Arthrology

NUR ARFIAN
DEP ANATOMI FK UGM

Movement in locomotor

- Pulling
- No movement without joint or articulation
- Articulation: Connection between 2 bones regardless (with or without) to the movement

ARTICULATIO

- Sendi, arthrosis, joints, junction
- Connection between skeletal components (oss/cartilago)
- Passive movement
- Arthrology

CLASSIFICATION

BASED ON THE MOVEMENT

1. Synarthrosis : IMPOSSIBLE TO MOVE
2. Amphiarthrosis: ANY MOVEMNET
3. Diartrosis: FREE MOVEMENT

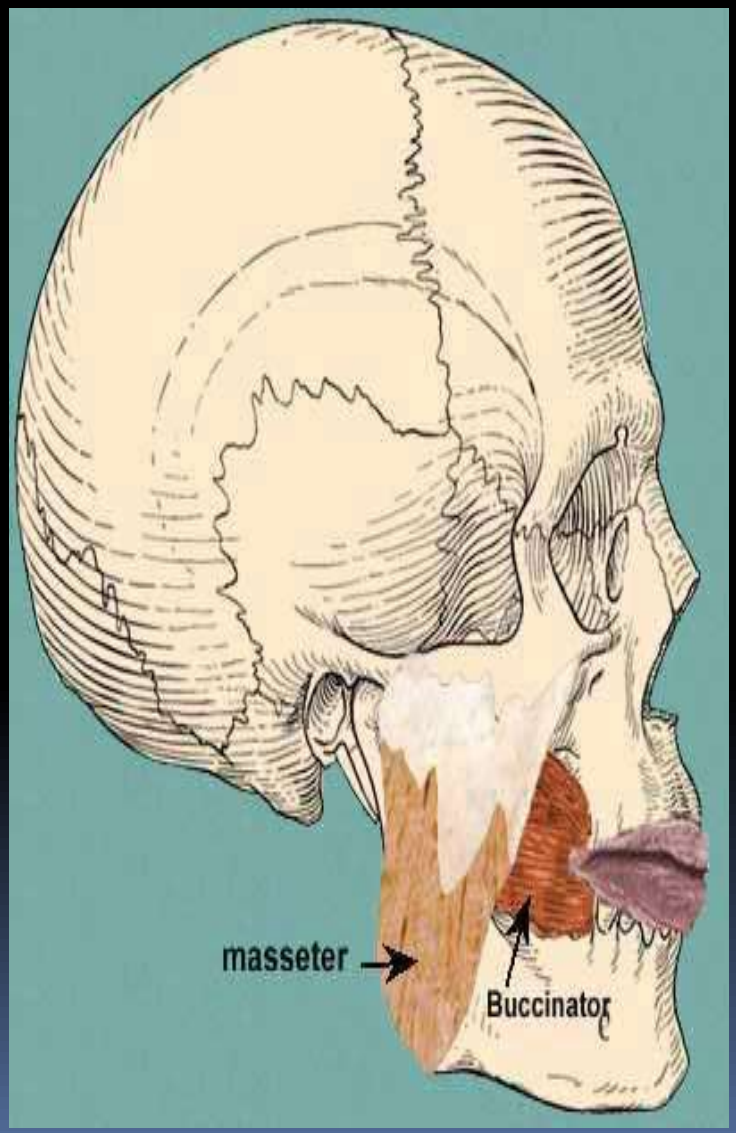
BASED ON CONNECTIVE TISSUE THAT CONNECTS THE BONES

1. Articulatio fibrosa : Fibrous tissue
2. Articulatio cartilaginea : cartilage
3. Articulatio synovialis : cavity between component

Articulatio fibrosa

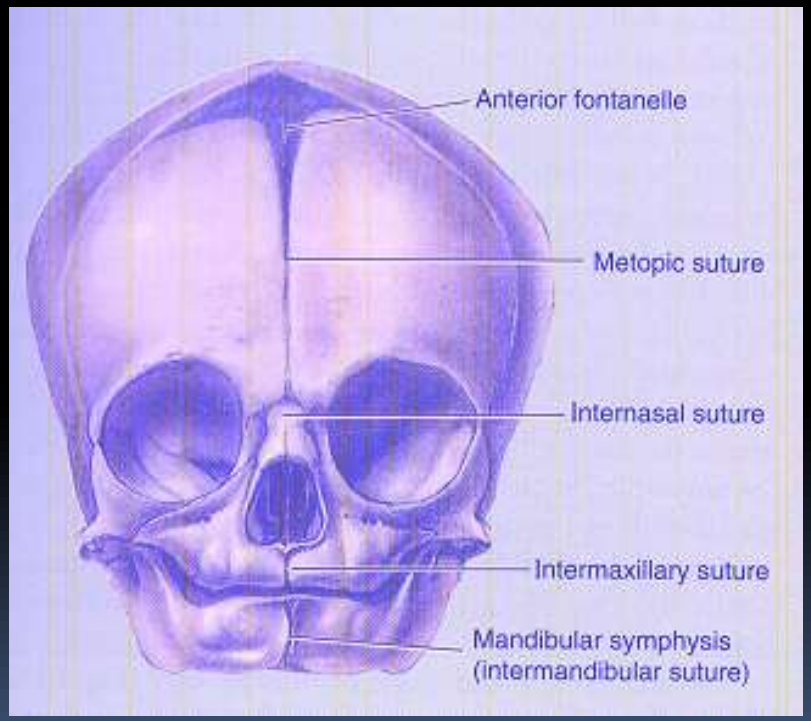
- The amount of movement occurring at a fibrous joint depends in most cases on the length of the fibers uniting the articulating bones
  - **Sutura**
  - **Syndesmosis**
  - **Gomphosis**

Articulation in cranium



Sutura

- Connected by fibrous tissue
- Collagen band, not hard
- Ossify : synostosis
- Seen in calvaria cranii, irregular bone surface
- Sutura coronaria, sutura sagitalis, dll.


Anterior fontanelle
Metopic suture
Internasal suture
Intermaxillary suture
Mandibular symphysis
(intermandibular suture)

