Cartilages and joints

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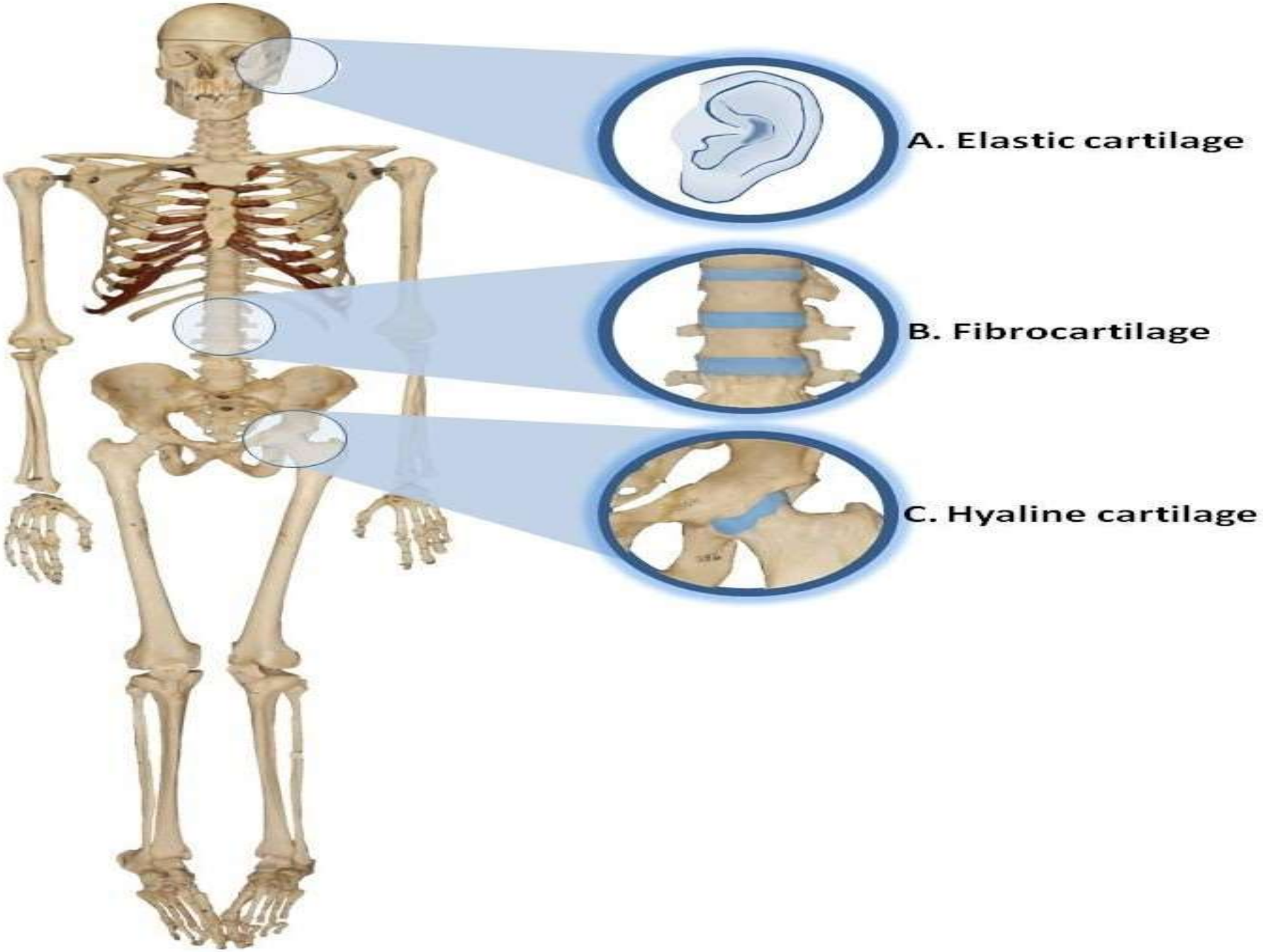
Cartilage

- Type of connective tissue in which the cells and fibers are embedded in a gel -like matrix
- Its surround by perichondrium .
- Cartilage is nourished by diffusion from blood vessels with perichondrium which contain a rich blood vessels and sensory nerves

Types of cartilage

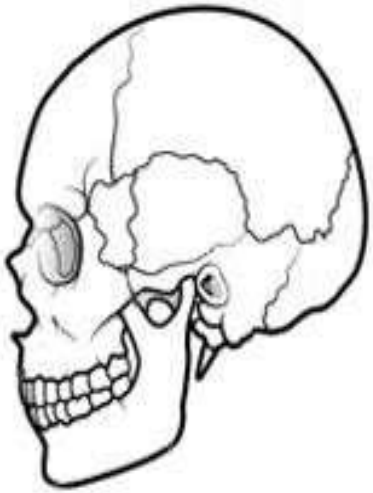
- **Hyaline cartilage**
  - Provides support, flexibility, and resilience
  - Collagen fibers only; most abundant type
  - Articular, costal, respiratory, nasal cartilage
- **Elastic cartilage**
  - Similar to hyaline cartilage, but contains elastic fibers
  - External ear and epiglottis
- **Fibrocartilage**
  - Thick collagen fibers—has great tensile strength
  - Menisci of knee; vertebral discs


A. Elastic cartilage
B. Fibrocartilage
C. Hyaline cartilage

Joints

- Three main types
- According to type of tissue between bone ends

1. **Fibrous joints**
2. **Cartilaginous joints**
3. **Synovial joints**



Fibrous
(Immoveable)

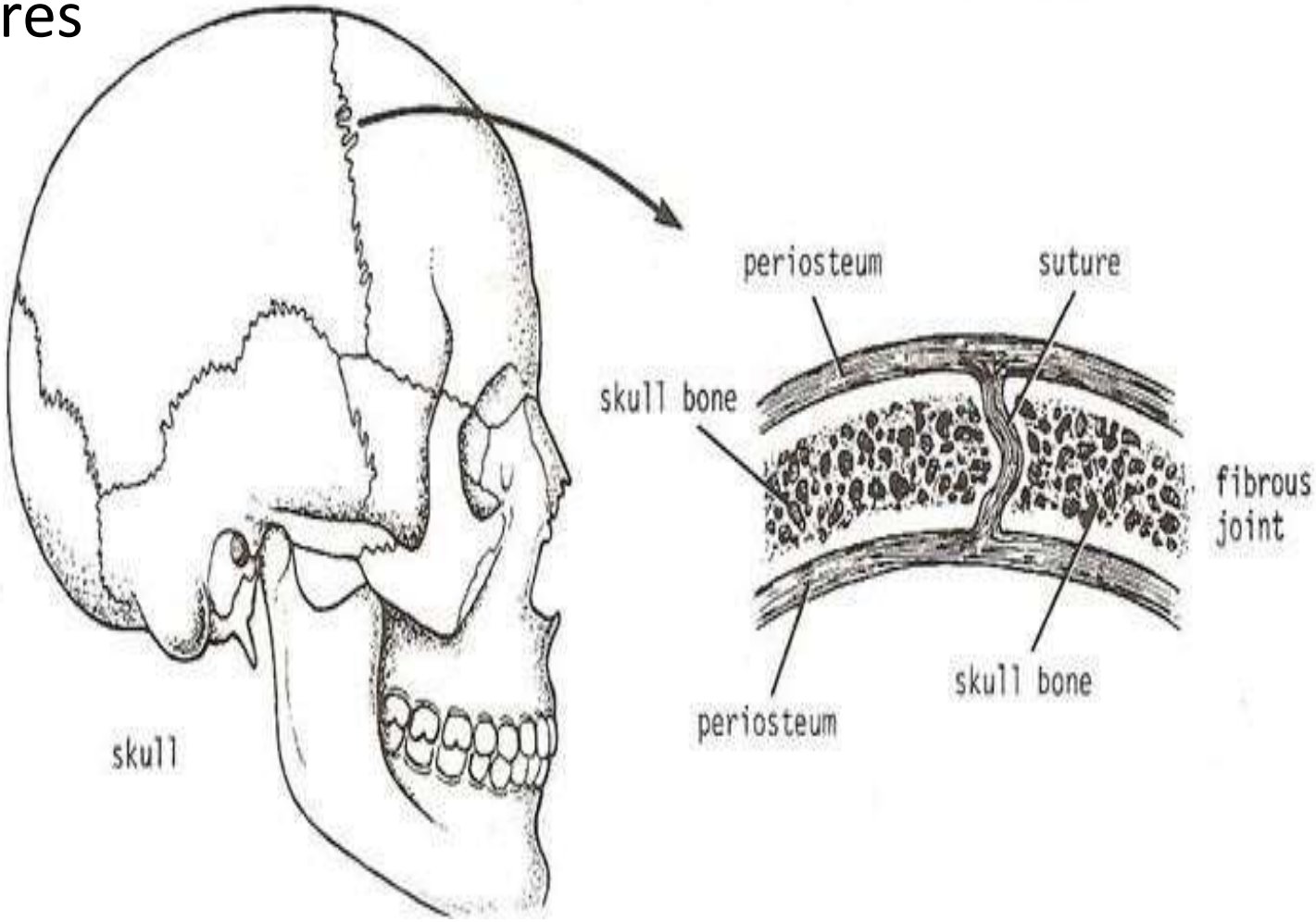
Cartilagenous
(Semi moveable)

