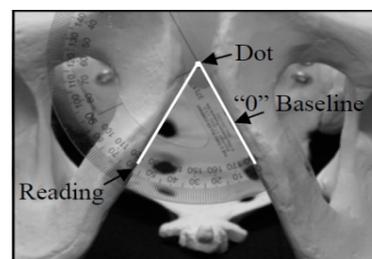


Figure 1B

Measurement of the Pubis Body

4. Using the Vernier caliper, measure the width of the pubis body, starting at the middle of the pubic symphysis to the medial edge of the obturator foramen. Record your measurement, in millimeters, in Table 1.
Figure 2

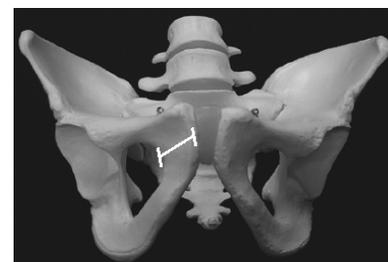


Figure 2

Measurement of the Greater Sciatic Notch

5. Place the pelvis on a white piece of paper lateral side down so that the greater sciatic notch is as close to flat on the paper.
6. Trace the sciatic notch on the paper.
7. Use a ruler to go over the lines of the greater sciatic notch you created.
8. Extend the lines until they meet to form an angle. Figure 3
9. Use the protractor to measure the angle of the greater sciatic notch. Record your measurement in Table 1.

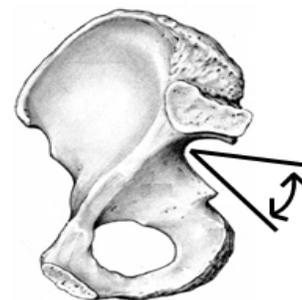


Figure 3

Sex Determination Using the Pelvic Bones, Skull, Femur, and Humerus- (Continued)

Skull

Observation of the Orbit- Upper Edge

1. Run your finger over the upper edge of the orbit of the eye and determine if the edge is rounded (blunt) or sharp (Figure 5). Record your observation in Table 2.

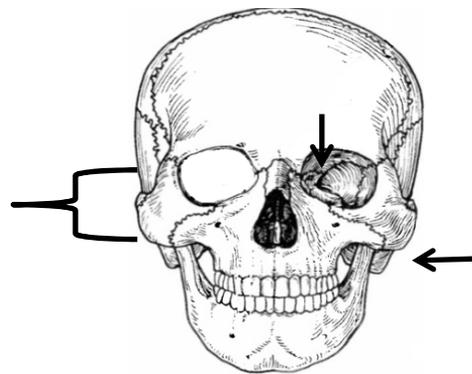


Figure 5

Observation of the Orbit- Shape

2. Observe the shape of the eye orbit and determine if the shape is round or square (Figure 5). Record your observation in Table 2.

Observation of the Zygoma

3. Observe the zygoma from the anterior view and determine if the zygoma extends laterally beyond the external auditory meatus (Figure 5). Record your observation in Table 2.

Observation of Occipital Bone Landmarks

4. Locate the occipital protuberance (a bump). Determine if an occipital protuberance is present or not (Figure 6). Record your observations in Table 2.



Figure 6

Observation of the Frontal bone

5. Observe the skull and frontal bone from a lateral view. Hold the skull as if it were in the body. Determine if the frontal bone is low and slanting (Figure 7) or rounded and globular (Figure 8). Record your observations in Table 2.

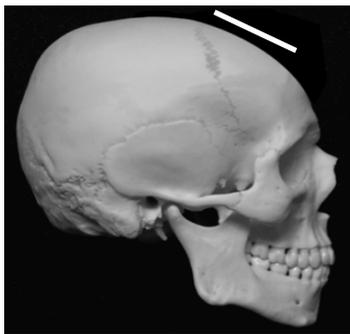


Figure 7

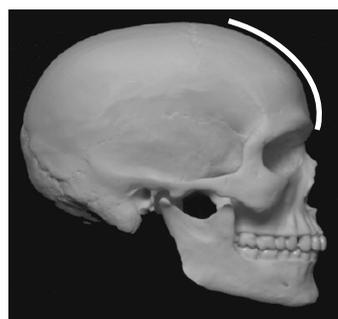


Figure 8

Observation of the Mandible- Inferior View

6. Observe the mandible from an inferior view (Figure 9). Determine if the shape of the mandible is U-shaped (rounded) or V-shaped. Record your observations in Table 2.