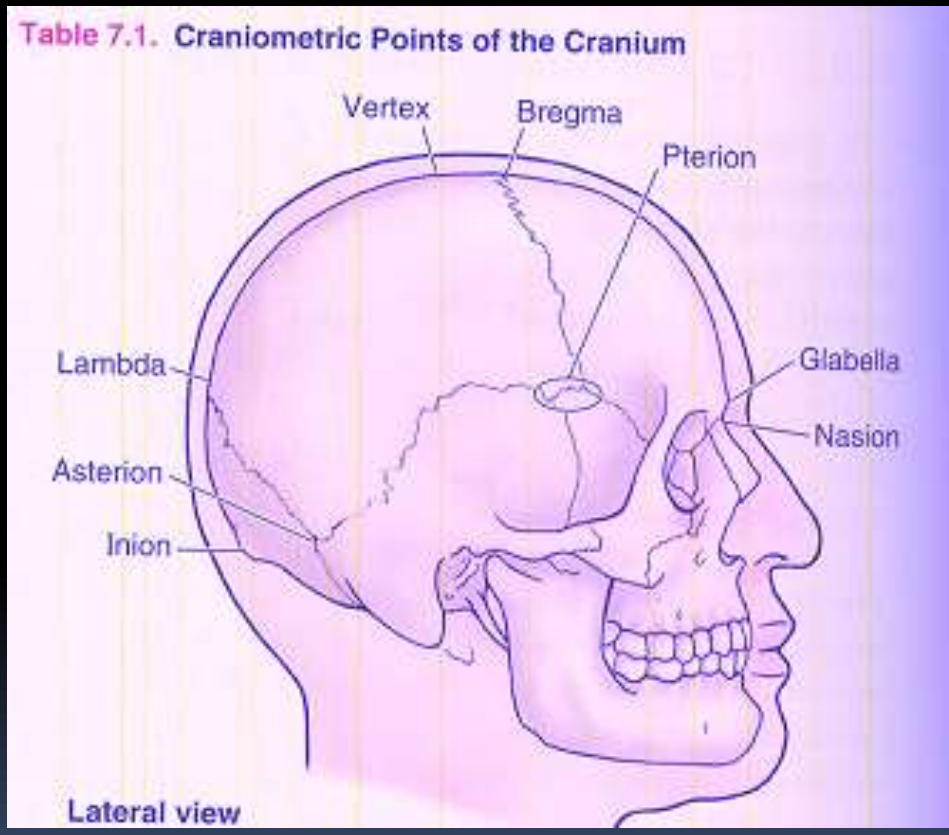


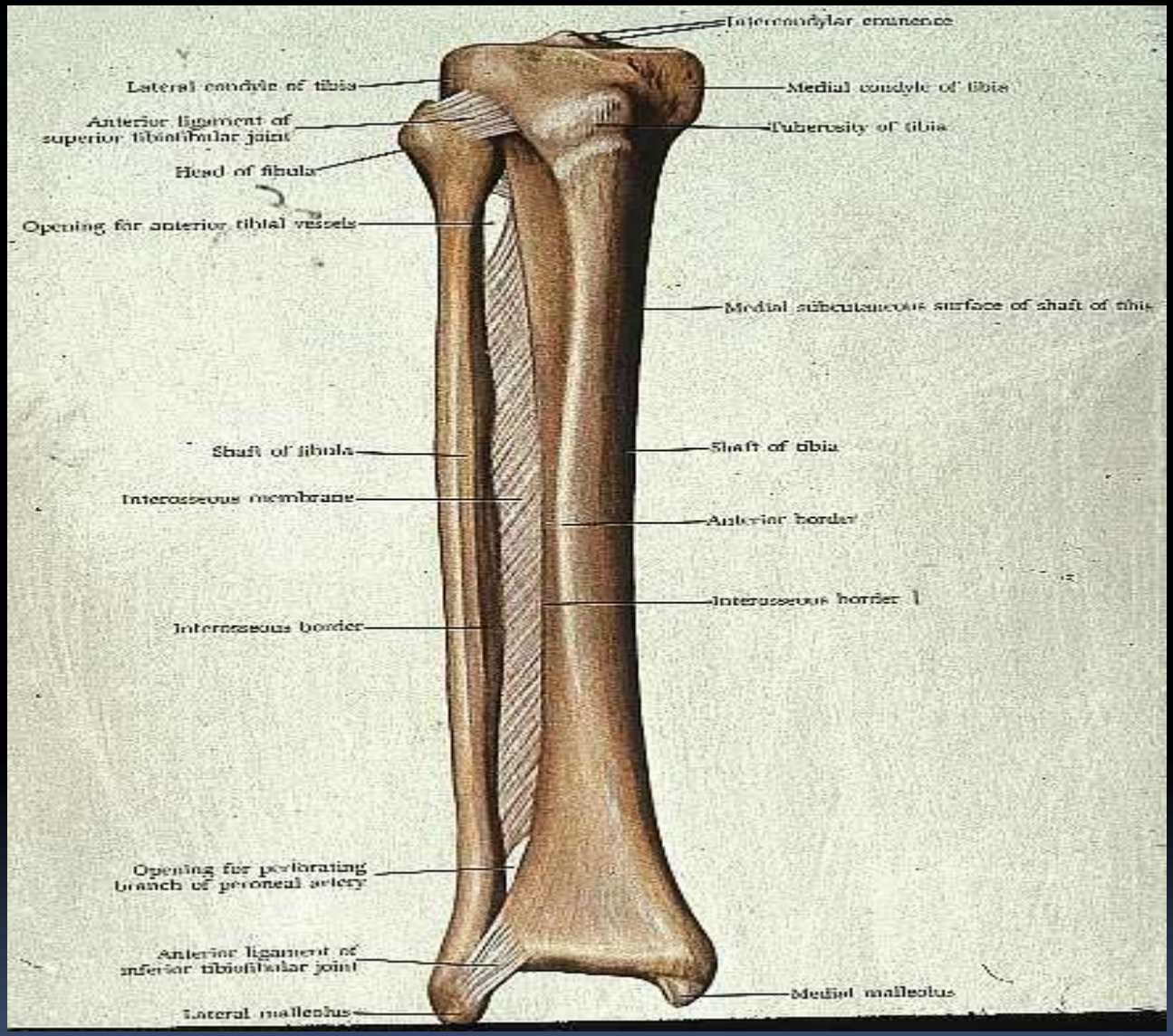
Table 7.1. Craniometric Points of the Cranium
Vertex
Bregma
Pterion
Lambda
Glabella
Nasion
Asterion
Inion
Lateral view

Syndesmosis

- unites the bones with a sheet of fibrous tissue, either a ligament or a fibrous membrane
- partially movable
  - **- Membrana interossea, syndesmosis tibiofibularis inferior/distalis**

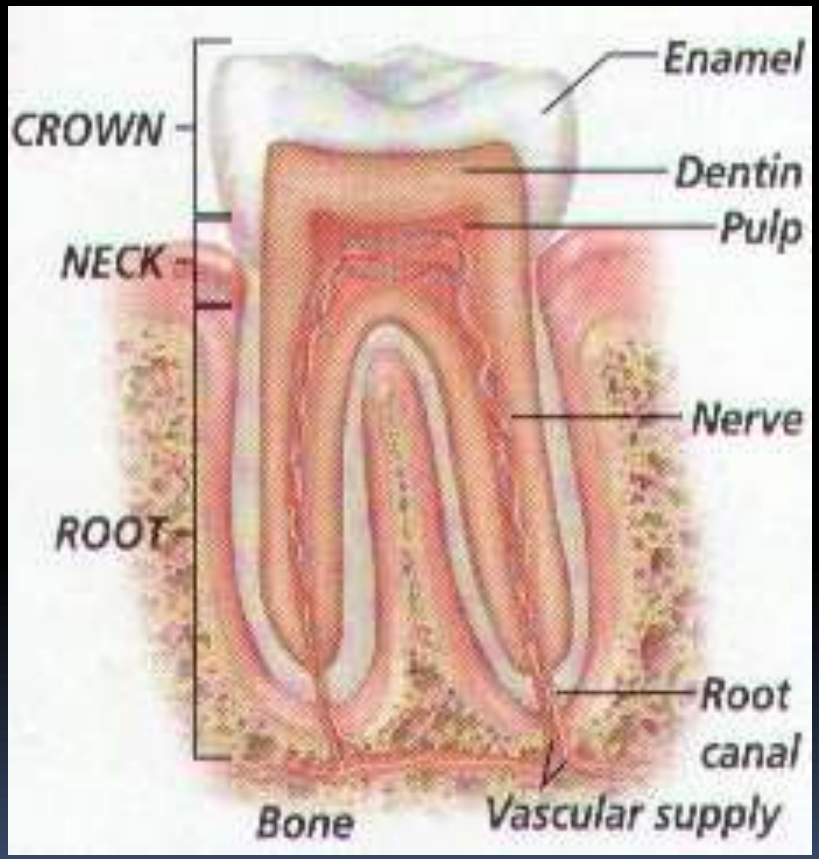
Gomphosis

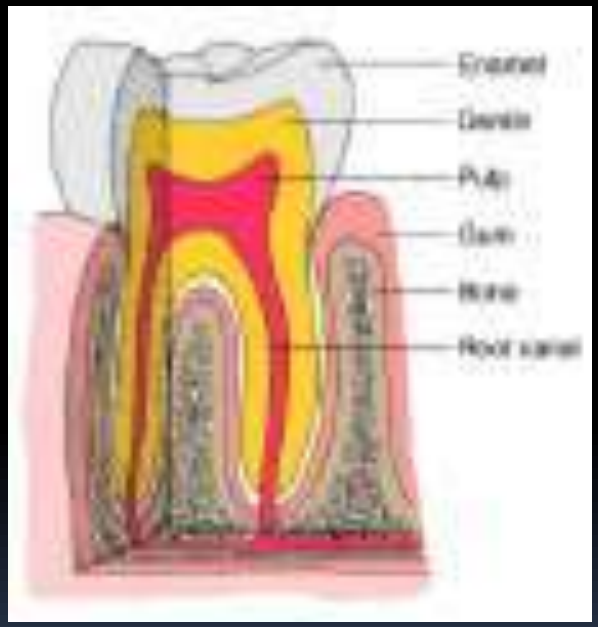
- **Articulation between teeth and alveolus (dentoalveolar syndesmosis)**
- a fibrous joint in which a peg like process fits into a socket
- articulation between the root of the tooth and the alveolar process o f the jaw
- **Movable = pathological process**
- **Connected by lig. periodentale**

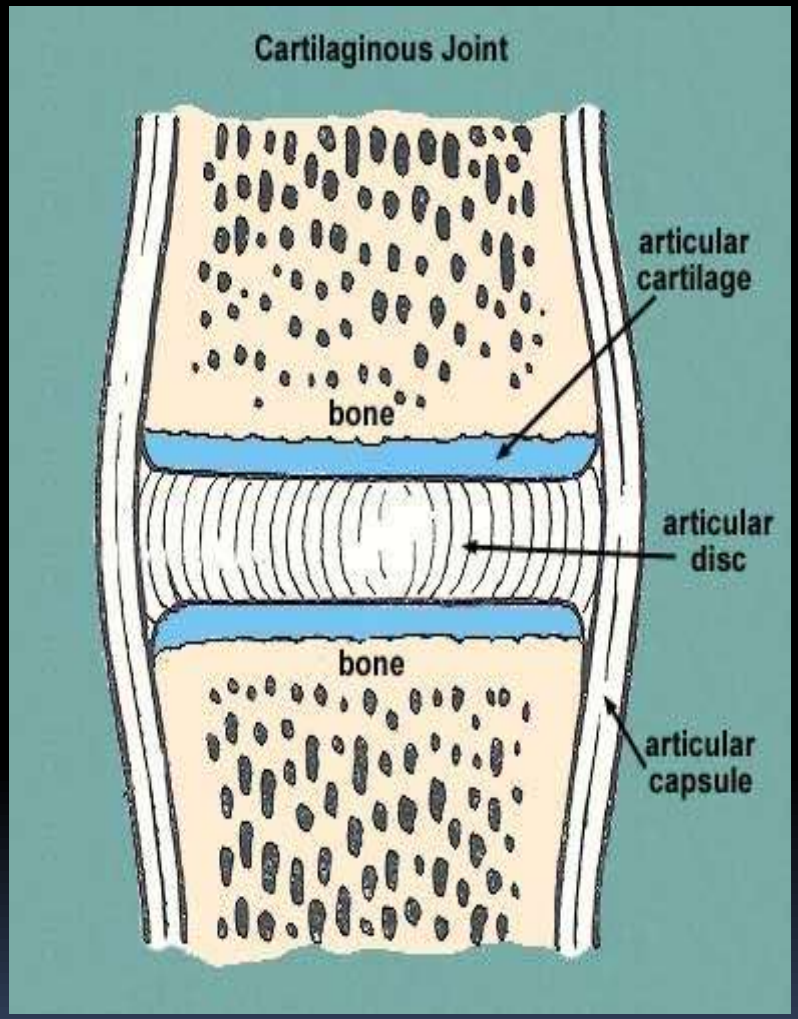


Sindesmosis antara radius & ulna

gomphosis


Enamel
CROWN
Dentin
Pulp
NECK
Nerve
ROOT
Root
canal
Bone
Vascular supply





- Articulatio cartilaginea
  - Articulatio cartilaginea primer/synchondrosis
  - Articulatio cartilaginea sekunder/symphysis