Synovial
(freely moveable)

Fibrous joints

- Fibrous C.T connect bones
- Little movements

EX: skull sutures

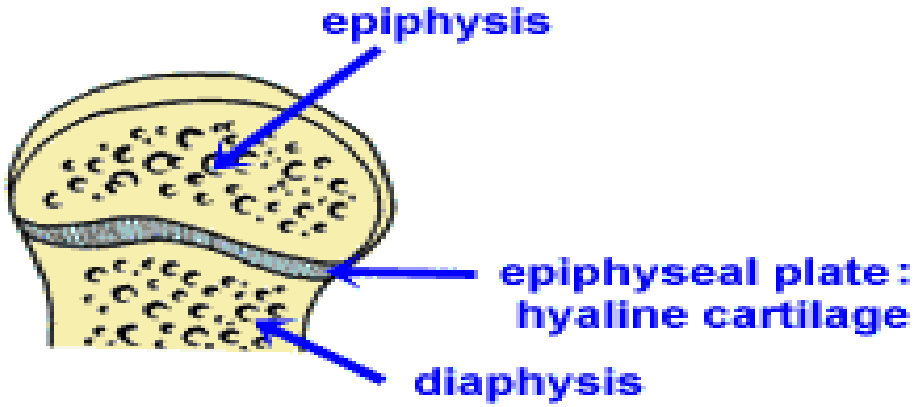


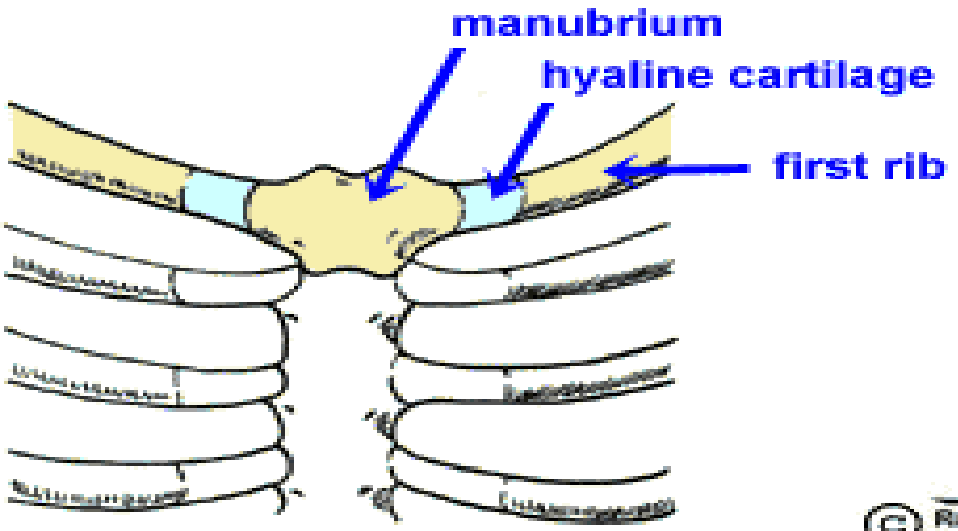
Cartilaginous joints

Primary (Synchondrosis):

- Plate of H. cartilage connect bones
- No movements

Ex. Epiphyseal plate



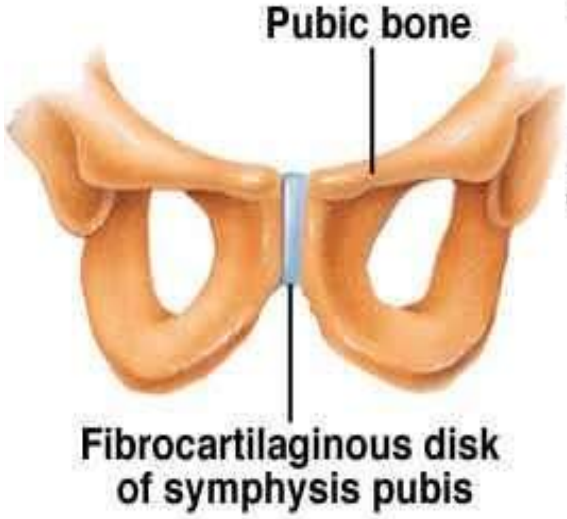


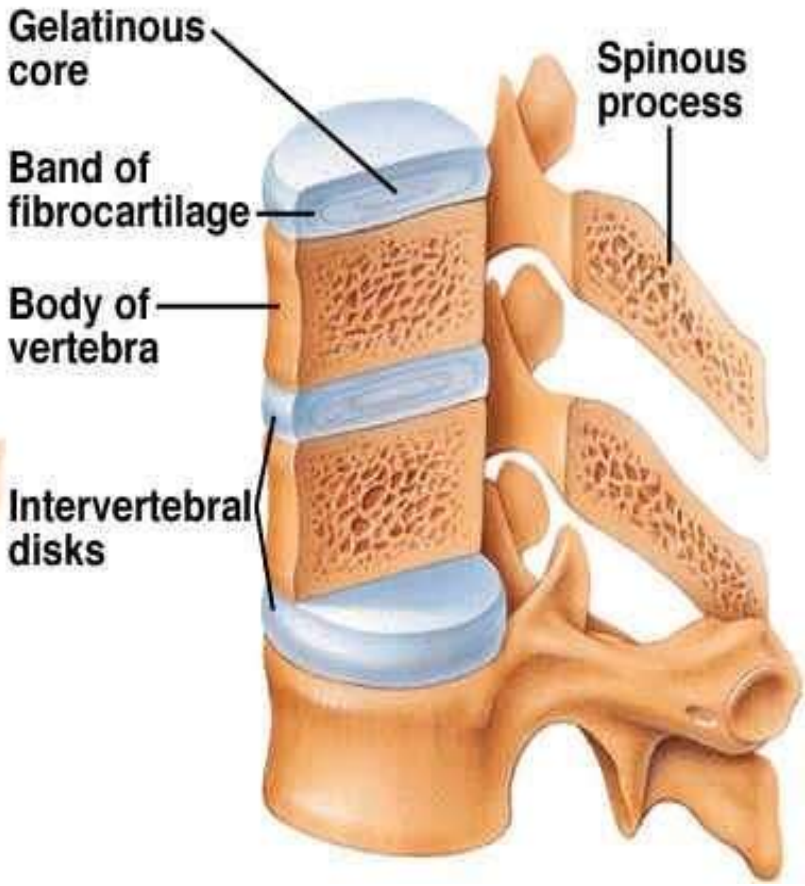
Cartilaginous joints

- **Secondary (Symphysis):**
- Plate of fibrocartilage with layer of hyaline cartilage
- Little movement

Ex.