Figure 9

Femur

1. Using the Vernier caliper, measure the vertical diameter of the head of the femur (Figure 11). Record your measurements in Table 3.

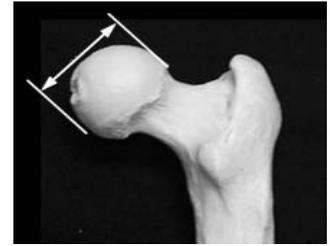


Figure 11

2. Using the Vernier caliper, measure the distal end of the femur by measuring the outer most side of the medial and lateral condyle (Figure 12). Record your measurements in Table 3.

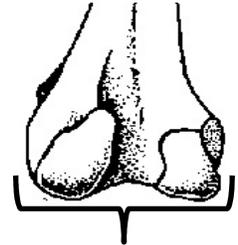


Figure 12

3. Using the tape measure, measure the entire length of the femur from the superior most part of the head to the inferior most part of the medial condyle (Figure 13). Record your measurements in Table 3.



Figure 13

Humerus

1. Using the Vernier caliper, measure the transverse diameter of the head of the humerus (Figure 14) and measure the vertical diameter of the head of the humerus (Figure 15). Record your measurements in Table 4.

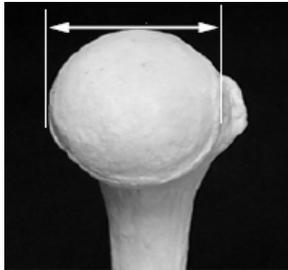


Figure 14

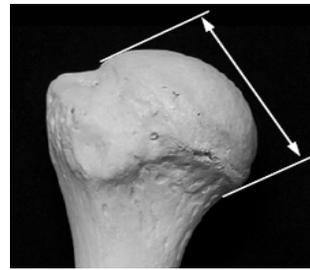


Figure 15

2. Using the Vernier caliper, measure the distal end of the humerus by measuring the outer most side of the medial and lateral epicondyles (Figure 16). Record your measurements in Table 4.

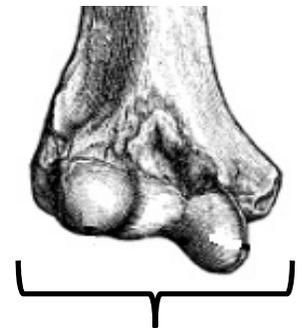


Figure 16

Sex Determination Using the Pelvic Bones, Skull, Femur, and Humerus- (Continued)

Humerus

- Using the tape measure, measure the entire length of the humerus by measuring from the most superior part of the head of the humerus to the most inferior part of the trochlea (Figure 17). Record your measurements in Table 4.



Figure 17

** Final Step

- Based on the data you entered in Tables 1-4, make a final determination of the sex of the skeleton and record your answer in the space below Table 4.

Race Determination Using the Skull and Femur

Skull

Measurement of the Nasal Width and Nasal Height

- Using the Vernier caliper measure the width of the nasal cavity at its widest section (Figure 18) and the height of the nasal cavity by measuring from the most superior part of the nasal bone to the nasal spine at the base of the nasal cavity (Figure 19). Record your measurements on Table 5.

