



# Human Anatomy

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Articulations

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# Articulations

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- A joint, or articulation, is the place of contact between bones, between bone and cartilage, or between bones and teeth.



# Naming of Joints

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- Usually derived from the names of the articulating bones.



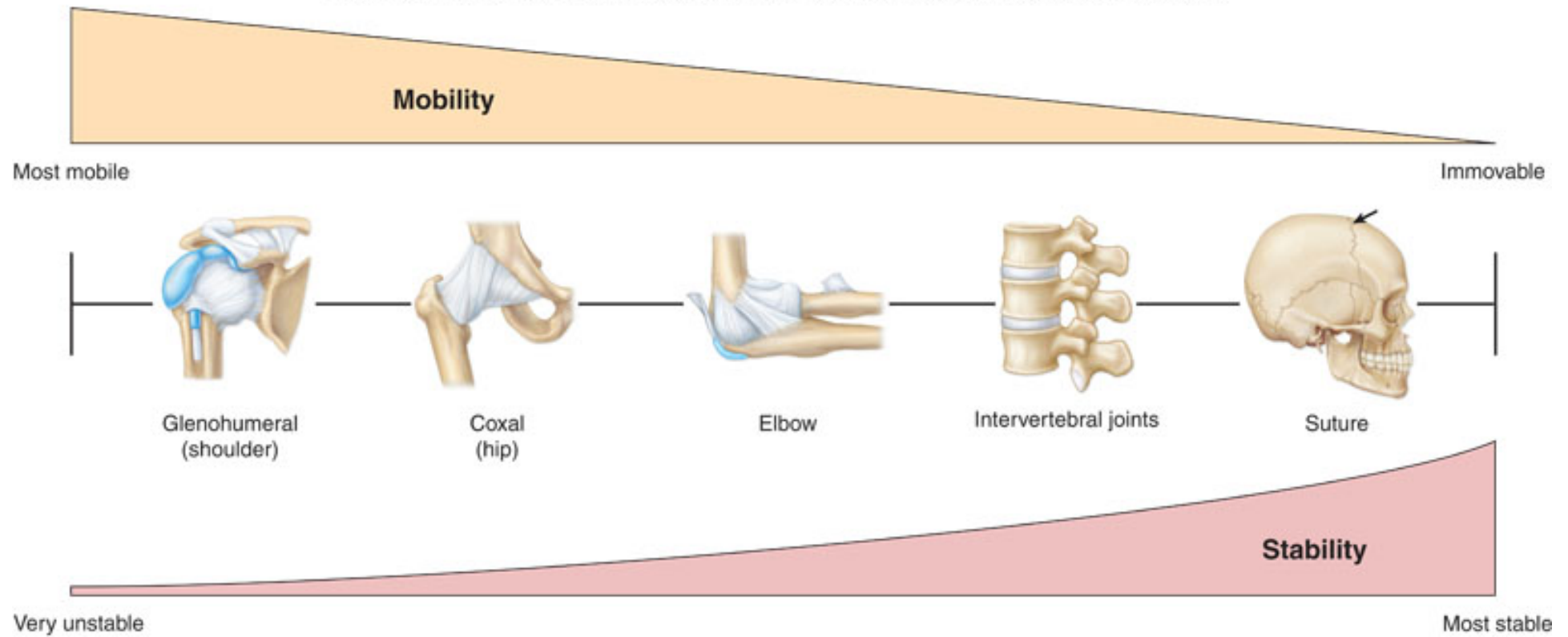
# Mobility and Stability in Joints

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- Motion permitted ranges from none to various extensive motions.
- Structure determines both its mobility and its stability.
  - more mobile = less stable



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# Classification of Joints

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- **Type of connective tissue** that binds the articulating surfaces of the bones.
- **Whether a space occurs** between the articulating bones.



# Classification of Joints

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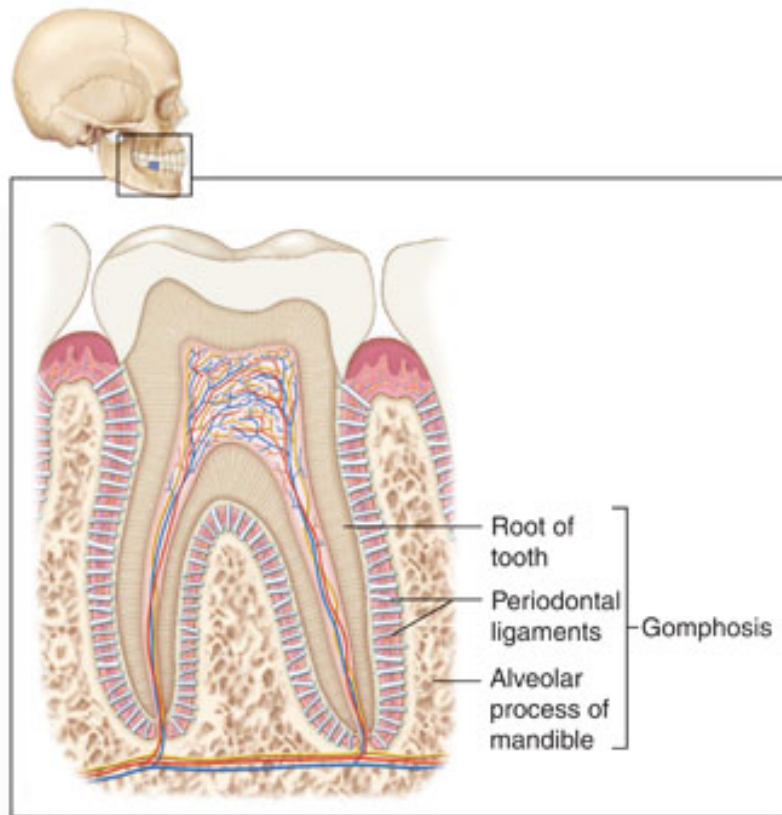
- A **fibrous joint** occurs where bones are held together by dense regular (fibrous) connective tissue.
- A **cartilaginous joint** occurs where bones are joined by cartilage.
- A **synovial joint**
  - has a fluid-filled synovial cavity
  - bones are enclosed within a capsule
  - bones are joined by various ligaments



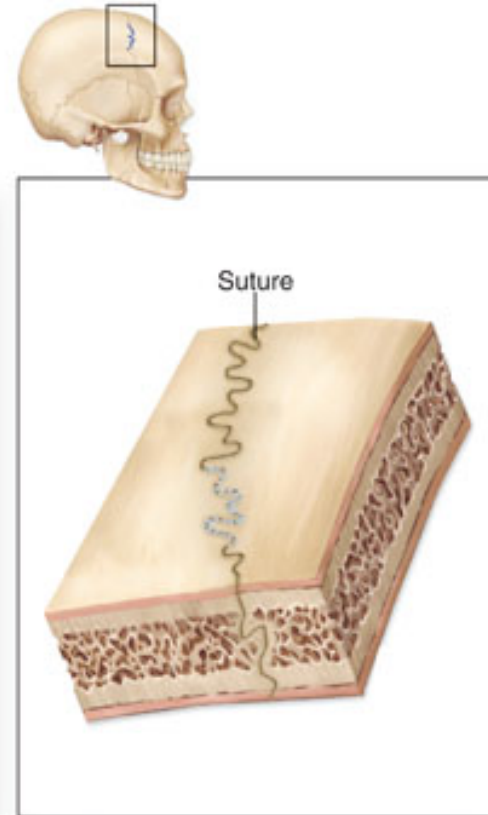
# Classification of Joints

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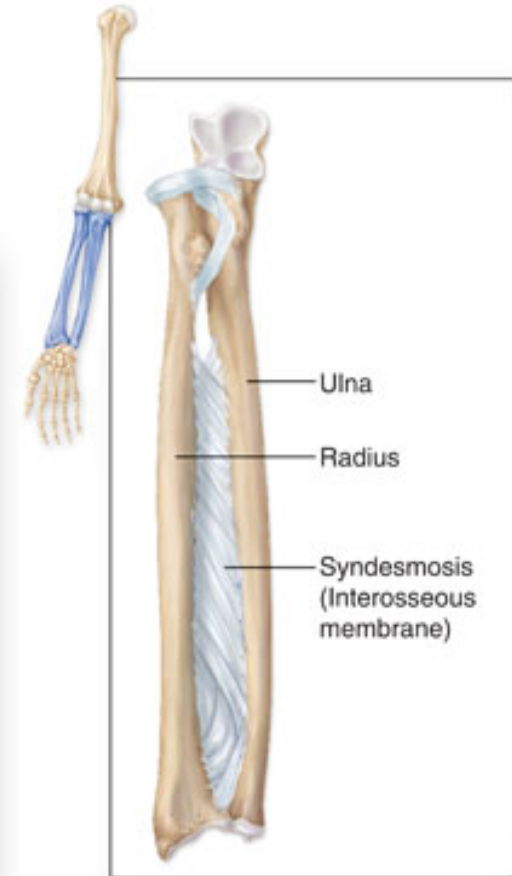
- Functionally based on the extent of movement they permit:
- **Synarthrosis** is an immovable joint.
- **Amphiarthrosis** is a slightly movable joint.
- **Diarthrosis** is a freely movable joint.



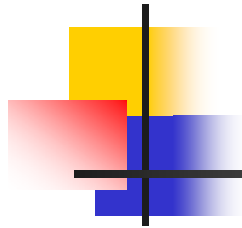
(a) Gomphosis



(b) Suture



(c) Syndesmosis



# Fibrous Joints

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- Most are immovable or only slightly movable.
- Have no joint cavity.
- Three types.
  - gomphoses
  - sutures
  - syndesmoses



# Types of Fibrous Joints – Syndesmoses

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- Fibrous joints in which articulating bones are joined by ligaments only.
- Allow for slight movement.
  - classified as amphiarthroses

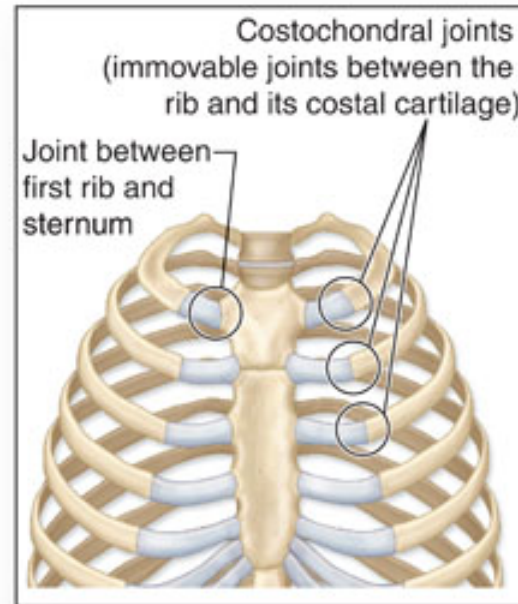
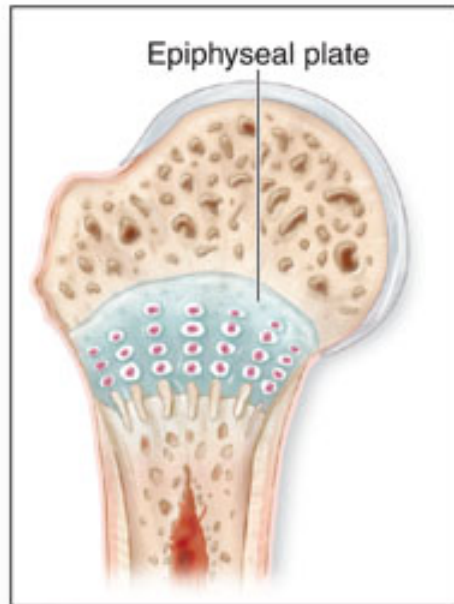


# Cartilaginous Joints

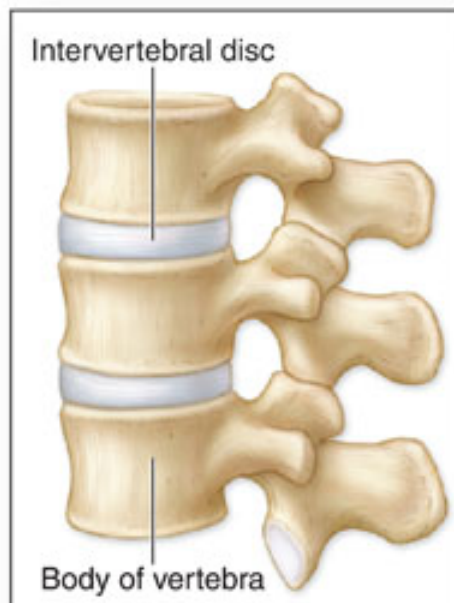
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- Bones are attached to each other by **cartilage**.
- Lack a joint cavity.
- Two types.
  - **synchondroses**
  - **symphyses**
    - symphyses are **amphiarthroses**