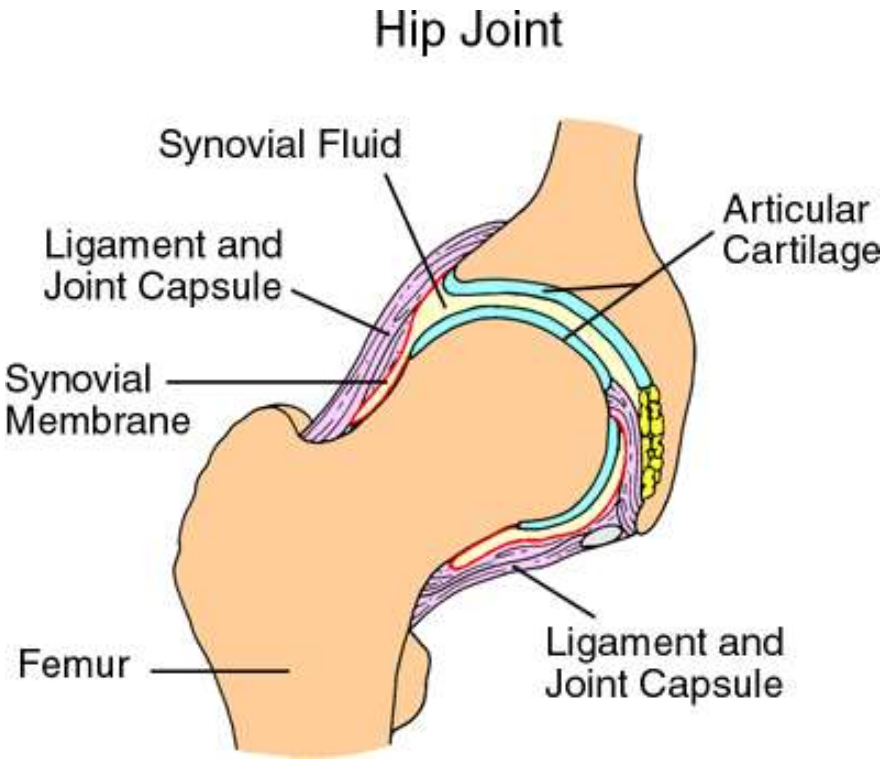
- ➢ Vertebral discs
- ➢ Symphysis pubis



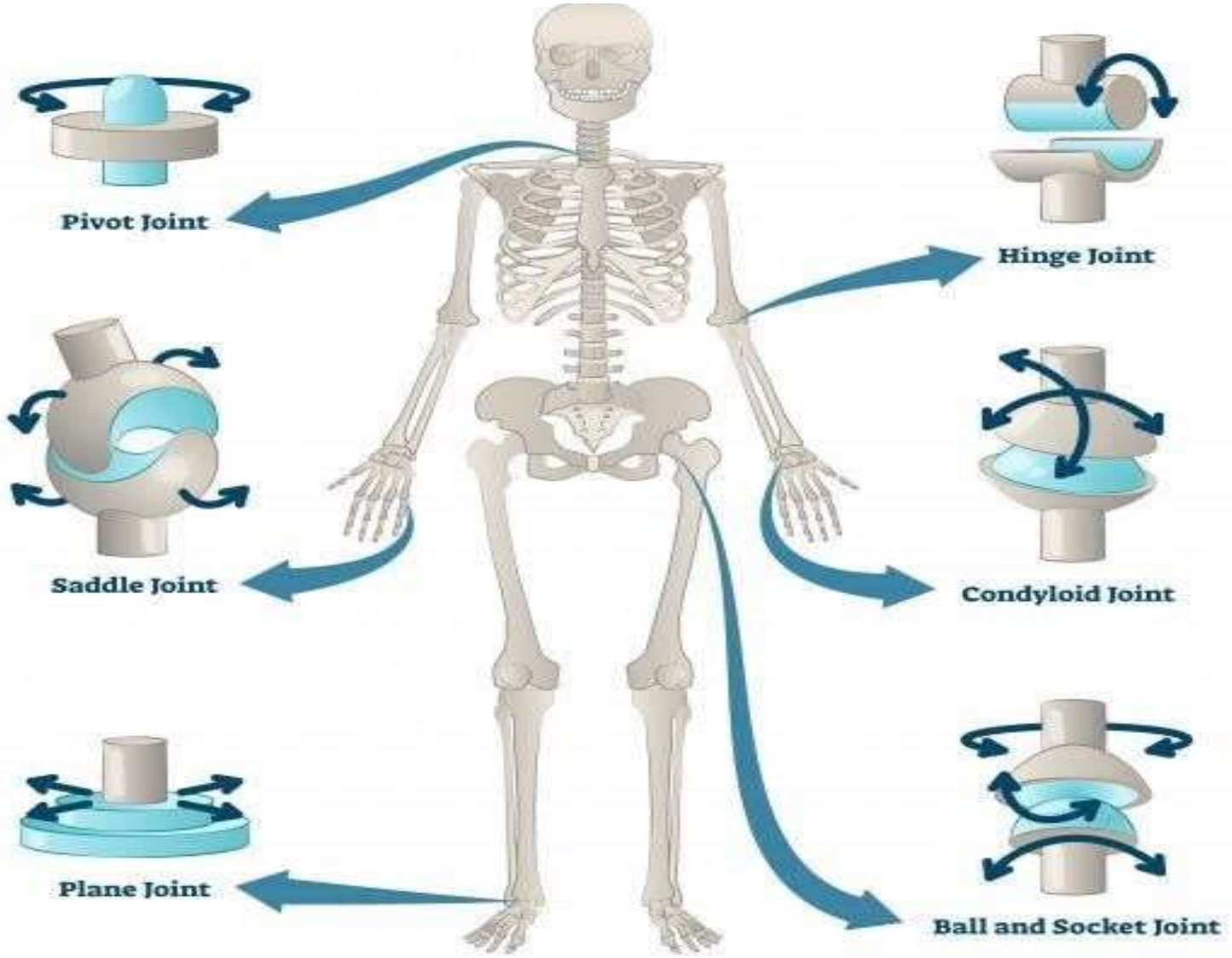


Synovial joints

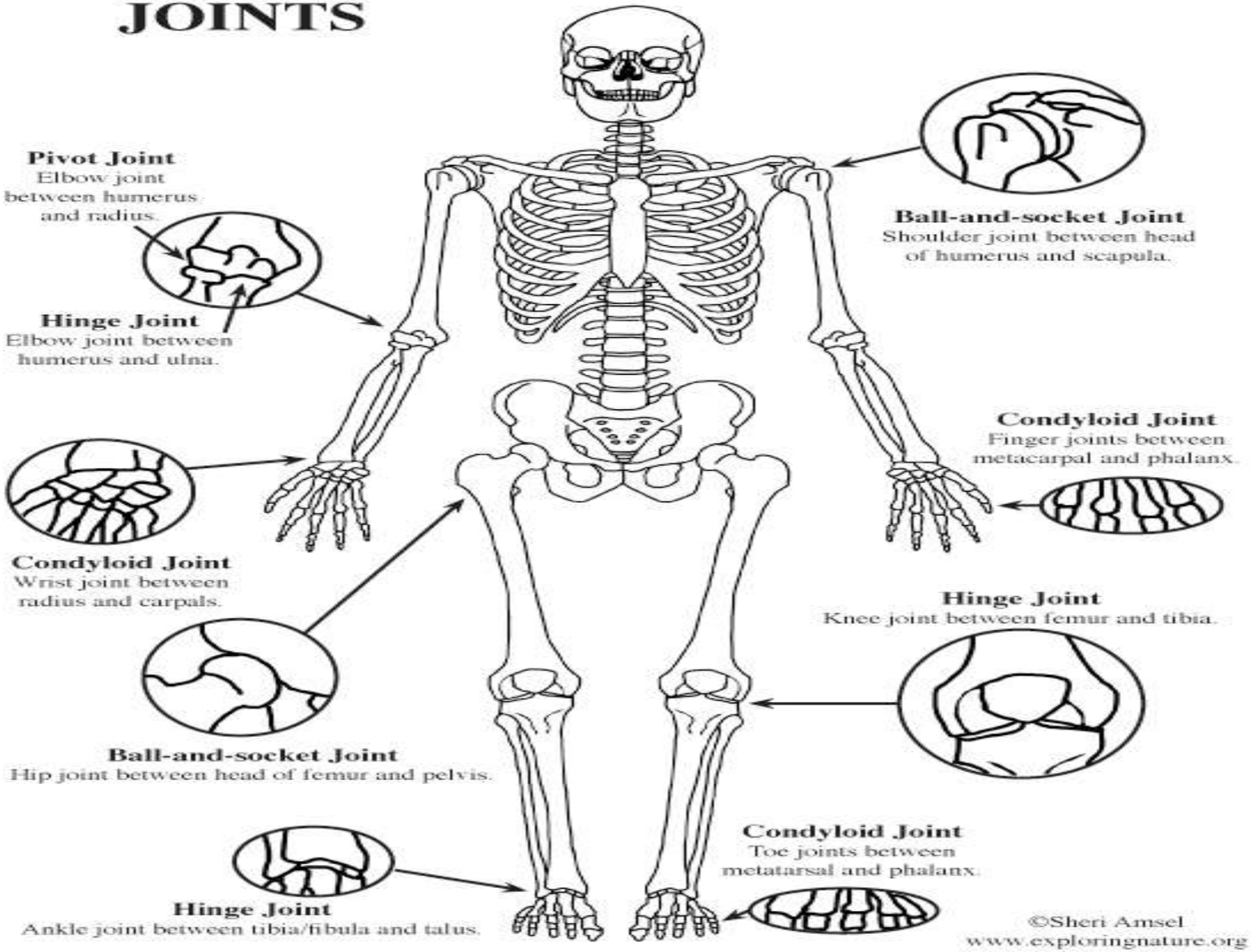
- Hyaline cartilage covers the two bone ends
- Cavity in between
- Fibrous capsule
- Synovial membrane line the capsule and produce synovial fluid (lubricate the articular surfaces)
- More movements



Types of synovial joints



JOINTS



Pivot Joint
Elbow joint between humerus and radius.

Hinge Joint
