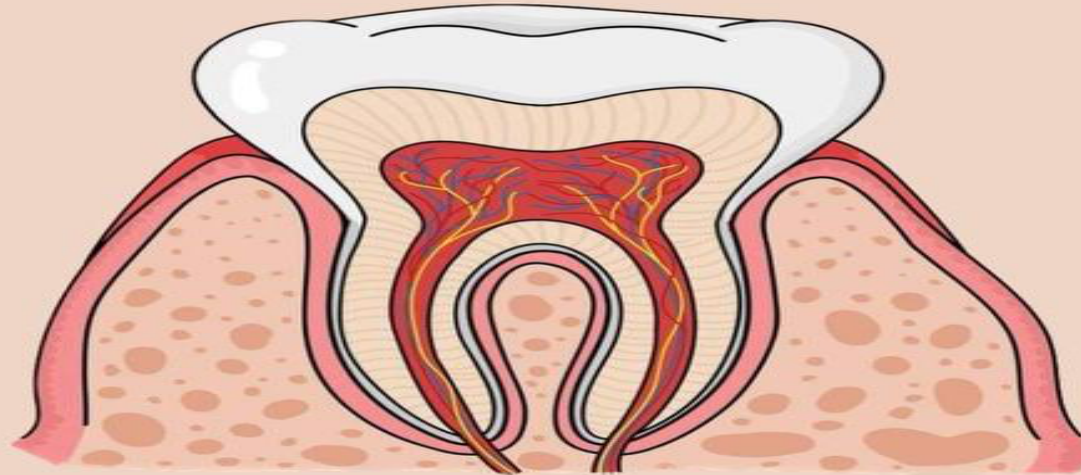




# ANATOMY



LEC NO. : L-6  
DONE BY : Malak Alhuseed

# General Anatomy

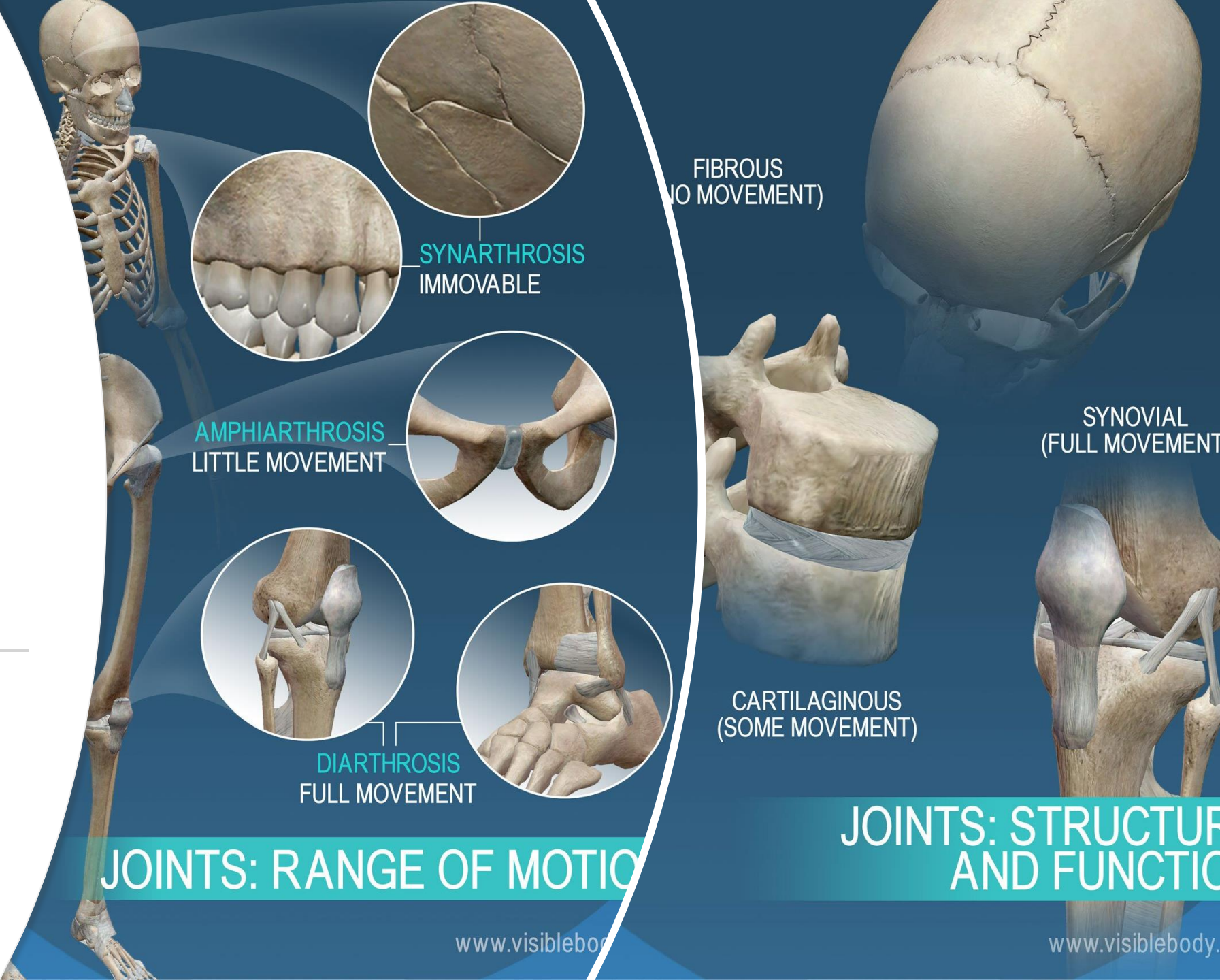
## Joints

Heba Ali

BDS, M.Sc.(Anatomy), Ph.D.  
(Anatomy)

JOINTS: RANGE OF MOTION

www.visiblebody.com



SYNARTHROSIS  
IMMOVABLE

FIBROUS  
(NO MOVEMENT)

AMPHIARTHROSIS  
LITTLE MOVEMENT



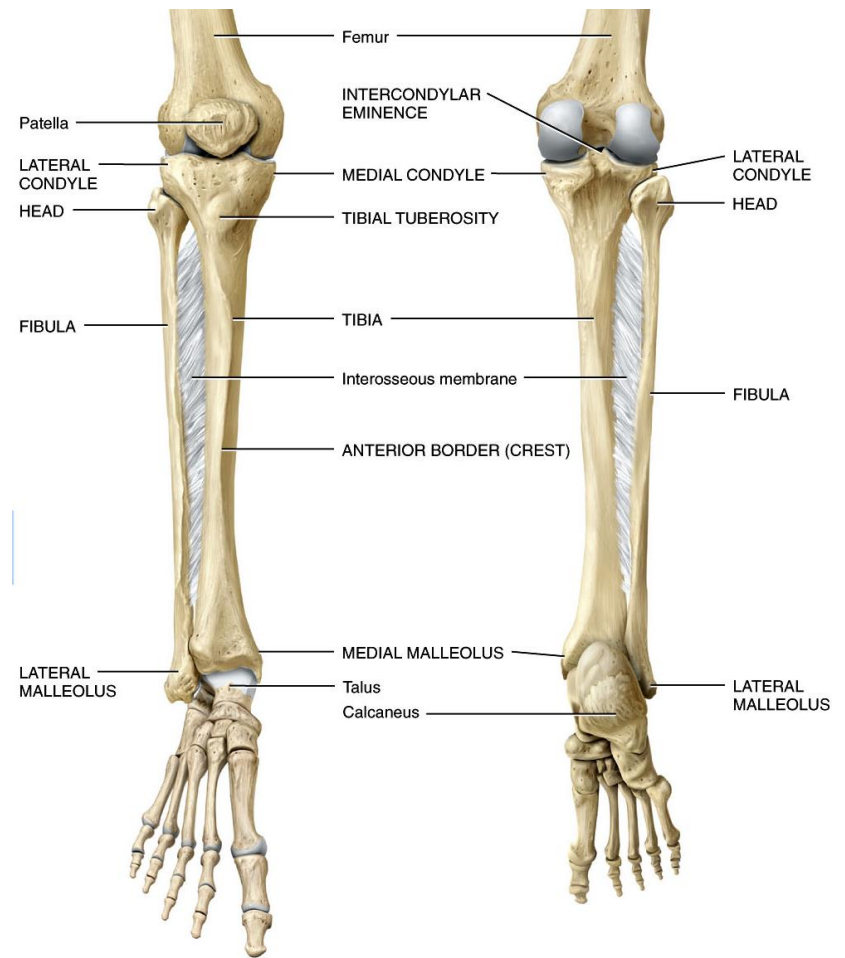
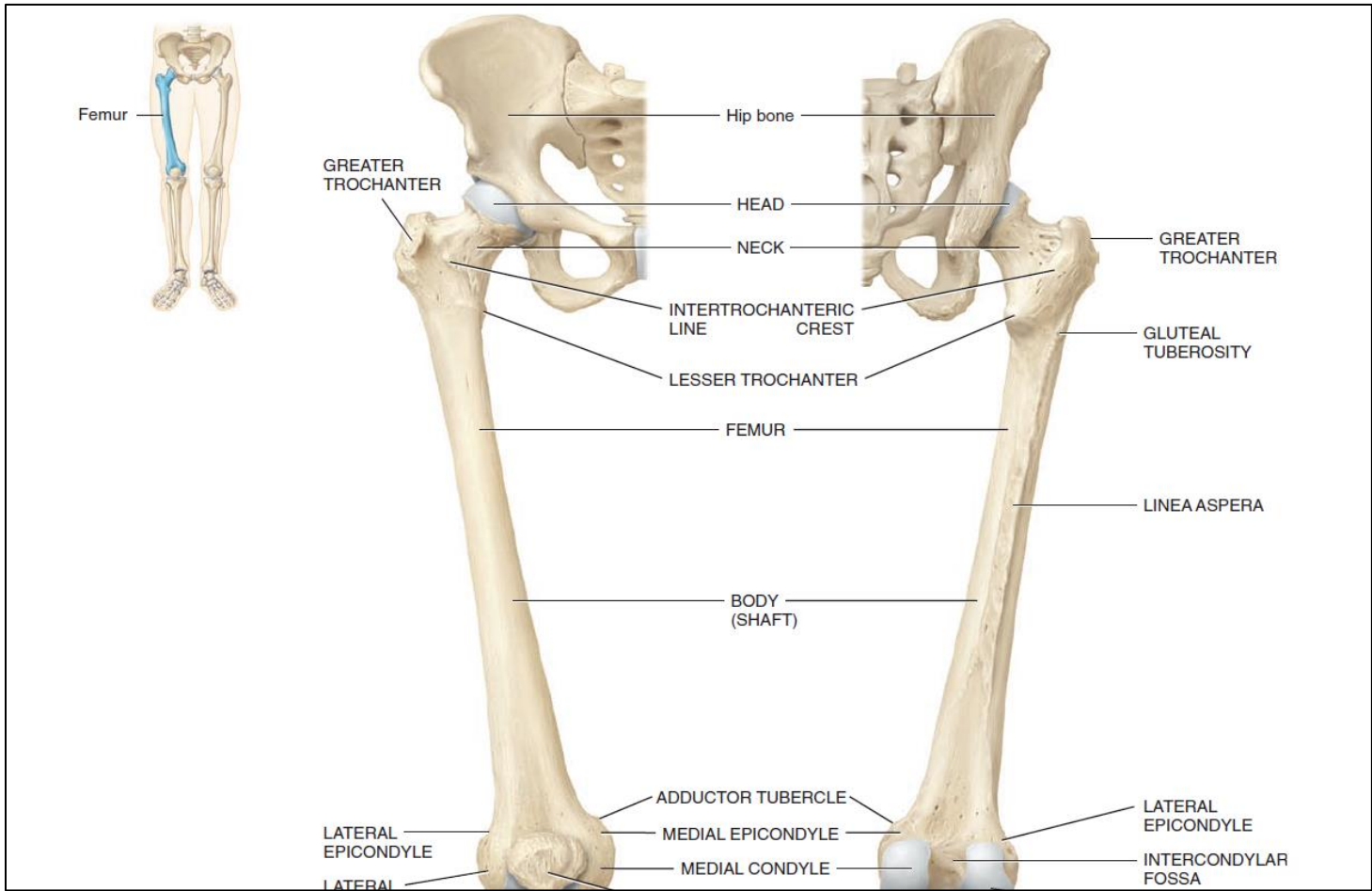
DIARTHROSIS  
FULL MOVEMENT

CARTILAGINOUS  
(SOME MOVEMENT)

SYNOVIAL  
(FULL MOVEMENT)

JOINTS: STRUCTURE  
AND FUNCTION

www.visiblebody.com



(a) Anterior view

(b) Posterior view

1 2  
Definition: a joint is a point where two bones or a bone and cartilage make contact.