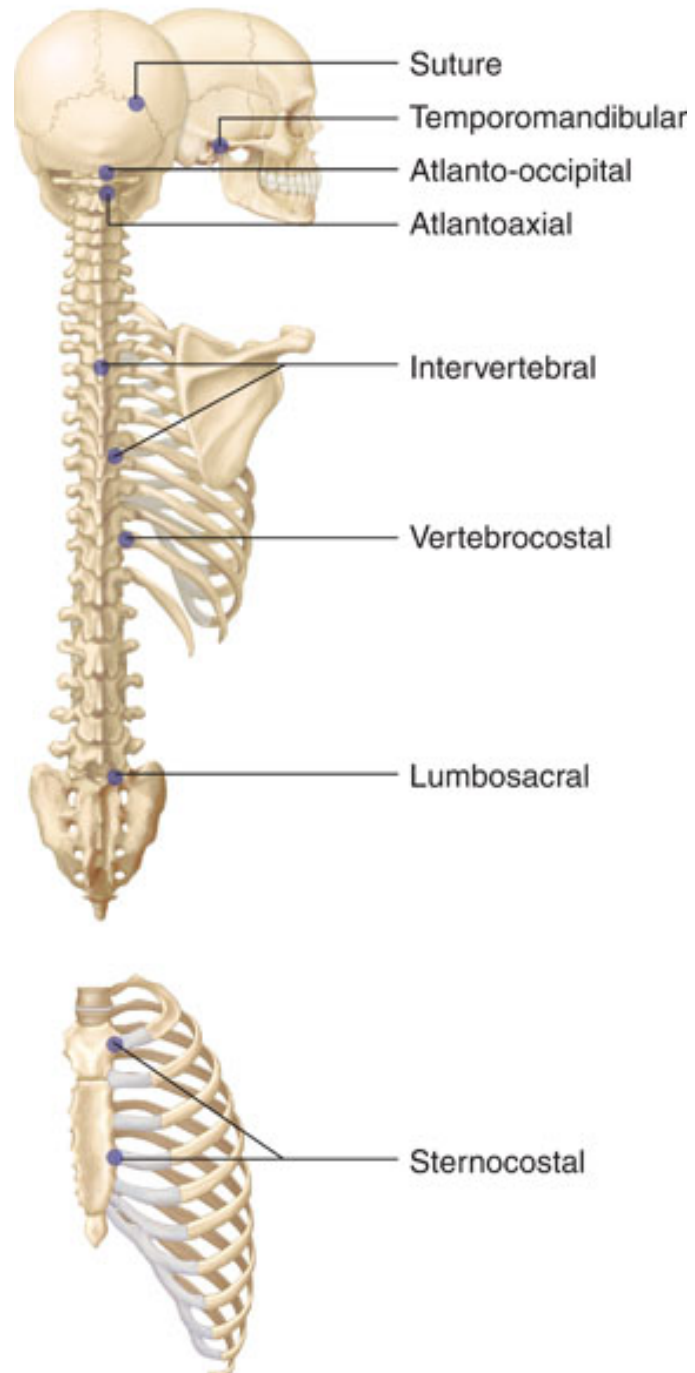


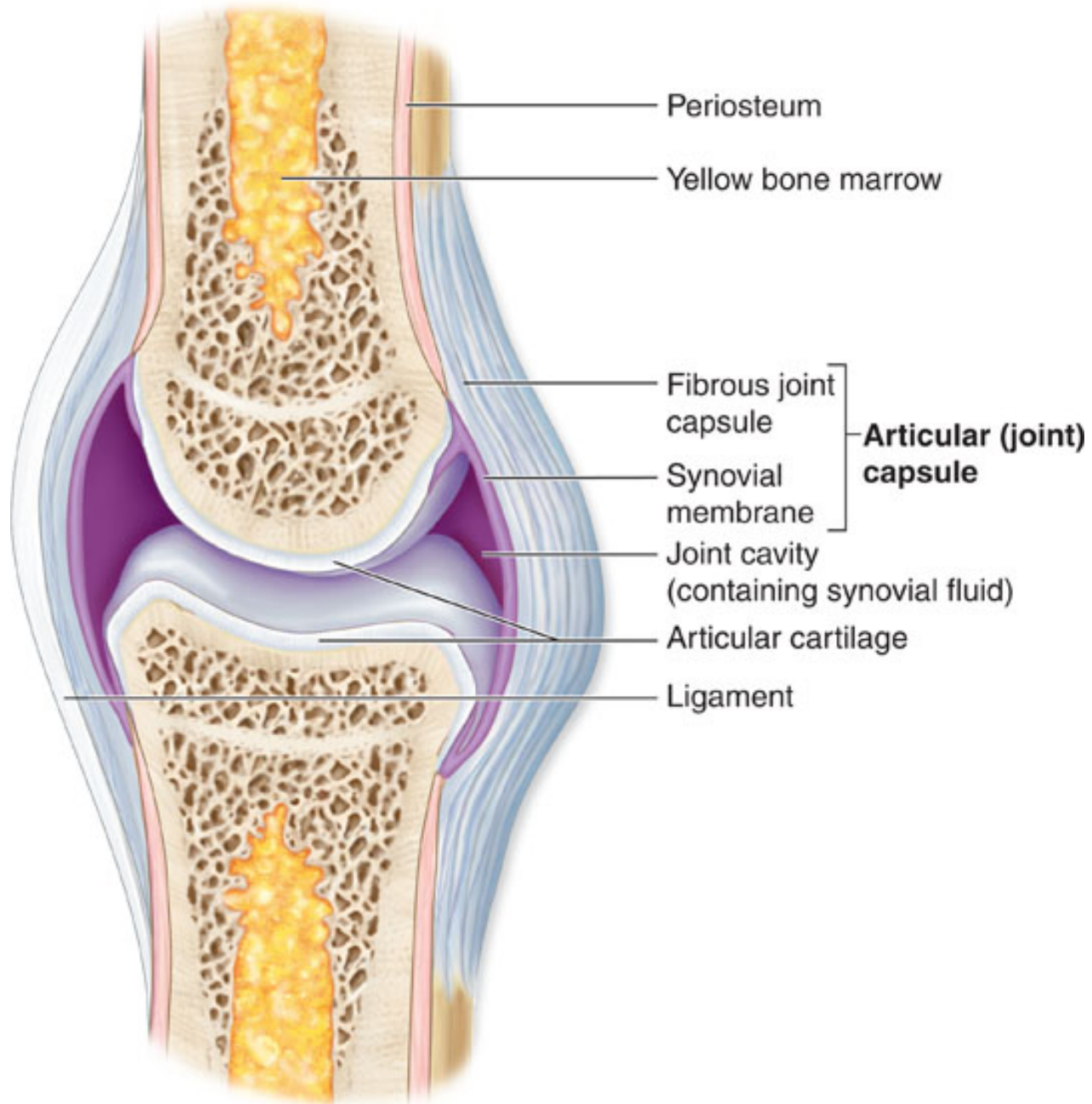


**(a) Synchondroses** (contain hyaline cartilage)

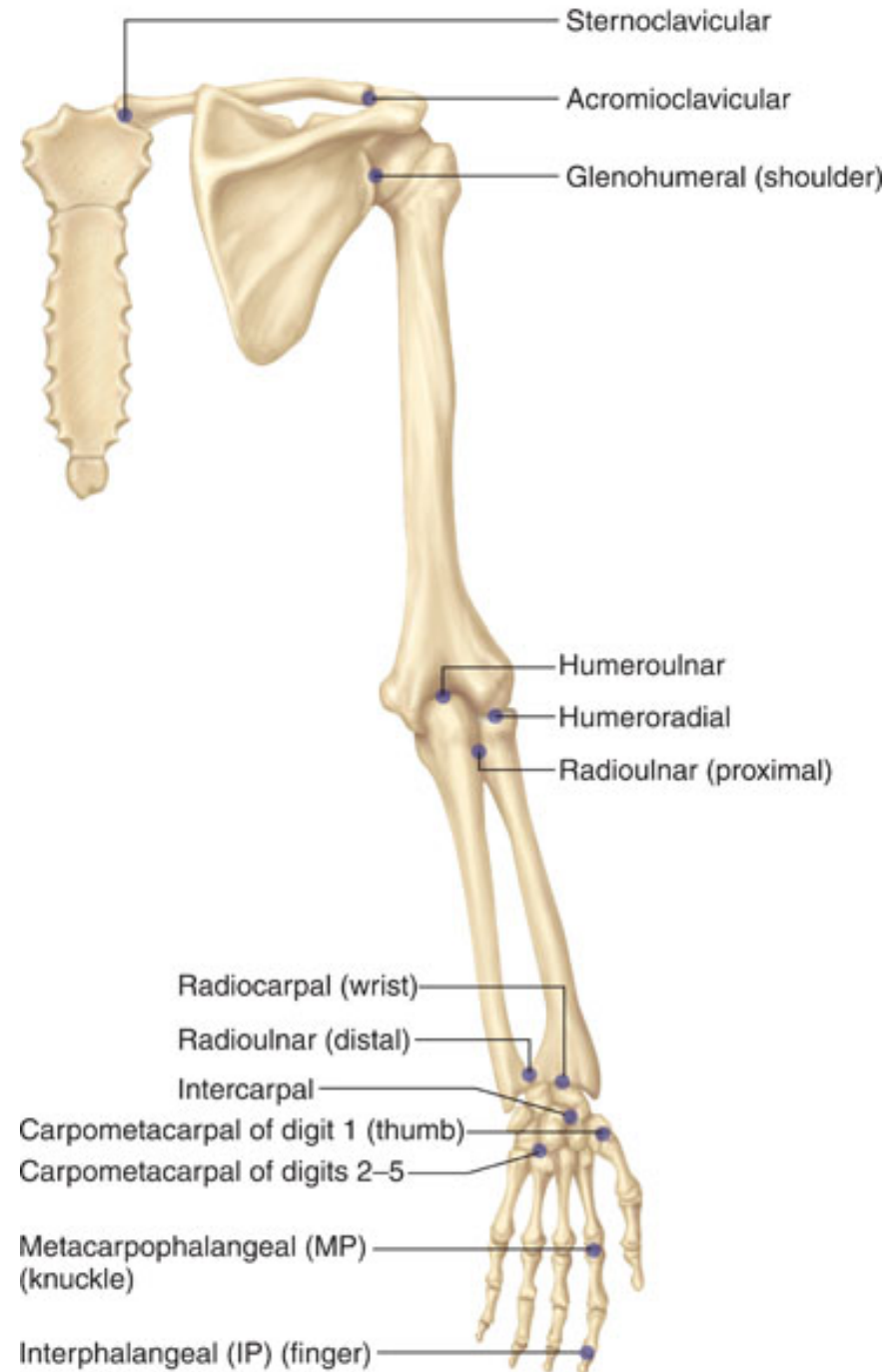


**(b) Symphyses** (contain fibrocartilage)





**Typical synovial joint**





# Synovial Joints

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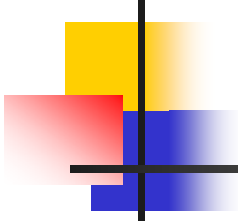
- Freely movable articulations
- Classified as diarthroses
- Bones are separated by a space called a joint cavity
- Most of the commonly known joints in the body
  - glenohumeral (shoulder) joint
  - temporomandibular joint
  - elbow joint
  - knee joint



# General Anatomy of Synovial Joints

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- Basic features:
  - articular capsule
  - joint cavity
  - synovial fluid
  - articular cartilage
  - ligaments
  - nerves
  - blood vessels

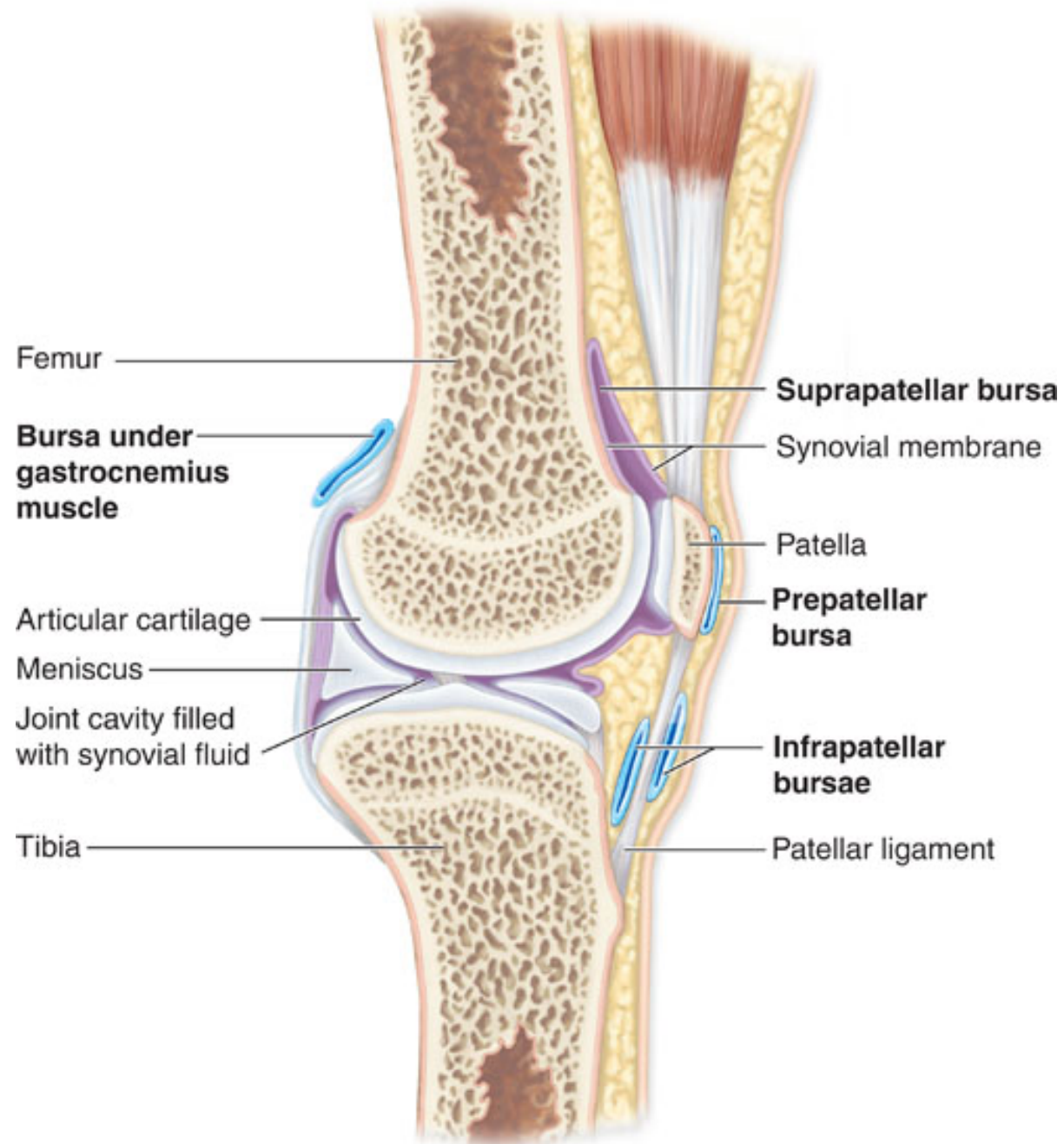


# General Anatomy of Synovial Joints – Accessory Structures

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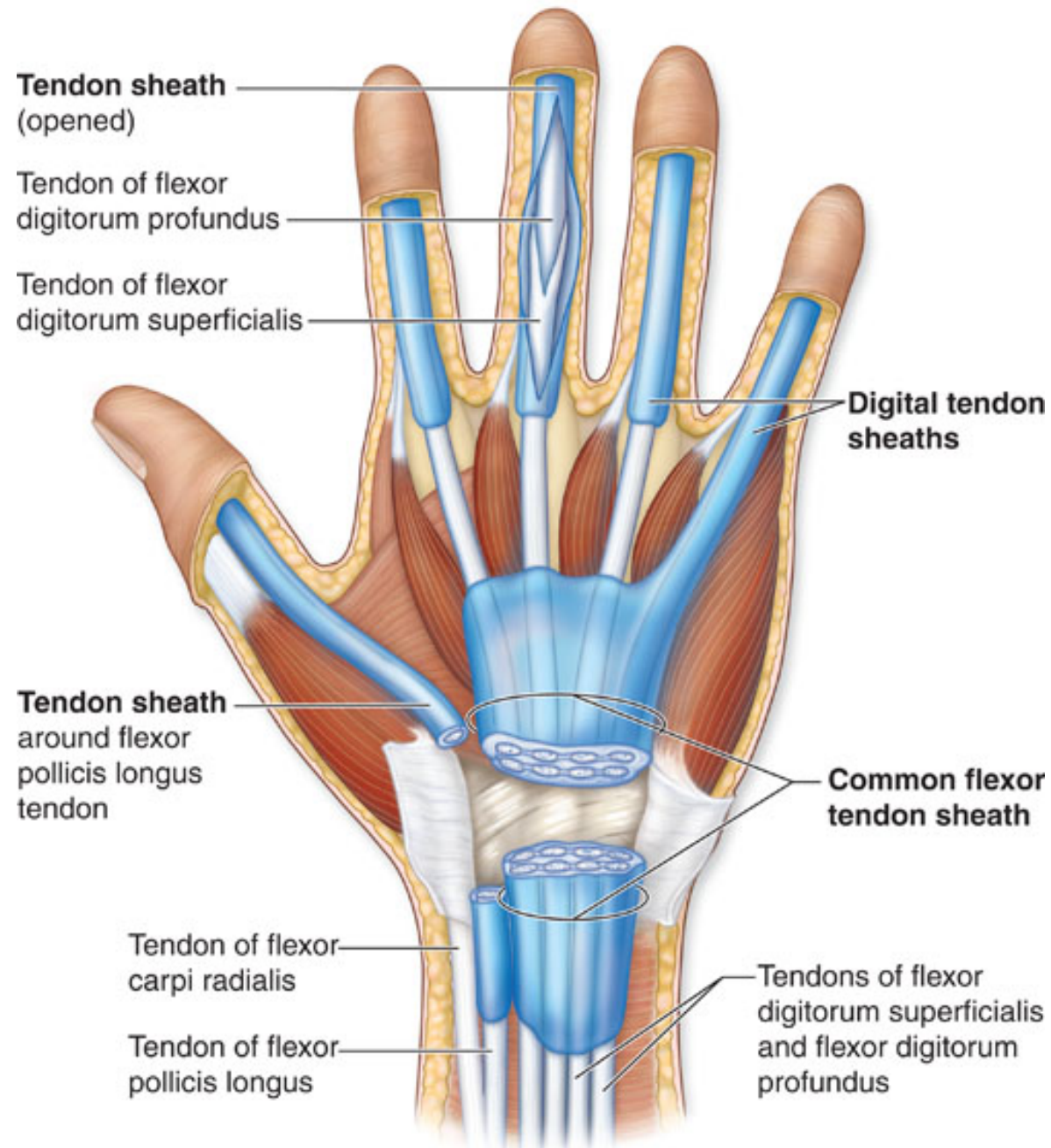
- Bursae
  - fibrous, **saclike structure** that **contains synovial fluid** and is lined by a synovial membrane
- Fatpads
  - often distributed along the periphery of a synovial joint
  - act as **packing material** and provide some **protection** for the joint
  - **fill the spaces** that form when bones **move** and the joint cavity changes shape
- Tendons
  - **attaches a muscle to a bone**
  - help **stabilize joints**