Elbow joint between humerus and ulna.

Ball-and-socket Joint
Shoulder joint between head of humerus and scapula.

Condyloid Joint
Finger joints between metacarpal and phalanx.

Condyloid Joint
Wrist joint between radius and carpals.

Hinge Joint
Knee joint between femur and tibia.

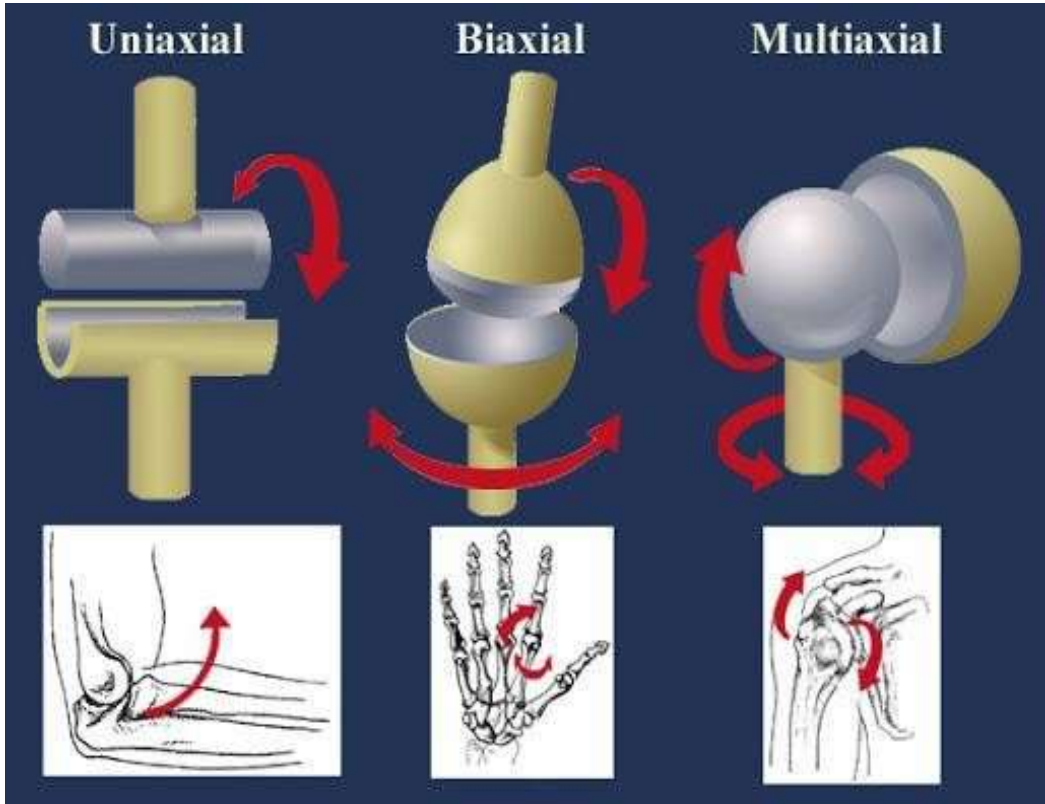
Ball-and-socket Joint
Hip joint between head of femur and pelvis.

Condyloid Joint
Toe joints between metatarsal and phalanx.

Hinge Joint
Ankle joint between tibia/fibula and talus.