3 Point wher Teeth & bone met  
Arthrology: is the science of studying the anatomy and function of joints. → (التهاب المفاصل) arthritis منها اجت كلمة

Can be classified **Structurally:**

- 1. Fibrous joints → الجزء الي يفصل ال 2 bones من
- 2. Cartilaginous joints
- 3. Synovial joints

Or **Functionally:** كيف حركتو بتحرك ما بتحرك

- 1. Synarthrosis (immovable) ما بتتحرك
- 2. Amphiarthrosis (slightly movable) حركة بسيطة
- 3. Diarthrosis (freely movable) بتتحرك

- 1. Fibrous joints >> immobile to slightly mobile joints
- 2. Cartilaginous joints >> immobile to slight movement
- 3. Synovial joints >> freely movable joints دايمًا بيتحرك

# Fibrous joints

- Immovable or limited movement
- No joint cavity
- Types:

لا يوجد مسافة بين bones  
The bones almost  
Attach to each other

1. **Sutures of skull** (immobile).<sup>3</sup> حكيما عنهم بالمحاضرة

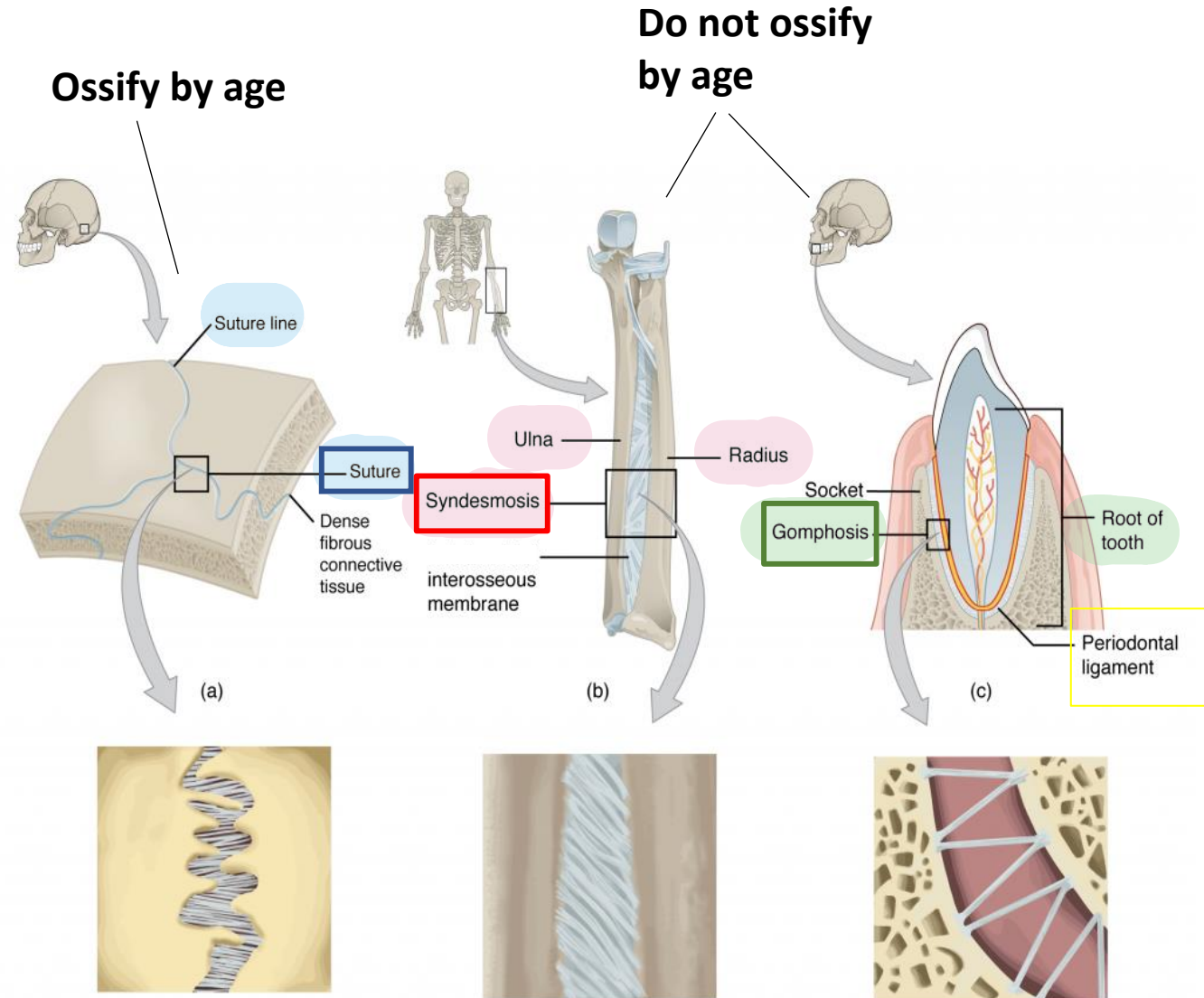
2. **Syndesmoses**; two bones are connected by strong fibrous tissue (slight movement)

1. **Interosseous membrane**, between radius and ulna. <sup>2</sup> Fibula & tibia

قوي جدا 2. **Ligament**, Distal tibiofibular joint.

3. **Gomphoses**; fibrous joints between the roots of the teeth and the alveolar part of the maxilla and mandible (immobile).

بكون فيه fibrous tissue & conctive tissue ما بين Alveolar bone (عظام فيها فراغات) و tooth اسمو Periodontal ligament



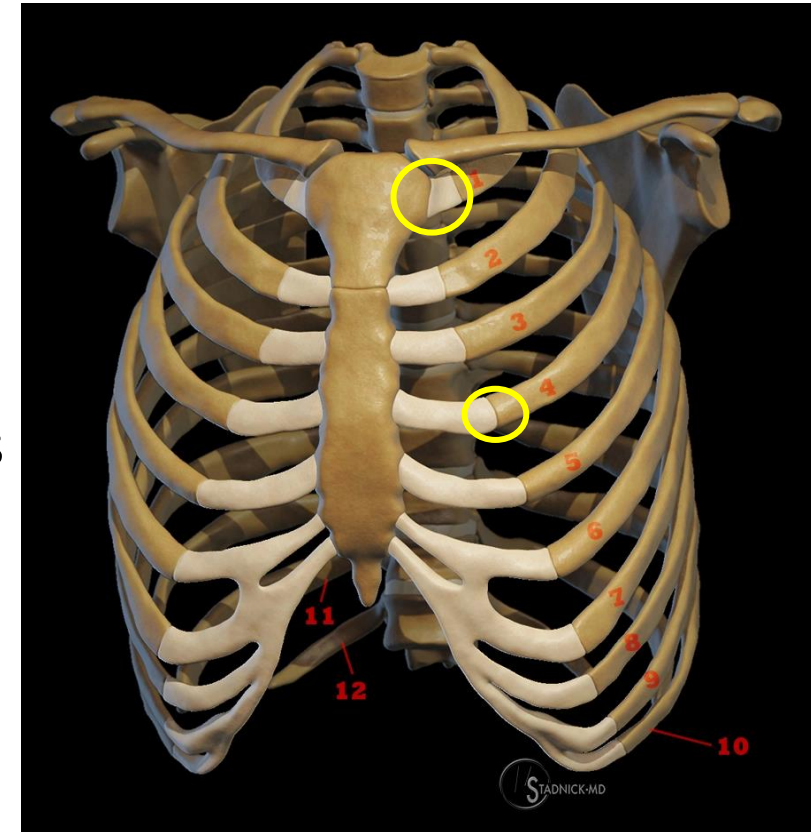
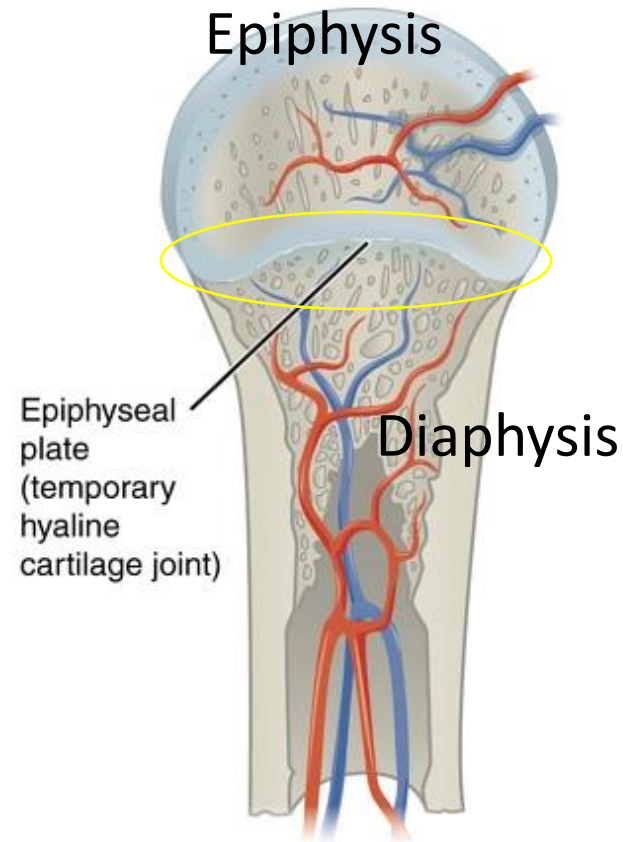
# Cartilaginous joints

يمكن انهما ما يتحرك او حركة صغيرة فيه

- When two bones articulate with each others by cartilage Or bone مع cartilage
- Hyaline cartilage and fibrocartilage

1. **Primary (synchondroses)** will ossify with age, e.g., joint between first costal cartilage and manubrium الجذع الاولى and joints between epiphysis and diaphysis in growing long bone.