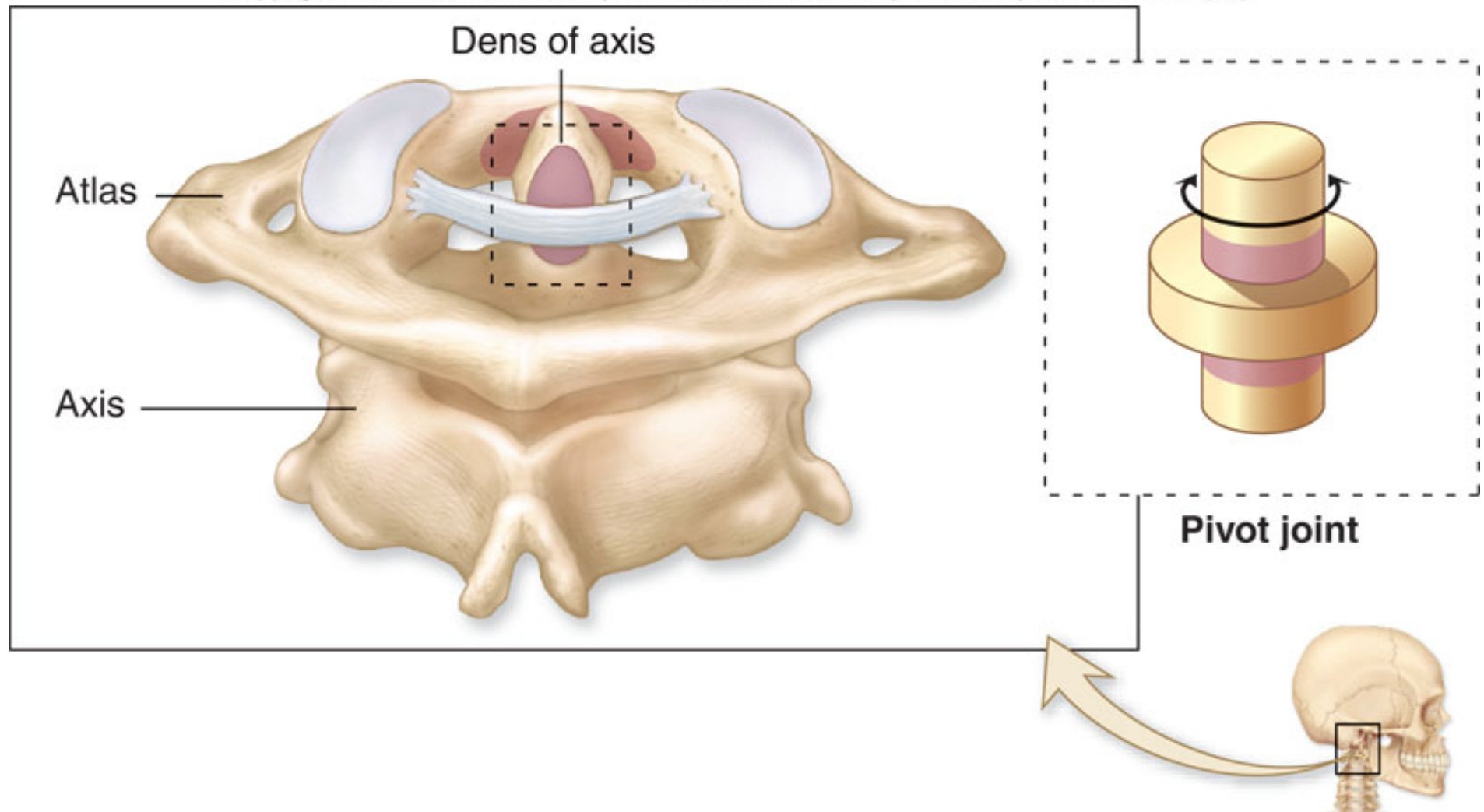


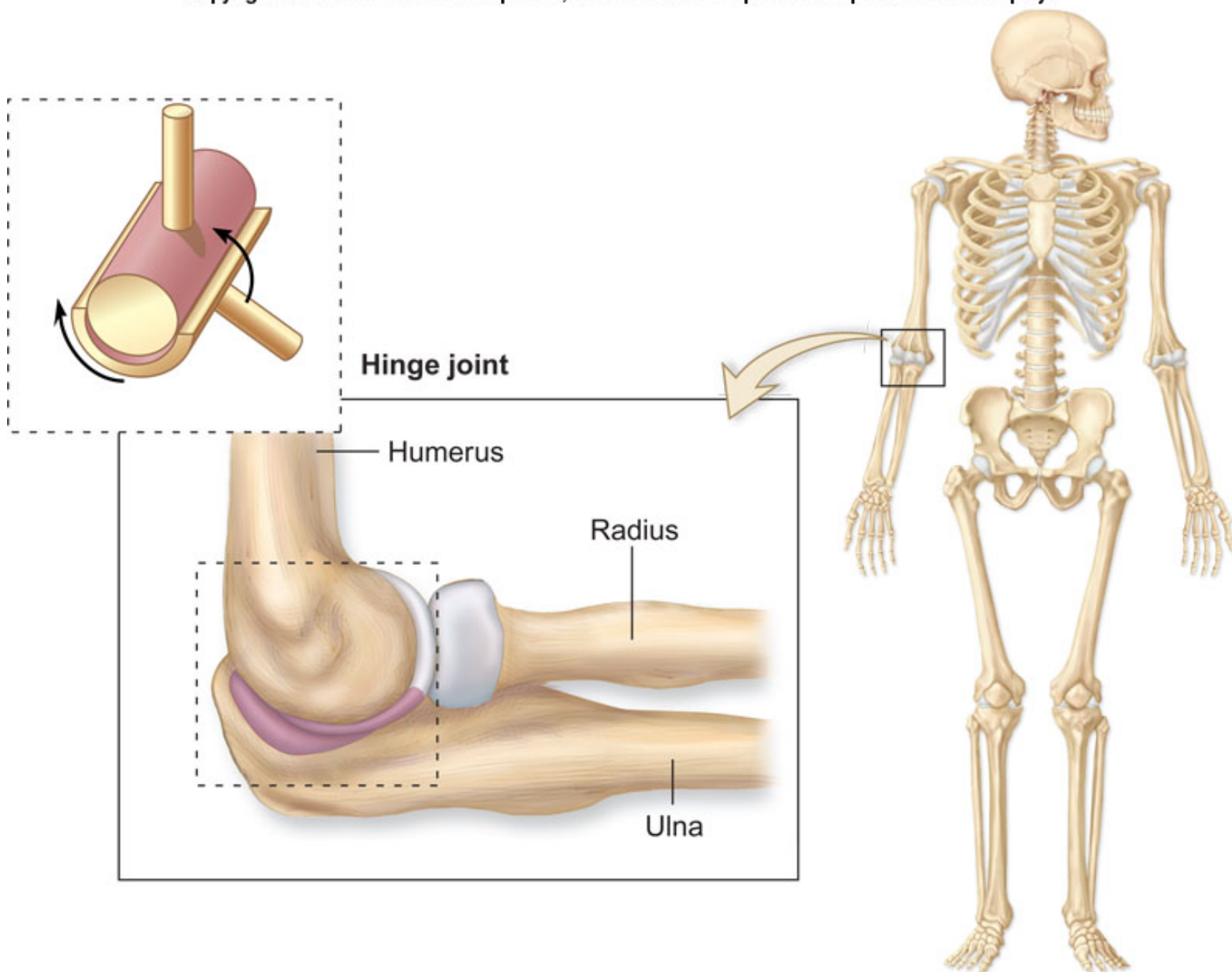
(a) Bursae of the knee joint, sagittal section

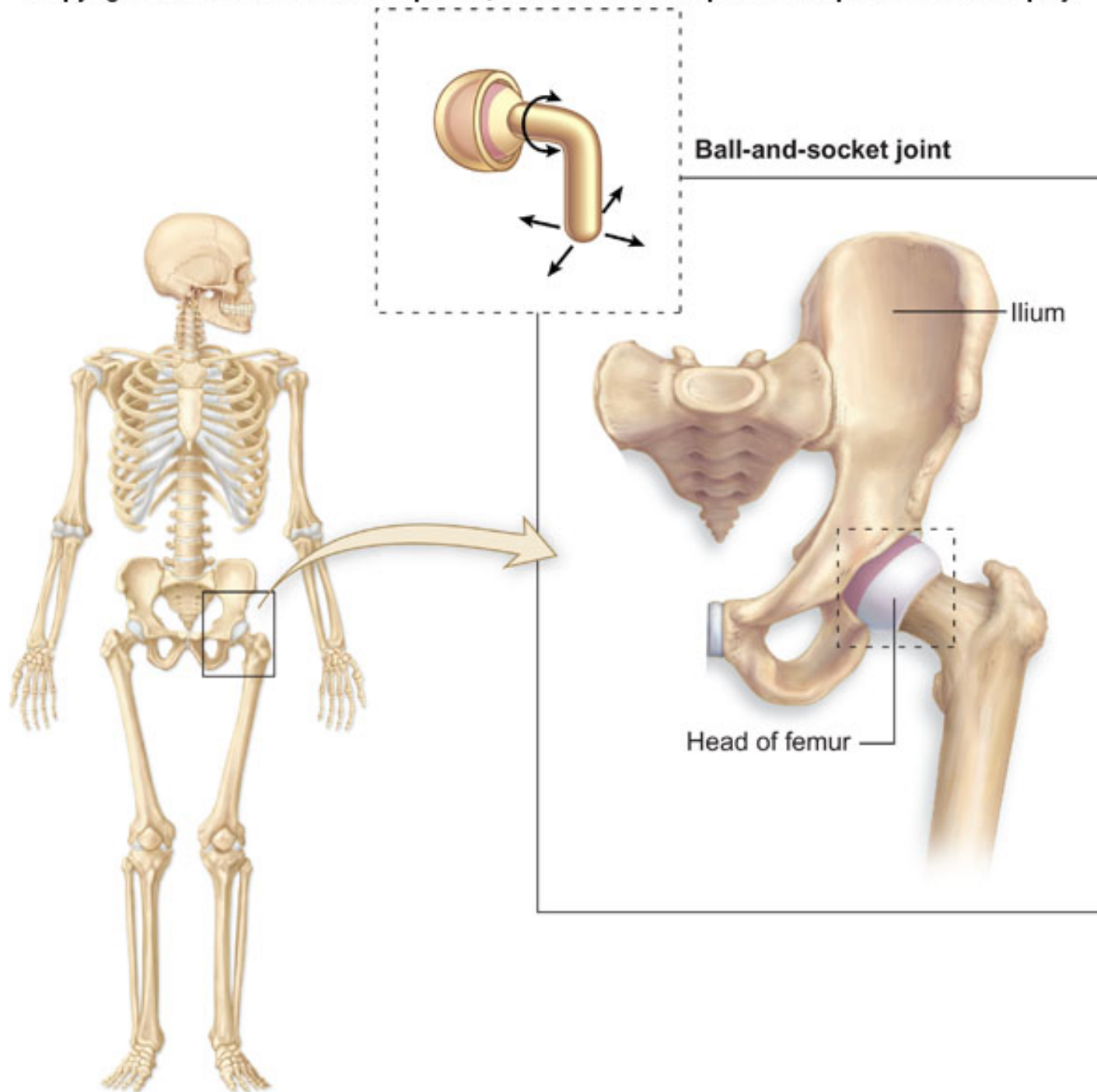




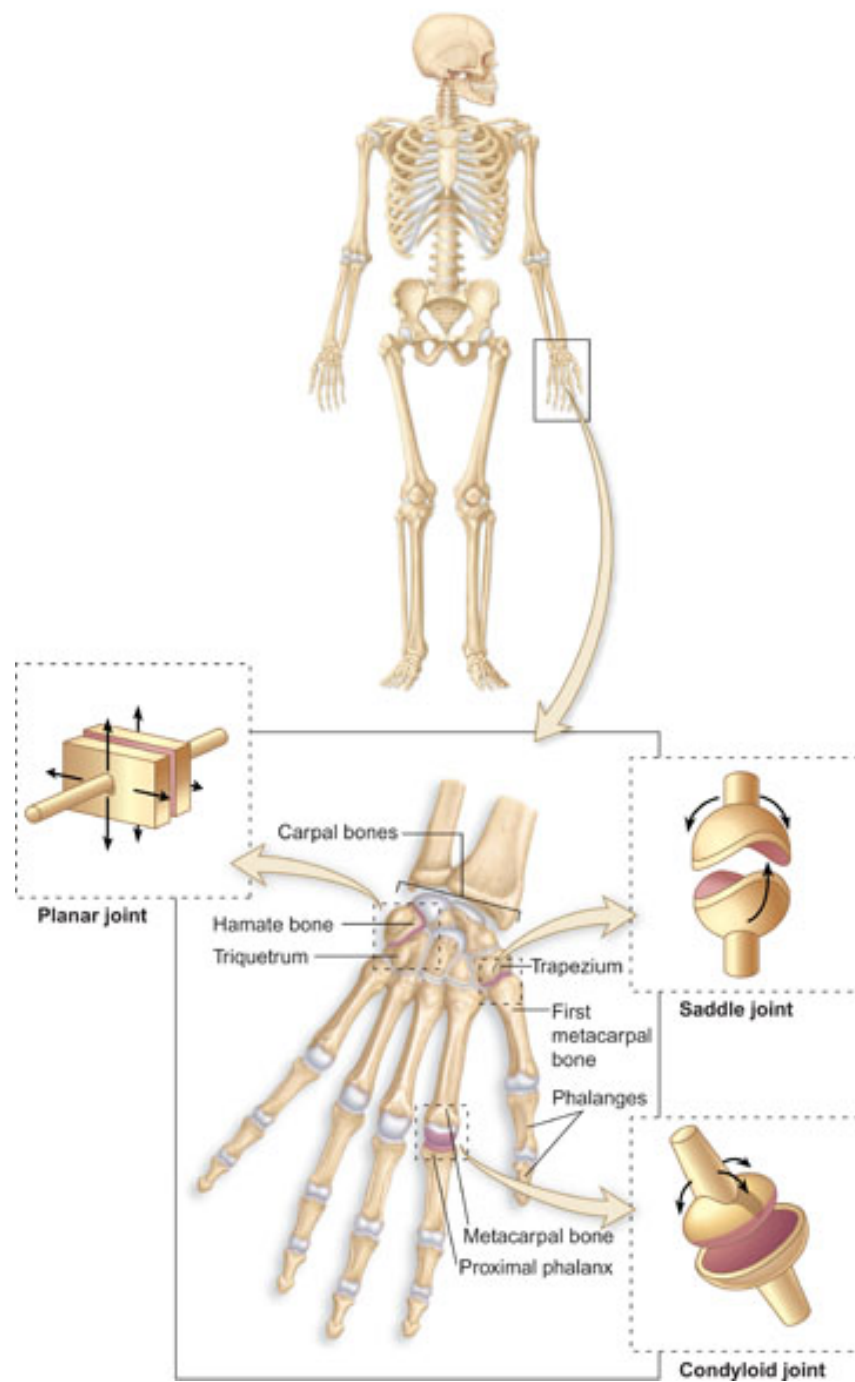
**(b) Tendon sheaths of wrist and hand, anterior view**









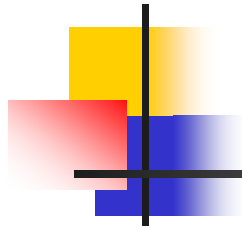




# Types of Synovial Joints

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- Classified by the shapes of their articulating surfaces
- Types of movement they allow
  - **uniaxial** if the bone moves in **just one plane**
  - **biaxial** if the bone moves in **two planes**
  - **multiaxial (or triaxial)** if the bone moves in **multiple planes**



# Types of Synovial Joints

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- From least movable to most freely movable, the **six specific types of synovial joints** are:
- planar (gliding) joints
- hinge joints
- pivot joints
- condyloid (ellipsoid) joints
- saddle joints
- ball-and-socket joints



(a)



(b)



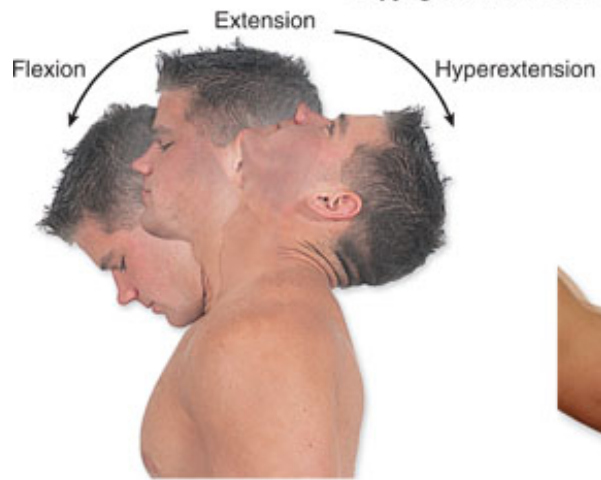
(c)



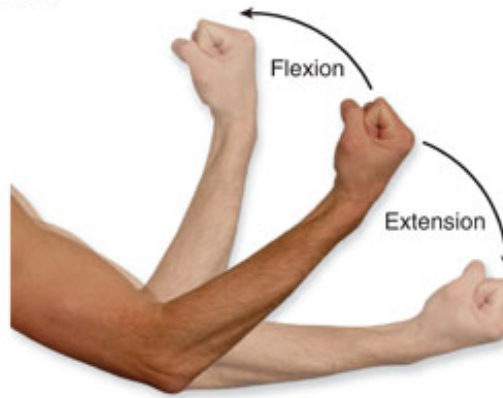
(d)



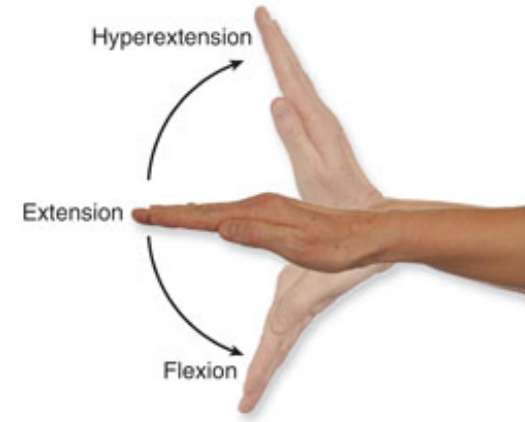




(a)



(b)



(c)



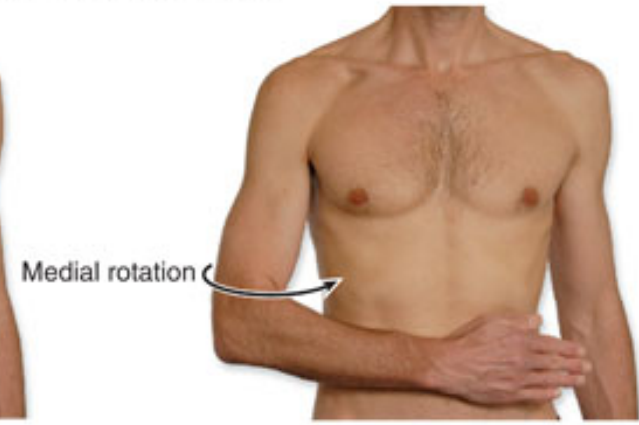
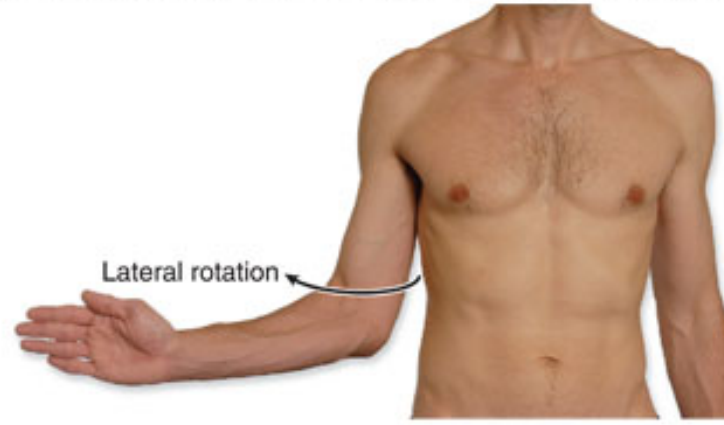
(d)



(e)



(a)



(b)



(c)

Depression



Elevation



(a)