Classification using the direction of movement permitted

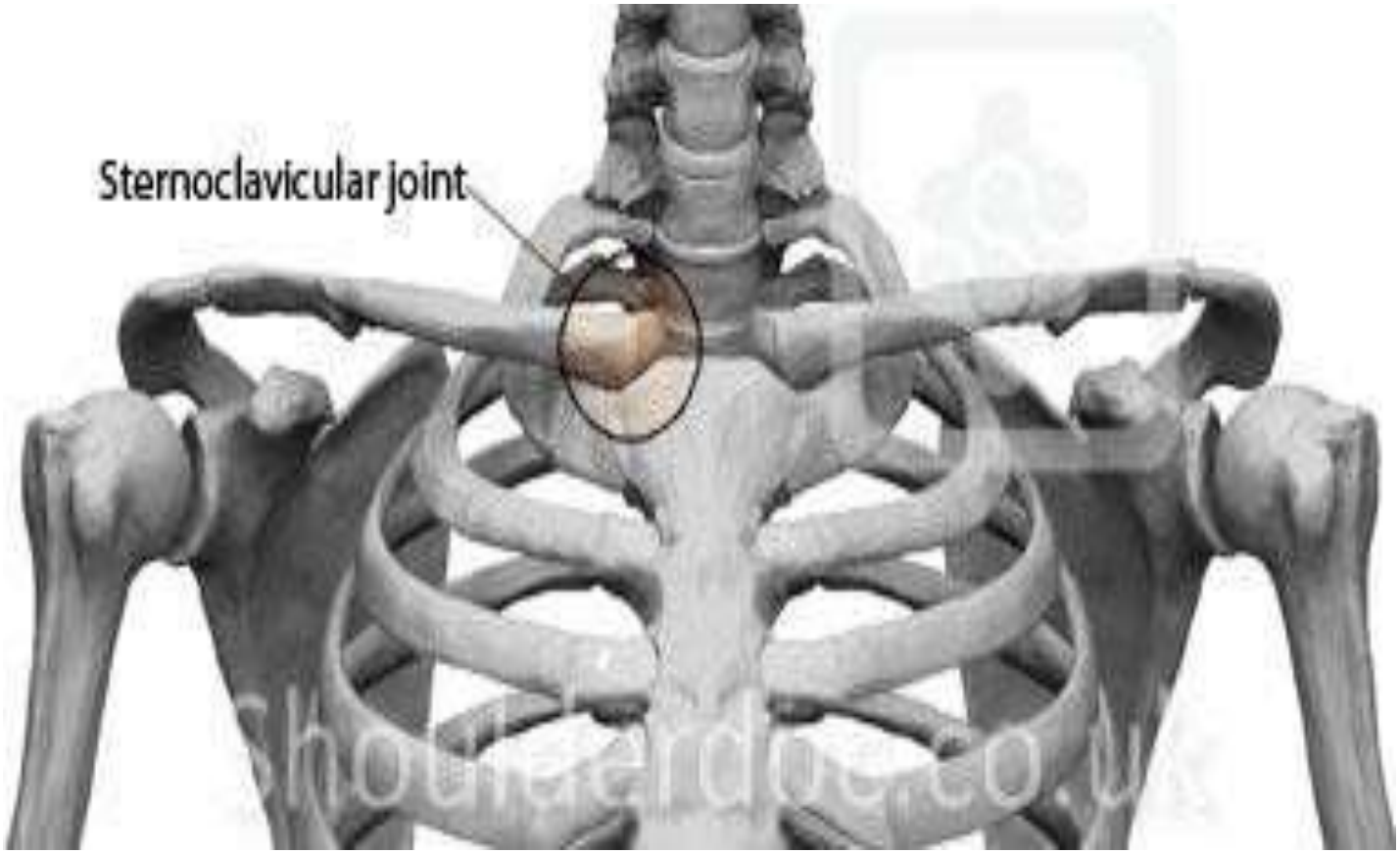
- Uniaxial (movement in one plane)
- Biaxial (movement in two planes)
- Multiaxial (movement in 3 planes)



Plane joint

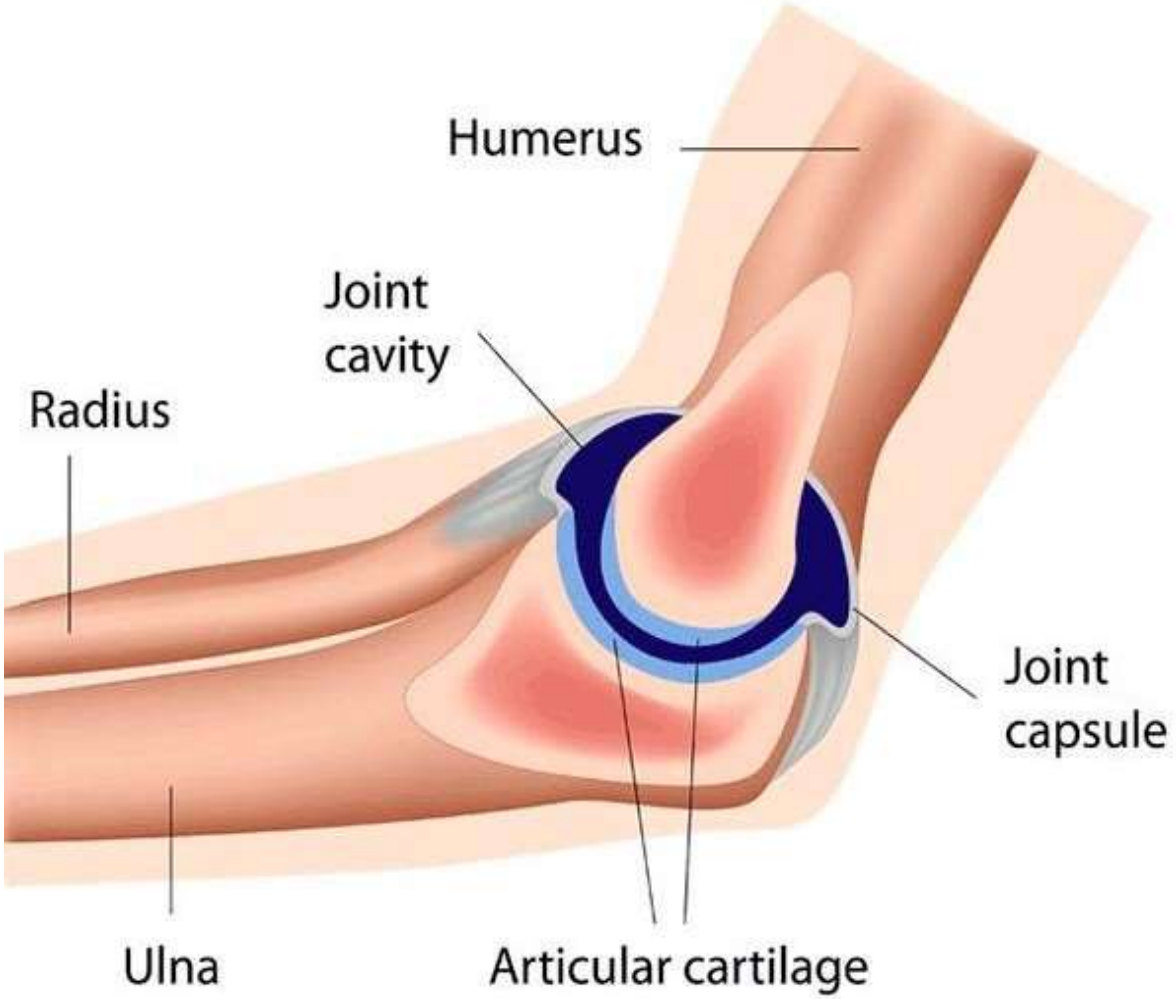
- Bone ends are flat
- Bones glide on each other

