Human Bone Identification Atlas

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Purpose

The purpose of our project is to create a dichotomous key for public workers (construction workers and police officers) to correctly distinguish between human and non-human bones. The nine bones of interest are the six long bones: humerus, radius, ulna, femur, tibia, and fibula and the three different types of vertebrae: cervical, thoracic, and lumbar.

Introduction

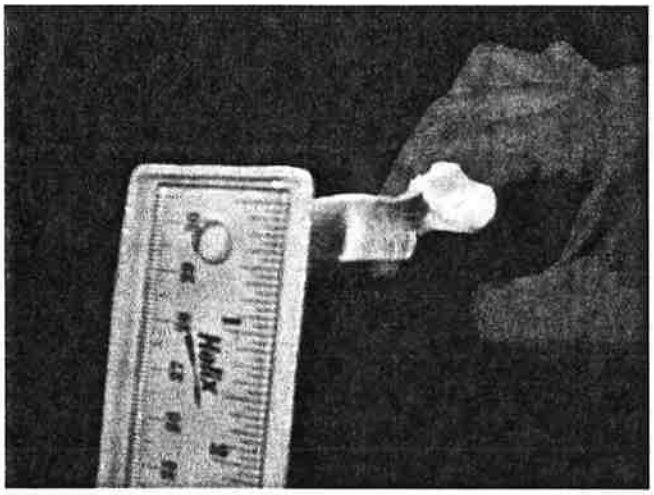
When first identifying a bone, one must first consider the size. This aspect of a bone can be a very informative characteristic in itself. After this, we identify more specific aspects of the bones through simple, everyday explanations and comparisons. It is important to keep in mind that, for purposes of this assignment, this bone key does not reach an incredibly specific level, but remains rather general.

For this assignment, Sara and Jack wrote the keys for the femur, humerus, and lumbar vertebra. Brittany, Jessica, Zohra, and Jamie wrote the keys for the tibia, fibula, radius, ulna, thoracic and cervical vertebrae.

Cervical Vertebra

Cervical Vertebra Key

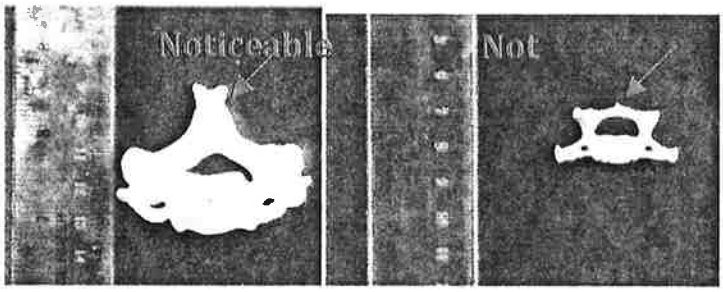
1. Is the height of the vertebral body greater than 1 in (3 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #2



Picture 1: How to measure the height of the vertebral body.

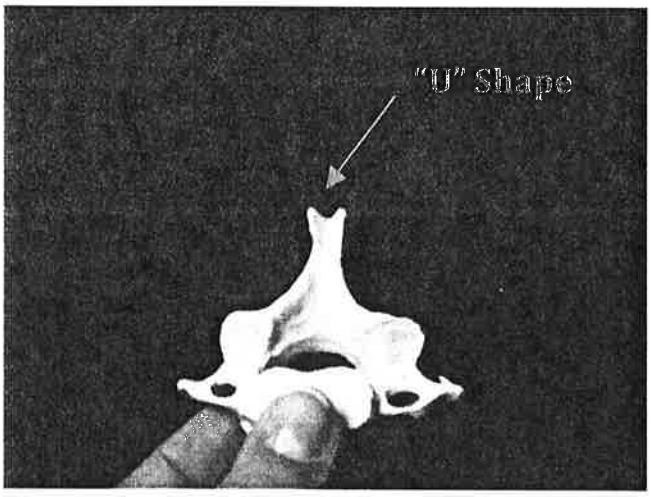
2. Is the height of the vertebral body less than 1/5 in (0.5 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #3

3. Does the vertebra have a noticeable spinous process? See Picture 2.
   a. Yes....Go to #4
   b. No....Not human



Picture 2: How to determine if the vertebra has a noticeable spinous process. Vertebra on left is human. Vertebra on right is non-human.