Dorsiflexion

Plantar flexion



(b)

Inversion

Eversion



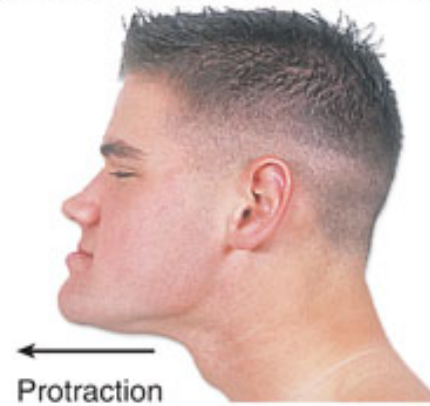
(c)

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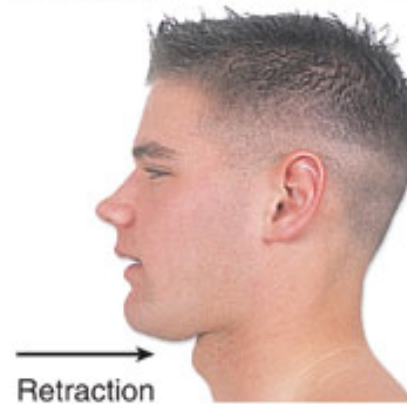


Pronation  
(d)

Supination



Protraction

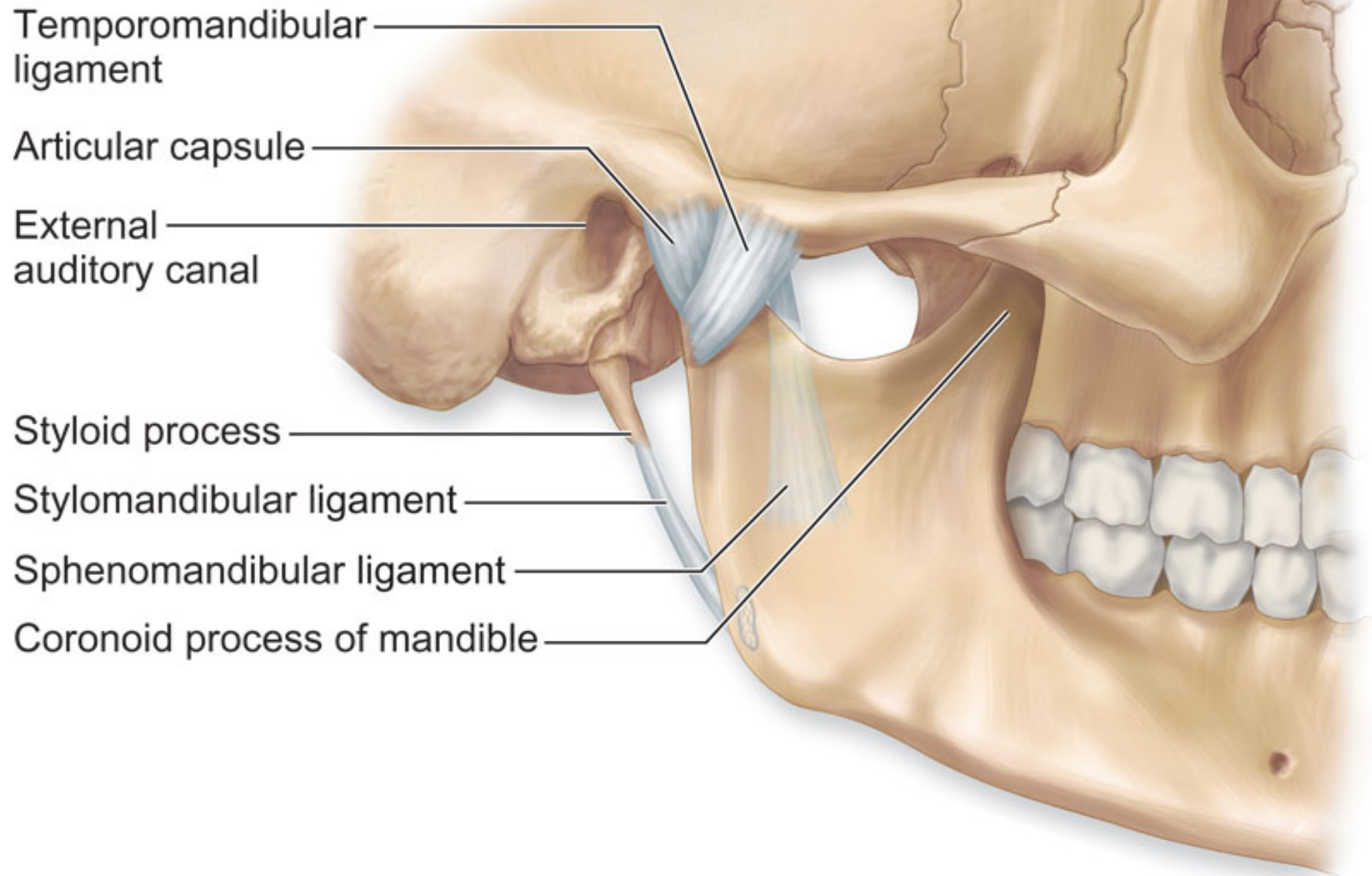


Retraction  
(e)

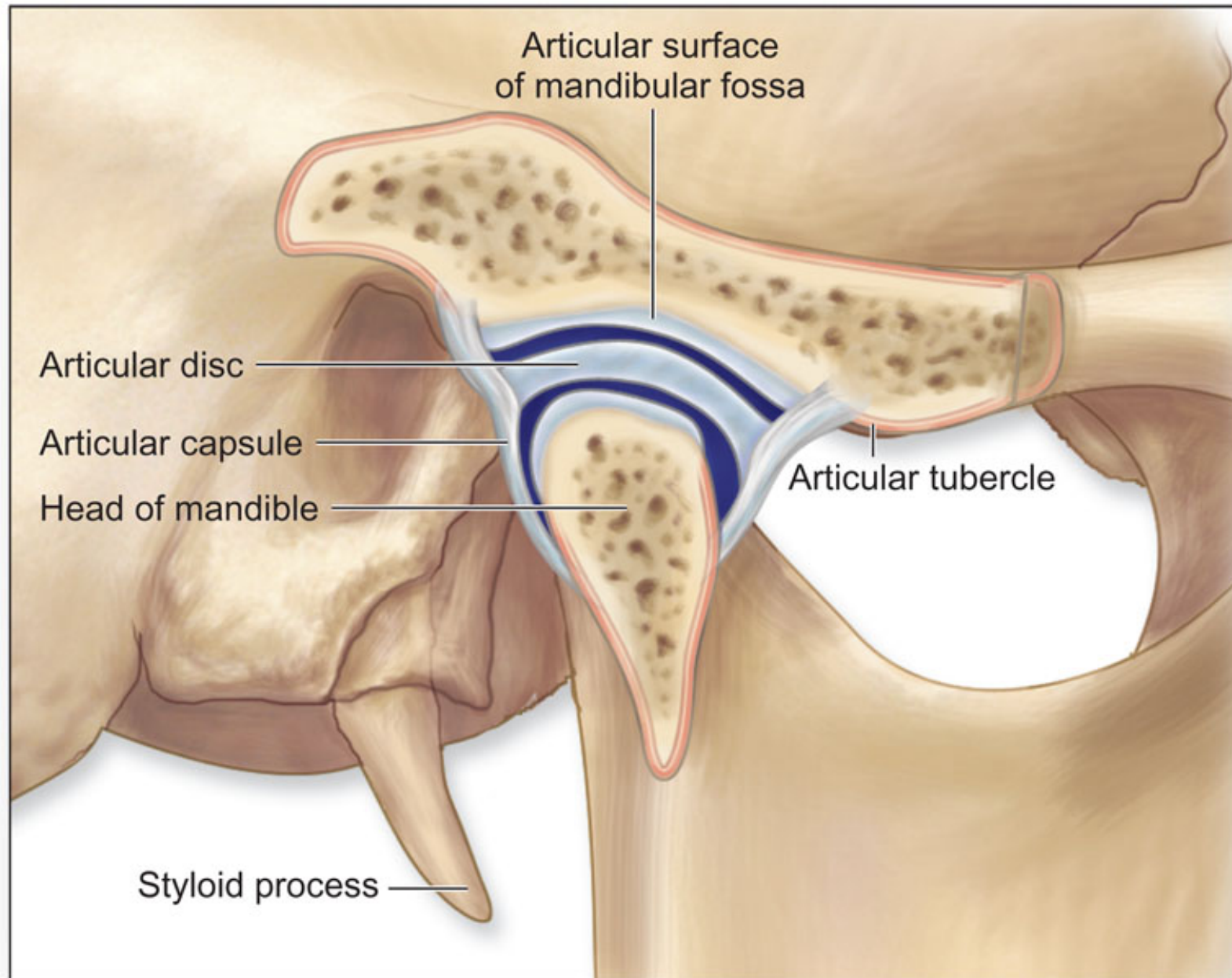
Opposition of  
thumb and pinky

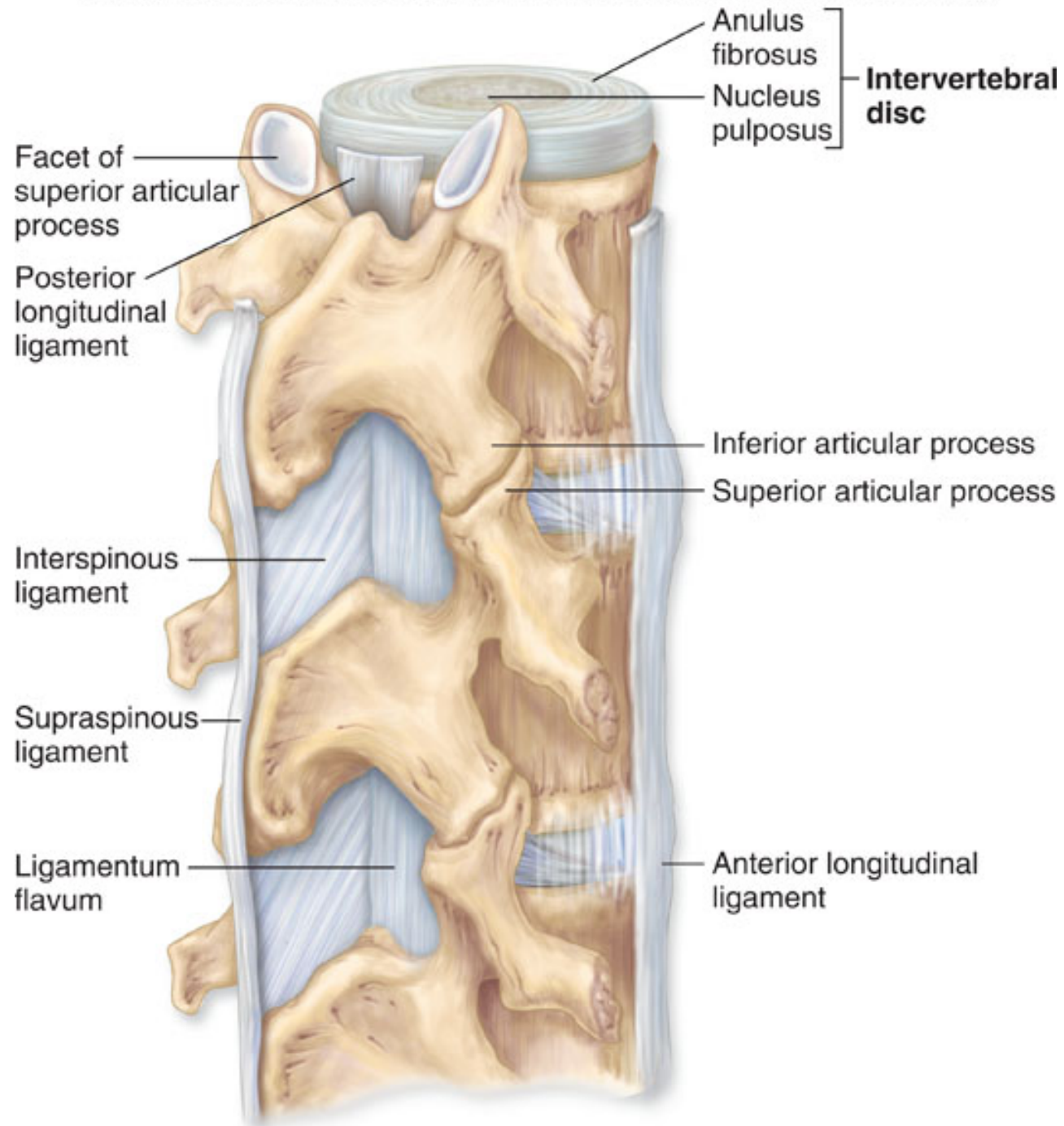


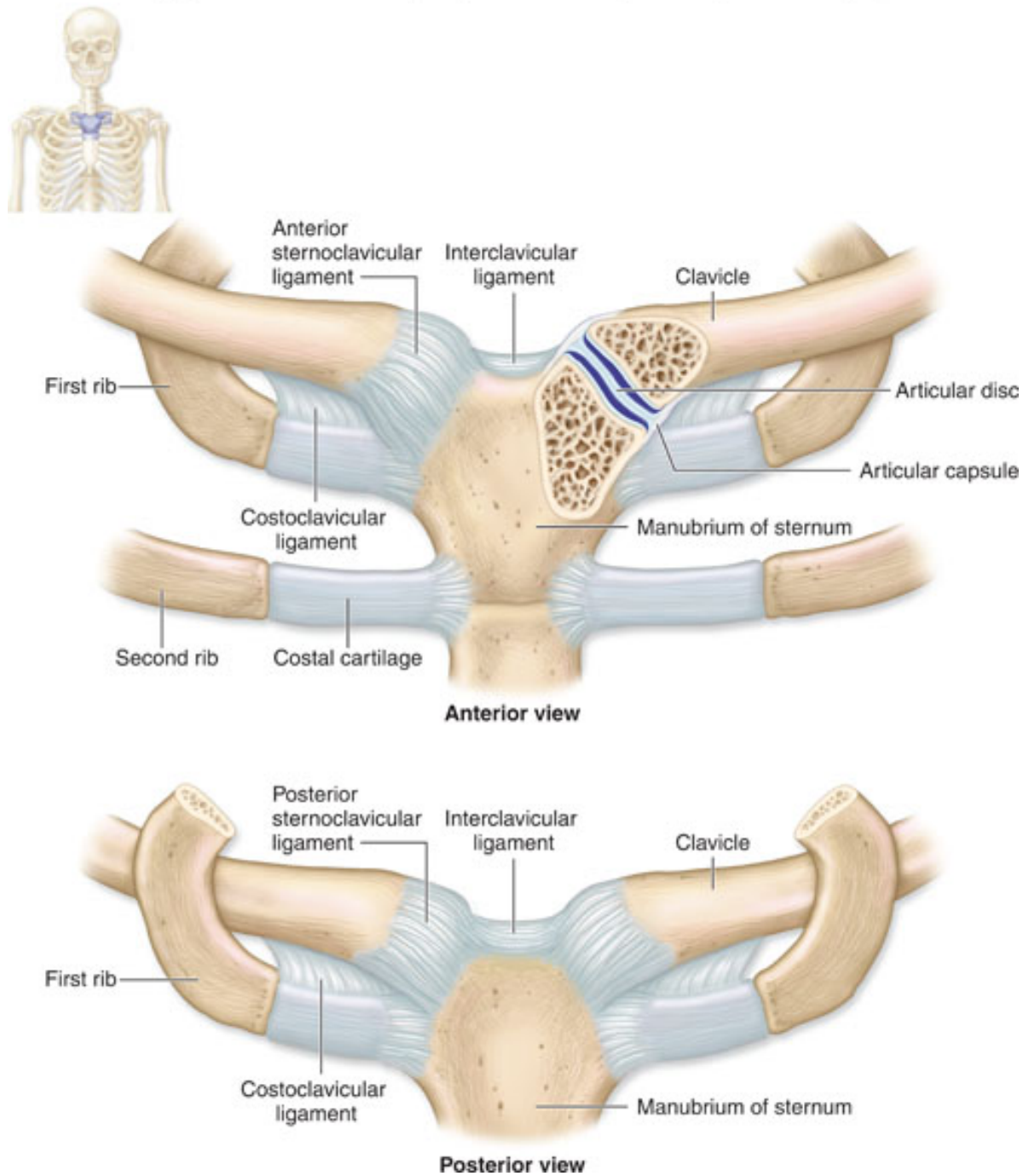
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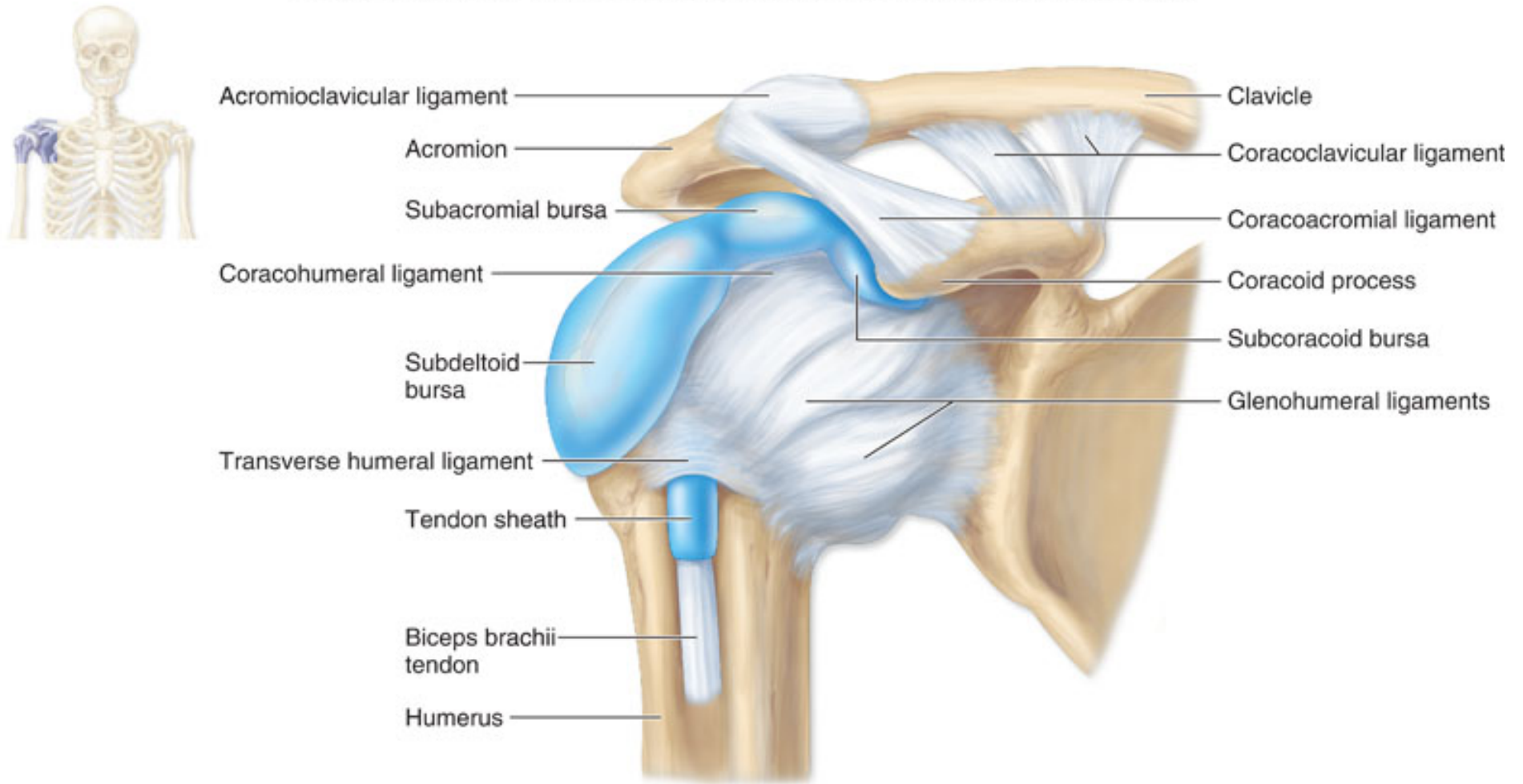