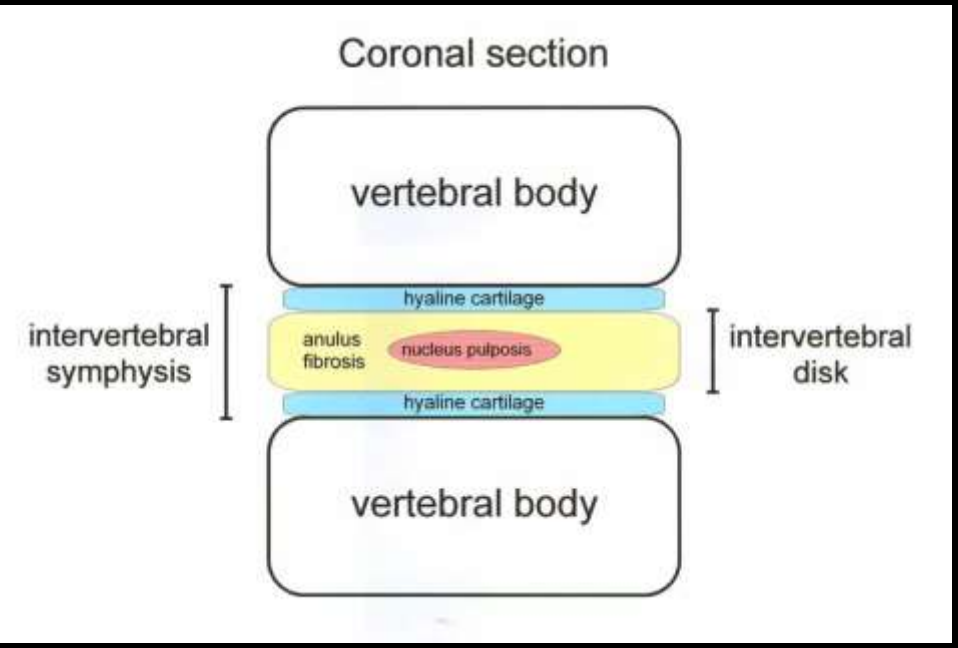
primary cartilaginous joints, or synchondroses

- the bones are united by Hyaline cartilage which permits slight bending during early life.
- Primary cartilaginous joints are usually temporary unions, such as those present during the development of a long bone
- **Become synostosis, no motion**
- **Discus epiphysialis, synchondrosis sphenooccipitalis, synchondrosis manubriosternalis**

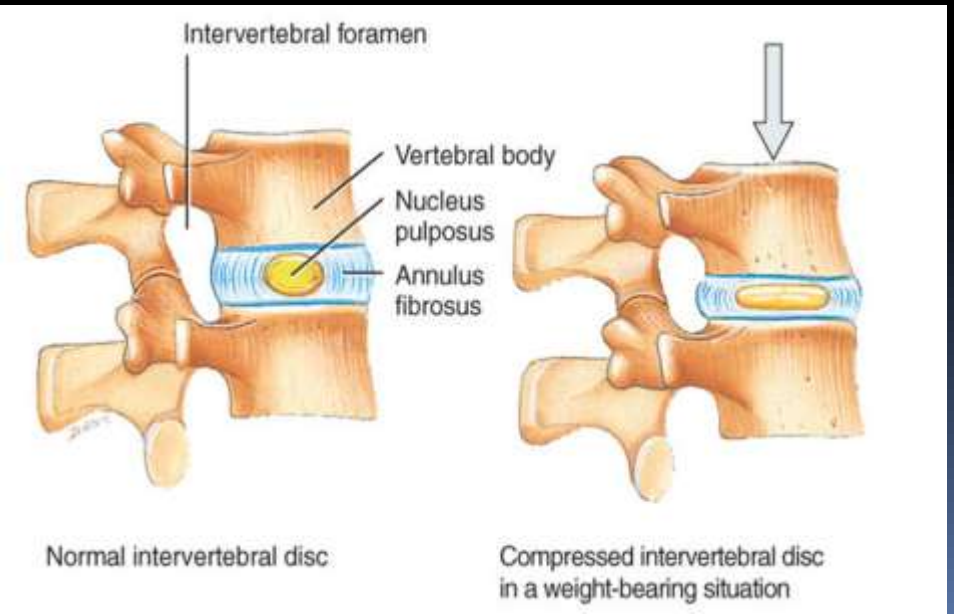
- Secondary cartilaginous joints, or symphysis, are strong, slightly movable joints united by fibrocartilage.
- The fibro cartilaginous interuertebra disc

Symphysis

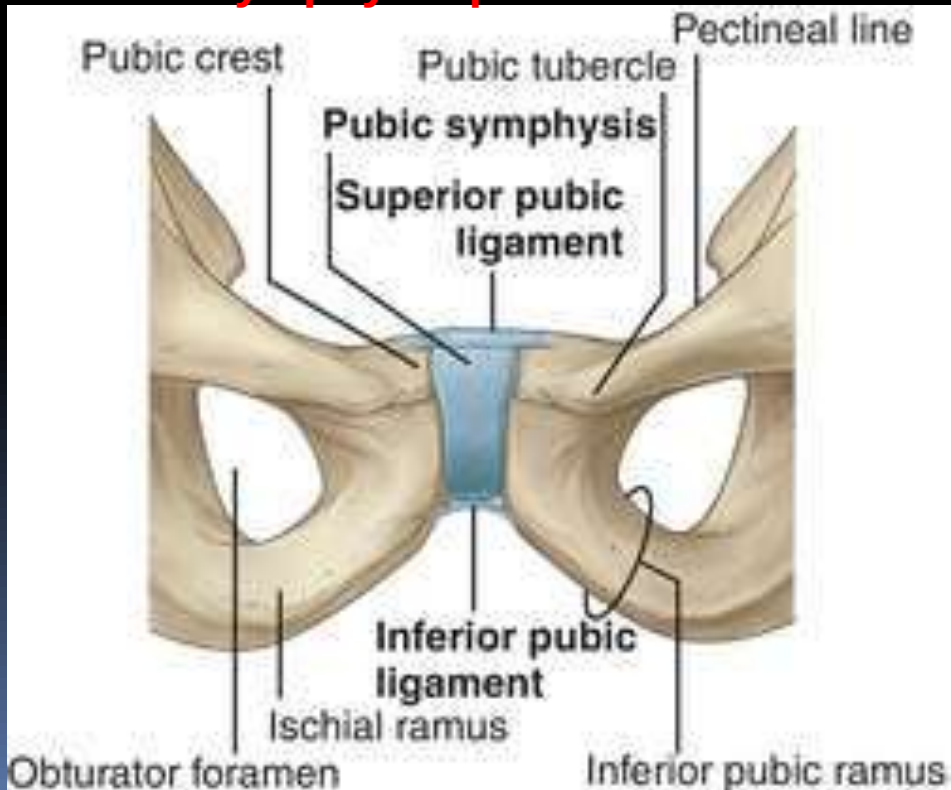
Discus intervertebralis



- Fused by fibrocartilaginea,
-cartilage mass with collagen
-little movement



Symphysis pubis



Articulatio synovialis (diarthrosis)

- Sendi
- Free movement : Diarthrosis
- Characteristic :

  - *Cavitas synovialis*

  - *Cartilago articularis (non calcification, avascular, transmit load and reduce friction)*