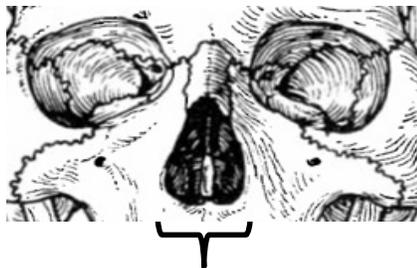


Figure 18

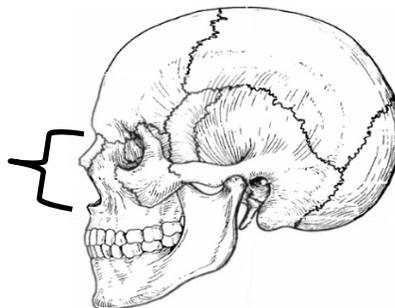


Figure 19

- Calculate the nasal index by dividing the nasal width by the nasal height. Record your calculation in Table 5.

Observation of the Nasal Spine

- Determine the possible ethnicity of the skull by observing the nasal spine. Rest a pencil sideways across the maxilla. Gently roll the pencil towards the nasal cavity. If the nasal spine prevents the pencil from rolling over the nasal cavity, the nasal spine is prominent. If the pencil rolls over a small protrusion onto the nasal cavity, the nasal spine is somewhat prominent. If the pencil glides onto the nasal cavity easily, the nasal spine is very small or nonexistent (Figure 20). Record your observation in Table 5.

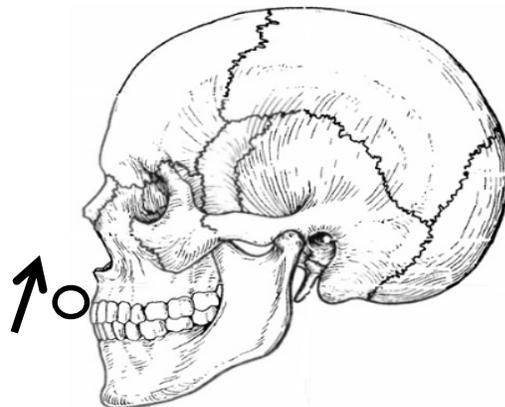


Figure 20

4. Determine if there are sharp ridges by sides of the nasal spine (nasal silling- Figure 21A), rounded ridges by the nasal spine, or no ridges by the nasal spine (nasal guttering- Figure 21B). Record your observation in Table 5.

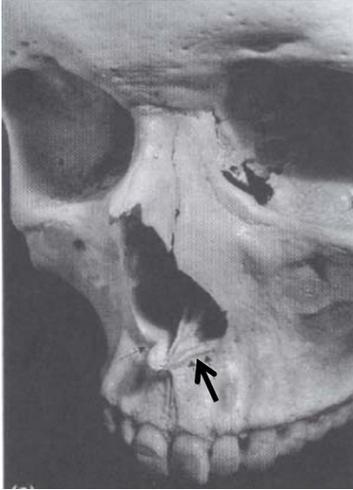


Figure 21A- Nasal Silling

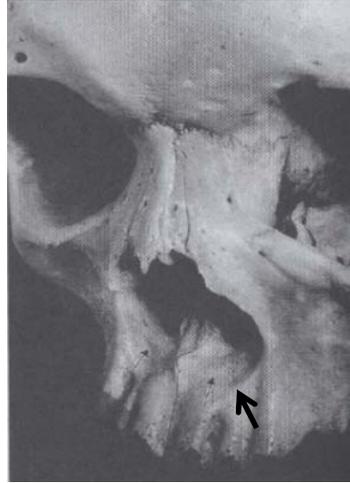


Figure 21B- Nasal Guttering

Observation of the Maxilla and Mandible

5. **Prognathism** is the positional relationship of the mandible and/or maxilla to the skeletal base where either of the jaws protrudes beyond a predetermined imaginary line in the coronal plane of the skull. Observe the skull from a lateral view and determine if your skull has prognathism, no prognathism (straight), or variable prognathism (in between prognathism and no prognathism) by comparing your skull to the pictures below (Figures 22, 23, and 24). Record your observation in Table 5.