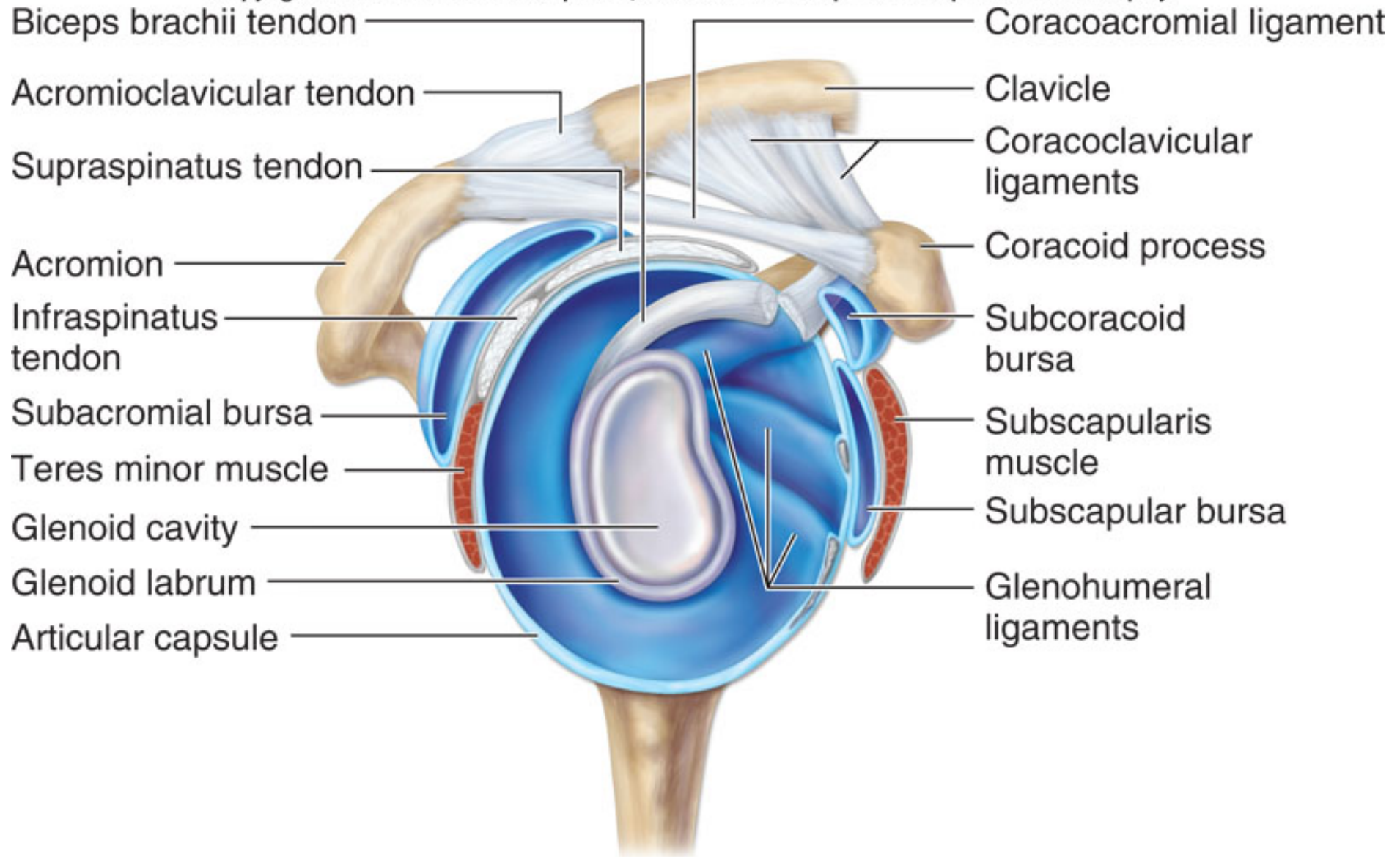




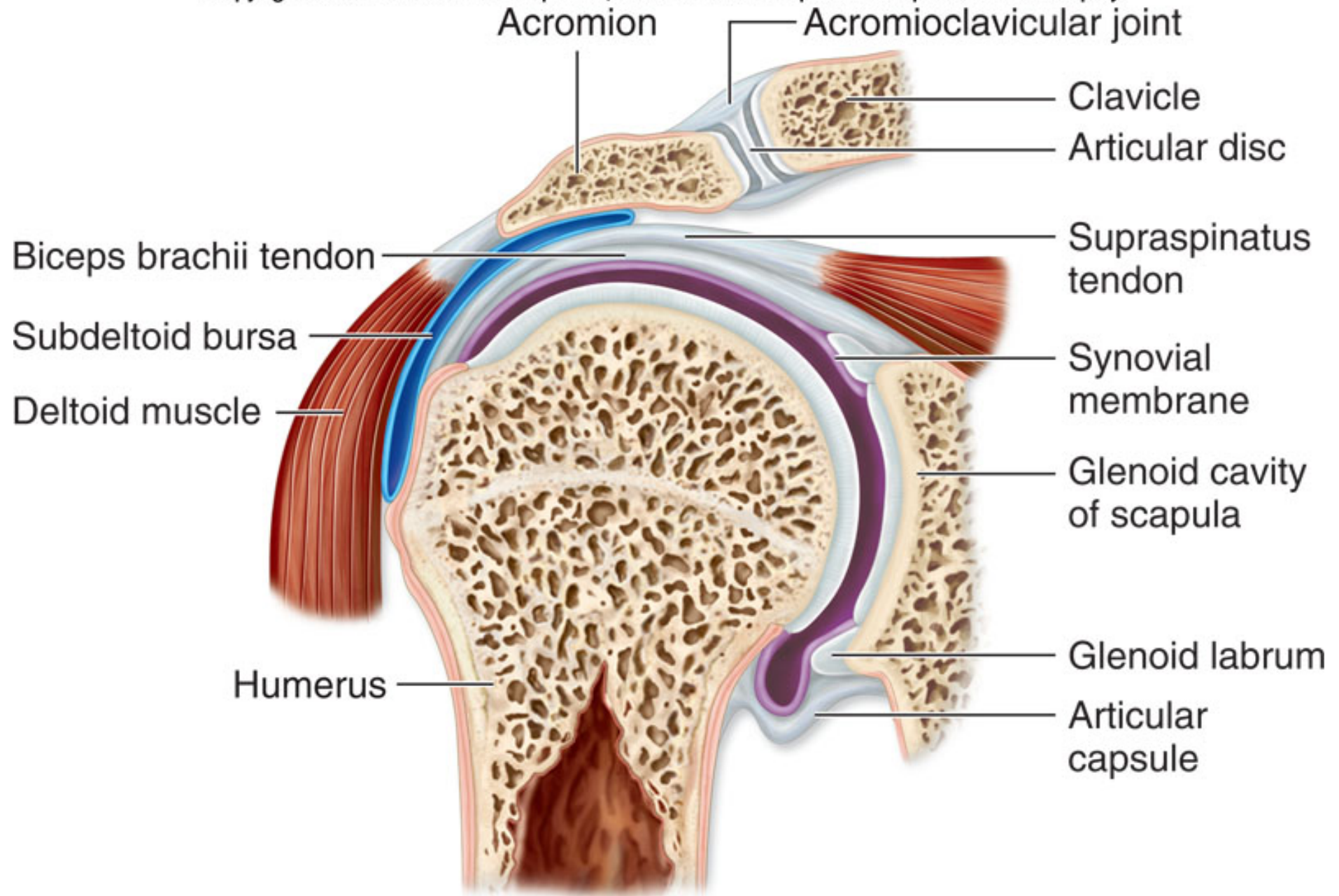


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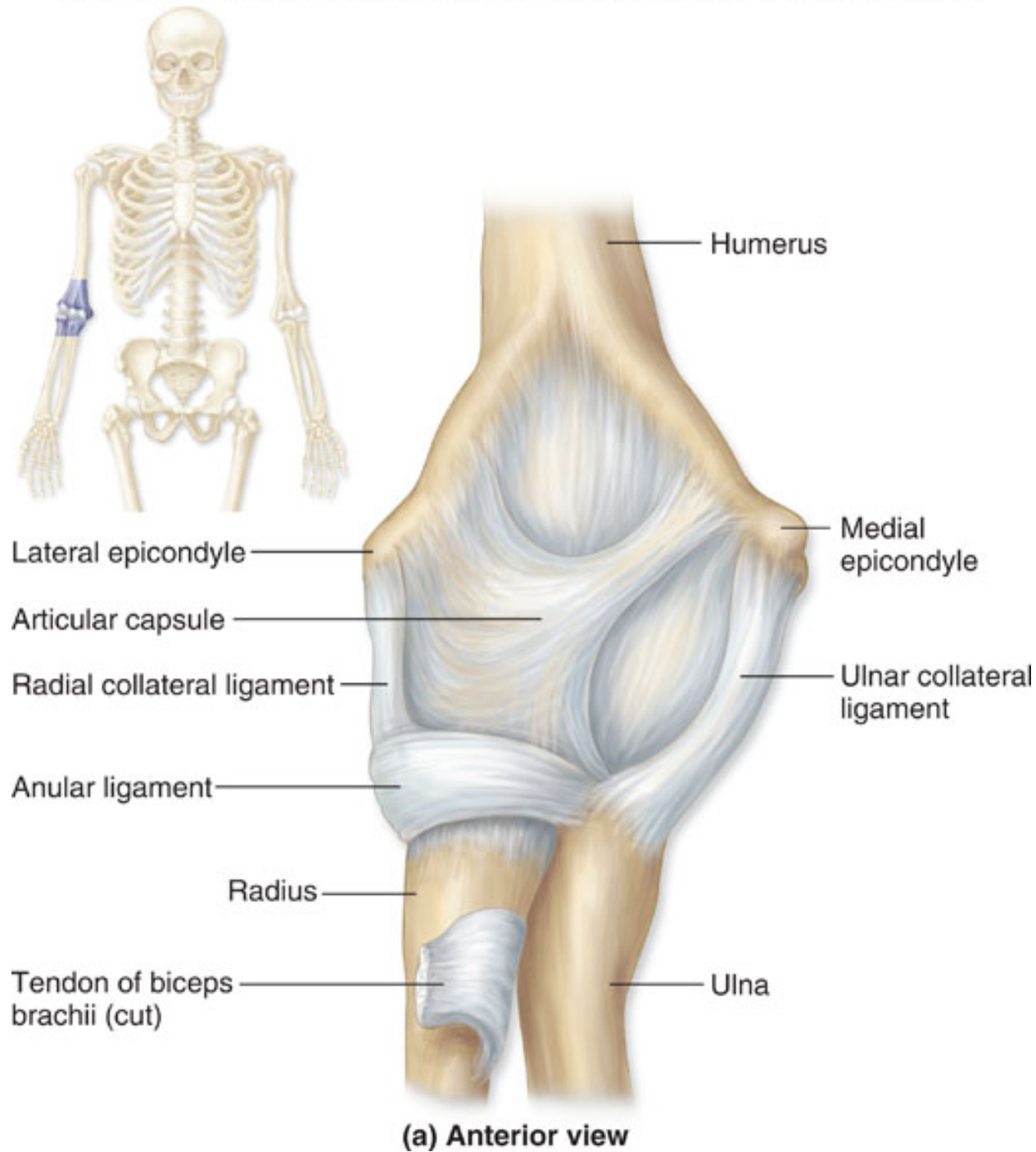