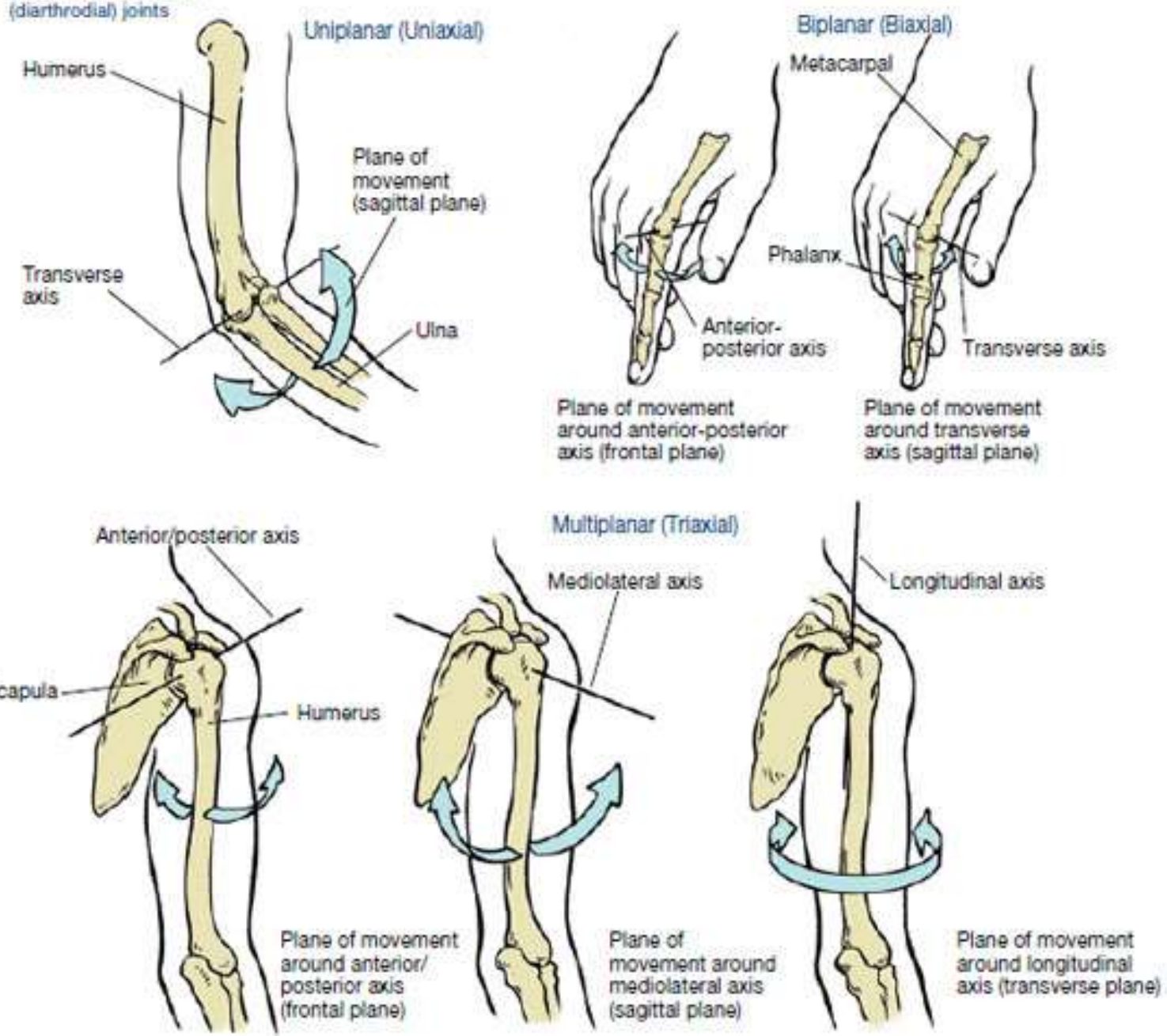
  - *Membrana synovialis*

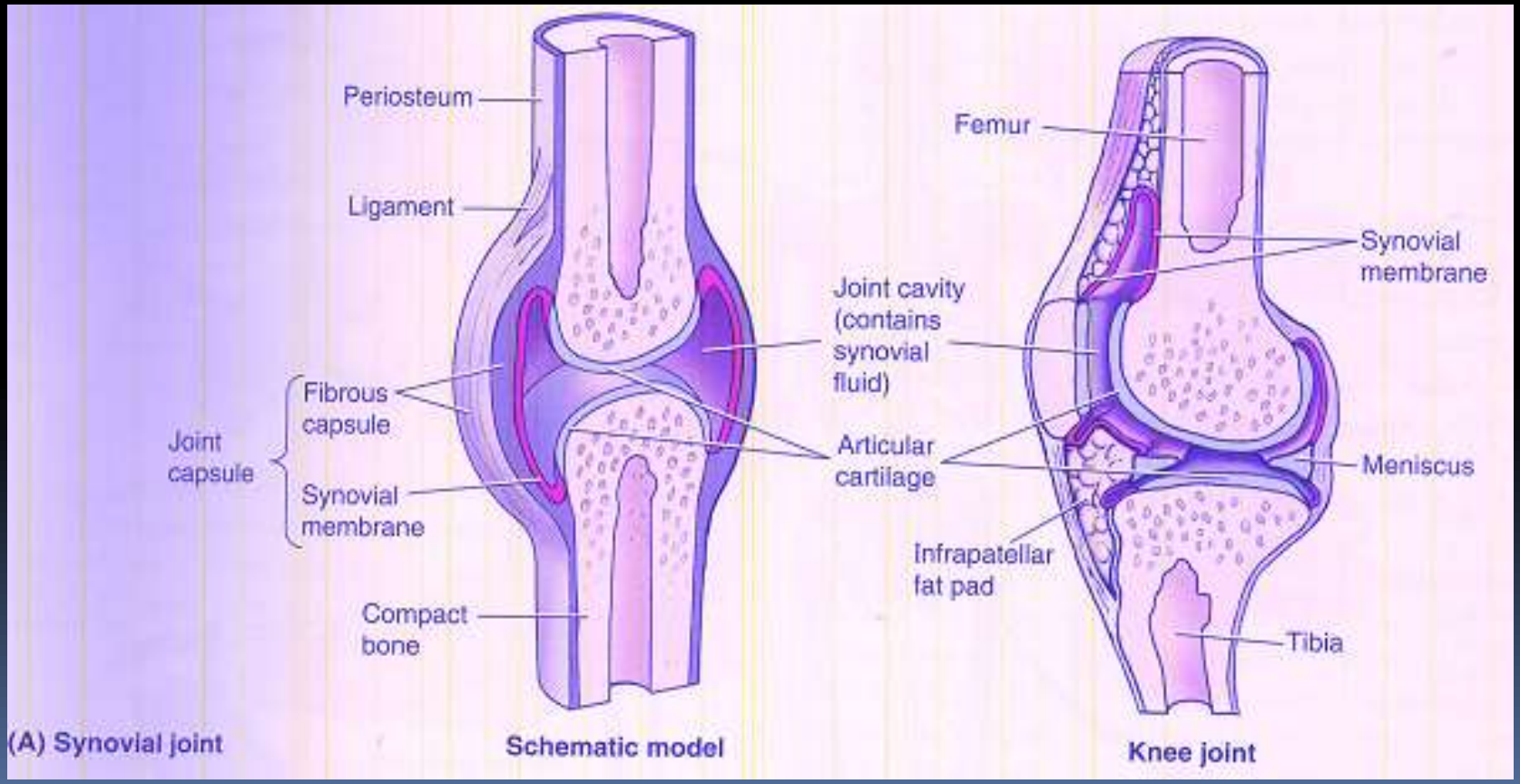
  - *Capsula articularis*

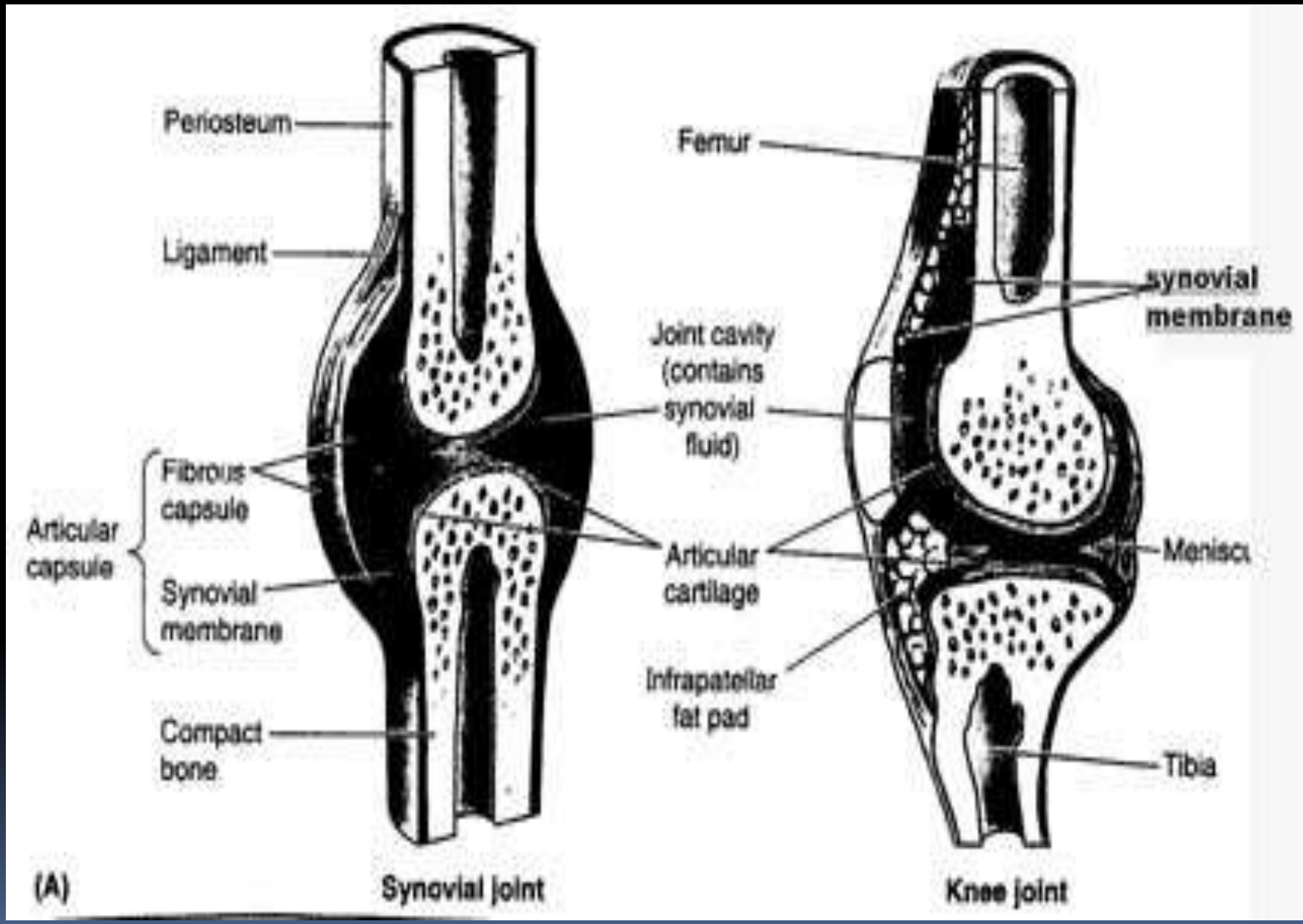
three axes of rotation

- Joints rotate in these axes, allowing movement to occur in the planes.
- the anterior-posterior axis (sagital)
  - Abduksi-adduksi,
- the mediolateral axis (transversa / frontal)
  - Fleksi-ekstensi
- the longitudinal axis
  - Endorotasi-eksorotasi
- **Axis : uniaxial, biaxial, multiaxial**
  Axis transversal – flexi & extensi
  Axis longitudinal – rotasi
  Axis sagittal – abduksi & adduksi