4. Does the end of the spinous process form a "U" shape? See Picture 3.
   a. Yes....Human
   b. No....Not human

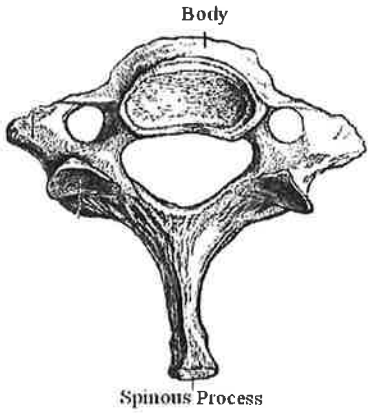


Picture 3: Example of a "U" shaped end of the spinous process.

Glossary

- Vertebral body- biggest vertebral part; is generally shaped like a short cylinder; its upper and lower surfaces are flattened and rough; bodies of the spine stack up on one another to create the vertebral column

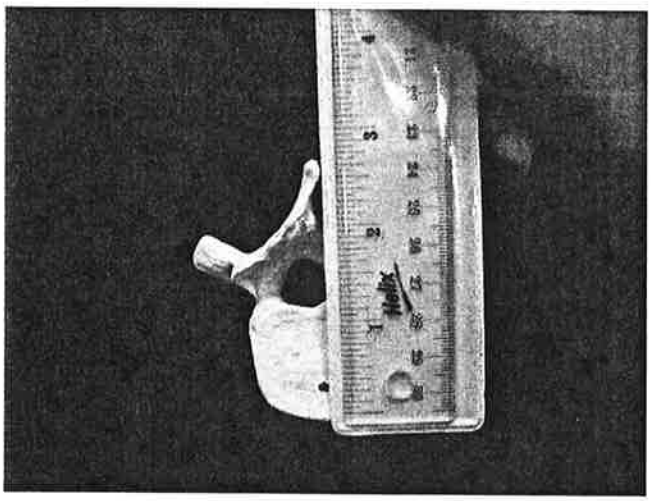
- Spinous process- a part of the vertebrae projecting backward from the arches, at the center of the vertebrae; allows for the attachment of back muscles



Thoracic Vertebra

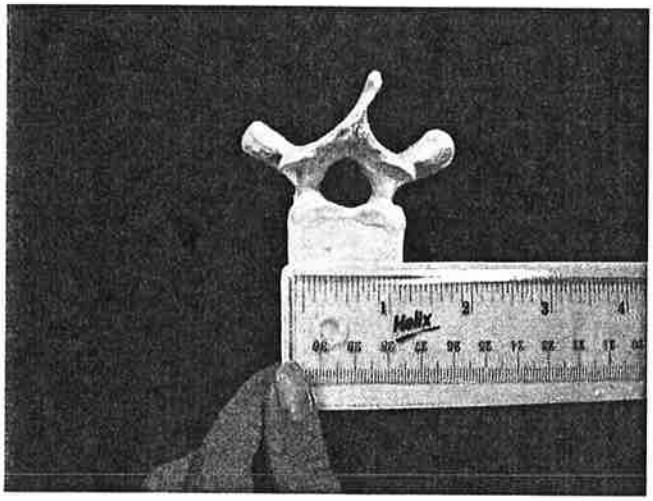
Thoracic Vertebra Key

1. Is the length of the thoracic vertebra from the tip of the spinous process to the end of the vertebral body less than or equal to 2 1/2 in (6 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #2



