

Skeletal System

I. Functions

- A. Bone – support, protection, mineral storage, makes blood cells, levers
- B. Cartilage – smooth surfaces, site of growth, support
- C. Tendons – attaches muscles to bones
- D. Ligaments – attaches bone to bone

II. Tissues

- A. Extracellular matrix determines characteristics
- B. Tendons/ligaments – mainly collagen
- C. Cartilage – collagen and proteoglycans (polysaccharides connected to proteins)
- D. Bone – collagen and minerals (CaPO_4)

III. Bone Types

- A. Short – carpals
- B. Flat – scapula
- C. Irregular – vertebrae
- D. Long - femur

IV. Bone Structure

- A. Epiphyses (head)- ends
- B. Articular cartilages cover the epiphyses.
- C. Diaphysis - shaft
- D. Periosteum - tough outer covering, continuous with ligaments and tendons.
- E. Compact bone makes up the walls; Bone cells (osteocytes) lie in concentric circles around osteonic canals (contain blood vessels and nerve fibers).
- F. Spongy Bone – in the epiphyses and middle of all others
 - adds strength, but reduces weight
- G. Medullary cavity
 - 1. hollow center of the diaphysis
 - 2. lined with endosteum
 - 3. filled with marrow
- H. Red Marrow – blood forming cells
 - in spongy bone
- I. Yellow Marrow – contains fat

V. Ossification

- A. Bones formation by replacing connective tissue or cartilage.
- B. Osteoblasts deposit bony tissue around themselves, then mature into osteocytes
- C. Osteoblasts beneath the periosteum lay down compact bone to increase width.

VI. Bone Repair

- A. After break, vessels bleed and clot forms.
- B. 2-3 days, callus forms of fibers and cartilage
- C. next 4-6 weeks, osteoblasts form spongy bone
- D. Bone is slowly changed to compact bone. May take a couple of months
- E. open (compound) – protrudes through skin
- F. closed – not through skin
- G. complete – complete separation into 2 fragments
- H. incomplete – not totally separated

VII. Various other

- A. Axial skeleton - skull, vertebrae and thoracic cage
- B. Appendicular skeleton – limbs and girdles
- C. Paranasal Sinuses – cavities inside nasal cavity bones
 - decrease weight
 - resonating chambers during vocalization
- D. Hard Palate – floor of nasal/roof of mouth.
- E. Soft Palate – connective tissue and muscles that extend back
 - both work to allow us to chew and breathe
- F. Ear Bones – anvil, hammer, stirrup
- G. Xiphoid process – tip of sternum
- H. Male Pelvis – larger, more massive, heart-shaped inlet
- I. Female Pelvis – inlet and outlet are larger, greater subpubic angle

VIII. Joints

- A. Fibrous Joints are immovable (skull) or only slightly movable
- B. Cartilaginous Joints
 - 1. Slight movement
 - 2. Between vertebrae.
 - 3. symphysis pubis
- C. Synovial Joints
 - 1. Covered with hyaline cartilage.
 - 2. Synovial fluid lubricates surfaces
 - 3. Some joints contain shock - absorbing pads called menisci.
 - 4. Some joints have fluid - filled sacs called bursae.
 - 5. Ball-and-socket joint - hip and shoulder.
 - 6. Condylod or Elipsoid - between a metacarpal and a phalange.
 - 7. Gliding joints - wrist and ankle
 - 8. Hinge joint - elbow
 - 9. Saddle joint - thumb.
 - 10. Pivot – radius and ulna