Figure 1-10
Movement of synovial (diarthrodial) joints

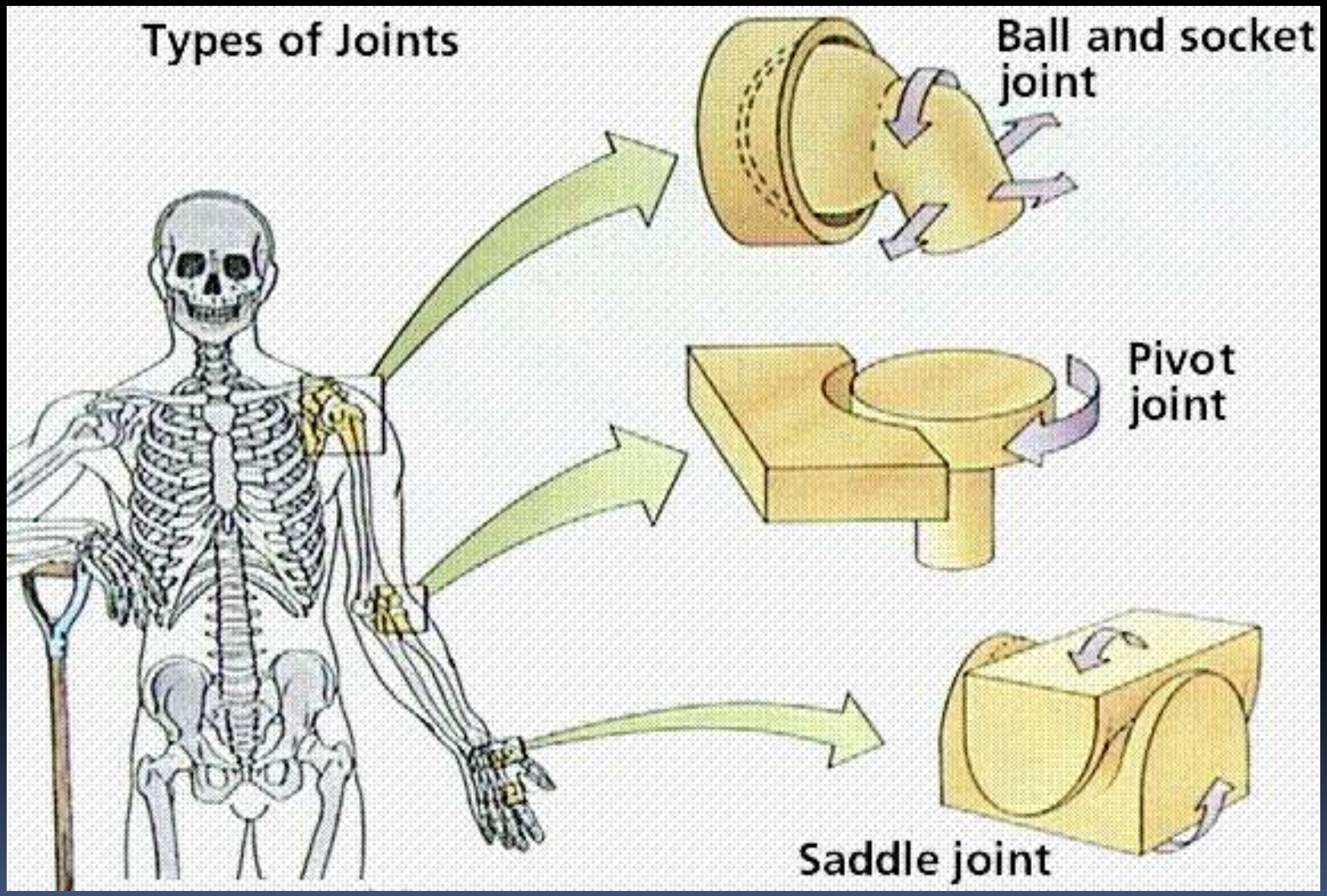


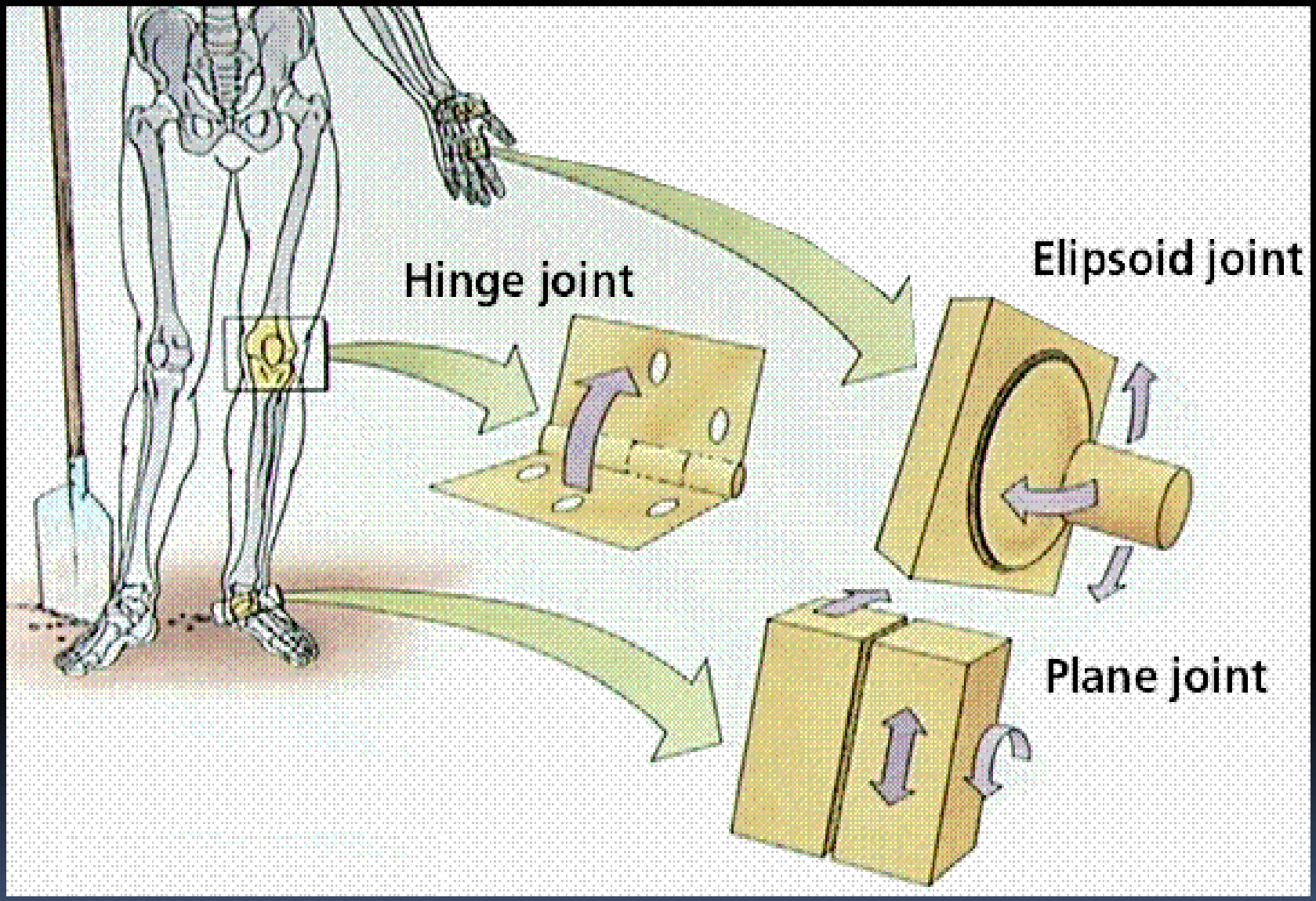

Periosteum
Ligament
Joint capsule
Fibrous capsule
Synovial membrane
Compact bone
Joint cavity (contains synovial fluid)
Articular cartilage
(A) Synovial joint
Schematic model
Femur
Synovial membrane
Meniscus
Infrapatellar fat pad
Tibia
Knee joint


Periosteum
Ligament
Articular capsule
Fibrous capsule
Synovial membrane
Compact bone
Joint cavity (contains synovial fluid)
Articular cartilage
Infrapatellar fat pad
Femur
synovial membrane
Meniscu
Tibia
(A)
Synovial joint
Knee joint

Based on the surface form of diarthrosis:

1. Articulatio plana
2. Articulatio sellaris (saddle joint, pelana)
3. Ginglymus (hinge joint, engsel)
4. Articulatio trochoidea (pivot joint, putar, pasak)
5. Articulatio condyloidea
6. Articulatio ellipsoidea
7. Artic. spheroidea (ball &socket joint,globoidea)


Types of Joints
Ball and socket joint
Pivot joint
Saddle joint


Hinge joint
Elipsoid joint
Plane joint

Gerakan –gerakan pada sendi

- Fleksi : gerakan menekuk atau mengurangi sudut antar bagian tubuh
- Ekstensi : pelurusan atau penambahan sudut
- Abduksi : gerakan menjauhi bidang tengah
- Adduksi : gerakan mendekati bidang tengah
- rotasi : gerakan mengelilingi aksis panjang

- Protrusi : gerakan kedepan
- Retrusi : gerakan ke posterior
- Pada lengan bawah

  - pronasi : gerakan telapak tangan menghadap posterior

  - supinasi : gerakan telapak tangan menghadap anterior

- Elevasi : mengangkat
- depresi : menurunkan
- kaki

  - inversi : gerakan kaki ke medial

  - eversi : gerakan kaki ke lateral

Articulatio plana

- Permukaan datar
- sliding/geser
- Artic. acromioclavicularis, artic. intercarpalia, artic. intermetacarpalia, artic. carpometacarpalia

Articulatio sellaris

- Permukaan sedel/pelana
- concavoconvex dgn convexoconcav
- Artic. carpometacarpalis I (gelang tangan & ibu jari tangan)

Ginglymus

- Bentuk engsel
- Uniaxial
- satu derajat kebebasan gerak: flexi - extensi
- Artic. humero-Ulnaris (artic. cubiti), artic. Interphalangea