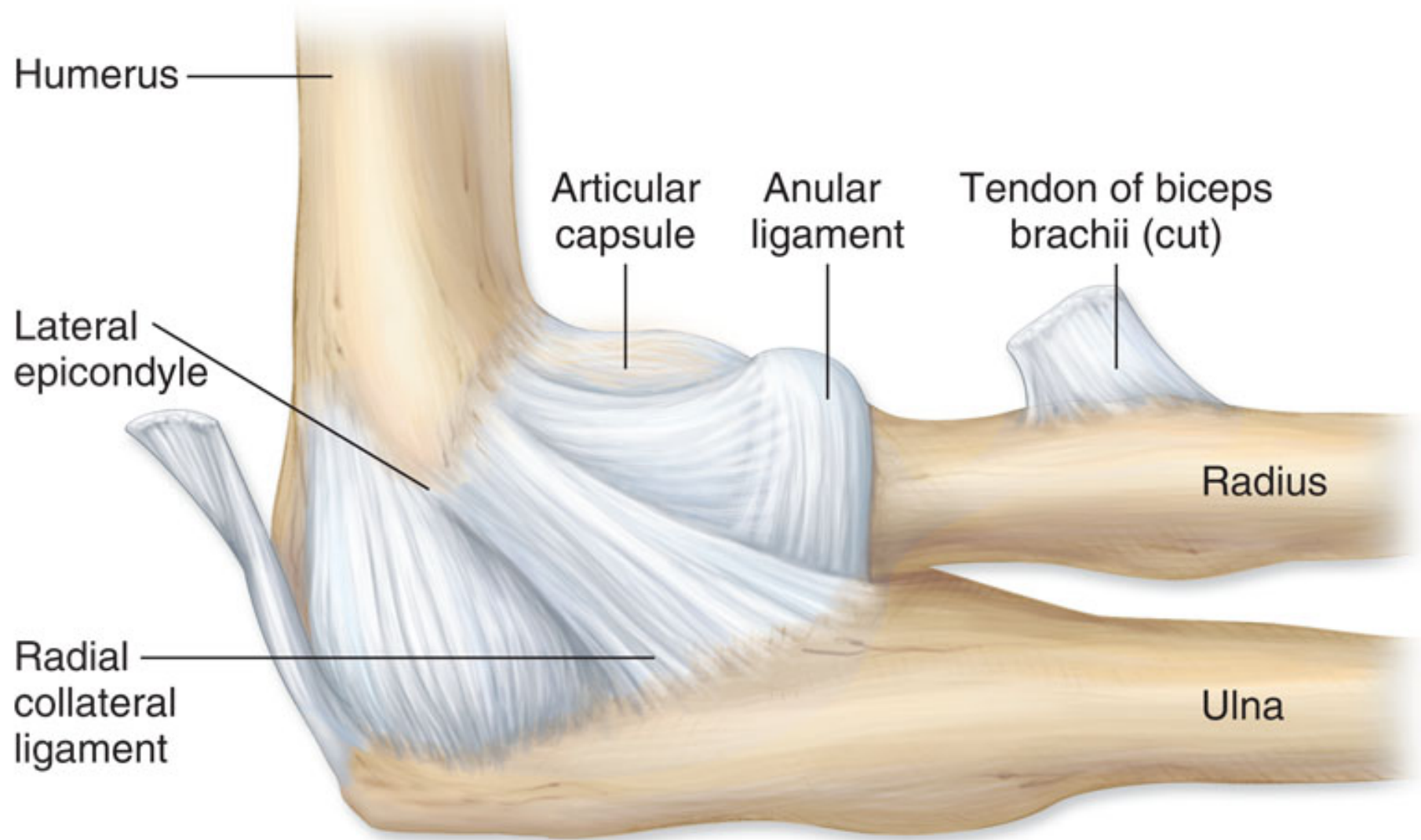
**(b) Lateral view**



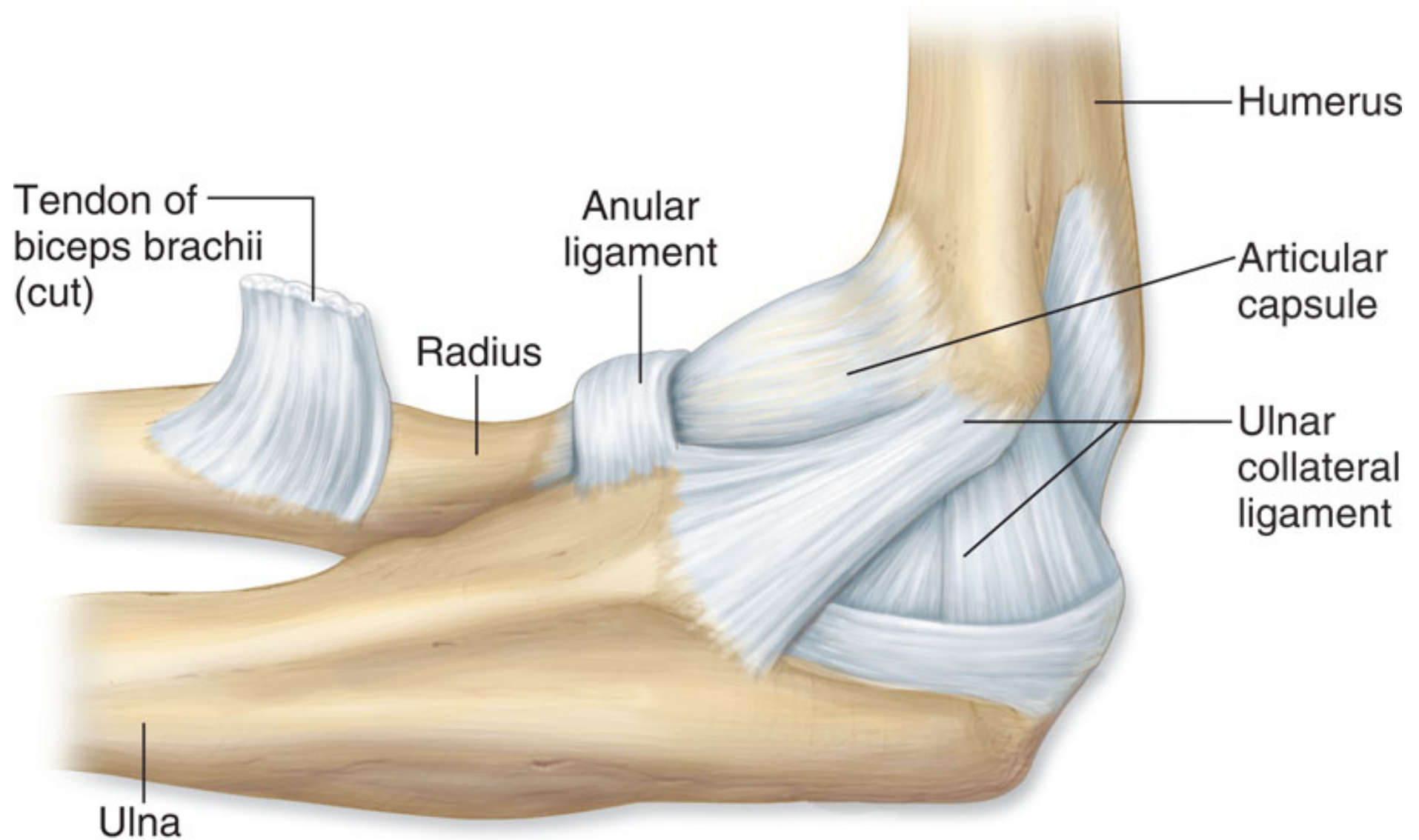
**(c) Coronal section**



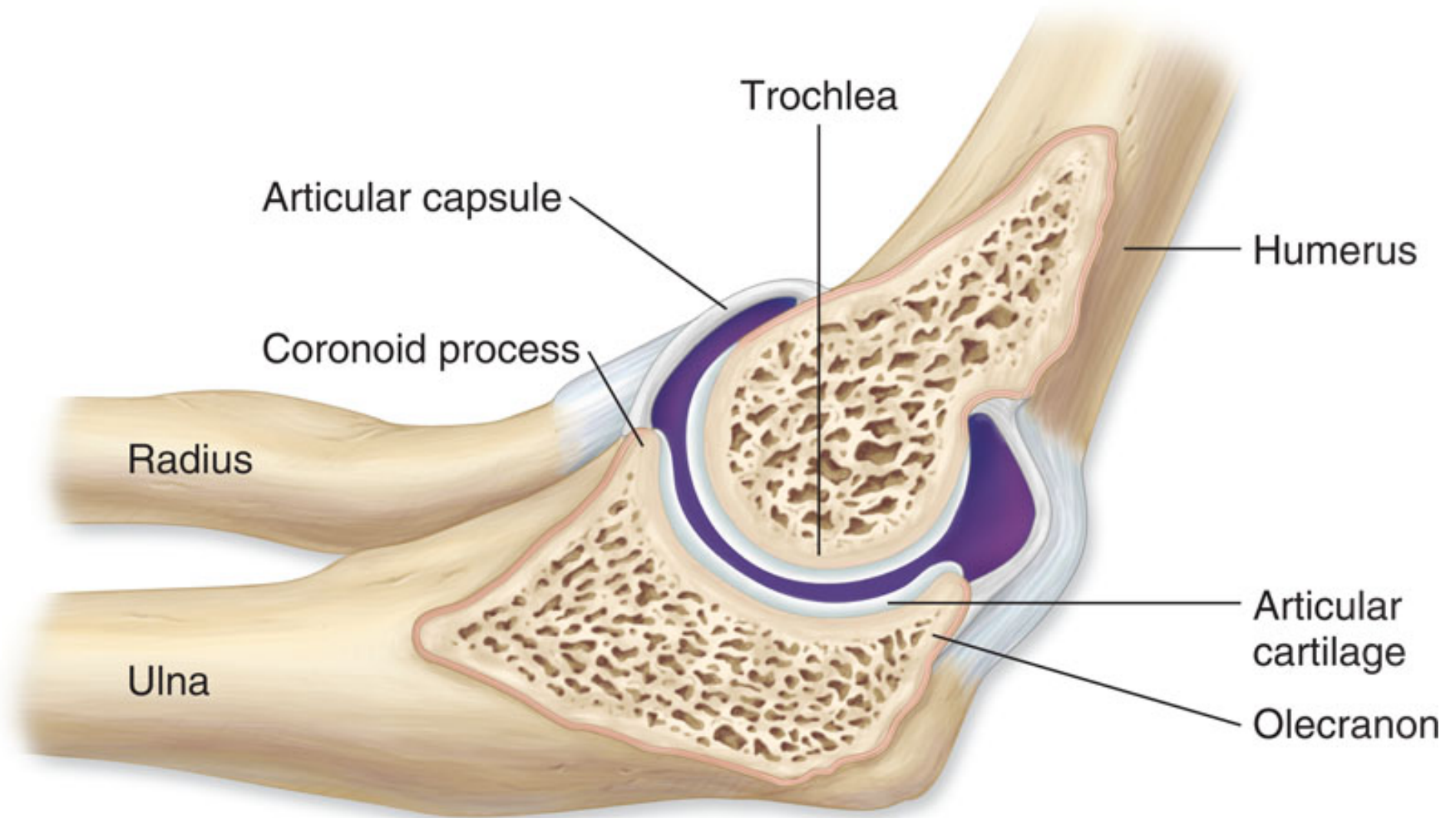




**(b) Lateral view**

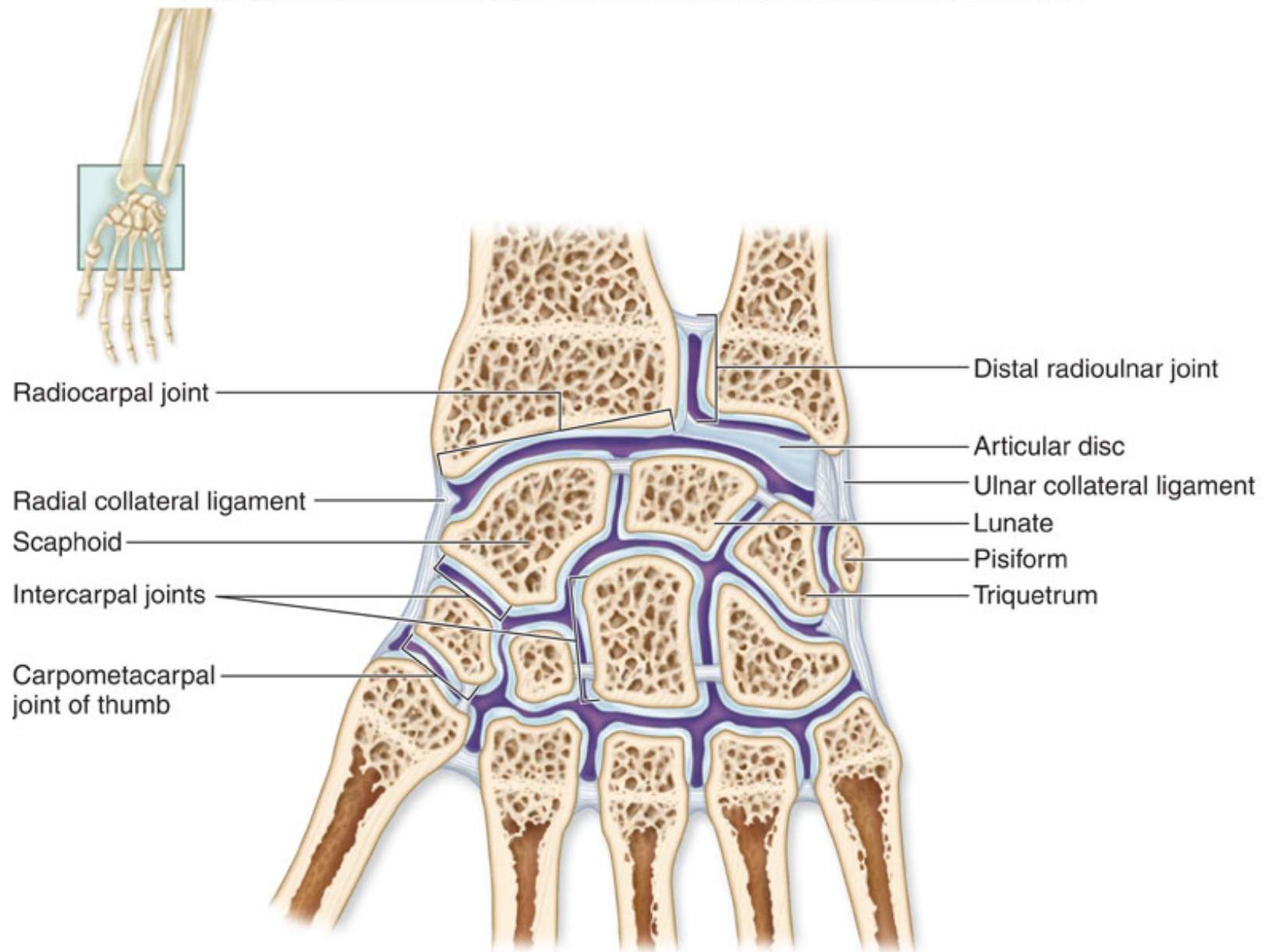


**(c) Medial view**



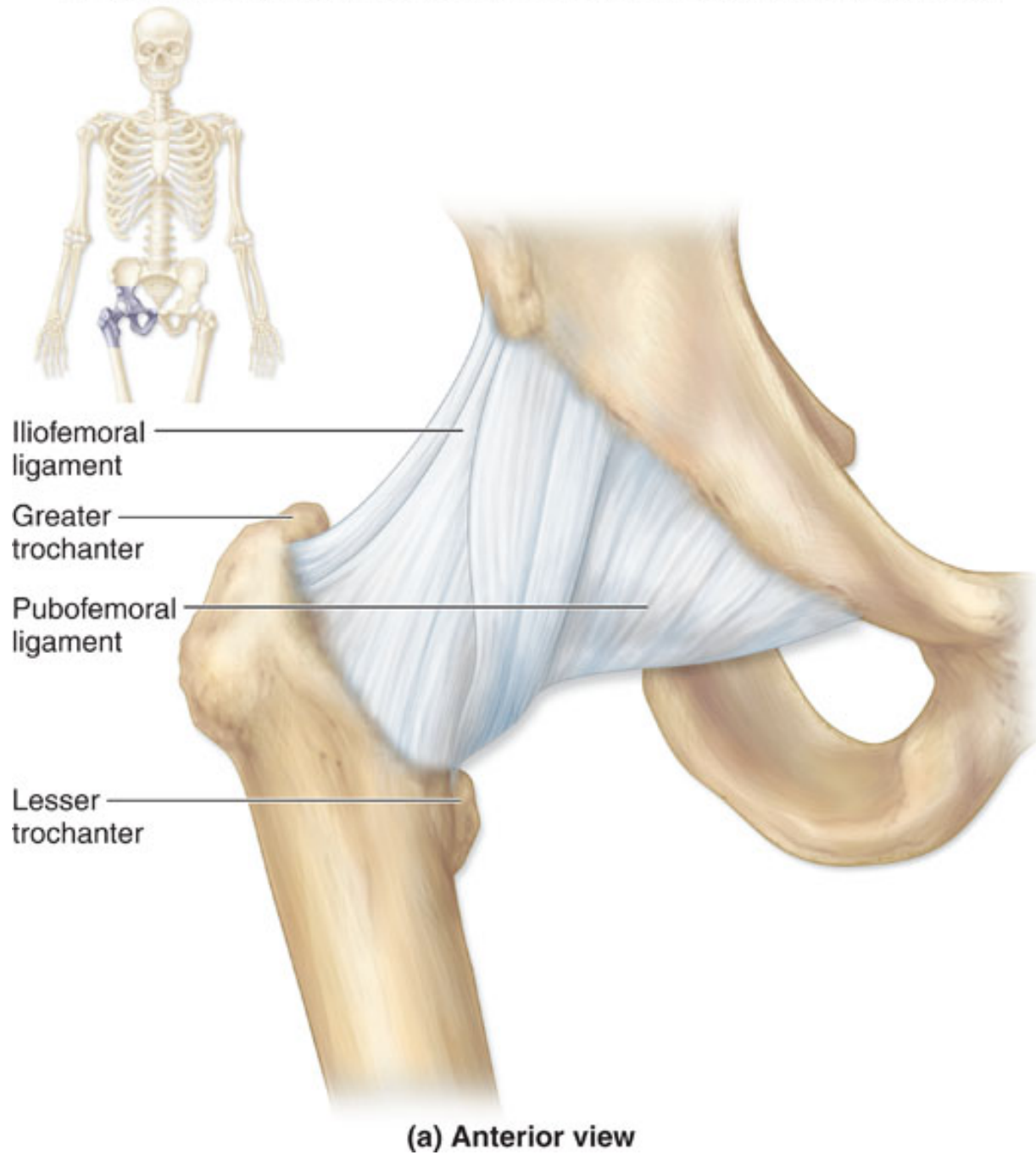
**(d) Sagittal section**

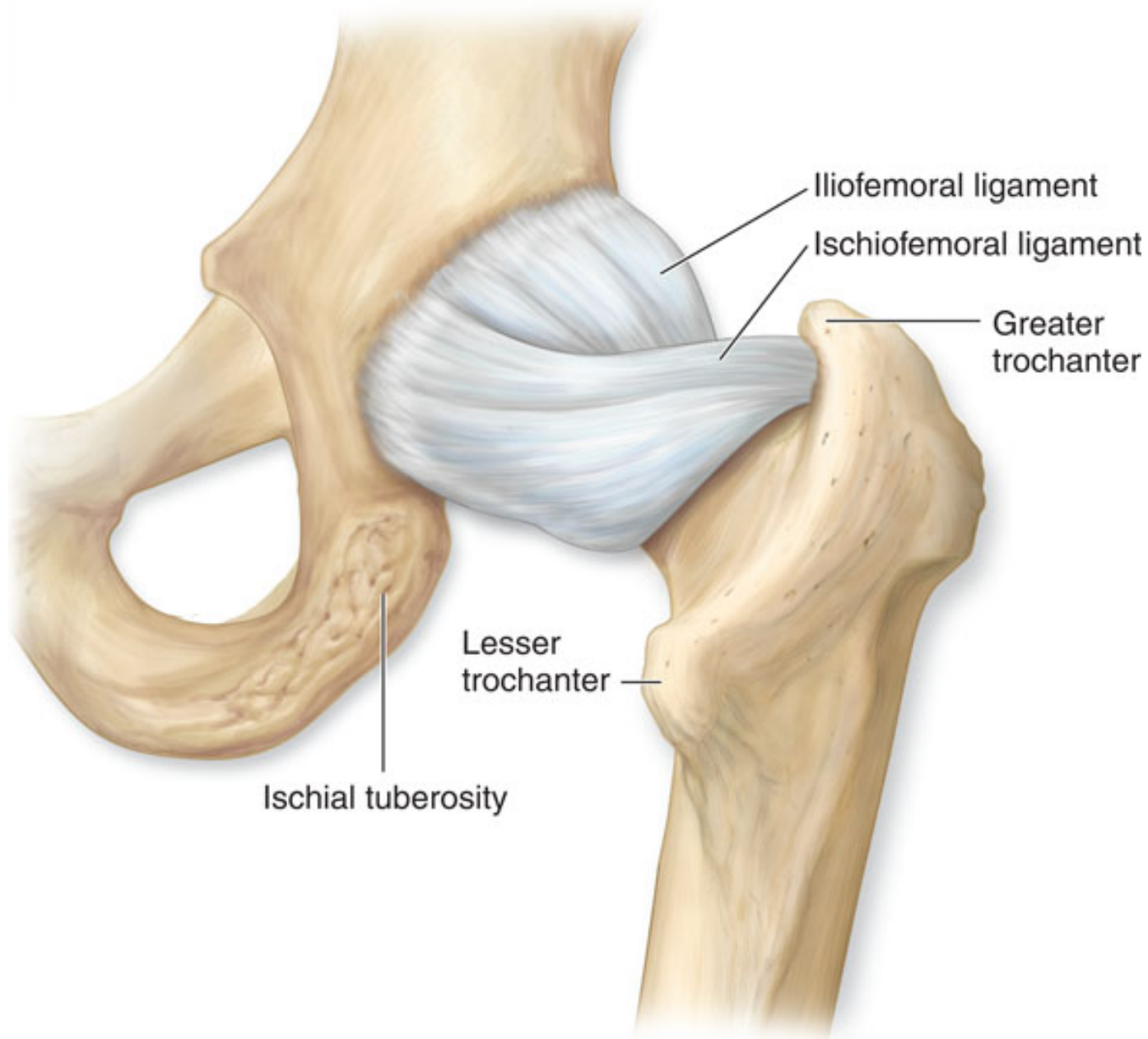




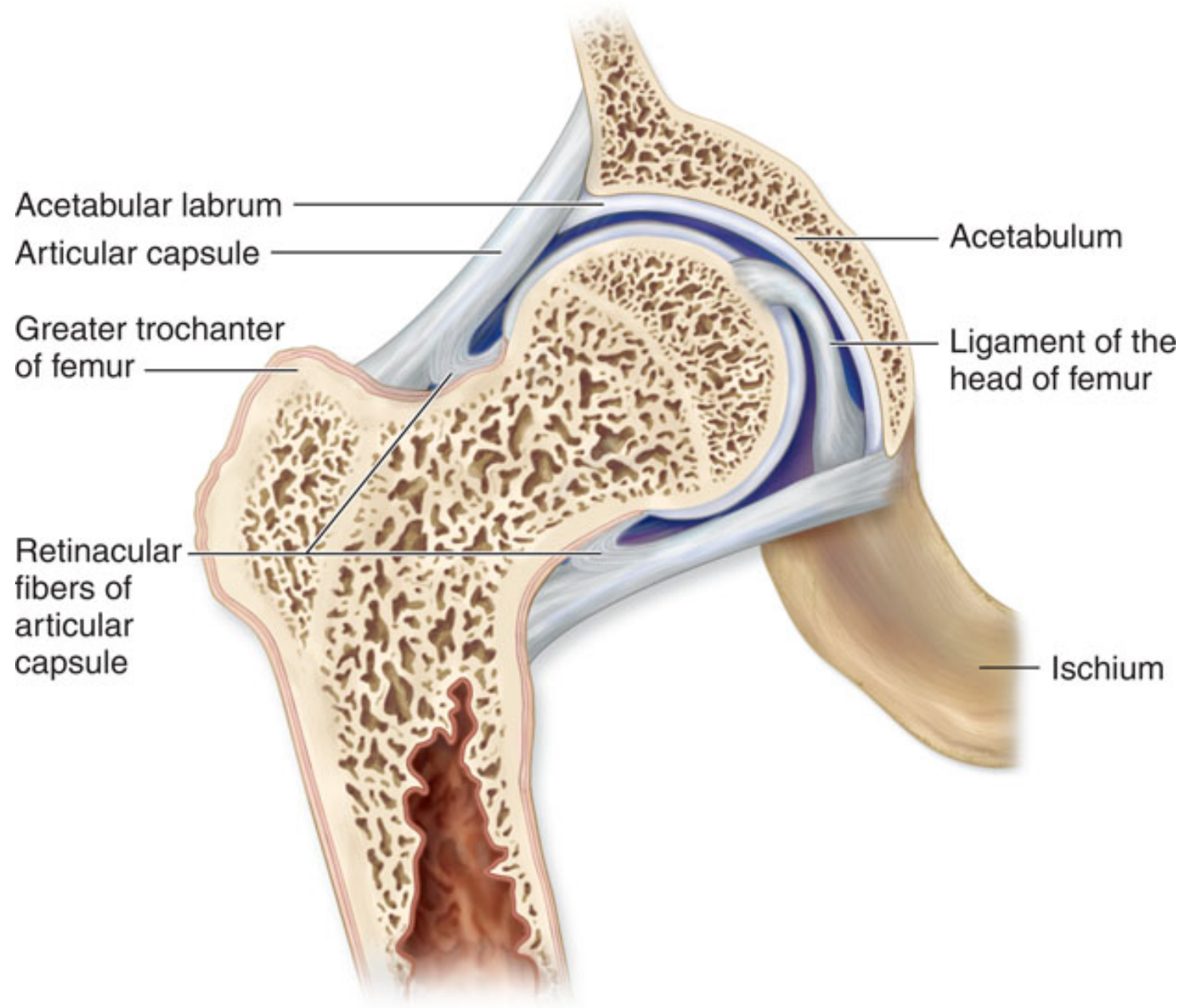
Right radiocarpal joint, coronal section