## Synchondrosis



# Cartilaginous joints

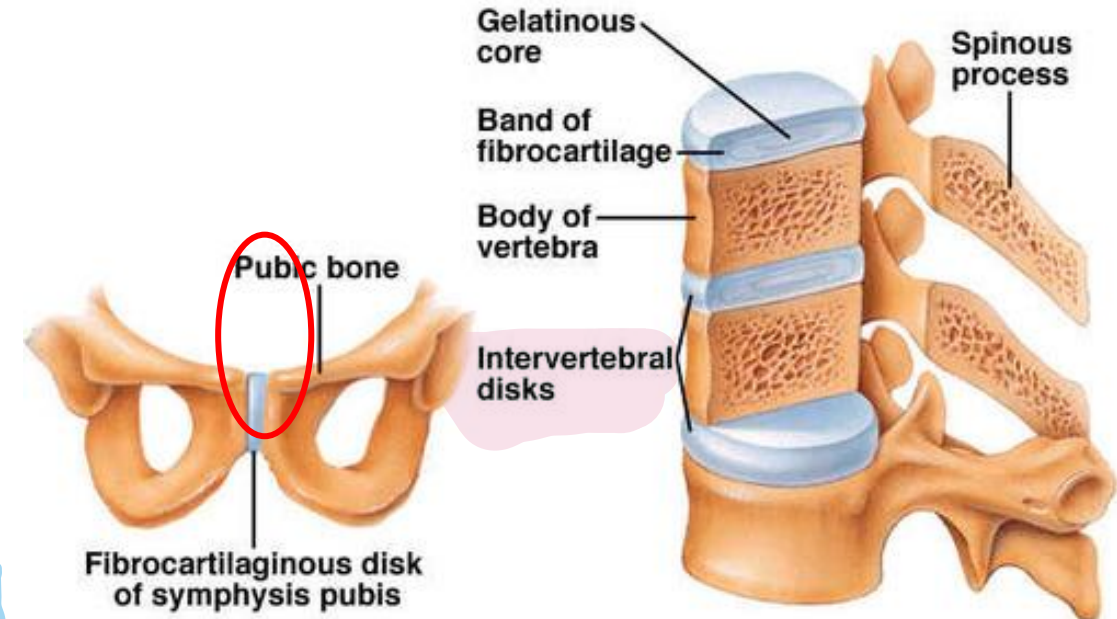
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## Cartilaginous Joint — Symphysis

### 2. Secondary cartilaginous joints

**(symphysis):**

when two bones are joined with fibrocartilage. e.g., **intervertebral disk** and **pubic symphysis**.



قرص موجود في vertebral وظيفته تمتص الصدمات لحد معين  
وبساعد في الحركة يعني يتحمل الضغط بسس ممكن بصيرله كسر  
و content الي فيه بتطلع وبتاثر على nerve الي بتطلع من  
intervertebral furamena

بكون بين 2hip bones in the midline

# Synovial joints

1. Freely movable and has a joint cavity

2. Consists of:

يعني في space between 2 articulates bone

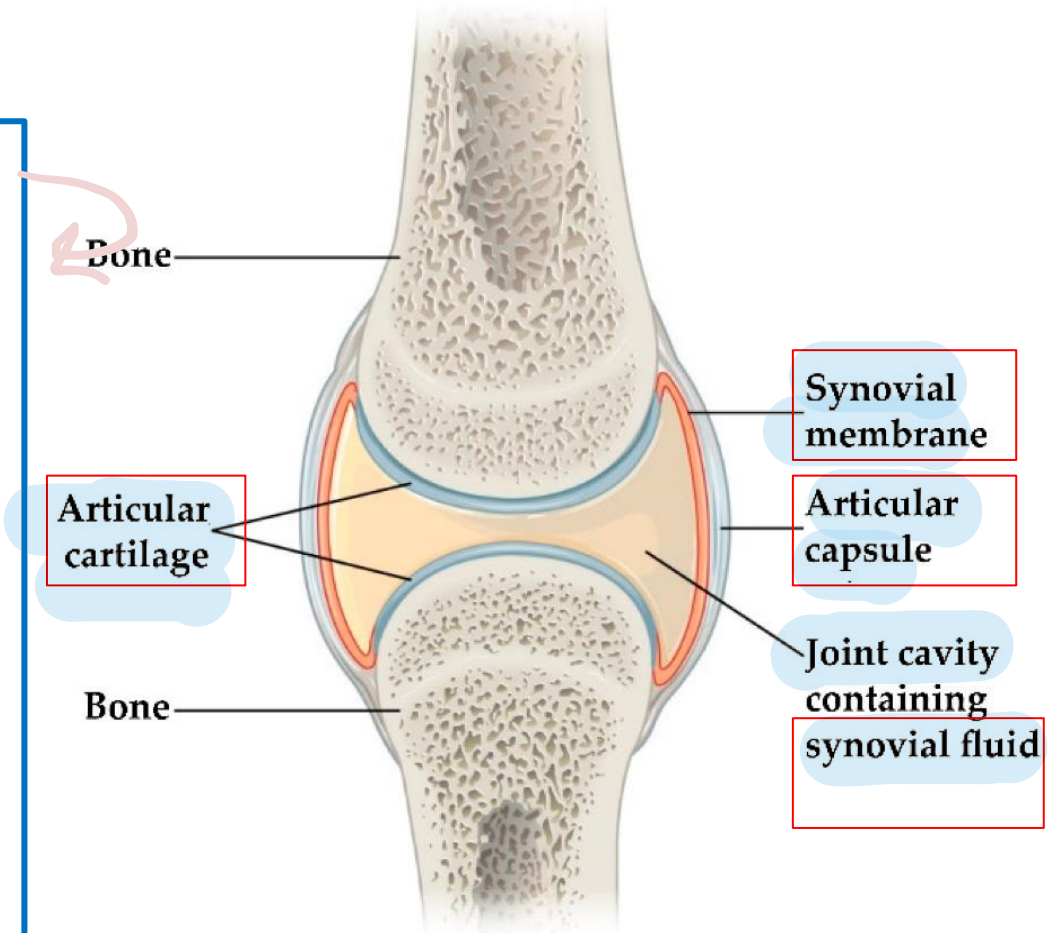
➤ **Articular hyaline cartilage** covering the articular surfaces of bone

➤ **Fibrous capsule** بتغطي من outside

➤ **Synovial membrane**: lines the fibrous capsule from inside and the margins of the articular surfaces اطراف

➤ **Synovial fluid (Synovia)** the synovial membrane secretes synovial fluid

Fibrous capsule lined with membrane called synovial membrane من بتكون cells بتفرز synovial fluid



**Hyaline cartilage is avascular !**

طبعا اي synovial joint لازم يكون الة joint cavity مليانه fluid ال fluid بتوفر ليونة بتساعد على الحركة



اربطه : بتثبت joint مكانو

# Synovial joints

## ➤ Accessory Ligaments and Articular Discs

ممکن بتكون موجودة وممكن لا:

بفصل 2

articulater joint

- **Articular disks (TMJ and sternoclavicular joint)**

بتشبهه المخدات

- **Menisci** Pads of cartilage lie between the articular surfaces of the bones, allow bones of different shapes to fit together more tightly (**Knee joint**) <sup>3</sup>

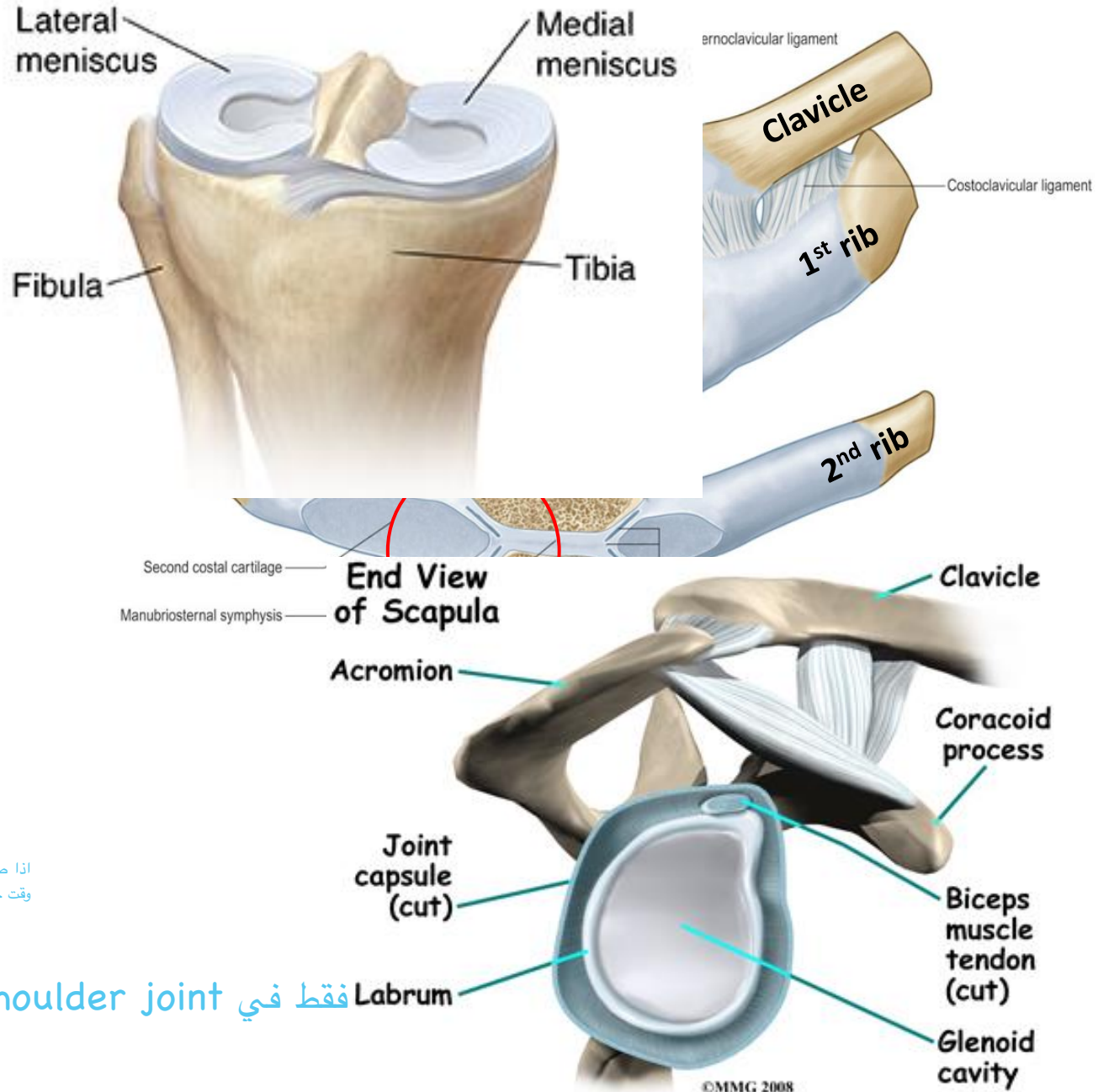
موجودة فقط في مفصل الركبة :

