Skeletal System Notes

1. Bone functions:

a. Support organs

b. Protect organs

c. Allow Movement

d. Store Calcium (Ca) and other minerals

e. Blood cell formation

f. Fat storage

2. Five bone types

a. Long bones: slightly curved for strength

i. Femur

ii. Humerus

b. Short bones: cube-shaped

i. Carpals

ii. Tarsals

c. Flat bones: thin - provides protection and areas for muscle attachmen

i. Ribs

ii. Skull

d. Irregular bones: complex shapes

i. Vertabrae

ii. Facial bones

e. Sesamoid bones: tiny; shaped like a sesame seed

i. develop in tendons (friction) - not in everyone

ii. exception - Patella

3. Bone structure

a. ___Spongy___ Bone

i. Contains many large spaces filled with ___red marrow___

ii. Found in short bones ,___flat bones___ , irregular bones, and the ends of ___long bones___.

b. ___Compact___ Bone

i. Contains few spaces between mineral matrix

ii. Deposited in layers over spongy bone

iii. Provides ___support___ and protection

c. Two types of marrow

i. ___Red___: where blood cells are made

ii. ___Yellow___: fat storage

4. Macroscopic structure of long bone (pg. 163-171)

a. ___Epiphysis___: enlarged ends of long bone

i. Articular Cartilage: hyaline cartilage that cov the joint surfaces of bones

ii. Secondary center of ___ossification___.

b. ___Diaphysis___: shaft of long bone

i. ___Periosteum___: tough fibrous CT that covers the diaphysis (shaft) and is continuou with tendons & ligaments

ii. Medullary Canal: hollow central canal in shaft (contains marrow)

iii. Primary center of ___ossification___.

5. Microscopic structure of compact bone

   a. Osteon: microscopic unit of structure in compact bone

   b. see attached diagra

6. Bone development and growth: Ossification

   a. Flat bones originate as membrane
      Example: fontanels – soft spots in an infant's skul

   b. Other bones originate as hyaline cartilage

   c. Three types of bones cells involved:

      i. Osteoblast: secrete mineral matrix

      ii. Osteocyte: mature bone cells, maintain bone

      iii. Osteoclast: dissolve mineral matrix

   d. Homeostasis of bone tissue: bone is constantly being remodeled by osteoblasts and osteoclasts in order to:

      i. Regulate blood calcium

      ii. Respond to stress

      iii. Reshape bone as it grows

7. Joints

   a. Immovable joints: Sutures

      i. Separated by fibrous C.T.

      ii. Example - Skull

b. Slightly movable joints

i. Held together by fibrocartilage or by ligaments

ii. Example - Pubic Symphysis

c. Movable joints: Synovial Joints

i. Surface covered in hyaline cartilage

ii. Articular capsule encloses and unite bones; parts include:

1. Ligaments: to hold bones together

2. Synovial Fluid: to lubricate

3. Meniscus: pads of fibrocartilage for cushioning

4. Bursa: fluid filled sacs that reduce friction with tendons moving

Note - ligaments connect bone to bone and Tendons connect muscle to bone (or muscle to muscle)

8. Types of Synovial joints

a. Ball and socket: allows the greatest movement (ex. Hip and Shoulder)

b. Hinge joint: allows movement in one plane (ex. Elbow)

c. Pivot joint: rotates around an axis (ex. Radius-Ulna)

d. Saddle joint: variety of movements (ex. Thumb)

e. Gliding joint: one surface glides over the other (ex. Vertebrae)

f. Condyloid joint: allows much motion, but not rotation (ex. Metacarpals-Phalanges)

9. Types of joint movements:

   a. Flexion vs. Extention vs. Hyperextention

   b. Dorsiflexion vs. Plantar Flexion

   c. Abduction vs. Adduction

   d. Rotatio

   e. Pronation vs. Suppination

   f. Retraction vs. Protraction

   g. Elevation vs. Depression

   h. Eversion vs. Inversion

   i. Circumductio

(See pages 252 -257)