EX: Facet joint and Sternoclavicular joint



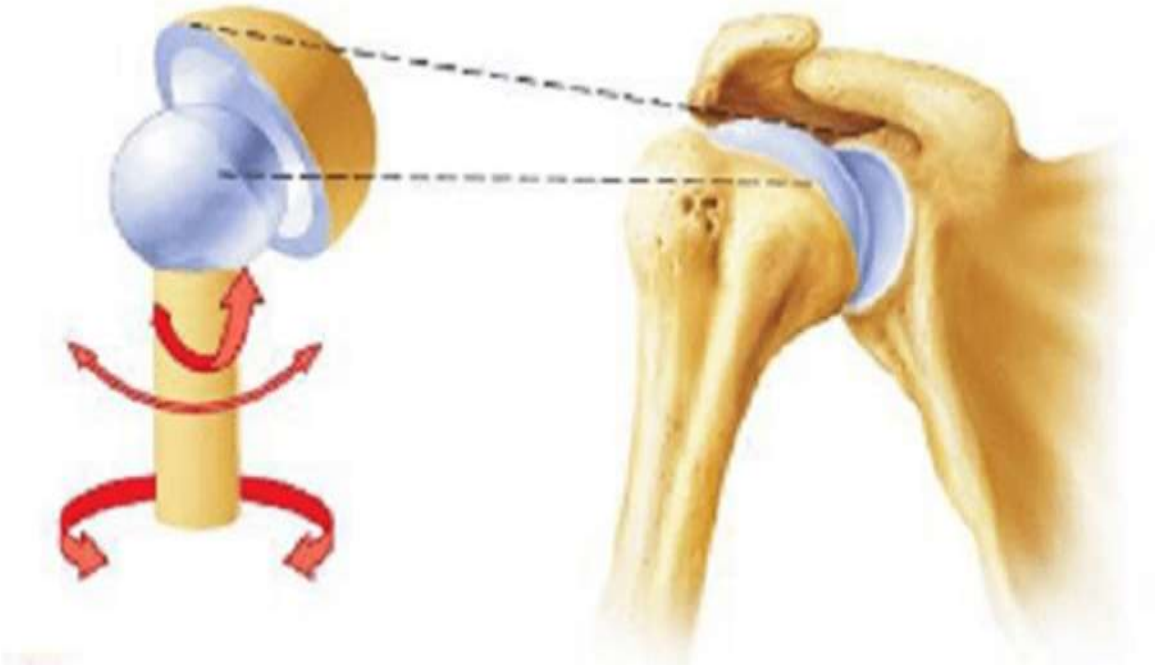
Hinge joint

- Like a hinge
- Flexion/Extension only
- Elbow/knee/ankle



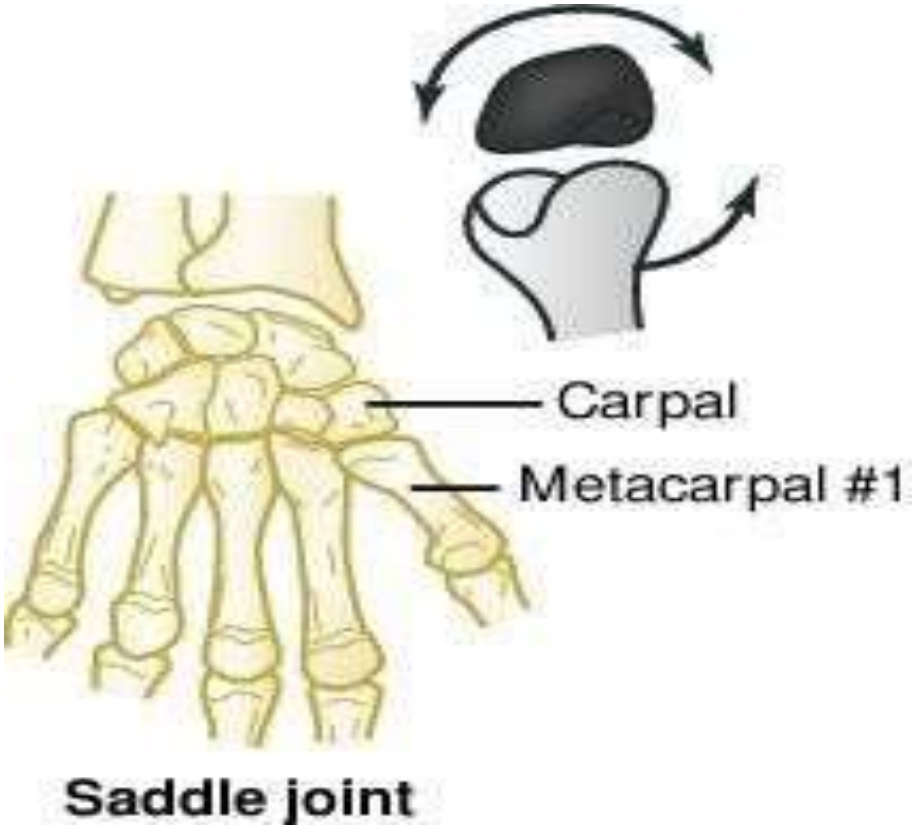
Ball-and-socket joint

- Ball shaped head with socket like concave surface
- Flexion- extension/ Abduction-adduction
- Medial and lateral rotation
- Circumduction
- Shoulder / hip joints



Saddle joint

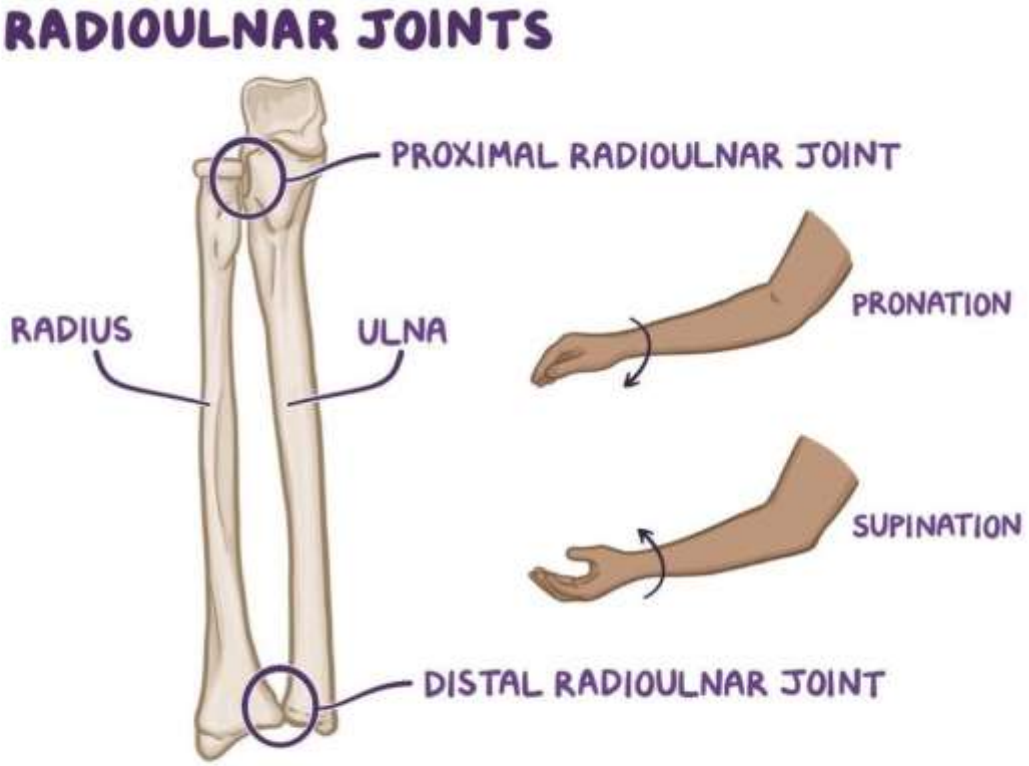
- Saddle on a horse's back.
- Flexion- extension/ abduction-adduction/ Circumduction
- Carpometacarpal joint of thumb