الرباط الصليبي

- **1 Collateral ligaments & 2 cruciate ligaments**

اذا صارو cut يحتاج وقت حتى يتعافى

- **Tendons; tendon of long head of biceps brachii.** جزء من humenas



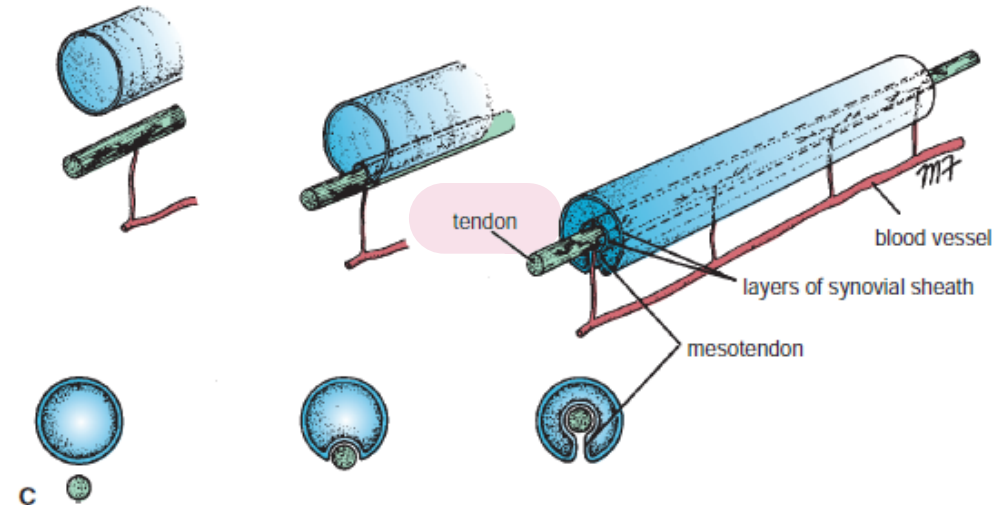
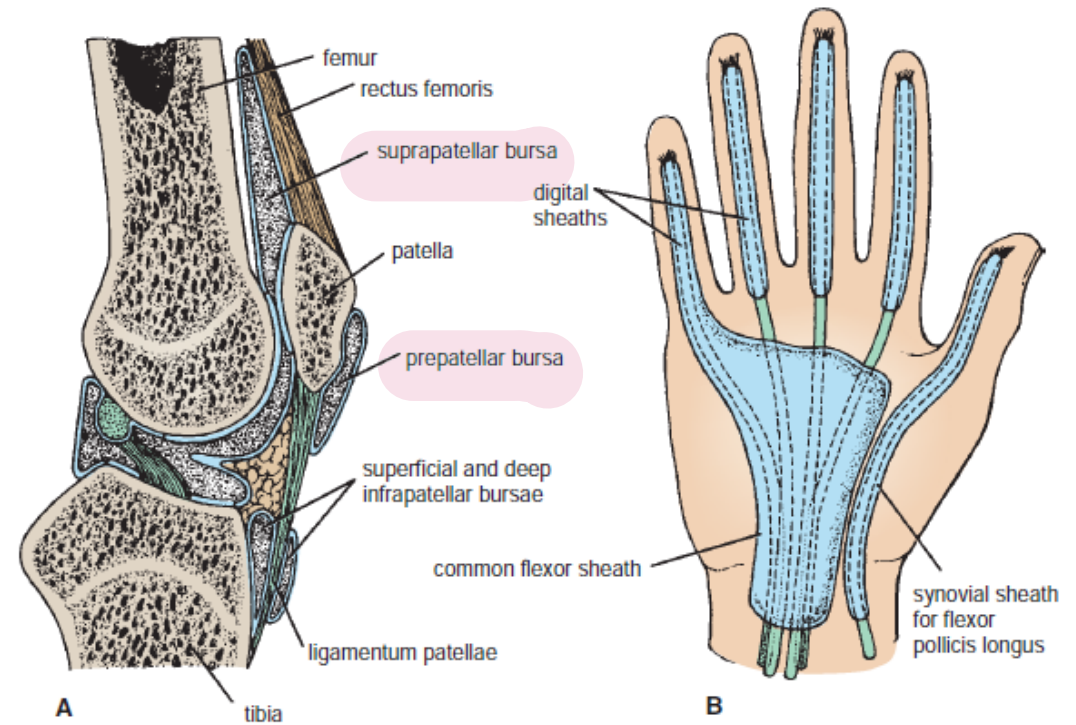
## ➤ Bursae and Tendon Sheaths

- **Bursae:** sac-like structures containing fluid similar to synovial fluid
- Located between tendons, ligaments and bones
- Cushion the movement of these body parts
- **Tendon sheaths:** Tube-like bursae that rap around tendons to reduce friction at joints

تقلل من احتكاك المفاصل

كيس صيني من الداخل  
synovial membrane

← في الداخل

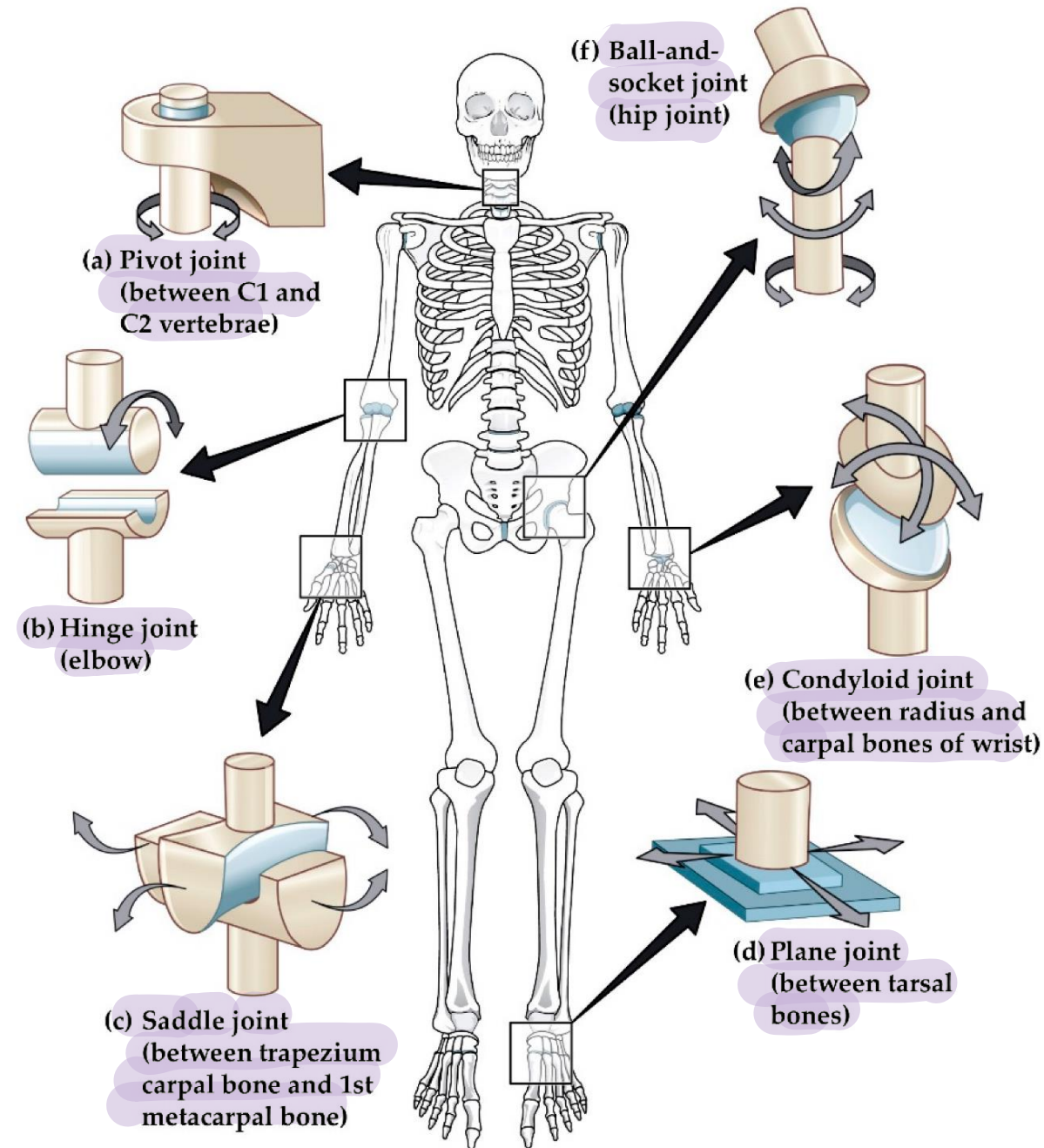


• Can be classified according to the shape of articular surfaces:

- Pivot joint
- Hinge joint
- سرج ➤ Saddle joint
- Plane joint
- Condyloid joint
- Ball and socket joint

Or according to the axis around which the movement occur:

- **Uniaxial** movement around one axis only
- **Biaxial** movement around two axes
- **Multiaxial** movement around more than two axes

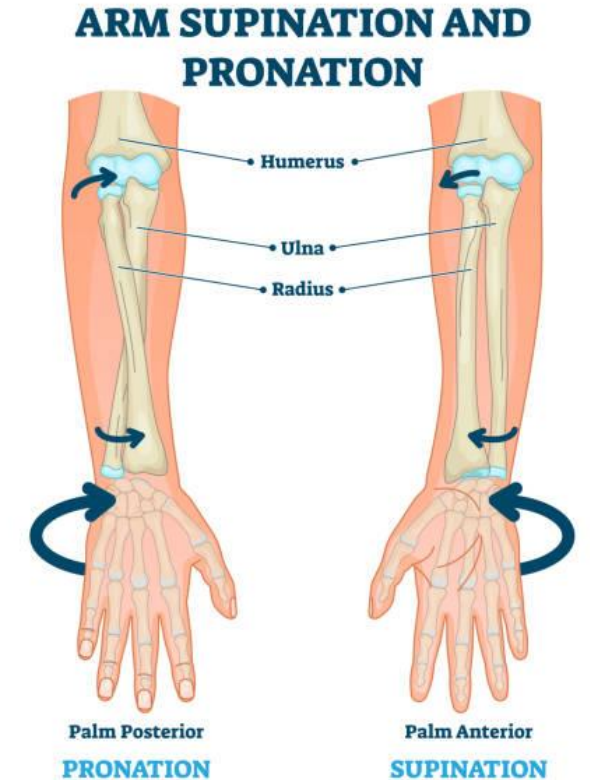


# Pivot joints

بتكون الحركة 180°  
من اليمين الى اليسار

one axis

- Uniaxial joints
- Rotation around longitudinal axis
- Examples: median atlanto-axial joint and proximal radioulnar joint.