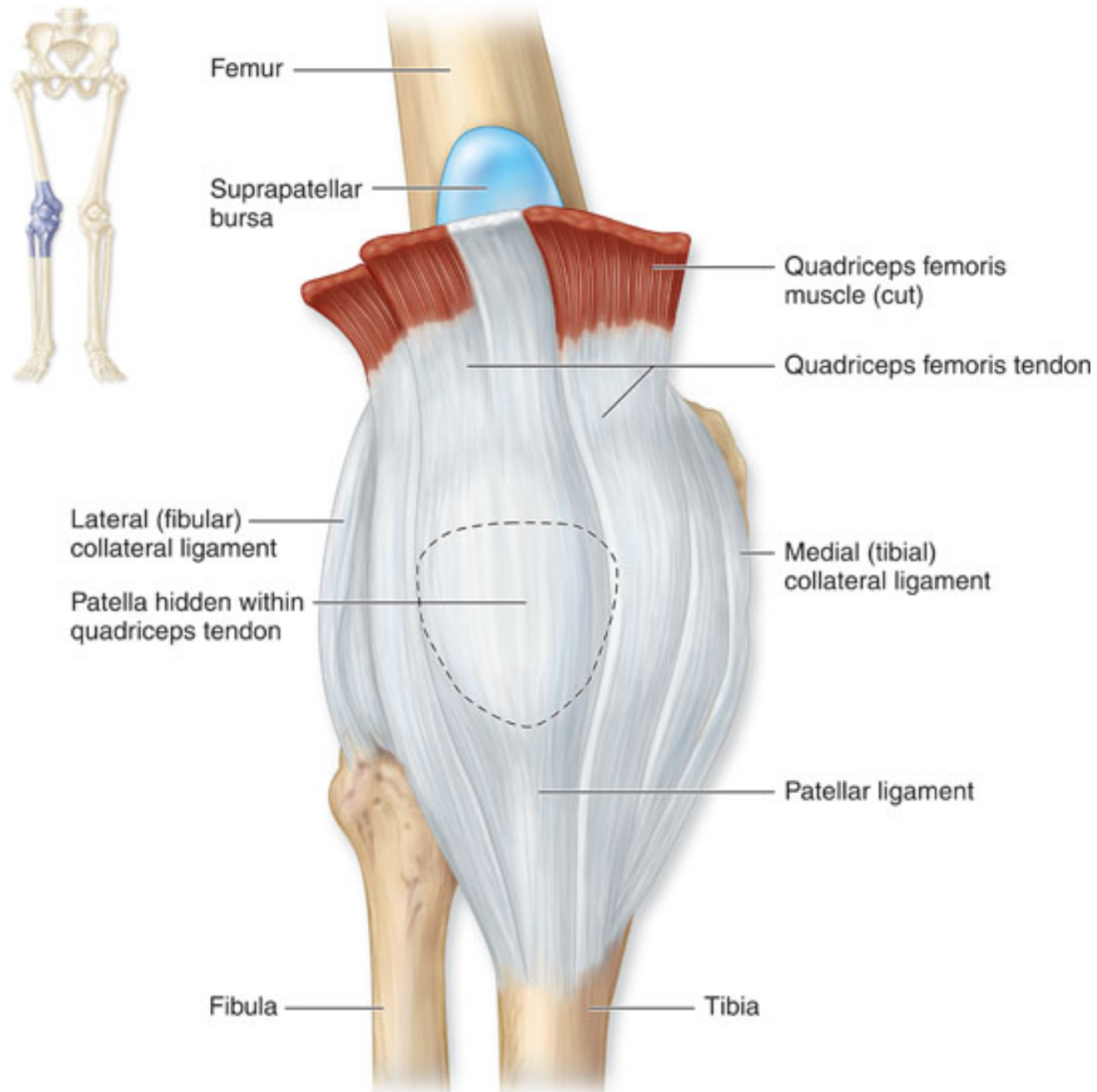




**(b) Posterior view**

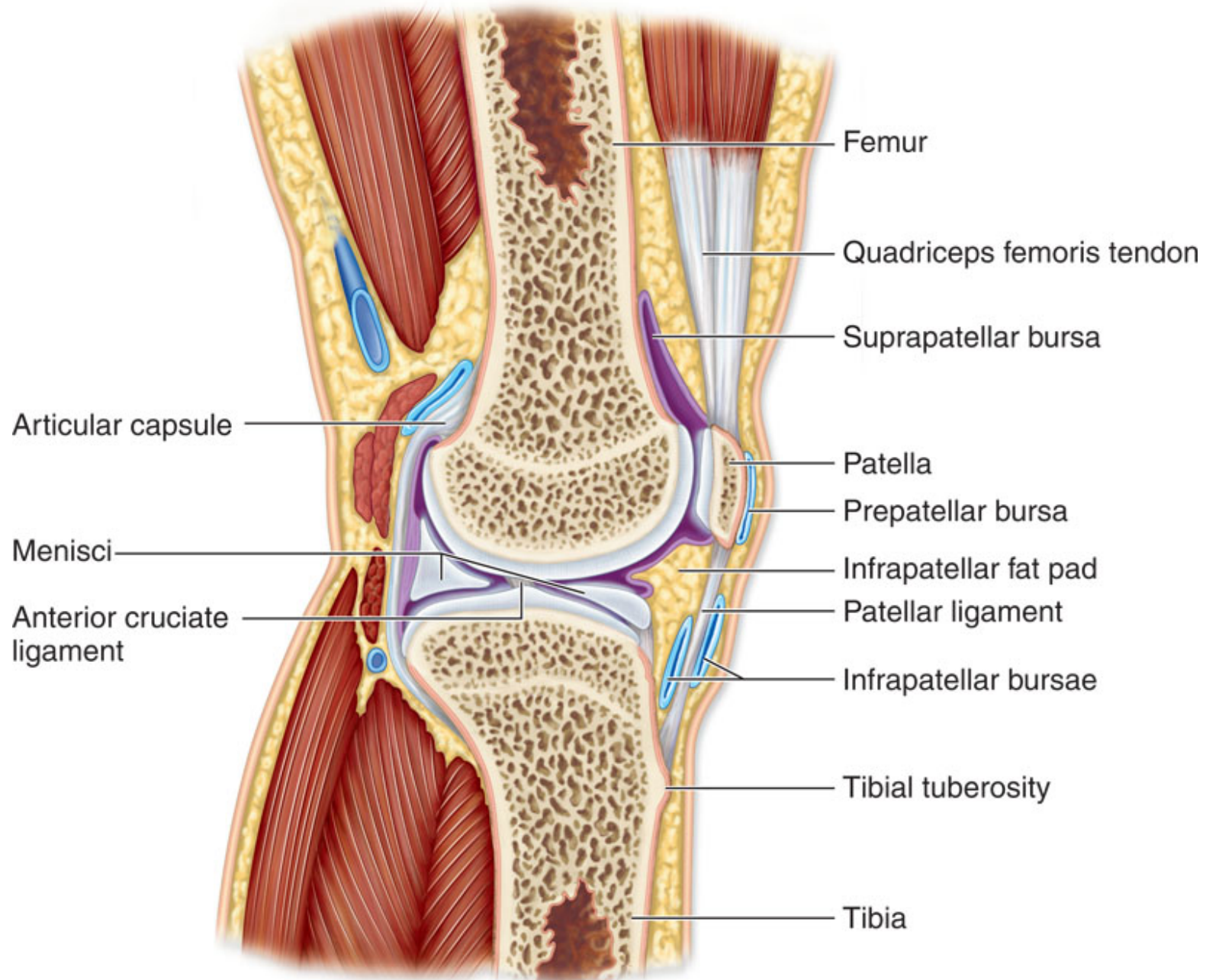


(c) Coronal section

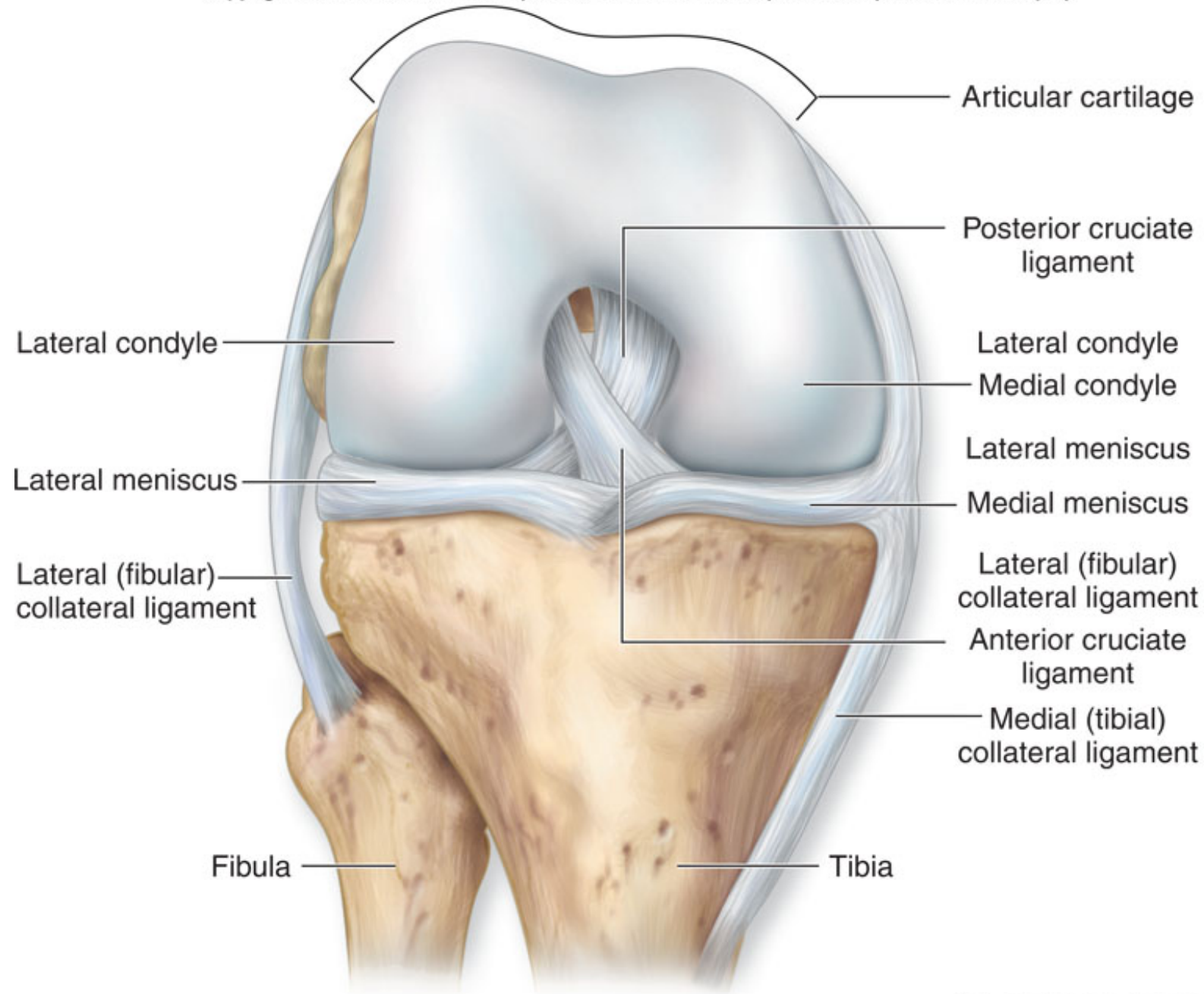


(a) Anterior superficial view

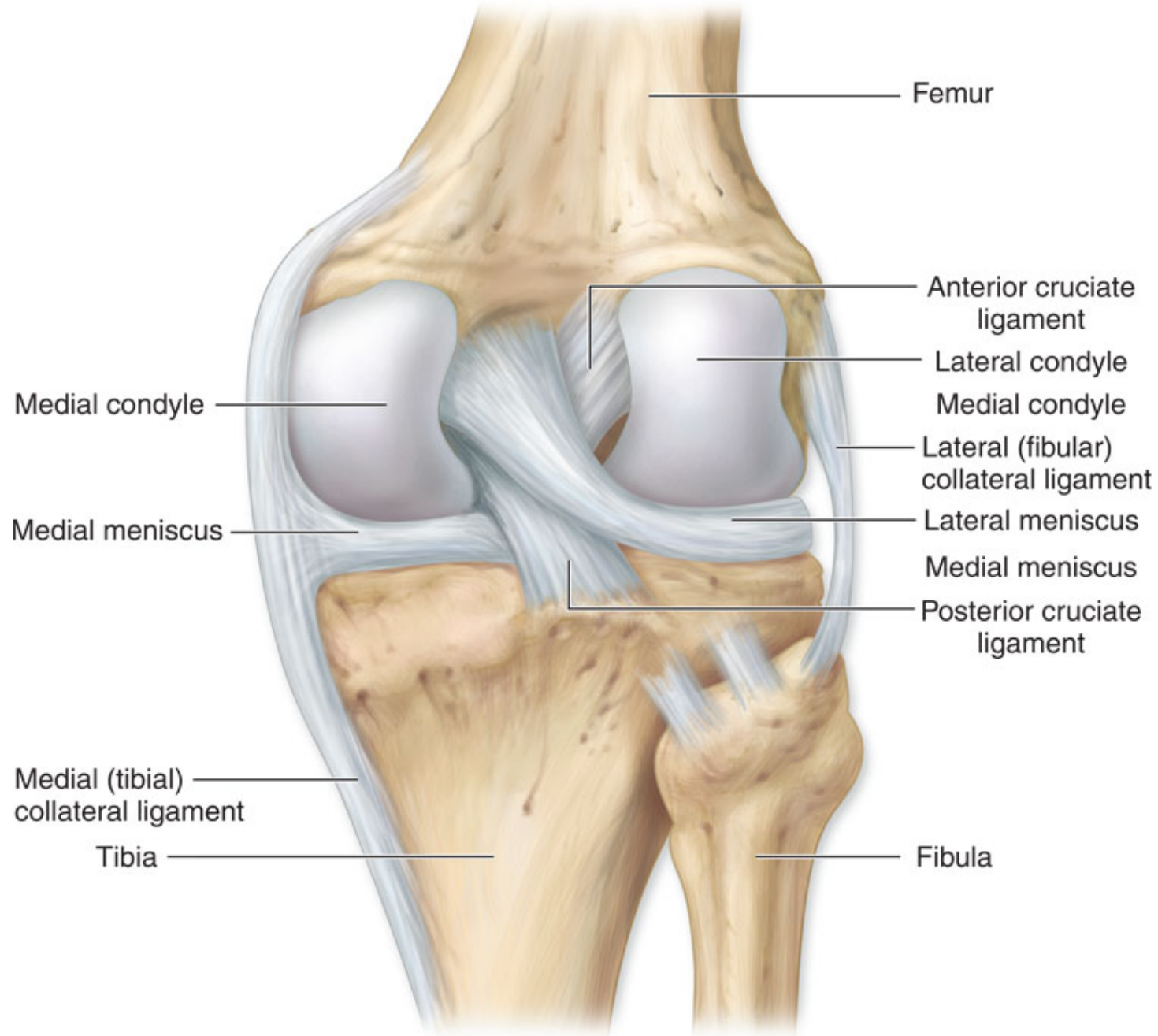




**(b) Sagittal section**

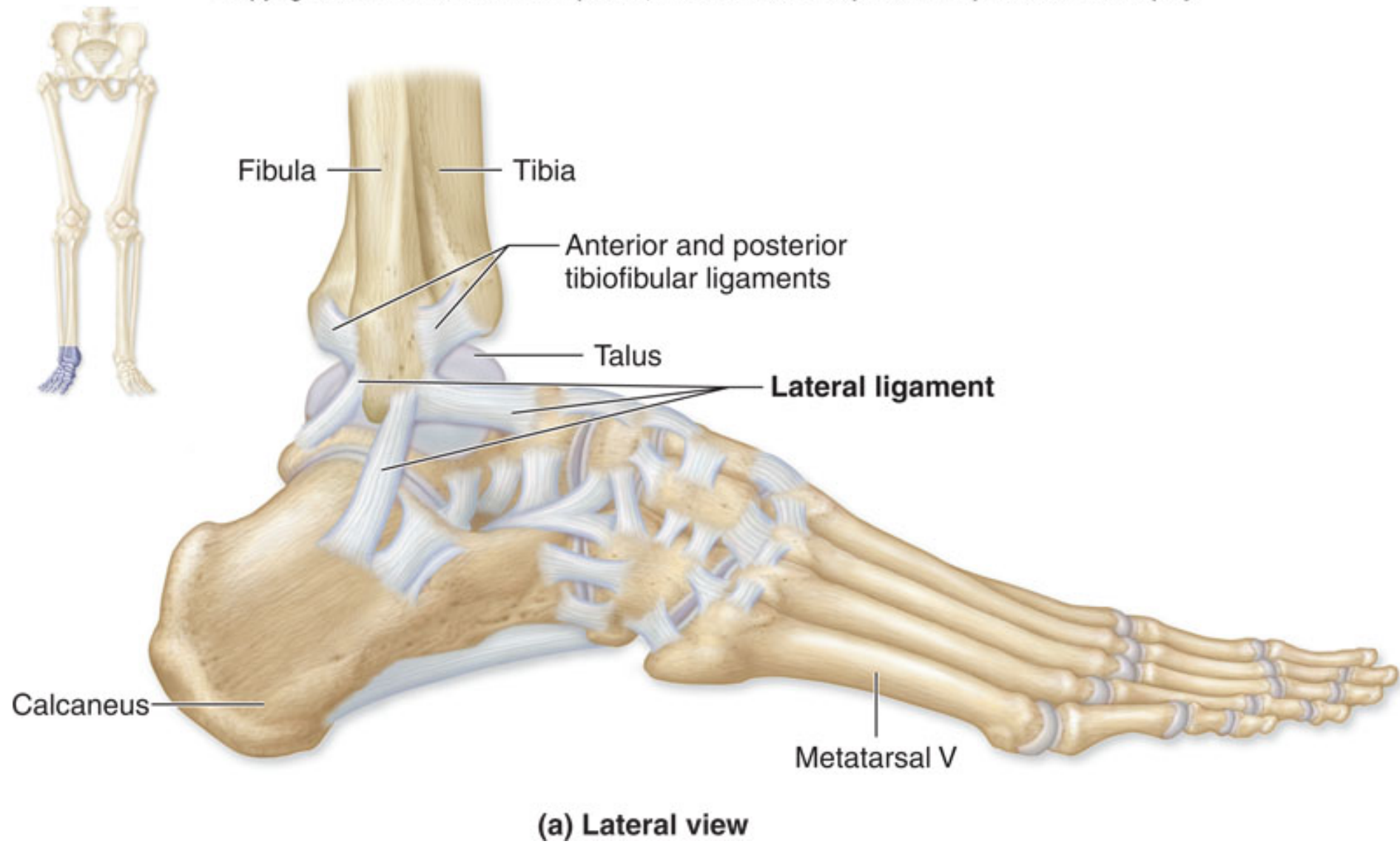


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**(c) Anterior deep view**

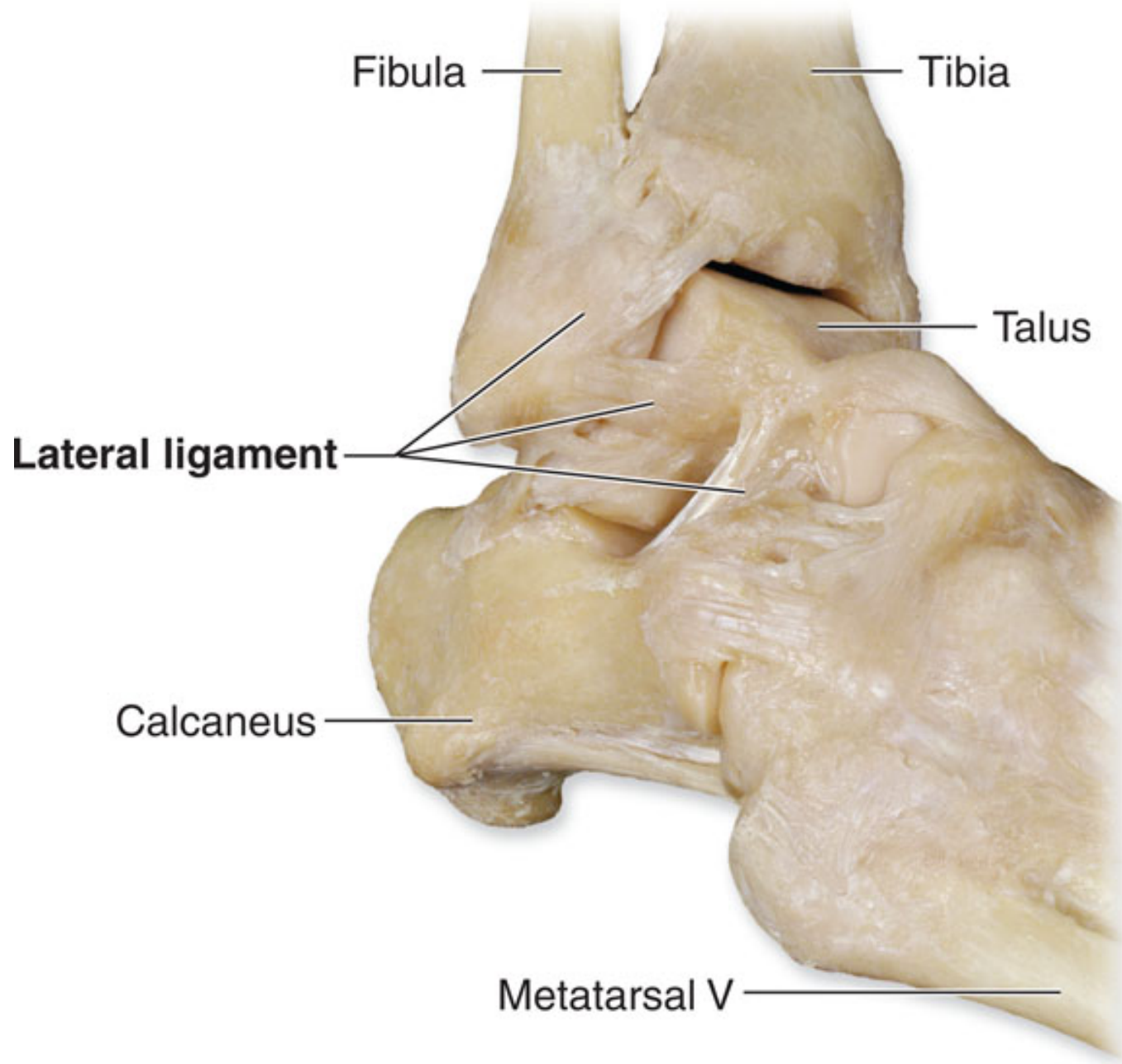


(d) Posterior deep view



