Section 25: Joints – Structure and Function
Joints

Joints attach bones, provide support and protection, and allow for body movement.

Joints are categorized by their structural classification and their functional classification.
Joints

- Provide necessary range of motion
- Classification based on structure: fibrous, cartilagenous, synovial
- Classification based on function: synarthroses (immovable), amphiarthroses (slightly movable), diarthroses (freely movable)
JOINTS

• Joints are where two or more bones articulate (move).

• Joints are classified according to how much movement they allow.

1. **Fibrous** – these are fixed or immovable joints such as the cranium, sacrum and the coccyx.

2. **Cartilaginous** – these are slightly movable joints such as the vertebrae.

3. **Synovial** – these are freely movable joints such as the shoulder and hip.
Cartilaginous joints

- Articulating bones are united by cartilage
- Lack a joint cavity
- Two types – synchondroses and symphyses
Cartilaginous joints: synchondroses

- A bar or plate of hyaline cartilage unites the bones
- All synchondroses are synarthrotic
- Examples include:
  - Epiphyseal plates of children
  - Joint between the costal cartilage of the first rib and the sternum
Cartilaginous Joints:

(a) Synchondrosis
Epiphyseal plate (hyaline cartilage)

(b) Joint between first rib and sternum (immovable)

Sternum (manubrium)
Cartilaginous joints: symphyses

- Hyaline cartilage covers the articulating surface of the bone and is fused to an intervening pad of fibrocartilage
- Amphiarthrotic joints designed for strength and flexibility
- Examples include intervertebral joints and the pubic symphysis of the pelvis
Cartilaginous Joints: Symphyses

- Fibrocartilaginous intervertebral disc
- Body of vertebra
Synovial Joints

• Bone ends separated by a joint cavity containing synovial fluid
• Most joints of the limbs
• Full range of motion available in most joints
Synovial joints

• Those joints in which the articulating bones are separated by a fluid-containing joint cavity
• All are freely movable diarthroses
• Examples – all limb joints, and most joints of the body
Components of synovial joints

- A **joint capsule** consists of two layers
  - **Fibrous capsule** holds the ends of the bones together and allows movement of the joint
  - **Synovial membrane** which consists of connective tissue

- **Synovial fluid**: combination of materials filtered from blood and secreted by cells of the synovial membrane
  - Contains hyaluronic acid, which makes the fluid very slippery
  - Lubricant to reduce friction within the joint
• **Articular (hyaline) cartilage** covers ends of the bones. Smooth and resilient.

• **Joint cavity** is a small space bounded by the synovial membrane and the articular cartilages. It is filled with synovial fluid.
Structure of synovial joints

- Articular cartilage – hyaline
- Fibrous capsule
- Joint cavity, contains synovial fluid
- Reinforcing ligaments
Synovial joints: general structure

- Synovial joints all have the following
  - Articular cartilage
  - Joint (synovial) cavity
  - Articular capsule
  - Synovial fluid
  - Reinforcing ligaments
Synovial joints: friction-reducing and extra structures

- **Bursae** – flattened, fibrous sacs lined with synovial membranes and containing synovial fluid
  - Common where ligaments, muscles, skin, tendons, or bones rub together

- **Tendon sheath** – elongated bursa that wraps completely around a tendon

- **Fat pads**
Synovial Joints: Friction-Reducing Structures