Figure 22- No Prognathism
(Straight)

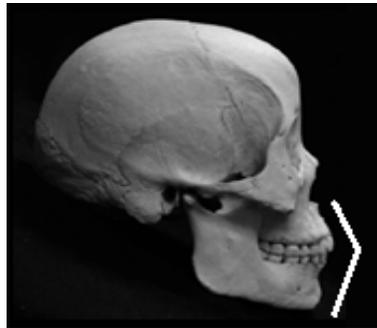


Figure 23- Variable
(Between Straight
and Prognathism)



Figure 24- Prognathism

Race Determination Using the Skull and Femur- (Continued)

Skull

Observation of the Orbit- Shape

6. Observe the skull from an anterior view and determine if the eye orbits are rounded and somewhat square (Figure 25), rounded and circular (Figure 26), or fairly rectangular (Figure 27). Record your observation in Table 5.



Figure 25



Figure 26



Figure 27

Femur

Observation of the Anterior Curvature of the Femur

1. Lay the femur on the table such that the lesser trochanter is closest to the table. Place your palm flat on the table and slide your fingers underneath the femur. Determine if your fingers and palm fit underneath the anterior curvature of the femur. Record your observation in Table 5.

** Final Step

1. Based on the data you entered in Table 5 and the anterior curvature test of the femur, make a final determination of the race of the skeleton and record your answer in the space below Table 5.

Height Determination Using the Femur, and Humerus

Femur

1. Record the Maximum Length of Femur (MLF) from Table 3 to Table 6. Convert the length from millimeters to centimeters.
2. Based on your determination of the sex and race of the skeleton, choose the correct regression formula, plug in your Maximum Length of Femur (MLF) and calculate the height and height range (minimum value and maximum value).
3. Finally, convert your height range in centimeters to a height range in feet and inches. The conversion of centimeters to inches is provided below Table 7.

Humerus

1. Record the Maximum Length of Humerus (MLH) from Table 4 to Table 6. Convert the length from millimeters to centimeters.
2. Based on your determination of the sex and race of the skeleton, choose the correct regression formula, plug in your Maximum Length of Humerus (MLH) and calculate the height and height range (minimum value and maximum value).
3. Finally, convert your height range in centimeters to a height range in feet and inches. The conversion of centimeters to inches is provided below Table 7.

Age Determination Using the Pelvic Bones, Femur, and Humerus

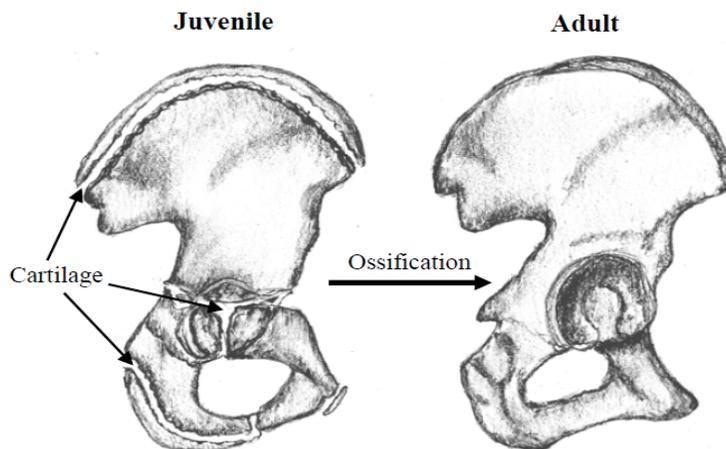
Pelvic Bones

Observation of Pelvic Bones- Ossification and Epiphyseal Plates

1. Using Table 8, observe the pelvic bones for epiphyseal plates, epiphyseal lines, or complete ossification of the ilium, ischium, and pubis. In Table 8, circle each age or age group based on your observations and the descriptions in Table 8.



Development of Coxal (Hip) Bone



Femur

Observation of Femur Landmarks

1. Using Table 9, observe presence of femur landmarks. In Table 9, circle each age or age group based on your observations and the descriptions in Table 9.

Humerus

Observation of Humerus Landmarks

1. Using Table 10, observe the presence of humerus landmarks. In Table 10, circle each age or age group based on your observations and the description in Table 10.

** Final Step

1. Based on the ages you circled in Tables 8, 9, and 10, determine the age range of the skeleton and record your answer in the space below Table 10.