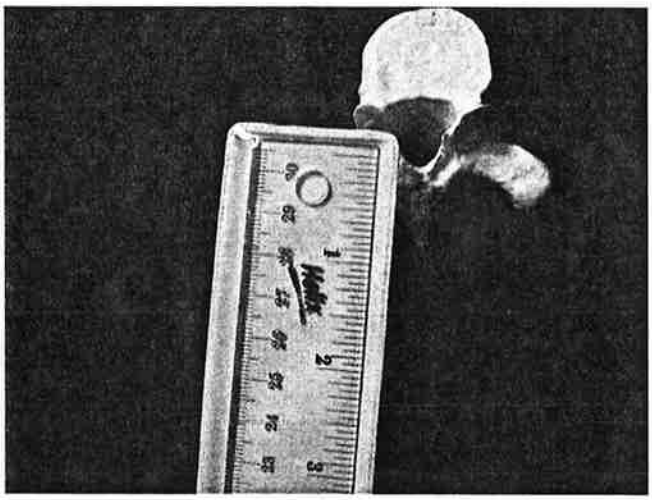
Picture 1: How to measure the length of the thoracic vertebra.

2. Is the length of the vertebral body less than or equal to 4/5 in (2 cm)? See Picture 2.
   a. Yes....Not human
   b. No....Go to #3



Picture 2: How to measure the length of the vertebral body.

3. Is the length of the spinous process from the hole in the center of the vertebra to the tip of the spinous process less than 1 1/2 in (4 cm)? See Picture 3.
   a. Yes....Human
   b. No....Not human

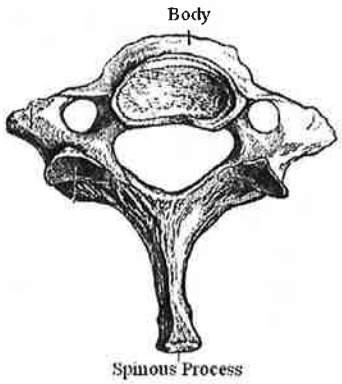


Picture 3: How to measure the length of the spinous process from the hole in the center of the vertebra to the tip of the spinous process.

Glossary

- Vertebral body- biggest vertebral part; generally shaped like a short cylinder; its upper and lower surfaces are flattened and rough; bodies of the spine stack up on one another to create the vertebral column

- Spinous process- a part of the vertebrae projecting backward from the arches, at the center of the vertebrae; allows for the attachment of back muscles



