**Forensic Anthropology Notes**  
What We Learn From Bones

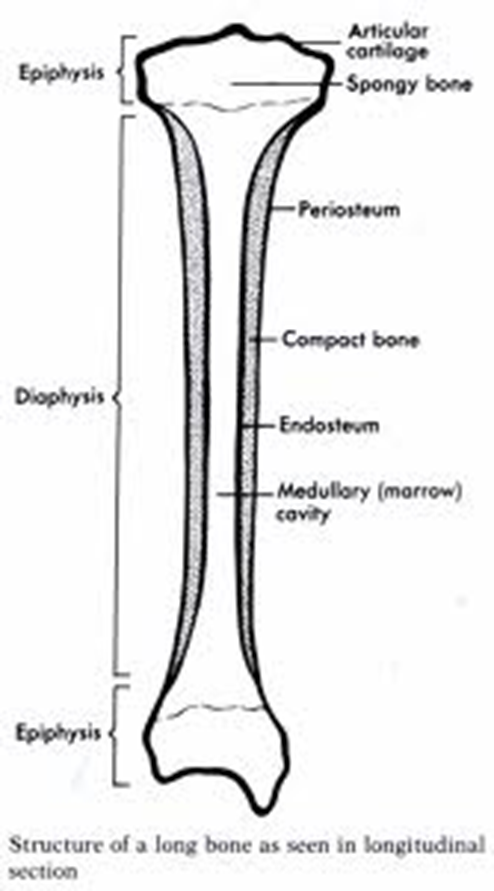
* **Adults Have \_\_\_\_\_\_\_ Bones**
* **Babies Have \_\_\_\_\_\_\_ Bones**
  + Bones fuse as we develop
* **Axial Skeleton**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Pelvis, arms, legs, etc….
* **Sacrum**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Coccyx at end = tail bone
* **Pelvis =**
  + Ileum
  + \_\_\_\_\_\_\_\_\_\_\_
  + Pubis (pubic bones)
* Osteoblast cells (osteocytes)—\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Skeleton starts out as cartilage
    - **Ossification**—
  + Starts to turn to bone after a few weeks of in utero development
  + At 8 weeks a skeleton is visible with x-ray
  + Process continues throughout lifetime.
* Life Cycle of Bone- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + - Osteoclasts—\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Osteoblasts – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The skeleton has completely replaced itself every \_\_\_\_\_\_\_\_\_\_

Compare and Contrast

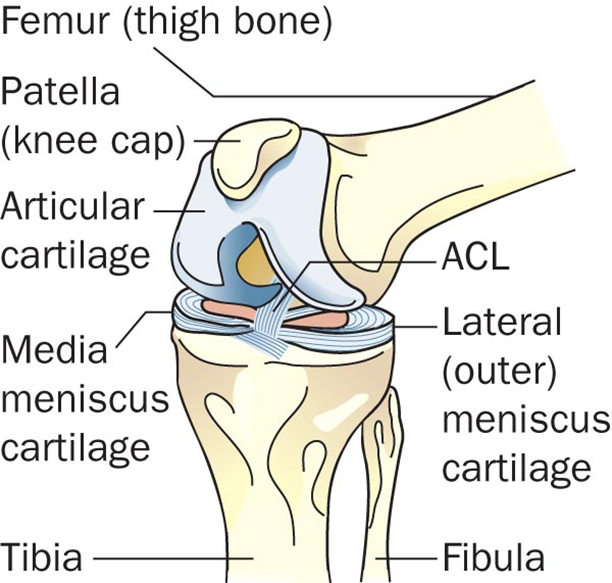
Osteoblasts and Osteoclasts



* **Periosteum**
  + Protective membrane or covering
  + Contains blood vessels and nerves
  + keeps bones moist
  + Aids in recovery from injury
* **Epiphysis-** 
  + the ends of the bone
  + Epipyseal (growth) plates located here
    - Cartilaginous areas
    - Close during stages of life a filled with bone
* **Diaphysis-** 
  + the shaft or long middle portion of bone
* **Spongy Bone**
  + **NOT ACTUALLY SPONGY**
  + More porous, located in/on epiphysis
* **Compact Bone**
  + Stronger bone of diaphysis
  + Contains cavity
* **Medullary cavity**
  + Contains bone marrow
    - Where blood cells are produced

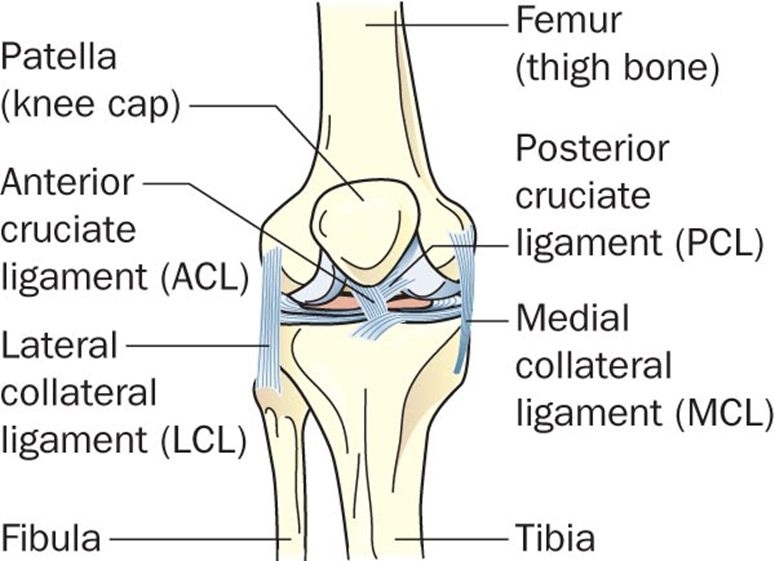
What Protects the Ends of Bones?