Articulatio trochoidea

- Permukaan mirip roda
- Satu kebebasan gerak: rotasi dalam cincin
- Artic. radioulnaris proximalis/superior, Artic. atlantoaxialis

Articulatio condyloidea

- Permukaan condylus (satu atau dua) dengan fossa
- Satu condylus: Biaxial, 2 derajat kebebasan gerak:

  Flexi-extensi & abduksi – adduksi (circumduksi)

  Artic. humeroradialis (artic. cubiti)

Articulatio ellipsoidea

- Dataran sendi ellips
- Biaxial
- Dua derajat kebebasan gerak:
- flexi-extensi & abduksi –adduksi (circumduksi)
- Artic. metacarpophalangea, artic. Radiocarpea

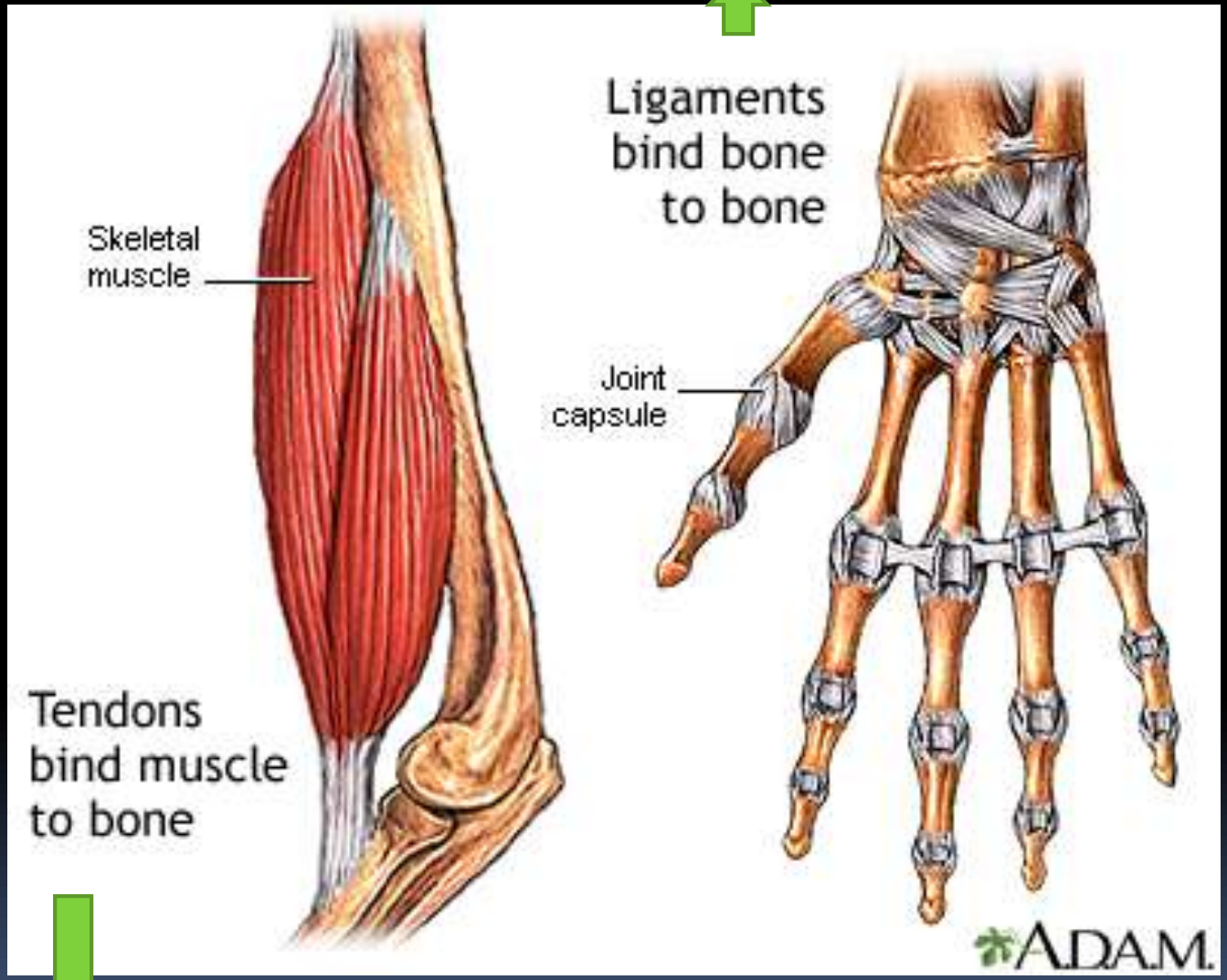
Articulatio spheroidea

- Bentuk bola & mangkok
- Multiaxial
- Flexi-extensi, abduksi – adduksi, (circumduksi), rotasi
- Artic. humeri , artic. coxae


"GEAR" FULL THROTTLE!

TENDON AND LIGAMENT

Hold structure together
Stabilize of the joint.

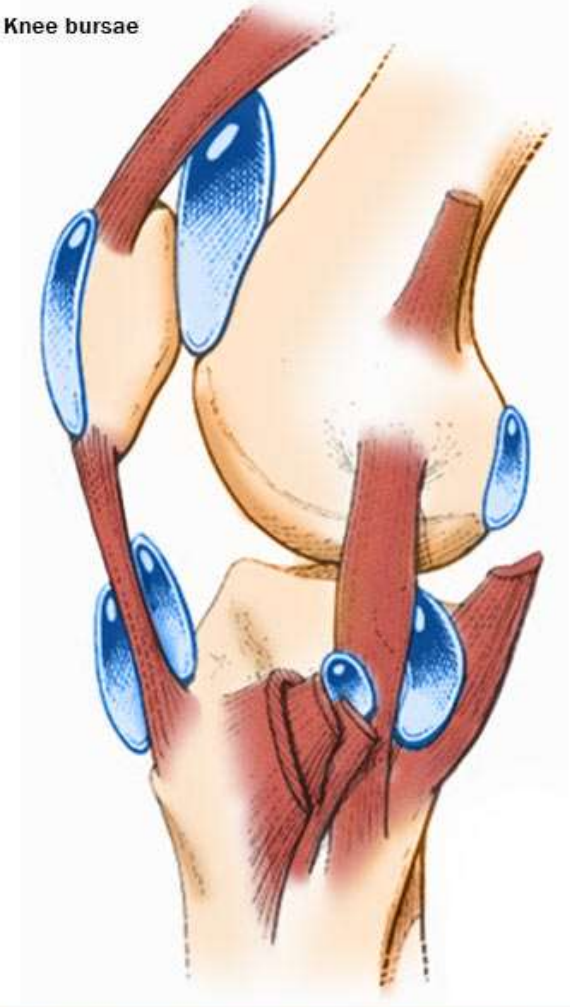


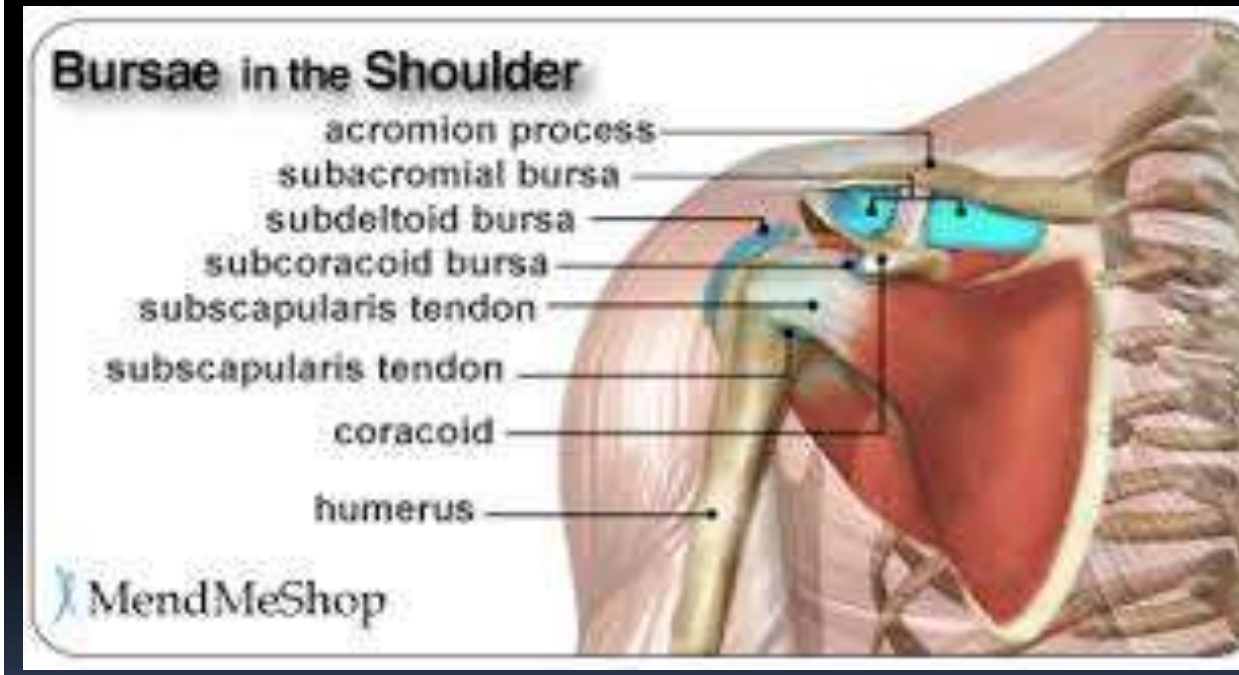
Connective tissue that attaches muscle to bone or structures