① Pronation and supination  
between Radius  
and Ulna

② between axis  
and atlas

le joint  
pezium

# Ball and socket joints

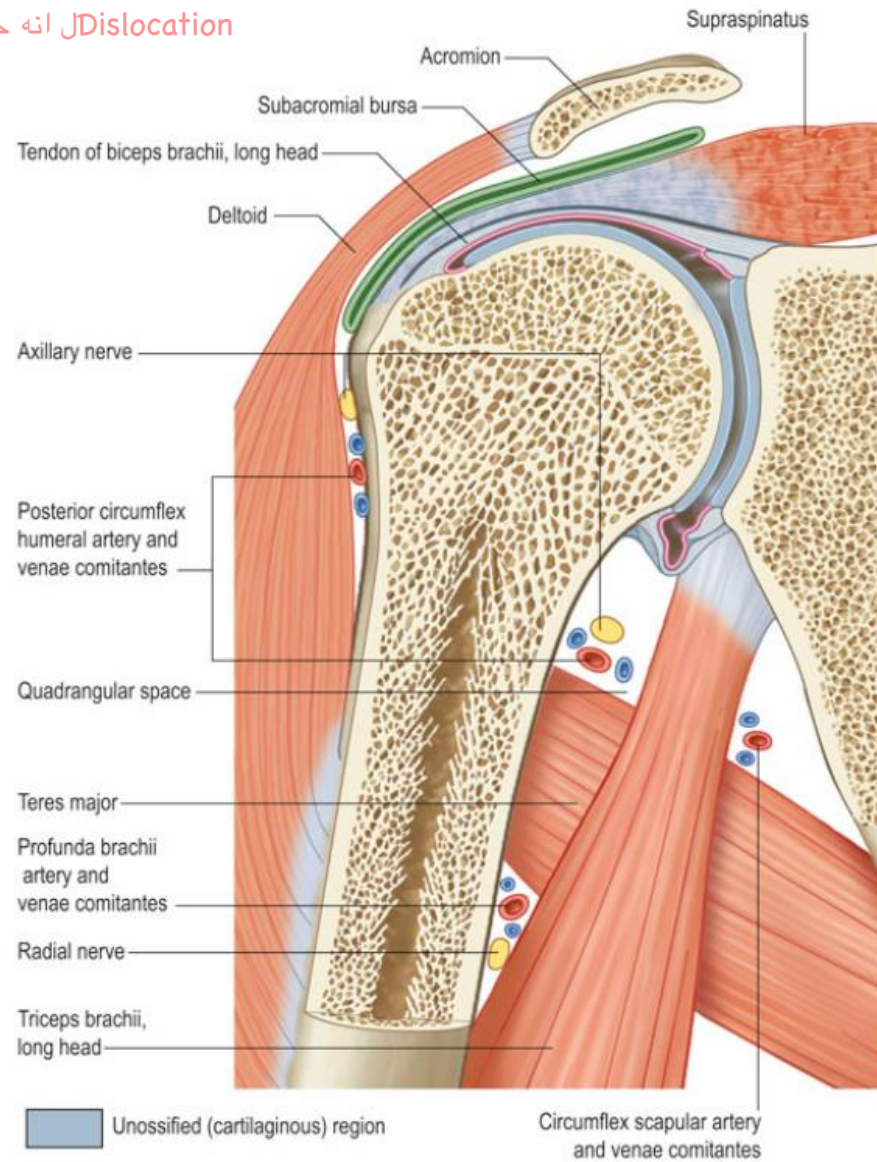
Between the scapula and humerus

Glenohumeral joint (shoulder joint)

- Most mobile and most frequently dislocated
- **Ball and socket joint, multiaxial**
- A fibrocartilaginous rim named **glenoid labrum** deepens the glenoid cavity



اکثر جزء بصيرله  
Dislocation لانه جميع

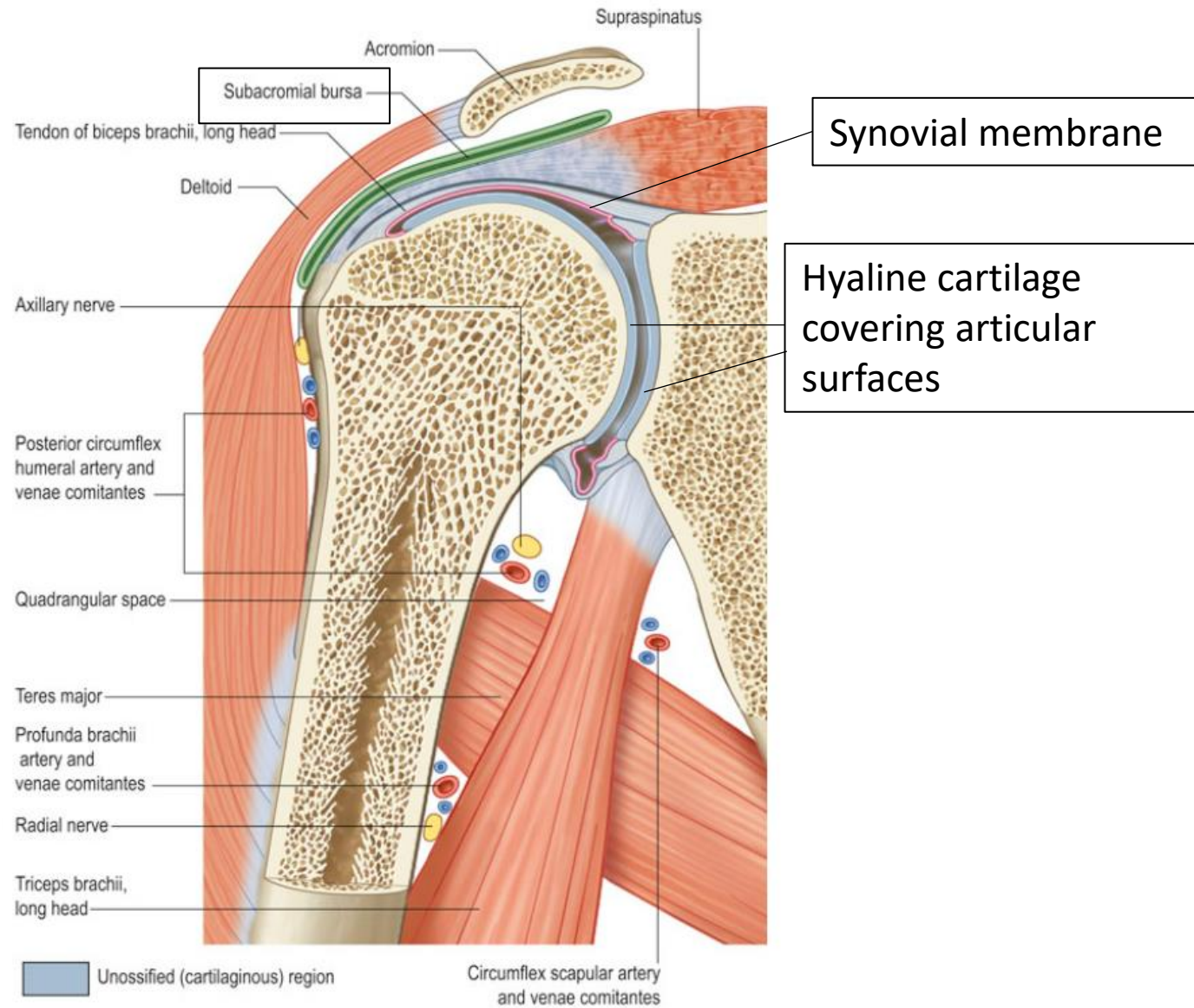


# Ball and socket joints

## Glenohumeral joint (shoulder joint)

**Bursae** is a synovial fluid-filled sac develops at points of friction

Movements:  
Flexion-Extension  
Adduction-Abduction  
Medial rotation-Lateral rotation



# Ball and socket joints

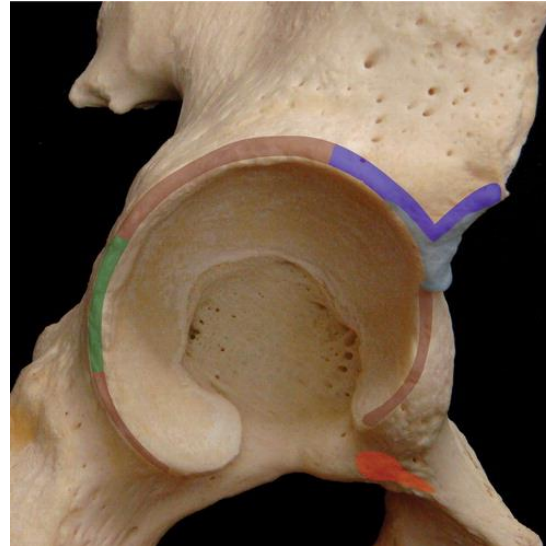
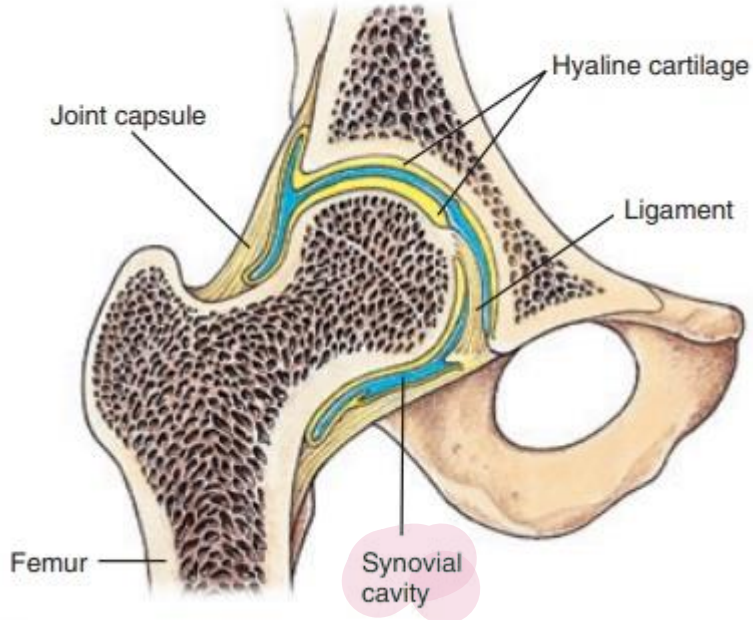
between pelvic acetabulum and the head of femur

## Acetabulo-femoral joint (Hip joint)

- More stable compared to shoulder joint (shape of articular surfaces).

