Joints

PART A

Functions of articulations

- Articulations
  - Where two bones interconnect
  - To hold bones together
  - To allow movements of the body

Functional classification

Immovable joints - Synarthroses
- More predominant in the axial skeleton
- Slightly moveable joints - Amphiarthroses
- More predominant in the axial skeleton
- Freely moveable joints - Diarthroses
- More predominant in the appendicular skeleton

Structural classification

Fibrous joints
- No presence of joint cavity
- They are synarthroses or amphiarthroses
- Fibrous tissue present
  - Suture = skull bones bound together by dense connective tissue. It is a synarthrose. Bones interlock
  - Gomphosis = teeth bound to bony sockets by periodontal ligaments

Structural classification

- Synostosis = two bones completely fused. Portions of the skull
- Syndesmosis = bones connected by a ligament. Distal articulation between fibula and tibia. Movement varies from immovable to slightly variable.

Fibrous Structural Joints: Syndesmoses

Figure 8.1b
**Cartilaginous joints**
- Bones connected by a pad or plate of cartilage
  - **Symphysis** = bone separated by fibrocartilage. Pubic symphysis and intervertebral joints. It is amphiarthrotic
  - **Syncondrosis** = bones connected by hyaline cartilage. Epiphyseal plate and articulation of the first rib with the sternum. It is synarthrotic.

**Synovial joints**
- Bony surfaces enclosed within **articular capsule** (dense connective tissue)
  - **Synovial membrane** - inside of the capsule
    - Secretes the synovial fluid
  - **Synovial cavity**
  - **Articular cartilage**
    - Resemble hyaline cartilage and covers the bone ends

**Synovial joints**
- **Menisci** or articular discs
  - Improves the fit of the joint
  - Minimizes the wear and tear of the joint
  - **Fat pads**
  - **Bursae and tendon sheath**
    - Synovial sacs between tendons
    - They reduce friction
    - May or may not be present in the joint

**Cartilaginous Joints: Synchondroses**

**The Structure of a Synovial Joint**

**Synovial Joints: Friction-Reducing Structures**
Synovial joints

- Reinforcing ligaments
  - Intrinsic or capsular - it is a thickening part of the capsule
  - Extracapsular - outside of the capsule
  - Intracapsular - inside of the capsule

Synovial Joints: Stability

- Stability is determined by:
  - Articular surfaces - shape determines what movements are possible
  - Ligaments - unite bones and prevent excessive or undesirable motion
  - Muscle tone

Structural Classification of the Synovial Joints

- Plane - articular surface is flat or slightly curved
- Hinge - round process of one bone fits into the concave surface of the other bone. Elbow
- Pivot - allows rotational movement between two bones.
- Condyloid - convex surface articulating with a concave one

- Saddle - one concave and one convex bone facing it other
- Ball-and-socket - permit rotation and other movements
Types of movements of synovial joints

- Gliding
- Flexion
- Extension, hyperextension
- Abduction
- Adduction
- Rotation
- Circumduction
- Elevation
- Depression

- Pronation
- Supination
- Inversion
- Eversion
- Dorsiflexion
- Plantar flexion
- Protraction
- Retraction
- Opposition

Selected synovial joints - Knee

Menisci
- Act as cushion
- Provide lateral stability to the joint
- **Lateral and medial**
- **Bursae**

Knee joint

Collateral ligaments
- Prevent rotation during extension
- Reinforce the sides of the knee
- **Medial or tibial**
- **Lateral or fibular**

Knee joint

Cruciate ligaments
- Prevent anterior-posterior displacement of the joint, overflexion and hyperextension of the joint
- **Anterior**
- **Posterior**

Knee joint

Popliteal ligaments
- Reinforce the posterior surface of the knee
- **Patellar ligament** - from patella to the tibia
- **Patellar retinaculum**
  - **Lateral and medial**
  - Merge with the capsule
Synovial Joints: Shoulder Stability

- **Acromion**
- **Coracoid process**
- **Articular capsule**
- **Glenoid cavity**
- **Glenoid labrum**
- **Tendon of long head of biceps brachii muscle**
- **Glenohumeral ligaments**
- **Tendon of the subscapularis muscle**
- **Scapula**

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**Hip joint**

- Ball and socket diarthroses
- **Acetabular labrum**
  - Circular rim of fibrocartilage. Deepens the socket
- **Ligamentum teres** or ligament of the head of the femur
  - From foea capitis to the acetabulum.
  - Helps to secure the femur
  - **Iliofemoral ligament**
  - **Pubofemoral ligament**
  - **Ischiofemoral ligament**
The Hip Joint

Temporomandibular joint (TMJ)
- Between mandibular fossa and mandibular condyle
  - **Articular disc**
    - Divides the joint in superior and inferior compartment
  - **Lateral ligament**

Joint Disorders

**Sprain**
- Damage of the ligament by excessive stretch or tear. Slow and painful healing
- **Dislocation**
  - Bones are forced out of their normal position
  - Reduction

Joint Disorders

**Adhesion**
- Fibrous bands between the surfaces where the bones meet
- **Spurs**
  - Extra bone growing along the joint
- **Bursites**
  - Damage or inflammation of the bursa by blow or friction

Osteoarthritis (OA)
- Most common chronic arthritis; often called "wear-and-tear" arthritis
- Affects women more than men
- More prevalent in the aged, and is probably related to the normal aging process

Arthritis
- **Gouty Arthritis**
- **Rheumatoid Arthritis**