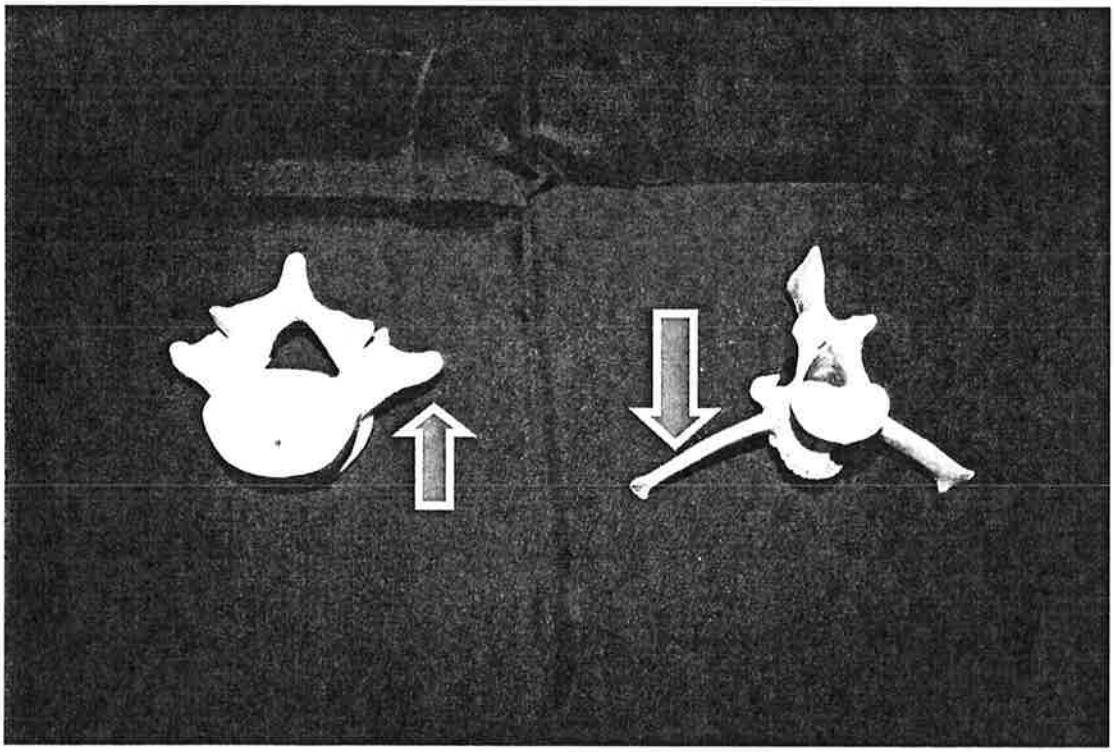
Lumbar Vertebra

Lumbar Vertebra Key

1. Plate-like disc is broad and is similar to size of a golf ball?
   a. Yes….go to #2
   b. No….Not Human
2. Vertebra appendages attached to disc extend away from the disc and toward other appendages?
   a. Yes….Human
   b. No….Not Human

Human Lumbar Vertebrae

The Lumbar Vertebrae are located at the end of the spinal column near the hips. As such they bear more weight and need to accommodate more muscle and tendon attachments, making them larger and spikier than most other vertebrae. They will have larger plate-like surfaces where they connect to the vertebra before and after them.



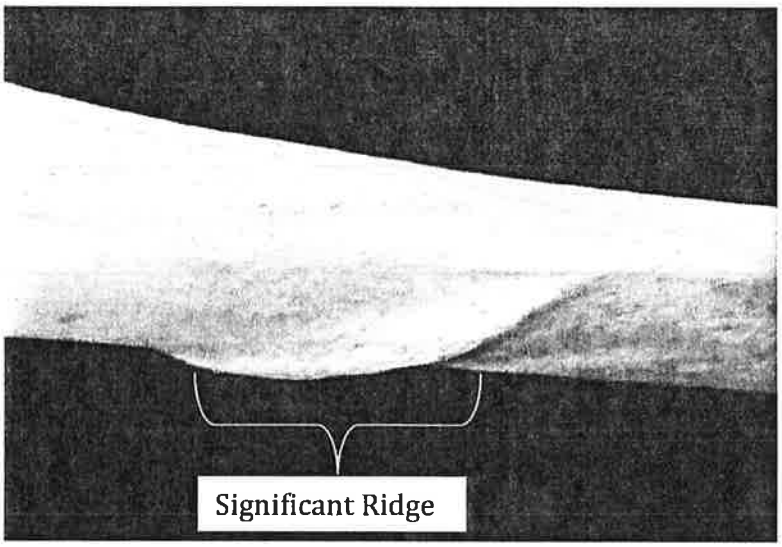
Humerus

Humerus Key

1. Bone is approximately 1 foot in length (give or take 2 inches)?
   a. Yes…Go to #2
   b. No….not human
2. The shaft (long, thin middle section) will not have any significant ridges?
   a. Yes….Human
   b. No….Not Human