اكثر استقرارًا

because



head of the femur and pelvic acetabulum

### Movements:

Flexion-Extension

Adduction-Abduction

Medial rotation-Lateral

rotation

Just more stable

than shoulder joint

Transverse  
ligament

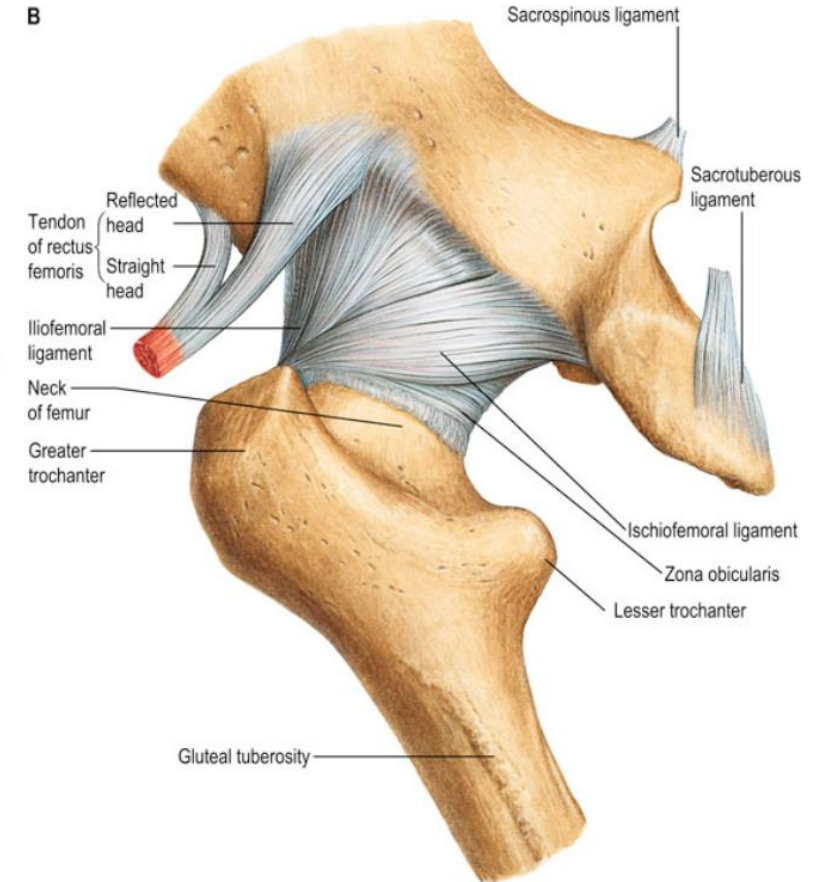
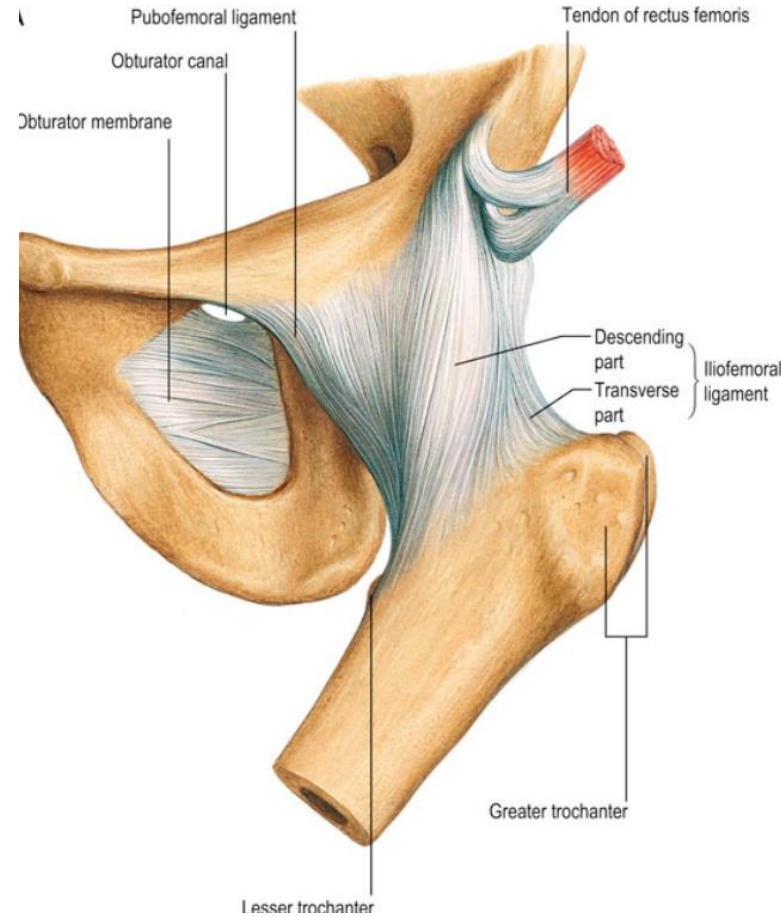
# Ball and socket joints

## Acetabulo-femoral joint (Hip joint)

### Ligaments of hip joint:

1. Iliofemoral ligament
2. Pubofemoral
3. Ischiofemoral

Ligaments are important in connecting bones and providing support and stability to the joint





# Hinge joints

→ two bones allows movement only one plane

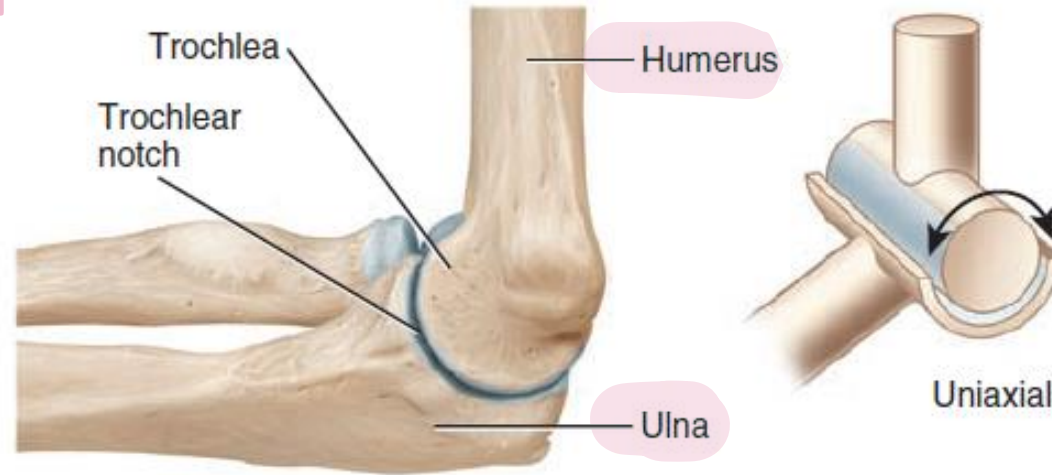
Elbow joint →

صبي فملياً بين  
Humerus / Ulna  
يس Radia  
و قطعة اساسية فيه

Humerus, radius and ulna.

**Uniaxial joint** → one axis

Movement: flexion-extension

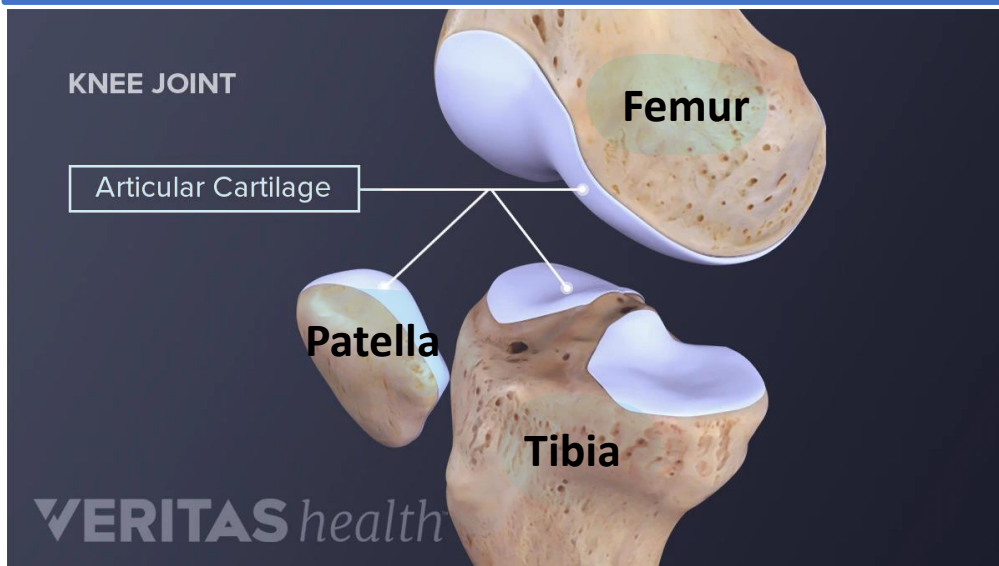


(b) Hinge joint between trochlea of humerus and trochlear notch of ulna at the elbow

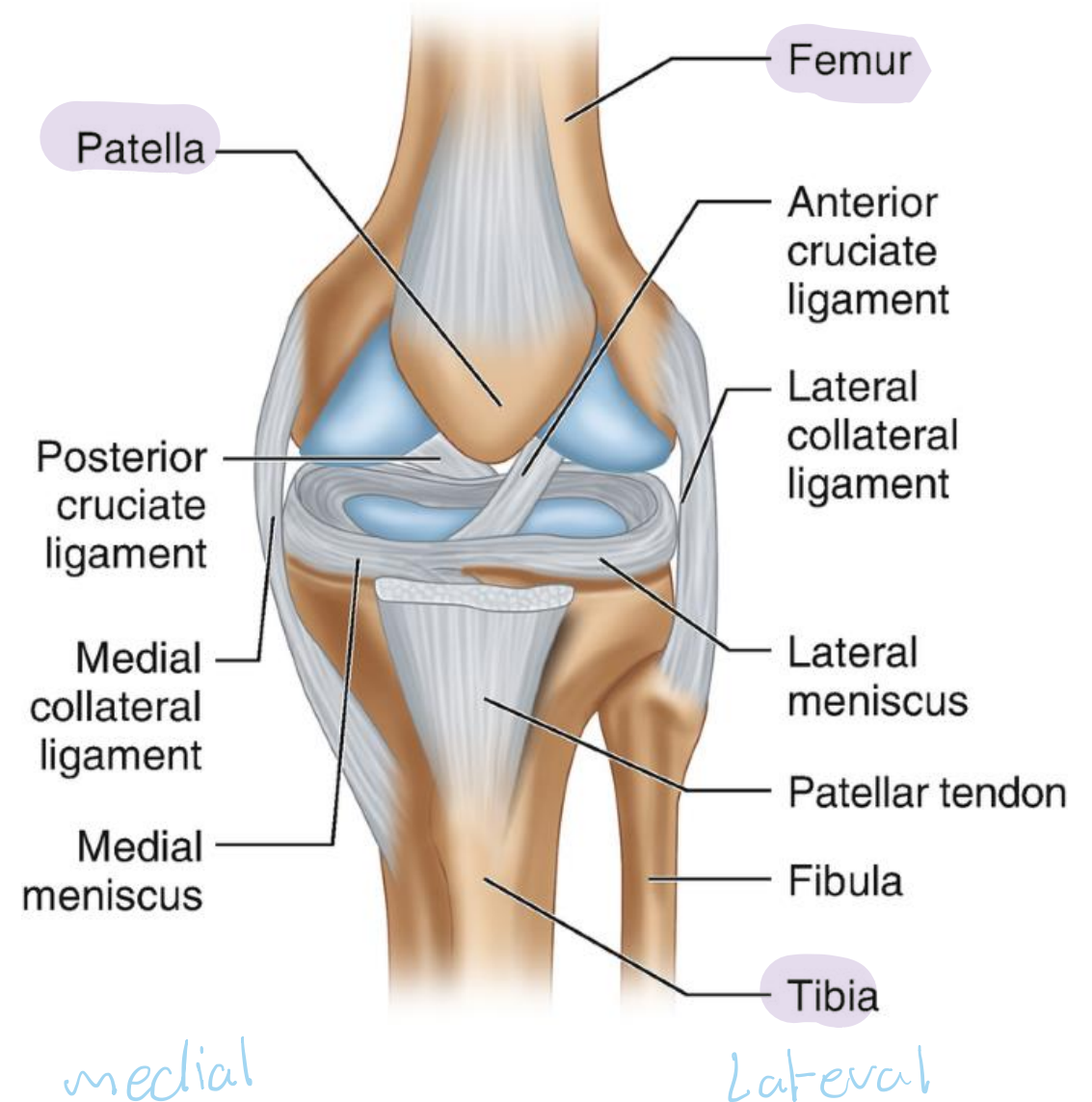
# Hinge joints

Knee joint → *between Tibia and patella*

- The largest and most complex joint in the body
- The most commonly injured
- **Modified hinge joint, uniaxial**
- Minimal medial and lateral rotation