Pivot joint

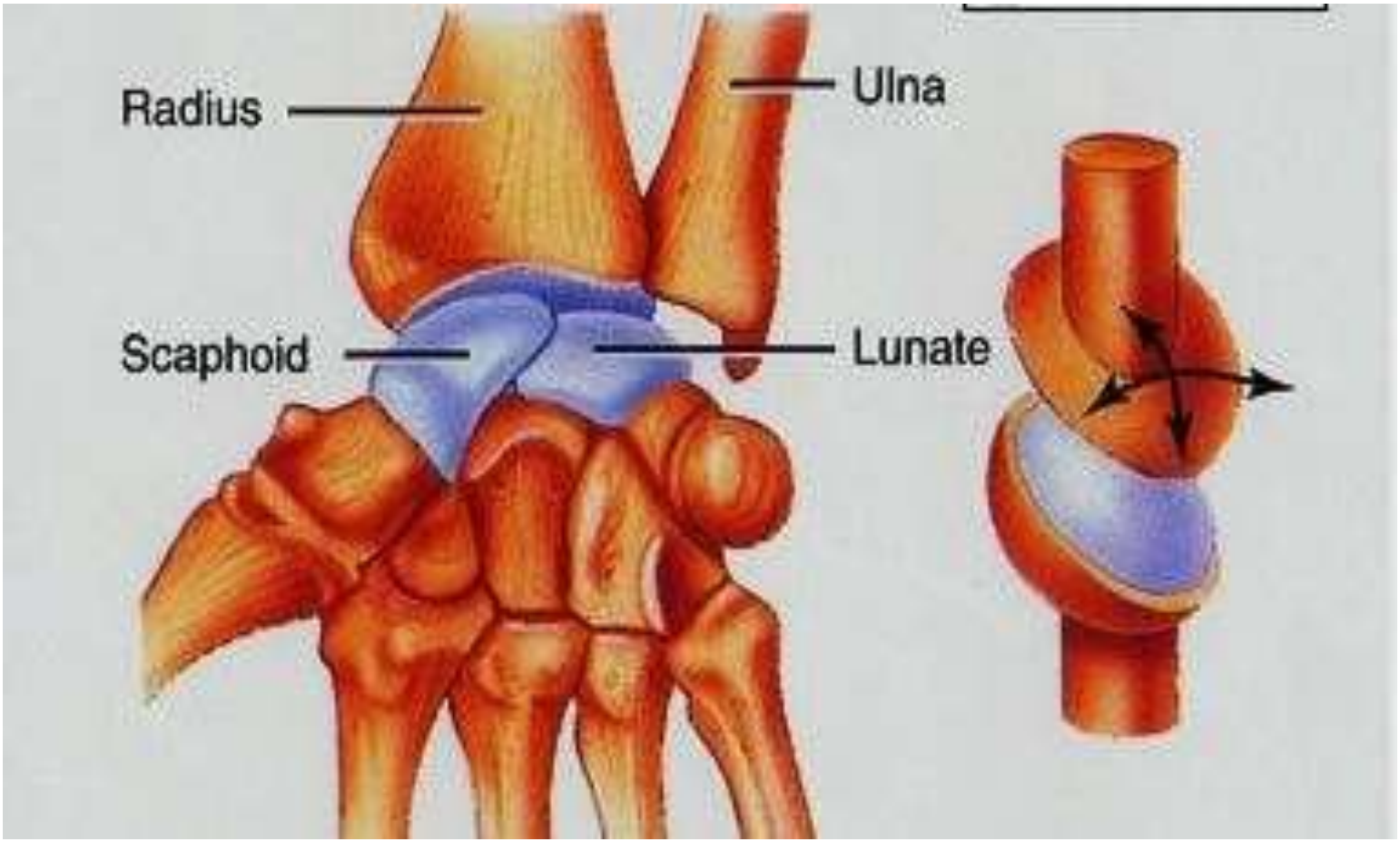
- Rounded process of one bone rotate within a ring made by bone and ligament
- Rotation only

EX: Superior radioulnar joint



Ellipsoid (condylar) joint

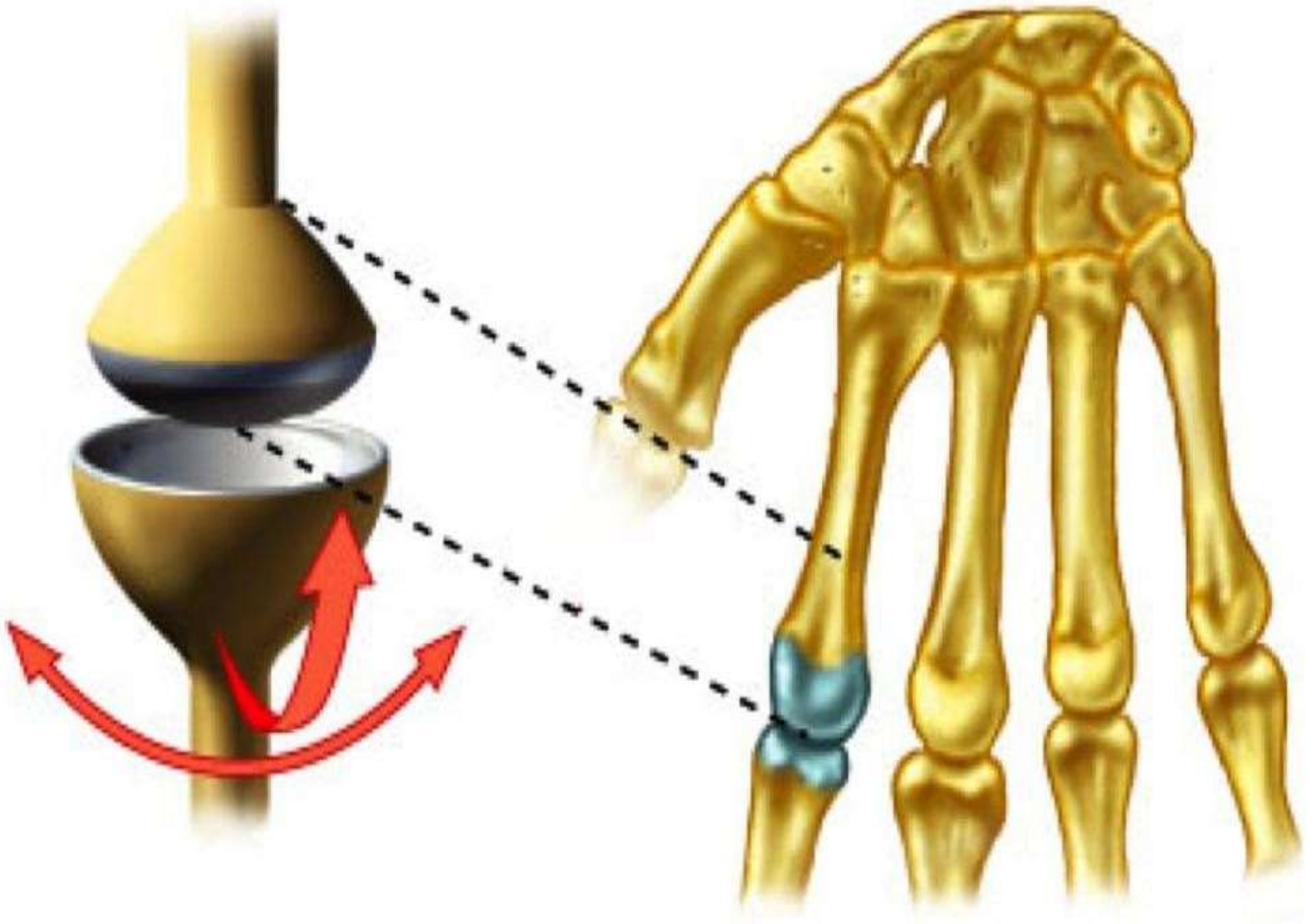
- Elliptical convex and concave surfaces
- Flexion-extension/abduction-adduction
- Wrist joint



Condyloid (bi-condylar) joint

- Two convex surfaces with two concave surfaces
- Flexion-extension/ abduction-adduction EX:

Metacarpophalangeal joints



Stability of joint depend on :