Human Humerus

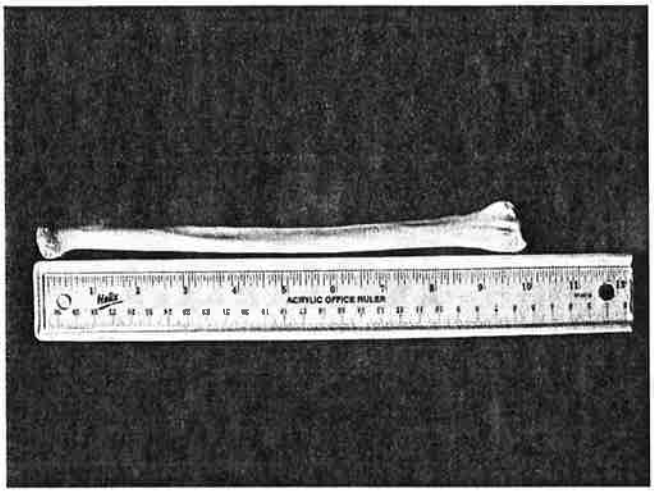
The Humerus it the bone of the upper arm, it connects the elbow and shoulder. It has a smooth, rounded end that allows for freedom of motion in the shoulder.



Radius

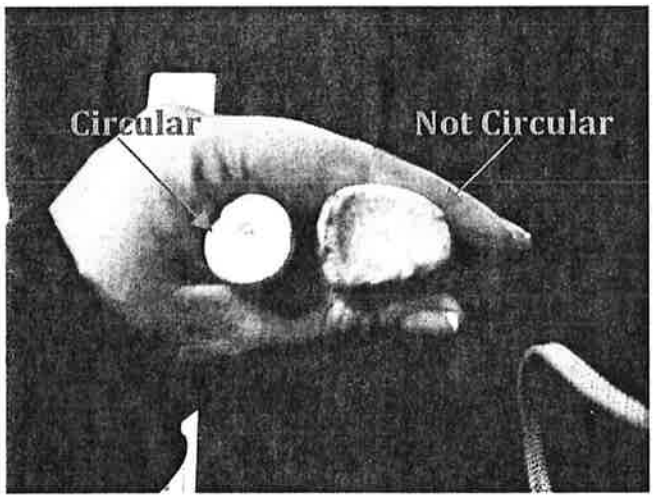
Radius Key

1. Is the length of the bone less than 4 in (10 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #2



Picture 1: How to measure the length of the human radius.

2. Is the head of the radius a smooth, even-shaped circle? See Picture 2.
   a. Yes....Human
   b. No....Not human

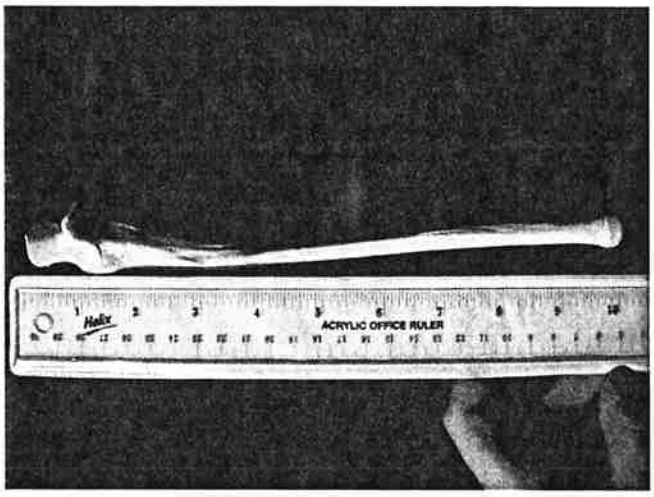


Picture 1: How to determine if the head of the radius is a smooth, even-shaped circle. Radius on the left is human and radius on the right is non-human.