**But not Fibula!!**



# Hinge joints

## Knee joint

Intra-capsular structures:

• Ligaments:

1. Anterior cruciate ligament (ACL)

2. Posterior cruciate ligament (PCL)

• Menisci (crescent-shaped fibrocartilage), increase fit and act as cushion:

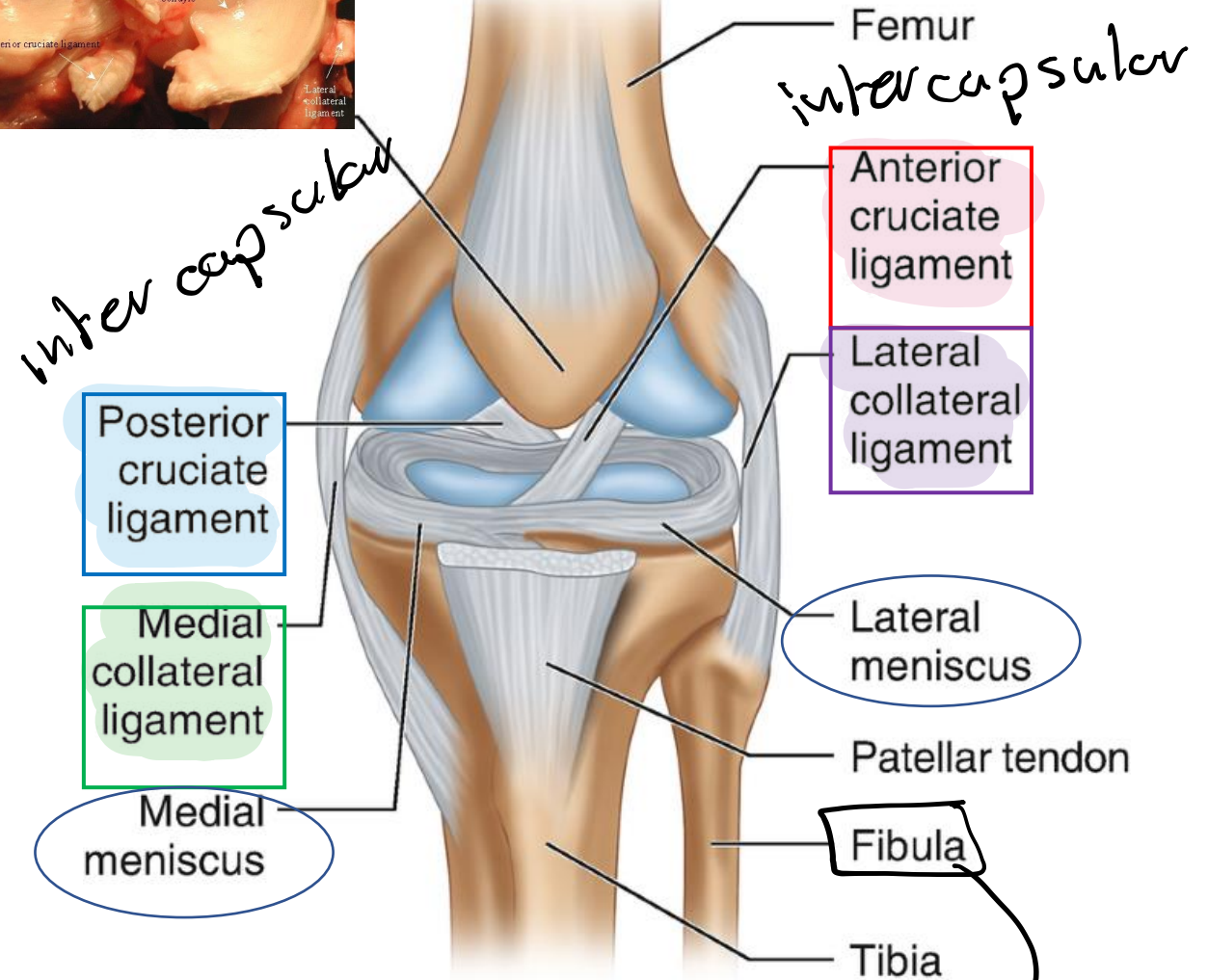
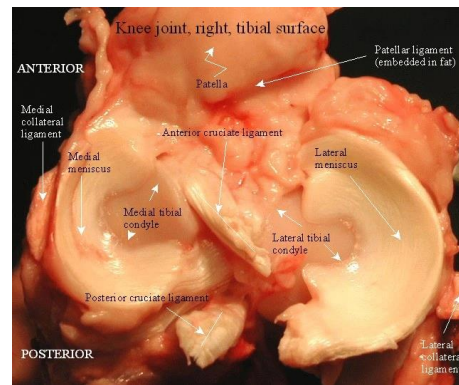
1. Medial meniscus
2. Lateral meniscus

Extracapsular ligaments

1. Medial collateral ligament

2. Lateral collateral ligaments

There are a number of bursae that protect the knee joint.

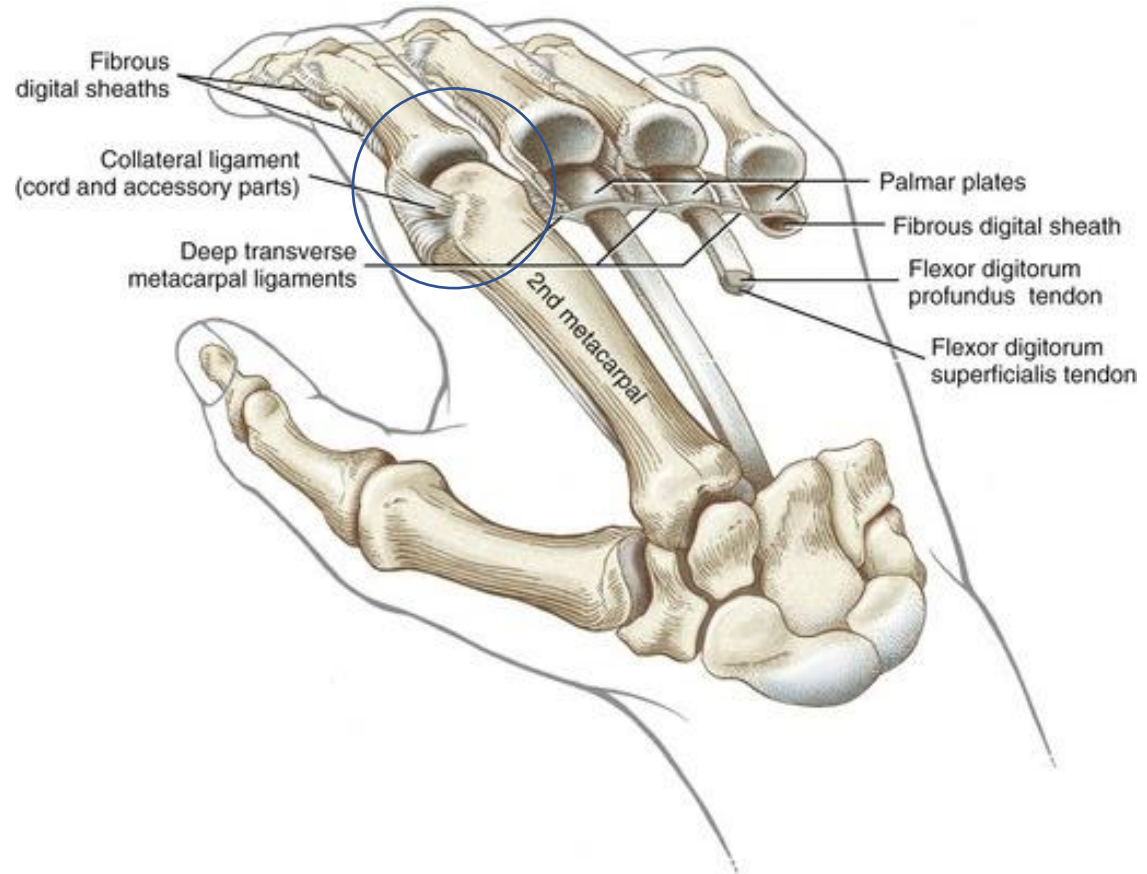


# Condyloid and ellipsoid joints

↳ the forearm and hand

- **Biaxial joints**
- **wrist joint (ellipsoid).**
- **Metacarpophalangeal joint (knuckle joint) as condyloid joint.** ↳ عقد الاصابع

Movement:  
Flexion-Extension  
Adduction-Abduction



# Saddle joints → خاص بالك بهما

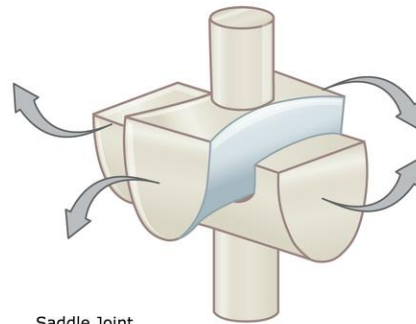
- **Biaxial joints**

1<sup>st</sup> carpometacarpal joint (thumb) and sternoclavicular joint.