* **Articular cartilage**—
  + Think chicken wing
  + Does not regenerate
    - Age
    - Injury



What Connects Bones?

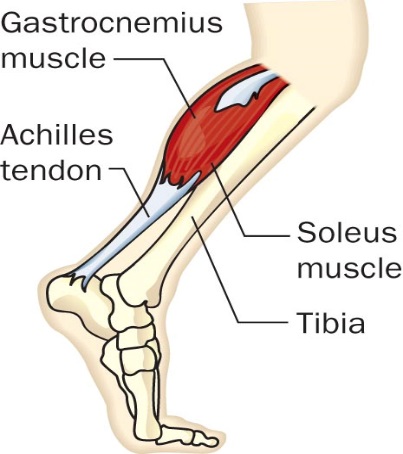
* **ligaments**—



How Do Bones Move?

Muscles-

Tendons-



Forensic Anthropology

* Studies the identifying characteristics of the remains of an individual
  + SKELETON
* So what can a skeleton tells us?
  + Sex
  + Height
  + Race/Ethnicity
  + Physical Health and/or History of Disease
  + Identification
    - Dental Records
    - Mitochondrial DNA

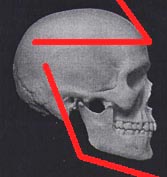
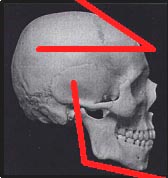
Distinguishing Males From Females  
OVERALL SKELETON

* + Female Skeleton
  + Male Skeleton
    - * Male hormones = more muscle development
      * Surface of bone where tendons attach is thicker

Sex Determination  
SKULL

|  |  |  |
| --- | --- | --- |
| **Male Characteristics** | **Trait** | **Female Characteristics** |
| More square | Shape of eye | More rounded |
| More square |  | More V-shaped |
| Thick and larger | Upper brow ridge |  |

|  |  |  |
| --- | --- | --- |
| **Male Characteristics** | **Trait** | **Female Characteristics** |
| Present | Occipital protuberance | Absent |
| Low and sloping |  |  |
| Rough and bumpy | Surface of skull | Smooth |
|  | Ramus of mandible | Slanting |
| Rough and bumpy | Nuchal crest |  |



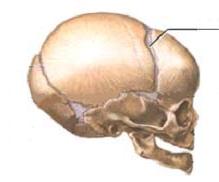
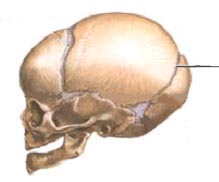
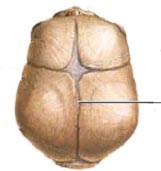
* Is the female skull smoother than the male’s?
* Which frontal bone is lower and sloping?
* Are the male’s eye orbits more circular?
* Which jaw is more square, with an angle that is closer to 90o?

Sex Determination

PELVIS



* An easy method to determine gender
* The surface of a woman’s pelvis can be scarred from pregnancy/child bearing
* The sub pubic angle of the female pelvis is greater than 90o; the male’s, less
* Pelvic cavity
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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* The male femur is thicker and joins the pelvis at a straighter angle than the female femur

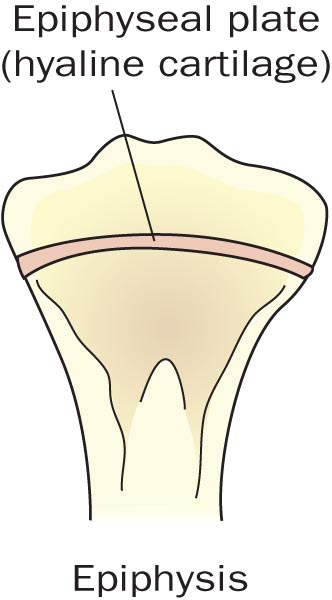


Age Determination

SKULL

* LAMBOIDAL SUTURE
  + - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* SAGITAL SUTURE
  + - Closes by about age 32
    - CORONAL SUTURE

Closed at about age 50

Age Determination  
LONG BONES

* At birth—450+ bones in the skeleton
* **Epiphysis line**—appears where  
   cartilage is replaced by bone
* This information can be used to   
  approximate a skeleton’s age

Height Determination

* Measurements of LONG BONES like the humerus and femur can be used to calculate a persons height
  + Involves calculations
    - Example
      * 2.10 x (length of femur in cm) + 72.22 cm = height of person in cm.
        + + or – 3.91 cm (about an 1 ½ inches)
* Shape of eye orbits
  + Caucasoid = rounded, somewhat square
  + Mongoloid = rounded, somewhat circular
* Nasal Spine
  + Negroid = very small spine
  + Mongoloid = somewhat prominent spine
* Nasal Index
  + Caucasoid = <.48
  + Negroid = >.53
* Prognathism
  + Caucasoid = straight
  + Mongoloid = variable
* Femur
  + Negroid = fingers do not fit under curvature
  + Mongoloid = fingers fit under curvature

Identification

* Dental records
* Facial Reconstruction

DNA and Identification

* Bone contains little nuclear DNA but it does contain **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**DNA
* Nuclear DNA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_before mitochondrial DNA
* Mitochondrial DNA is inherited only from the **\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Compare results with living relatives on the mother’s side of the family

Right vs Left Handed

* Bones are usually more developed on the side that is used most
* Sometimes there may also be more deterioration.

History of Disease / Prior Surgeries

* Osteoporosis
* Arthritis
  + Rods, plates ect..
    - Have id number

Skeletal Trauma / Cause of Death

* Sharp Force Weapons, Blunt Force Trauma, Gunshots
  + Blunt force generally more widespread fractures and greater damage to bone than sharp objects