Ulna

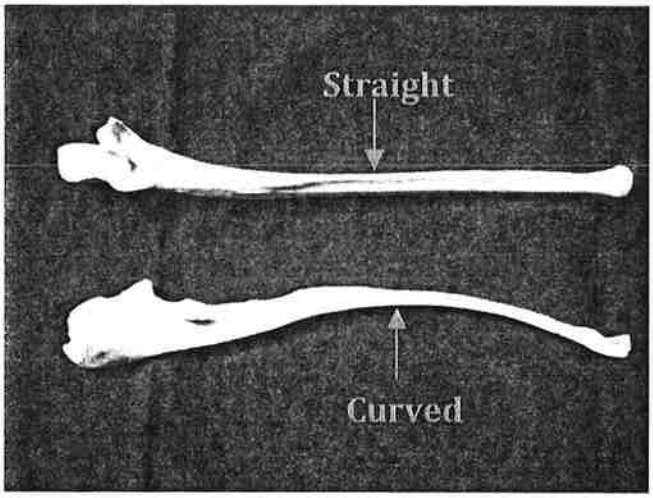
Ulna Key

3. Is the length of the bone less than 10 in (25 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #2



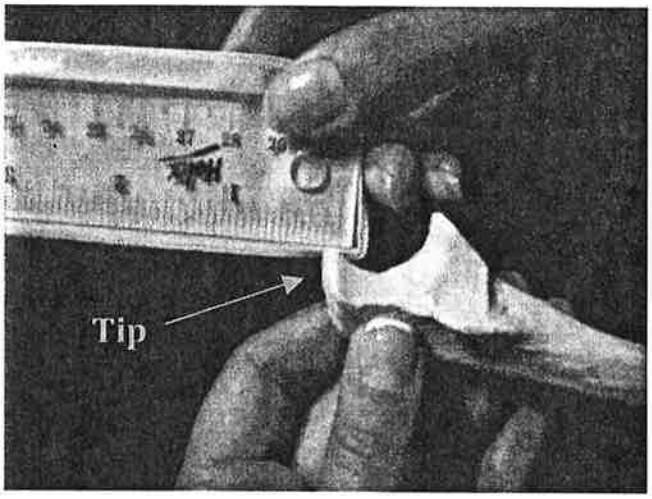
Picture 1: How to measure the length of the human ulna.

4. Does the ulna have a curve to it? See Picture 2.
   a. Yes....Not human
   b. No....Go to #3

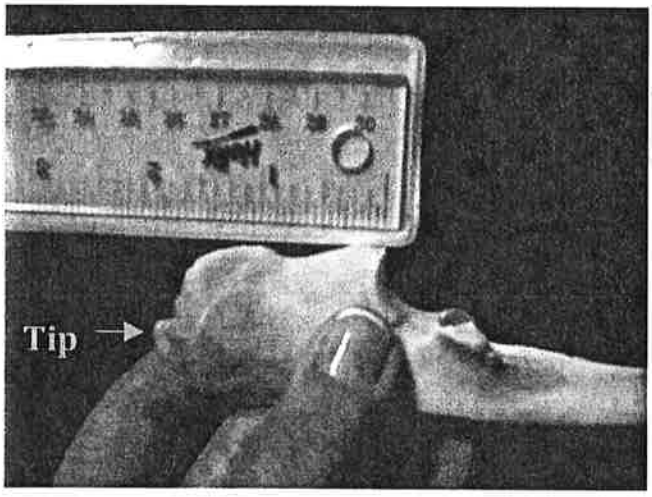


Picture 2: Example of a straight ulna (human) and a curved ulna (not human).

5. Is the length from the tip of the ulna to the top of the **'U'** shape greater than 2/5 in (1 cm)? See Pictures 3 and 4.
   a. Yes....Not human
   b. No....Human



Picture 3: How to measure the length from the tip of the ulna to the top of the **'U'** shape using the human ulna as an example.



Picture 4: How to measure the length from the tip of the ulna to the top of the **'U'** shape using a non-human ulna as an example.