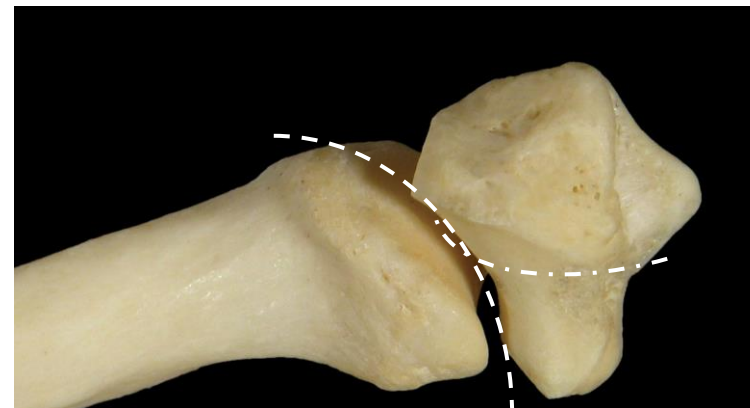
Bones have concave-convex articular surfaces and resemble a saddle on a horse back



Movement:  
Flexion-Extension  
Adduction-Abduction  
**Opposition** (thumb)



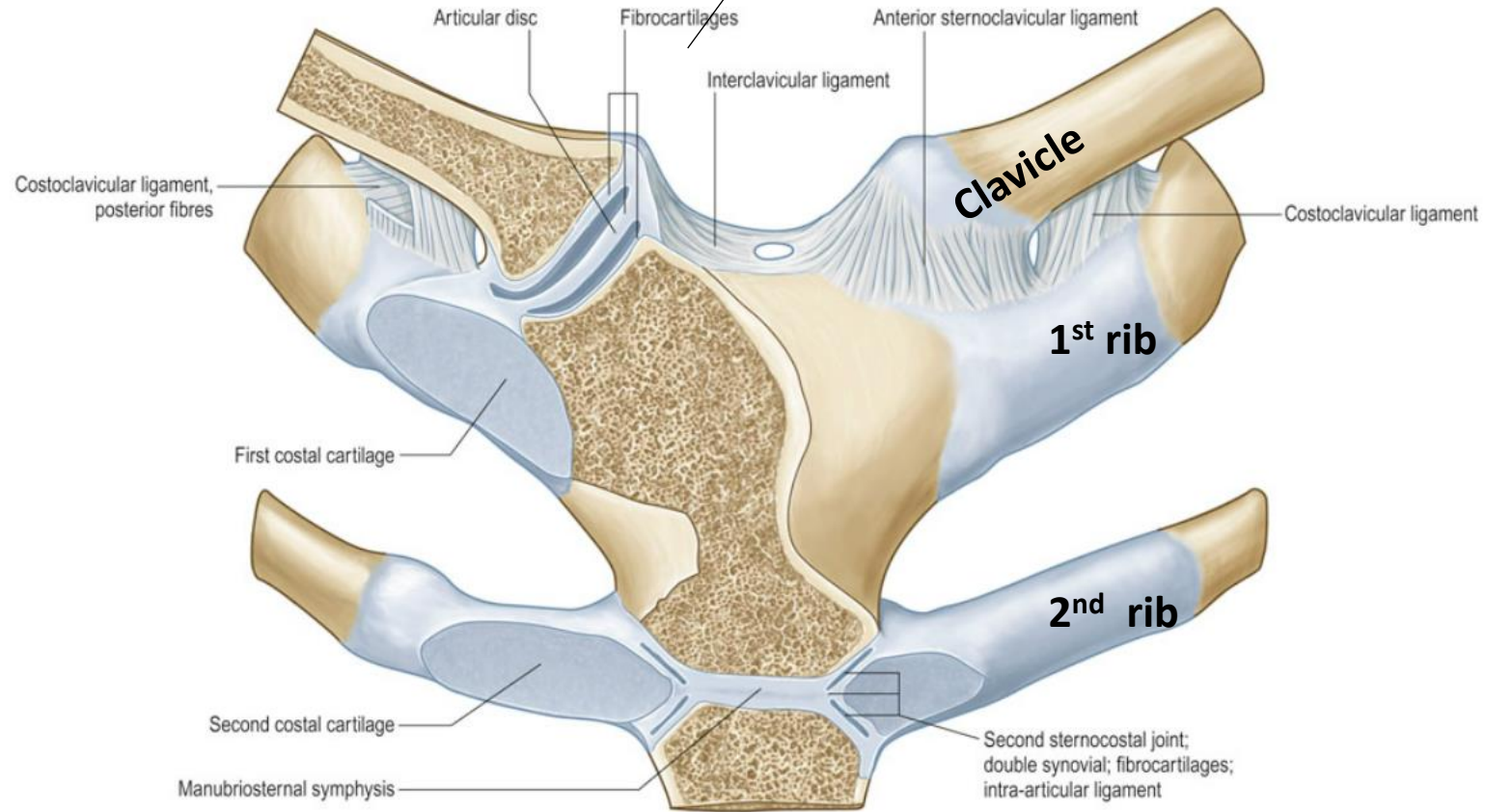
Saddle Joint  
eg. CMC Joint of Thumb



# Saddle joints

Sternoclavicular joint is synovial saddle-type joint

## Sternoclavicular joint



# Plane joints →

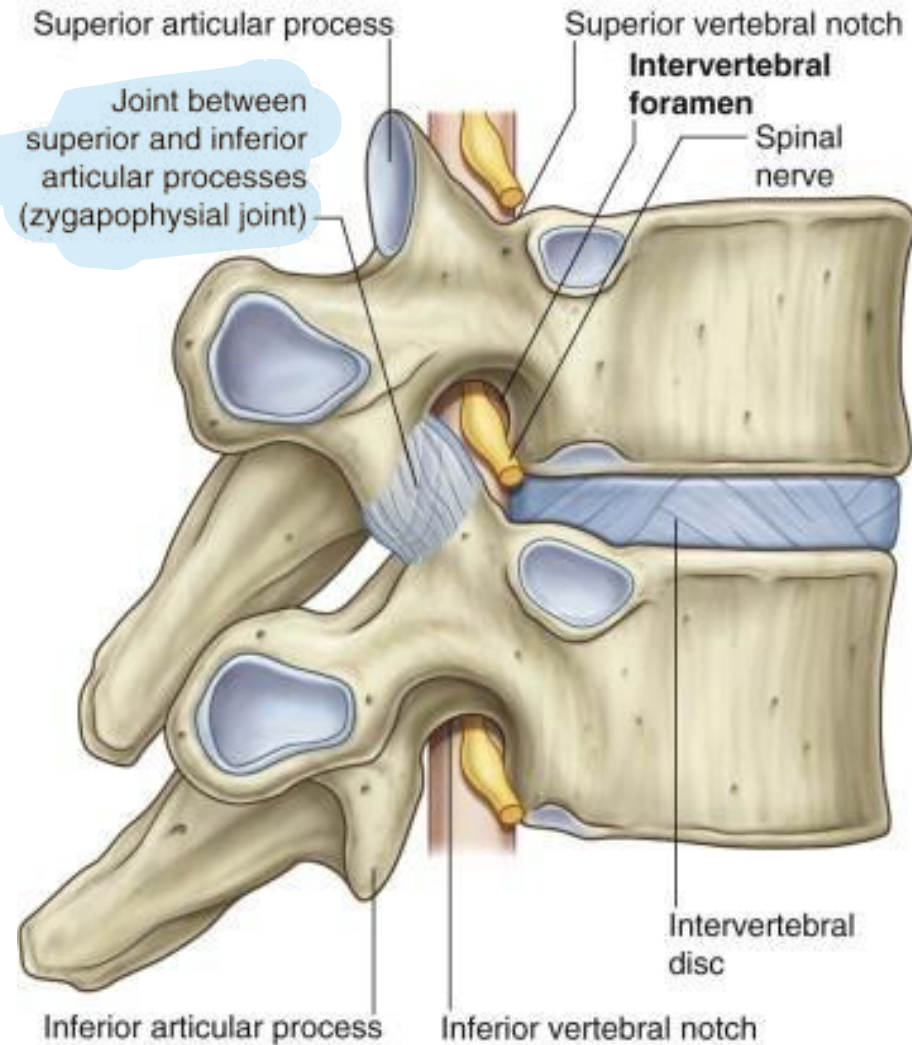
تسمح بالحركة

➤ Gliding movement.

➤ between the **superior and inferior articular processes on adjoining vertebrae.**

➤ Between **carpal bones**

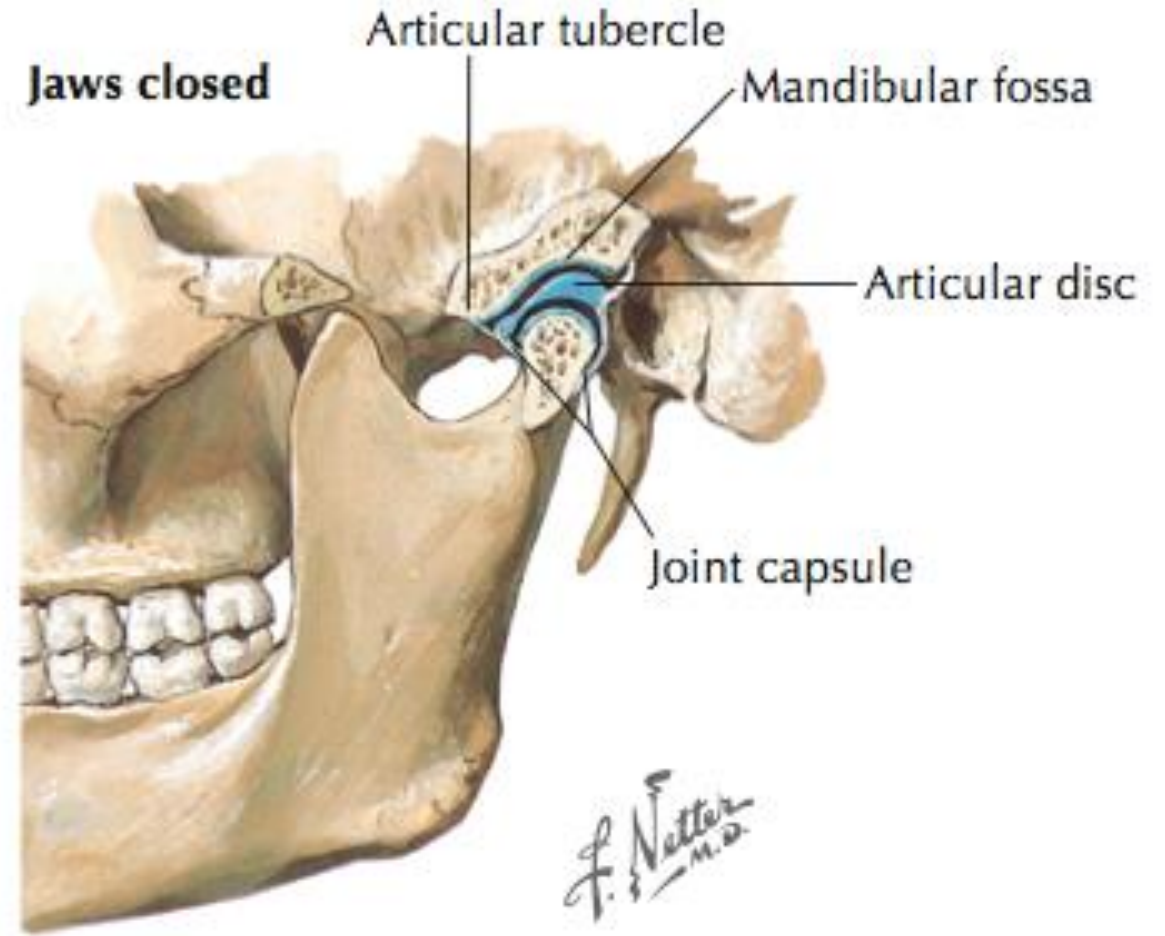
➤ Between **tarsal bones**



**Remember!**  
Intervertebral disk is a cartilaginous joint

# Temporomandibular Joint

- It is an articulation between **the articular tubercle and the anterior portion of the mandibular fossa** of the temporal bone above and the **head (condyloid process)** of the mandible.
- The **capsule** surrounds the joint and is attached above to the articular tubercle and the margins of the mandibular fossa and below to the neck of the mandible.
- **Articular Disc:** is a fibrocartilage articular disc intervenes between the bony surfaces and divides the TMJ into **upper and lower compartments**





Thank you!