

**Anatomy & Physiology 319 (Lecture 4 continued...)**  
**February 12, 2015**

**Infant skull**

- Has fontanel (refers to fountain)
- Can feel infants pulse from back of head
- Soft spot is robust fibrocartilage (delicate)
- Advantage of being born with skull full of fibrocartilage
  - Coming down birth canal, tight space (gives)
  - Proportions of head are different from adult skull
- Nose and mandibular region is part that catches up to rest of skull
  - Not a lot of variation
  - Mandible, maxilla, cheek bone
- Doesn't reach full facial features until reach teenage years
- Cranium is already ahead of rest of skull

**Growth**

- Body changes throughout life
- Head for most part doesn't change as much

**Gross Anatomy**

- Appendicular skeleton

**Long Bones**

- Longer than they are wide
- Straight
- Very close to being cylindrical
- Have knobby ends
- Apart of appendicular skeleton
- Why ribs aren't long bones?
  - Fail because not straight
  - Flat
  - And don't have knobby ends
- Long bones don't have to be really long, can be short
- Bones in fingers are long bones
- **Diaphysis**- shaft of long bone
  - Most of length
- **Metaphysis**- knobby end
  - Region where line of epiphysis and diaphysis exists
- **Epiphysis**- knobby end, where bone swells at either end
- **Periosteum**- Outer coating of bone, only represented in living bone
  - Connective tissue (dense fibrous tissue)
  - Tough outer coating
  - Attached to bone

- o Manufactures shell that allows bones to grow thicker
- **Sharpey's fibers**- one outside of bone
- **Compact bone**- outer layer of the (cortical bone)
  - o Outer bark
- **Trabeculae** (pleural)- all beams going off in different directions
  - o Spongy looking (spongy bone)
- **Living bone**- very dynamic
  - o Has living soft tissue living in it
  - o In spongy bone is full of red bone marrow
  - o Blood vessels running through
  - o **Bone marrow**
    - Can be red (blood forming)
    - Yellow marrow
    - Hollow space
- **Medullary Cavity**
  - o Central cavity
  - o **Medulla**- filled with tissue... adrenal medulla, adrenal cortex

### Flat Bones

- o Cranial bones, scapula, ribs, skull
- o Have a flat aspect, even though curved
- o Collar bone and skull develop in same way
  - o Out growth of embryotic mesenchyme
  - o Diploe- same as spongy bone in skull

### Marrow

- o **Red marrow**
  - o Where all blood cells come from
  - o Hematopoietic tissue= red marrow
  - o Limited in life span
    - o Missing mitochondria so can't repair genes
    - o 3 month life span in average individual
    - o Spleen kills old RBC, and recycles nutrients in RBC
    - o Heme taking away and turned into bile
- o Red marrow in all long bones
  - In teenage years start converting red marrow into yellow
  - Adults have red marrow in vertebrae, hip, ribs, skull flat bones
  - Can increase in proportion on demand
    - Go from low elevation to higher concentration RBC levels trying to increase

- Hematopoietic level- amount of RBC per mL
- Through hormonal regulation produce more blood cells per mL
- Plasticity can rise to bar that is set
- Can increase red marrow

#### o Compact bone

- o **Osteon**- structural unit, group of lamellae
- o **Lamellae**- individual rings
- o **Haversian canal (central canal)**- passageway for blood vessels, small arteries and veins; normally run down in pairs, and nerves
- o **Perforating canal (Volkmann's Canal)**- have a lot of these canals running at right angles to central canal, give advance grid like blood vessels in bone
- o Dense blood and nerve supply
- o **Palliative care**- make people feel comfortable when sick or dying
- o When cancer spreads to bone- can cause bone pain
- o Bones have cells- located in Osteocytes in lacunae
- o Can't look at live cells through electron microscope
- o Connective tissue has a minimal amount of cells spaced out
- o Canaliculi- can radiate out and get free oxygen
- o As bone grows manufactures interstitial lamellae
- o Has collagen fibers

#### Osteons- heart and sole of long bone

- Alternating lamellae have alternating collagen fibers (run 90 degrees to each other)
- Alternating lamellae reinforces structure against twisting structures
- Lets bone be hard and tough (good shield also hard to tear or shatter)
- Collagen fibers reinforce

#### Spongy bone

- Filled with trabeculae
  - o Made of lamellaer bone
  - o Irregular rings
  - o Have osteocytes