Femur

Femur Key

1. Bone is over 1 foot in length?
   a. Yes….Human
   b. No….Not human

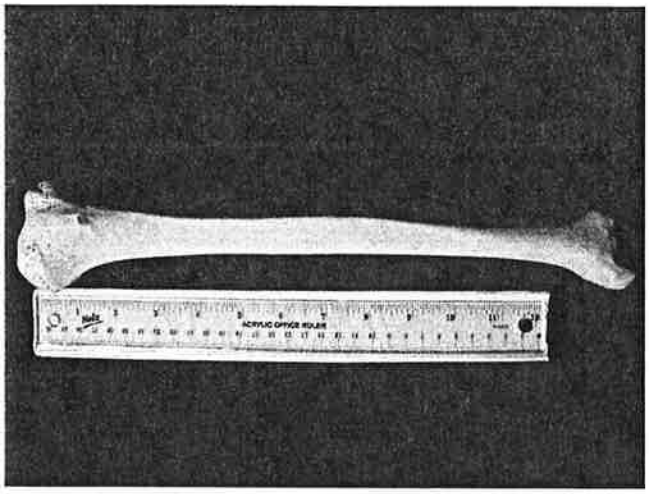
Human Femur

The Femur is the longest bone in the human body. It is located in the upper leg, between the hip and knee. It is attached to the hip by a ball and socket joint that gives it a distinctive sphere shape at one end.

Tibia

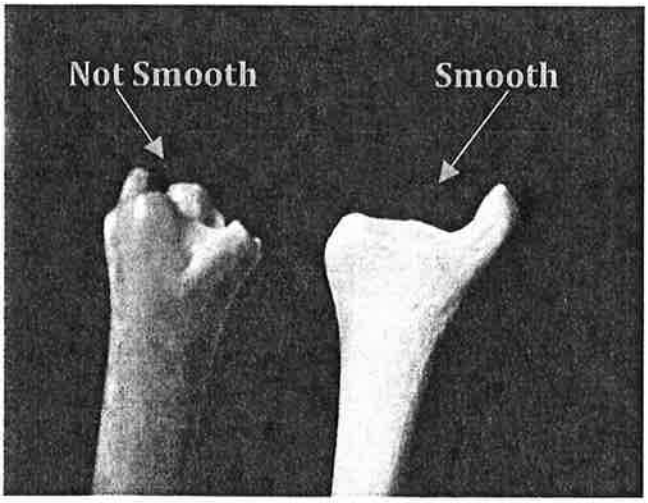
Tibia Key

1. Is the length of the bone less than 8 in (20 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #2

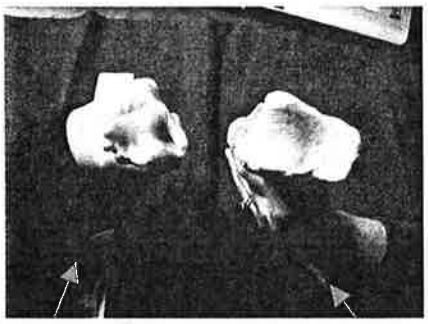


Picture 1: How to measure the length of the human tibia.

2. Is the bottom (slender end) of the tibia relatively smooth? See Pictures 2, 3 and 4.
   a. Yes....Go to #3
   b. No....Not human

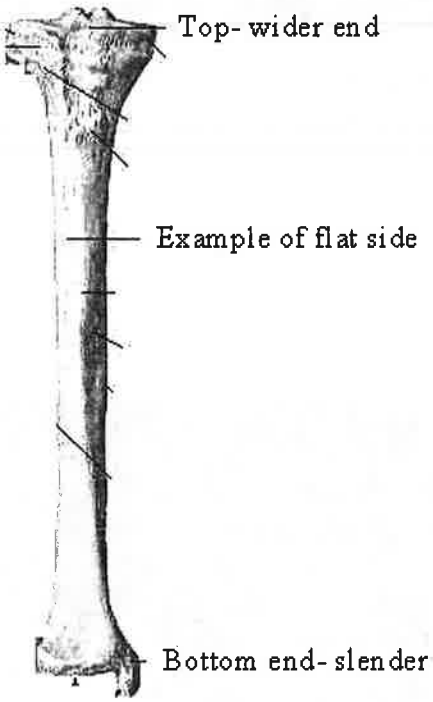


Picture 2: How to determine if the bottom of the tibia is relatively smooth. Tibia on left is non-human. Tibia on right is human.



Picture 3: How to determine if the bottom of the tibia is relatively smooth. Tibia on left is non-human. Tibia on right is human.

