Chapter 8 - Joints

I. Classification of joints

A. Functional
   1. Synarthroses: *immovable joints*
   2. Amphiarthroses: *slightly movable*
   3. Diarthroses: *freely movable*

B. Fibrous joints: *no cavity; bones joined by fibrous C.T.; no movement*

1. Sutures: *short collagen fibers join bones together*
2. Syndesmoses: *bones connected by sheet of fibrous C.T.*
3. Gomphoses: *C.T. fibers hold teeth in their bony sockets*
C. Cartilagenous joints

1. Synchondroses: a plate of hyaline cartilage joins bones

2. Symphyses: a pad of fibrocartilage is found between bones

D. Synovial joints: all freely movable
1. General structure: 5 features
   a. Articular cartilage: found at surfaces where bones meet
   b. Joint cavity: filled with synovial fluid
   c. Articular capsule: double layerd structure enclosing cavity
      1) Fibrous capsule: outer layer connected to periostea of both bones
      2) Synovial membrane: areolar C.T. lining the fibrous capsule
   d. Synovial fluid: thin, viscous fluid that keeps bones from touching, it is also a lubricant
   e. Rich nerve and blood vessel supply
   f. Reinforcing ligaments: capsular (inside) or extracapsular

2. Bursae and tendon sheaths: outside joints, but nearby

(a) Frontal section through the right shoulder joint
(b) Enlargement of (a), showing how a bursa eliminates friction where a ligament (or other structure) would rub against a bone

a. Bursae: flat fibrous sacs filled with synovial fluid

b. Tendon sheaths: elongated bursae that wrap around crowded tendons subject to friction, e.g., wrist
3. Movements allowed by synovial joints
   a. Gliding movements: *simplest – one flat surface glides over another*

   b. Angular movements: *increase or decrease the angle between bones*
      1) Flexion: *decreasing the angle between bones*
      2) Extension: *opposite of flexion*
         a) Hyperextension:
      3) Abduction: *movement away from the midline*
      4) Adduction: *movement toward the midline*
      5) Circumduction: *movement of limb that describes a cone in space*
      6) Rotation: *turning of bone along its own long axis*
4. Special movements
   a. Supination: movement of palm anteriorly
   b. Pronation: opposite of supination
   c. Dorsiflexion: of foot - like wrist extension
   d. Plantar flexion: of foot - like wrist flexion
   e. Inversion: foot is moved so that the sole faces medially
   f. Eversion: opposite of inversion
   g. Protraction: movement forward in transverse plane
   h. Retraction: opposite of protraction
   i. Elevation: lifting a body part superiorly
   j. Depression: opposite of elevation
   k. Opposition: touching the thumb to the fingertip
E. Types of synovial joints

1. Nonaxial joints: perform gliding movements

   a. Plane joints: flat surface of one bone against flat surface of another

2. Uniaxial joints: movement in one plane

   a. Hinge: flex and extend only
b. Pivot: rotation in 1 plane

3. Biaxial joints: movement in 2 planes
   
a. Condyloid: All angular movements

b. Saddle: special case for thumb only: like condyloid but movement is greater
4. Multiaxial: movement in multiple planes

a. Ball and socket: most freely movable -

F. Selected synovial joints

1. Knee joint: Largest most complex joint in body
2. Hip: *ball and socket joint: deep and stable*

3. Elbow: *stable and smooth -*

G. **Homeostatic imbalance of joints**

1. **Sprains:** *ligaments are stretched or torn*
2. **Cartilage injuries:** *mostly tearing of knee menisci*
3. **Bursitis and tendonitis:** *inflammation of bursae or tendon sheaths*
4. **Arthritis:** *over 100 types*
   a. **Osteoarthritis:** *most common type – “wear and tear” arthritis*
   b. **Rheumatoid arthritis:** *chronic inflammatory disorder*
   c. **Gouty arthritis:** *excess uric acid crystallizes in joints*