bURSAE

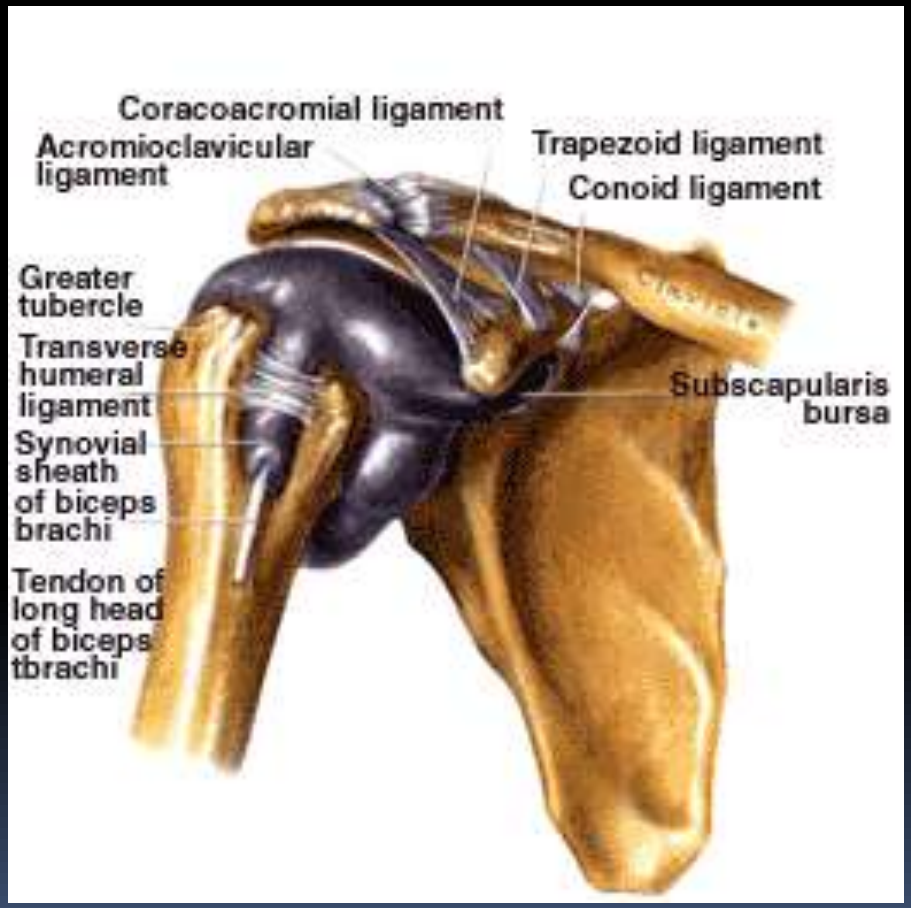
- A bursa is a fluid-filled structure that is present between the skin and tendon or tendon and bone.
- The main function of a bursa is to reduce friction between adjacent moving structures.
- Typically, bursae are located around large joints such as the shoulder, knee, hip, and elbow.

