ARTICULATIONS:

Functional or Structural classification?

Synarthrotic: little or no movement
- Fibrous CT - (*suture/gomphosis*) sutures, teeth
- Cartilagenous - (*synchondrosis*) skull base, young bone
- Bony - (*synostosis*) bone-bone fusion

Amphiarthrotic: slight movement
- Fibrous - (*syndesmosis*) distal Tibia-fibula
- Cartilaginous - (*symphysis*) fibrocartilage in pelvic girdle

Diarthrotic: free movement = **Synovial joints**
- Monaxial: single plane (*ex. hinge, pure pivot*)
- Biaxial: two planes (*ex. gliding, ellipsoid, saddle*)
- Triaxial: three planes (*ex. ball & socket*)

Movement of various joints:

1) Gliding - clavicle and sternum
2) a**B**duction - away from body's longitudinal axis
3) a**D**duction - toward body's longitudinal axis
4) Extension - increase in angle between elements
5) Flexion - decrease in angle between elements
6) Circumduction - gross orbital movement of element
7) Rotation - rolling movement along axis
8) Supination - rotation of palm/sole to face anteriorly
9) Pronation - rotation of palm/sole to face posteriorly
10) Protraction - "extension" anteriorly (horizontal)
11) Retraction - "flexion" posteriorly (horizontal)

Feet - inversion/eversion = supination/pronation
Feet - dorsiflexion/plantar flexion = extension/flexion

Structure of synovial joints:

1. Joint cavity surrounded by articular capsule -
   a. fibrous outer portion (periosteum of adj. bones)
   b. inner synovial membrane produces synovial fluid

2. Articular surface
   a. hyaline cartilage (self-lubricating?)
   b. not covered by perichondrium

3. Meniscus
   a. fibrocartilage pad with shock absorbing capacity
   b. often torn or displaced

4. Synovial fluid
   a. lubricates/nourishes the chondrocytes
   b. phagocytic cells
   c. *cushion*?

Arthritis: non-specific term - Inflamed joints

Osteoarthritis (degenerative joint disease - DJD)
- weight bearing joints suffer cartilage erosion
- osteophyte formation, joint deformity, limited mobility

Suppurative arthritis (bacterial insult - synovitis)
- injury, reduced immuno-competance
- degeneration of cartilage
- typically monoarticular / large joints

Rheumatoid arthritis (chronic inflammatory disease)
- systemic erosion of synovium w/ vascularized mass
- bilateral deforming arthritis - small joints
- typically hands, wrists, elbows

Gouty arthritis (metabolic disorder - *hyperurecemia*)
- body-fluids saturated with monosodium urate
- crystals precipitate out in the joint capsules
- irritation of synovium = pain and joint degeneration

Ankylosis - fusion of adjacent bones due to friction/trauma

Reinforcement/Support of Synovial joints:

1) Capsular Ligaments: (all synovial joints)

2) Extracapsular ligaments:
   - med./lat. collateral ligaments (Elbow & Knee)

3) Intracapsular ligaments:
   - ant./post. cruciate ligaments (Knee)

4) Associated structures:
   a. menisci (knee, jaw)
   b. bursae/tendon sheaths - synovial-fluid filled sacs

Hilton's Law -
   - multiple nerves, blood vessels assoc. with ea. joint

Bones + Muscles = Lever Systems

1. Lever: rigid structure (board, crowbar, or bone)
2. Fulcrum: fixed point (joints)
3. Provide mechanical advantage - make work easier
4. Punchline? ...big bony processes = greater strength

Humans are designed for a wide range of movement...
NOT STRENGTH & POWER!

Several classes of lever systems...

Muscle actions:

1. Agonist: largest muscle @ joint movement
2. Antagonist: muscle that reverses movement
   - *Antagonists* usually found in PAIRS!
3. Synergist: adds to movement/stabilization of the joint

How are muscles named?

1. Fiber direction: rectus, transversus, oblique
2. Location: temporalis, ulnaris, radialis, femoris
3. Position: externus, lateralis, superficialis, anterior
4. Number of tendons: biceps, triceps, quadriceps
5. Shape: orbicularis, longus, deltoid
6. Origin & insertion: sternocleidomastoid
7. Action: flexor, rotator, levator, abductor

Uni-articular muscles - act upon a single joint
Bi-articular muscles - muscle span two joints
Multi-articular muscles - span multiple joints