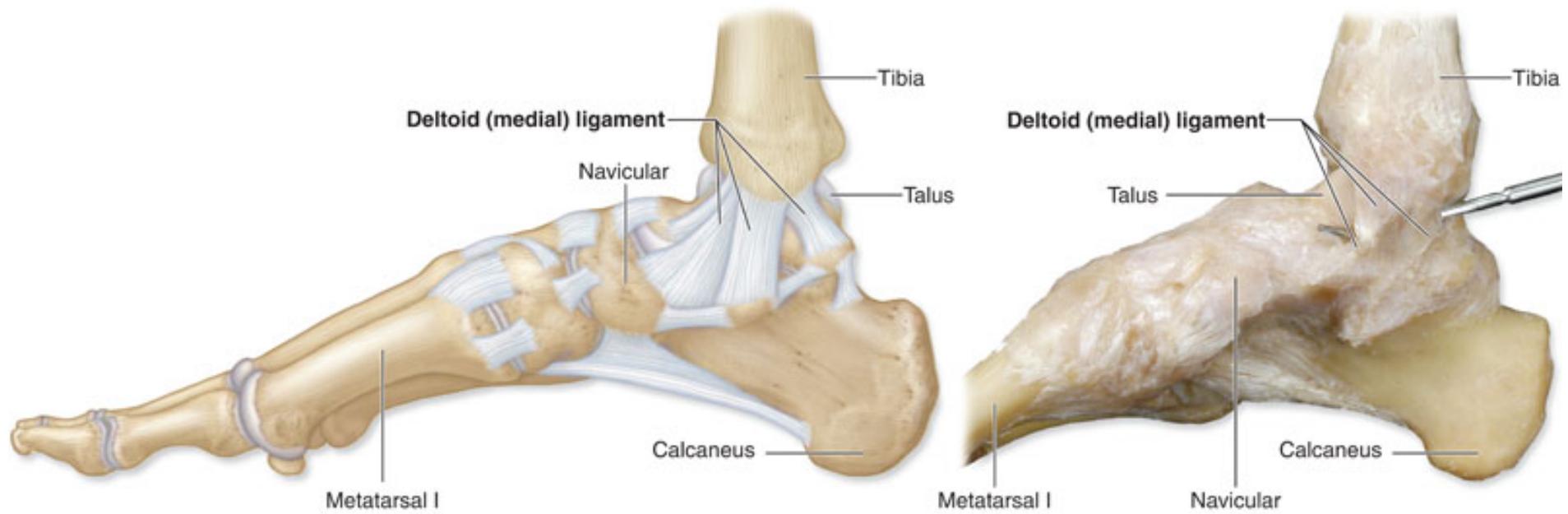




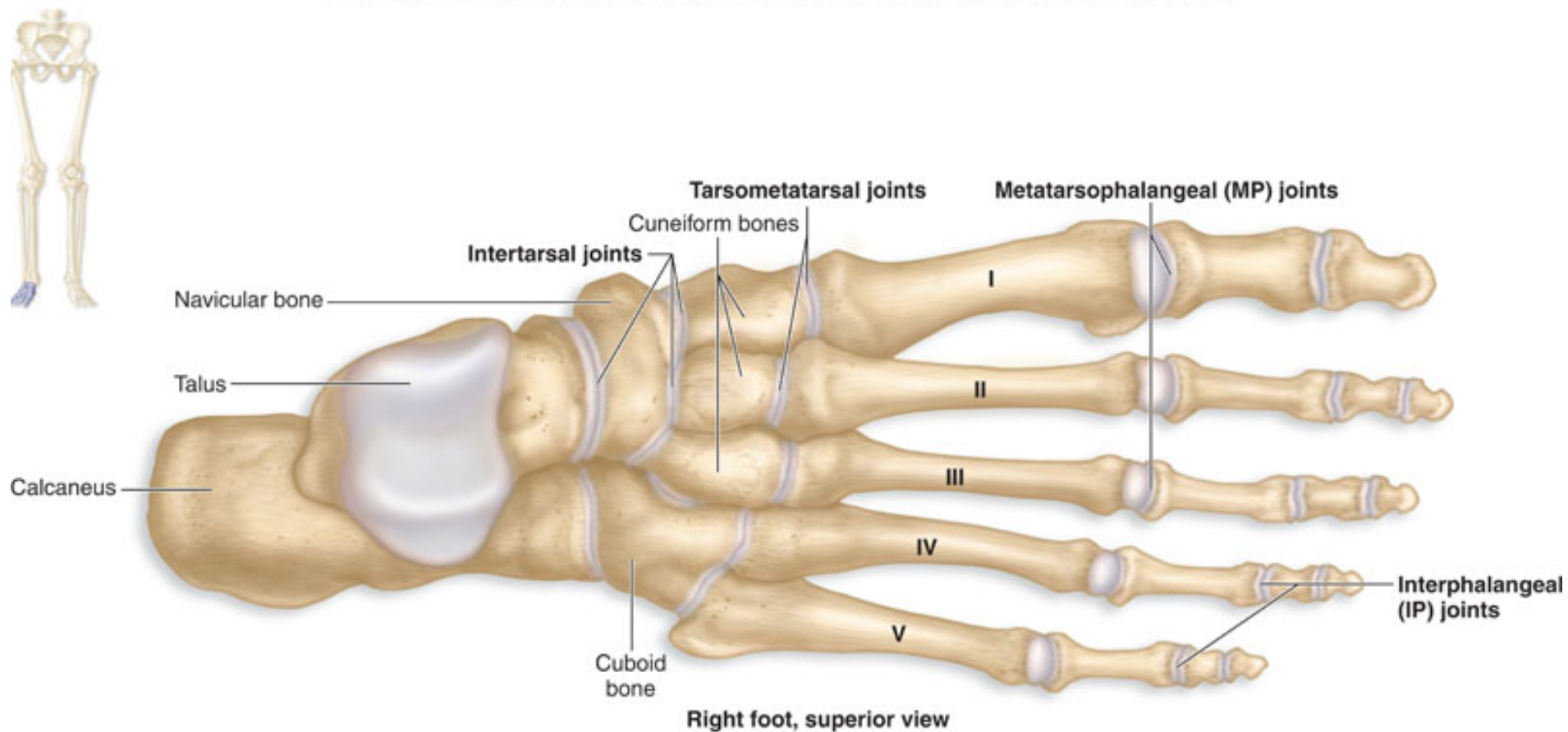


**(b) Anterolateral view**

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(c) Medial view





# Arthritis

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- A group of inflammatory or degenerative diseases of joints that occur in various forms.
  - swelling of the joint
  - pain
  - stiffness
- Most prevalent crippling disease in the United States.
  - gouty arthritis
  - osteoarthritis
  - rheumatoid arthritis