1-shape of articular surfaces

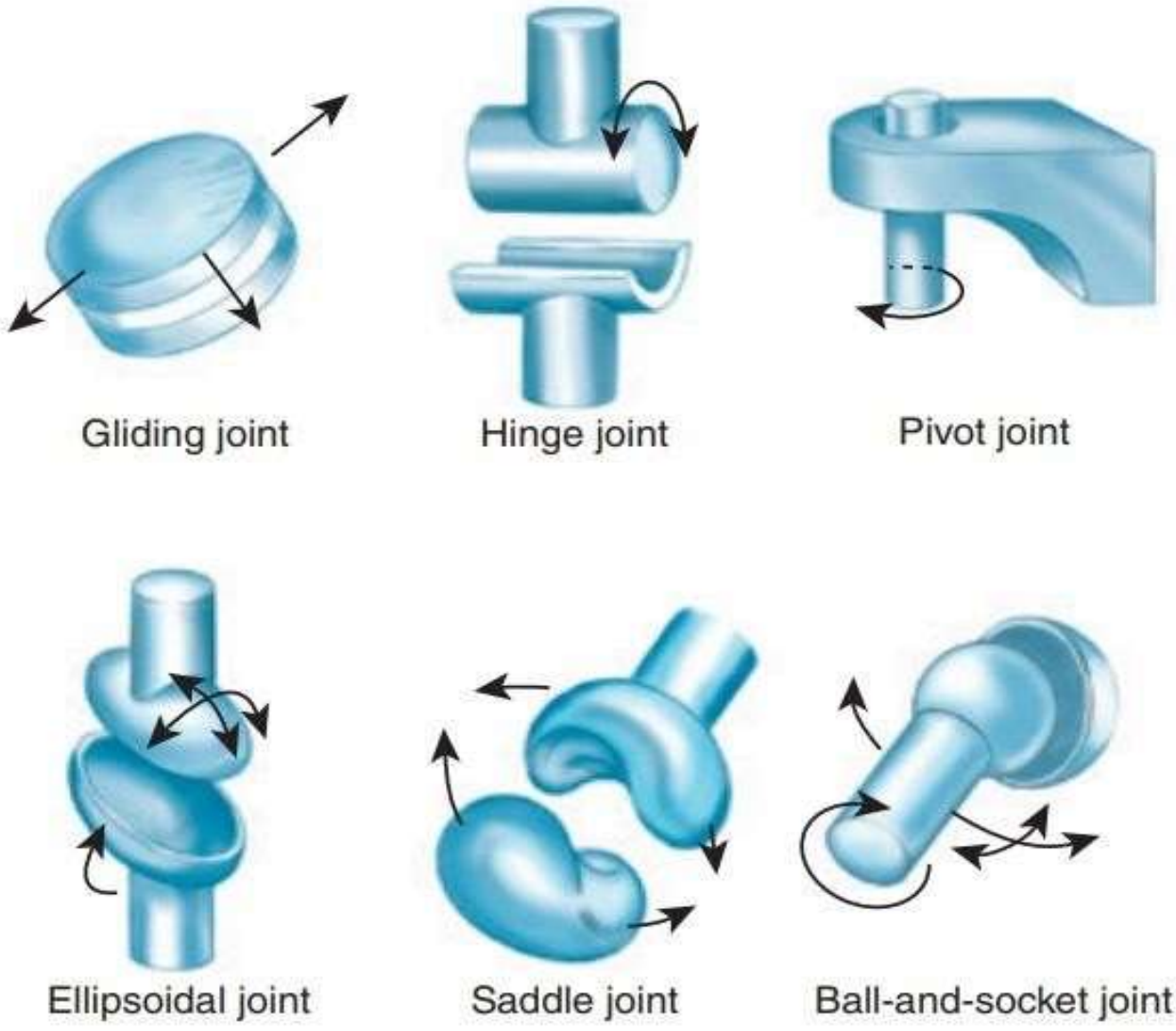
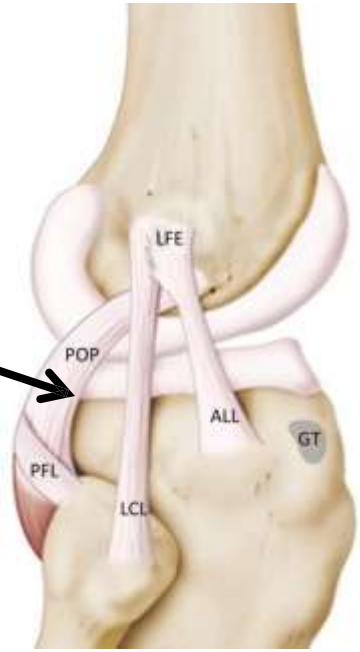
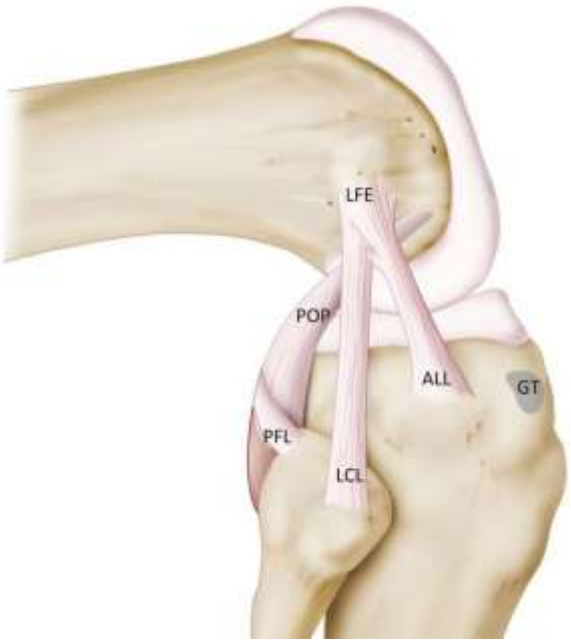


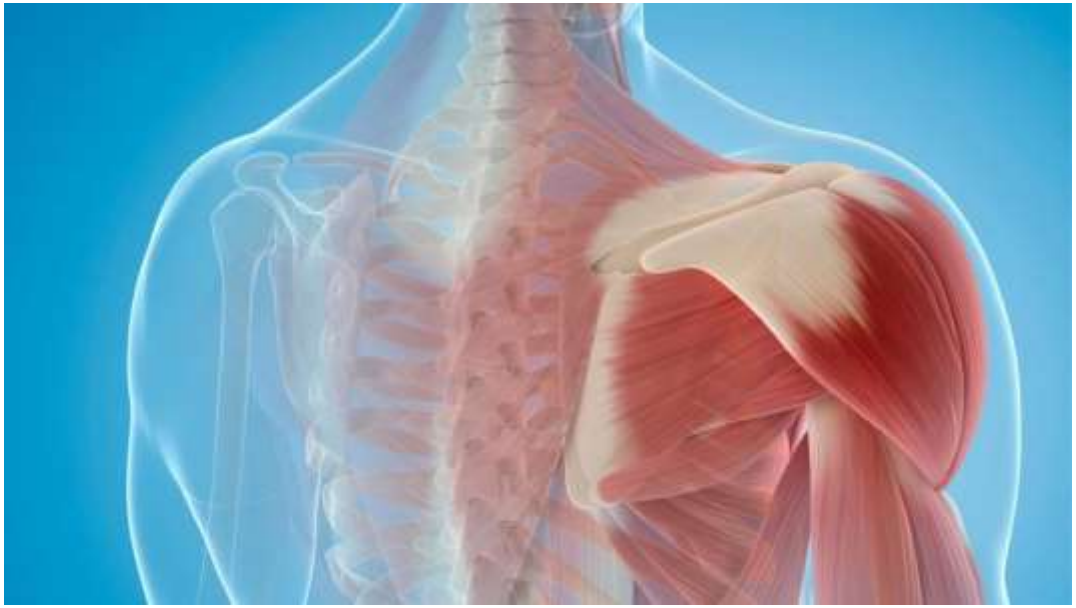
FIGURE 8-3 Types of synovial joints.

2-Ligaments





3-Tone of the muscle around the joint .



Nerve supply of joints

- Joints are innervated according to **Hiltons law** which states that((the nerve supplying *joint* also supply the **muscles** moving the joint and the **skin** covering their distal attachment))
- These nerves give off **articular branches** which supply the joints capsule with sensory nerve fibers that that transmit information about stretch, pain sensation and joint position
- The synovial membrane and cartilaginous structures within joints are **insensitive** to pain


Thank you!