3. Does the middle of the tibia have 3 flat surfaces to it? See Picture 4.
   a. Yes....Human
   b. No....Not human

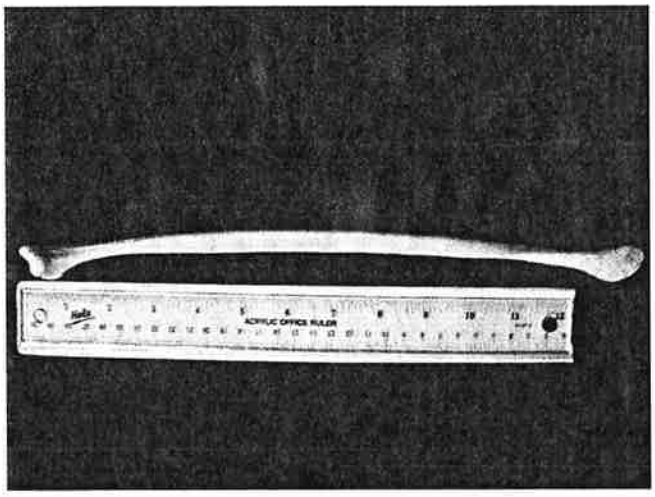


Picture 4: How to determine if the middle of the human tibia has 3 flat surfaces.

Fibula

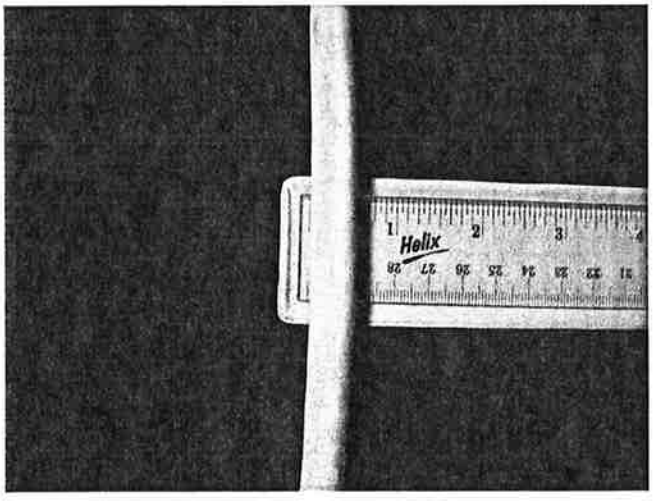
Fibula Key

1. Is the length of the bone less than 8 in (20 cm)? See Picture 1.
   a. Yes....Not human
   b. No....Go to #2

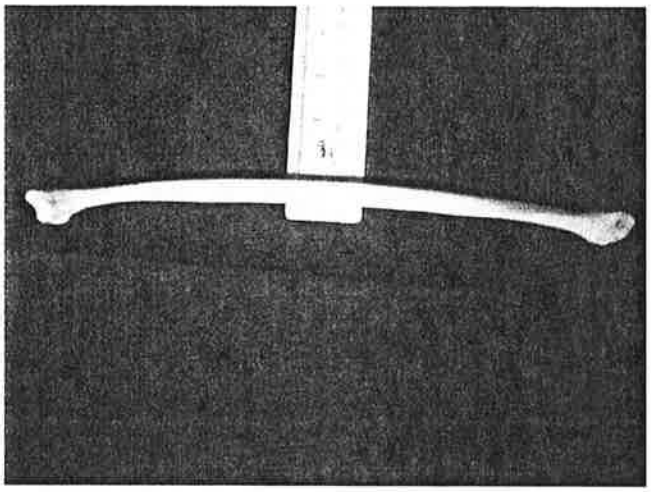


Picture 1: How to measure the length of the human fibula.

2. Is the width of the middle of the fibula less than a centimeter? See Pictures 2 and 3.
   a. Yes....Not human
   b. No....Human



Picture 2: How to measure the width of the human fibula.



Picture 3: How to measure the width of the human fibula.