Knee bursae



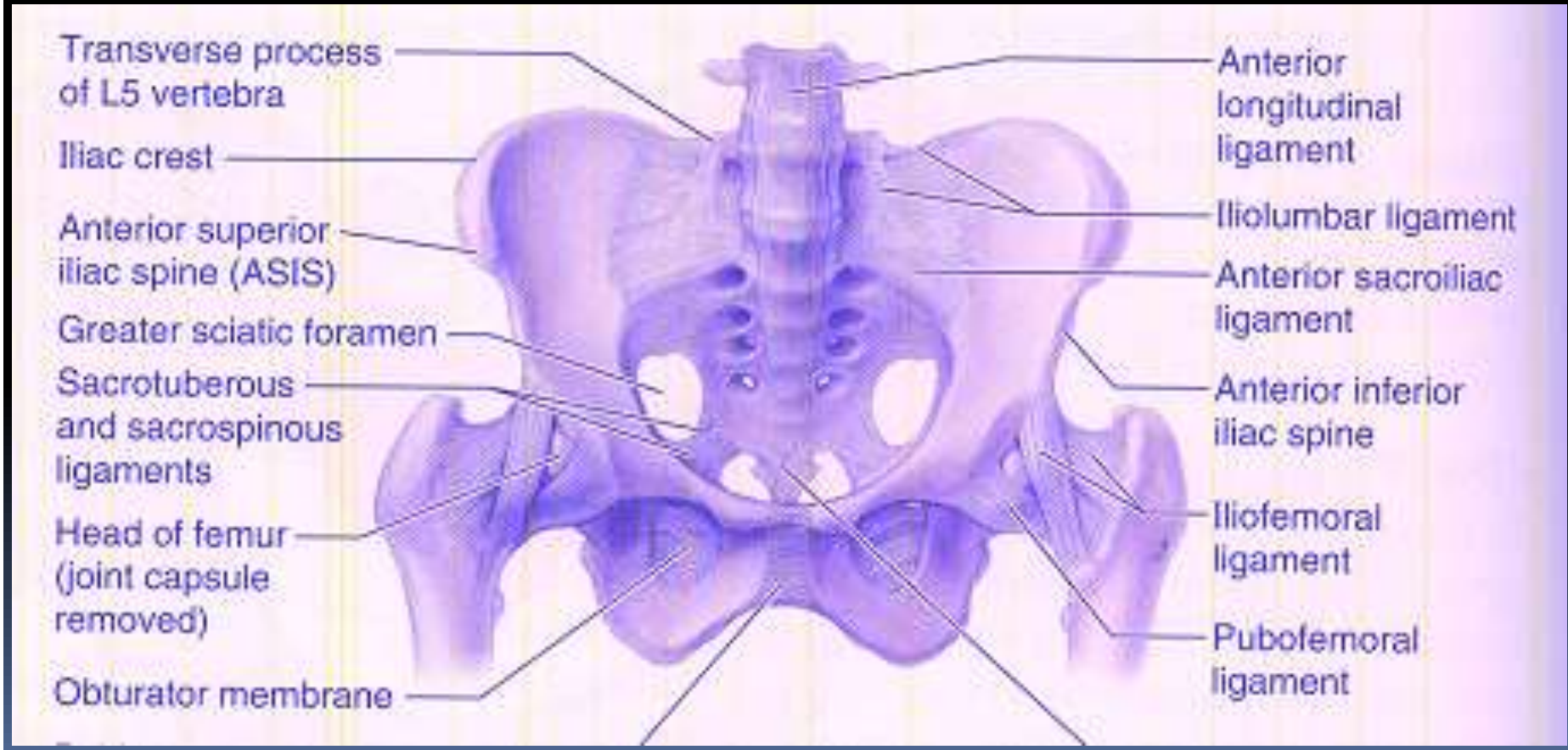


Articulatio globoidea, spheroidea

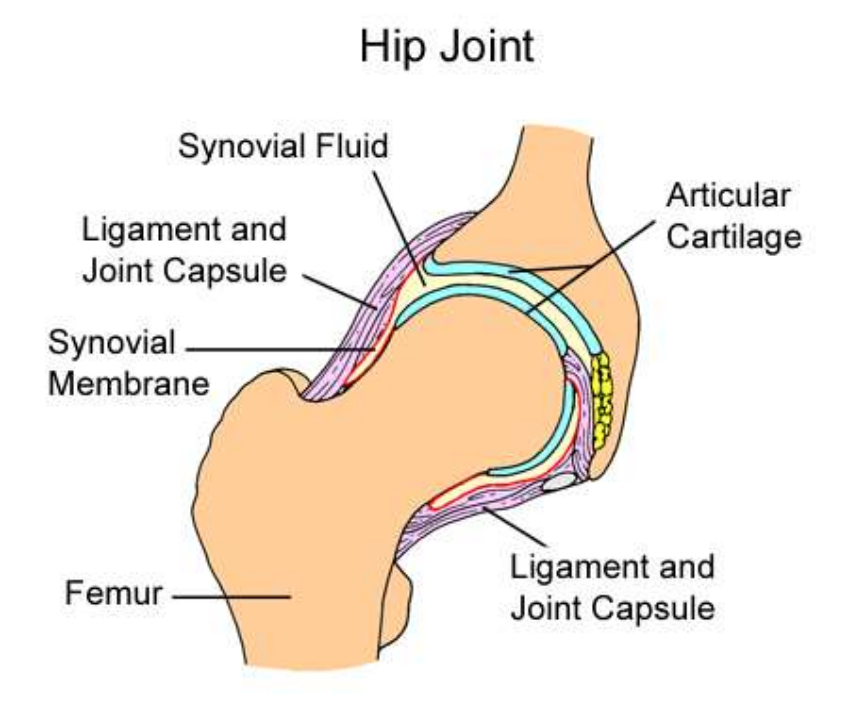


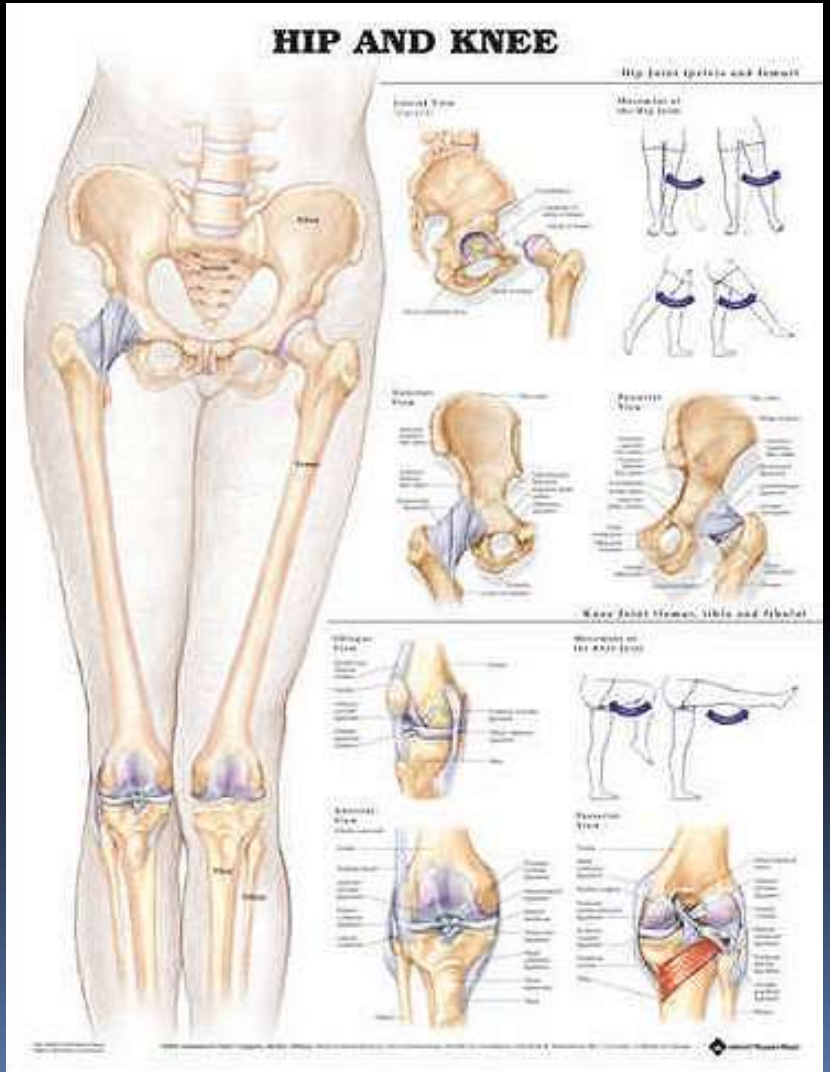
1.Articulatio cubiti: humero-ulnaris & humeroradialis
2. articulatio radioulnaris proximalis

Art. Sacroiliaca

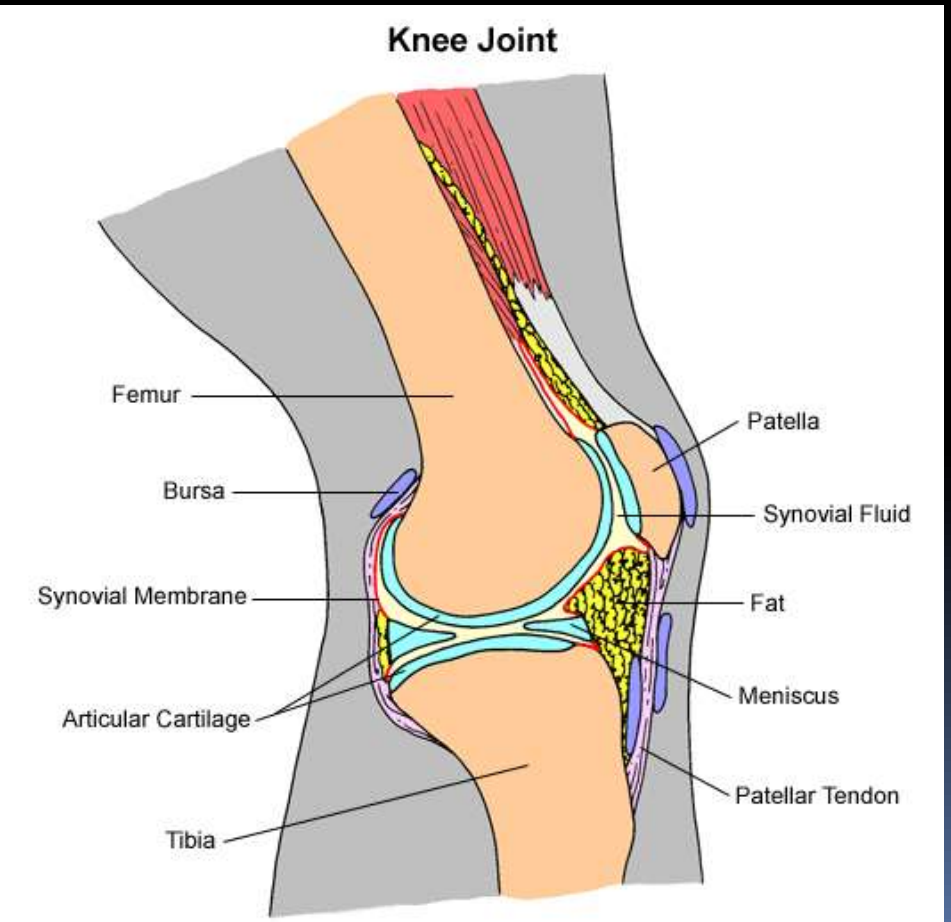


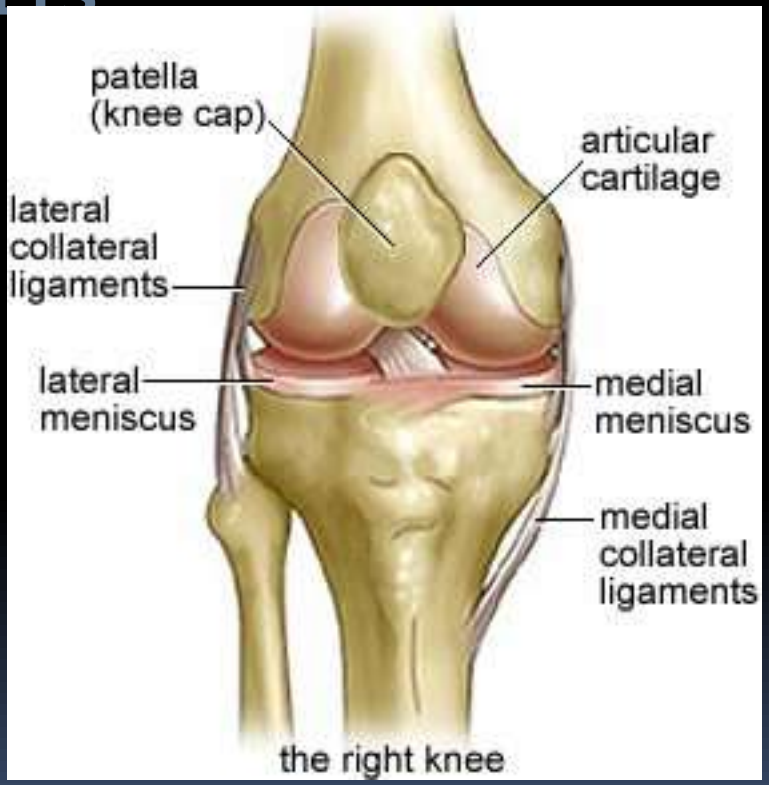
Articulatio coxae: BALL & SOCKET JOINT



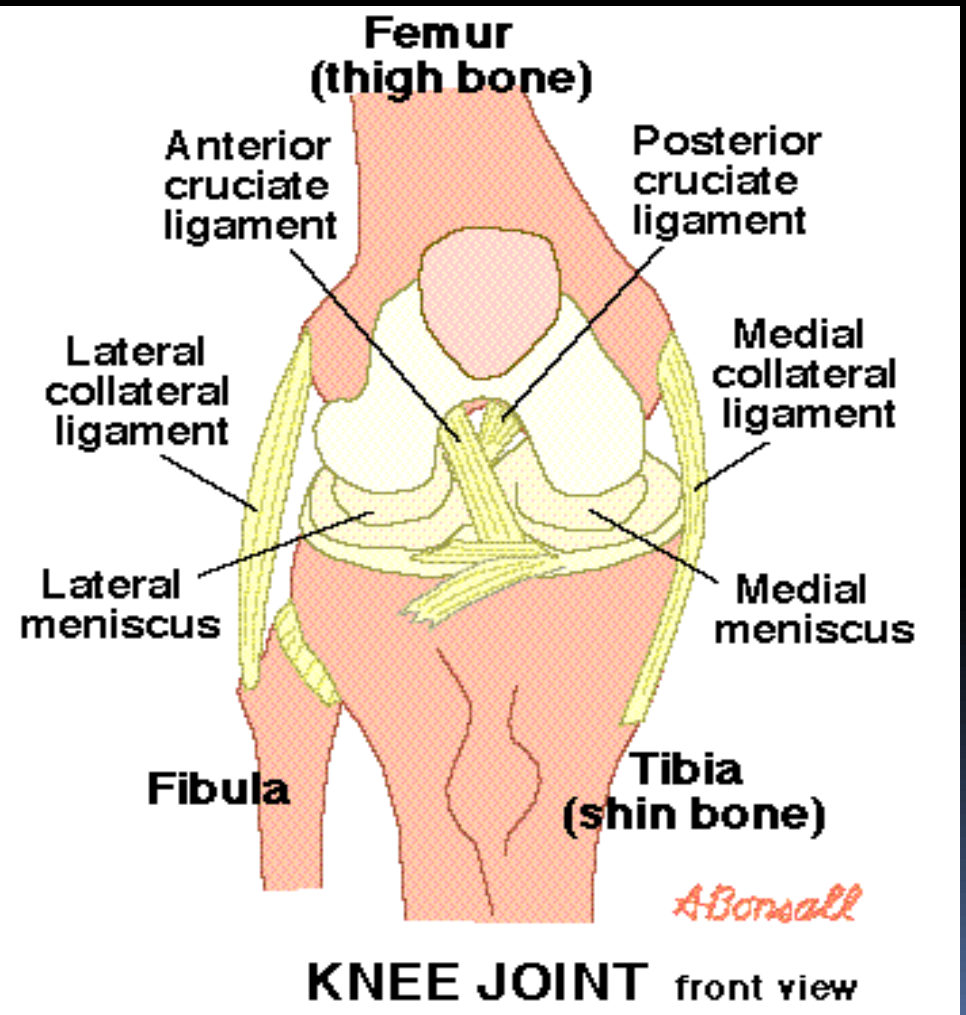


Articulatio genu : femoro-patellaris & femorotibialis articulatio tibiofibularis proximalis

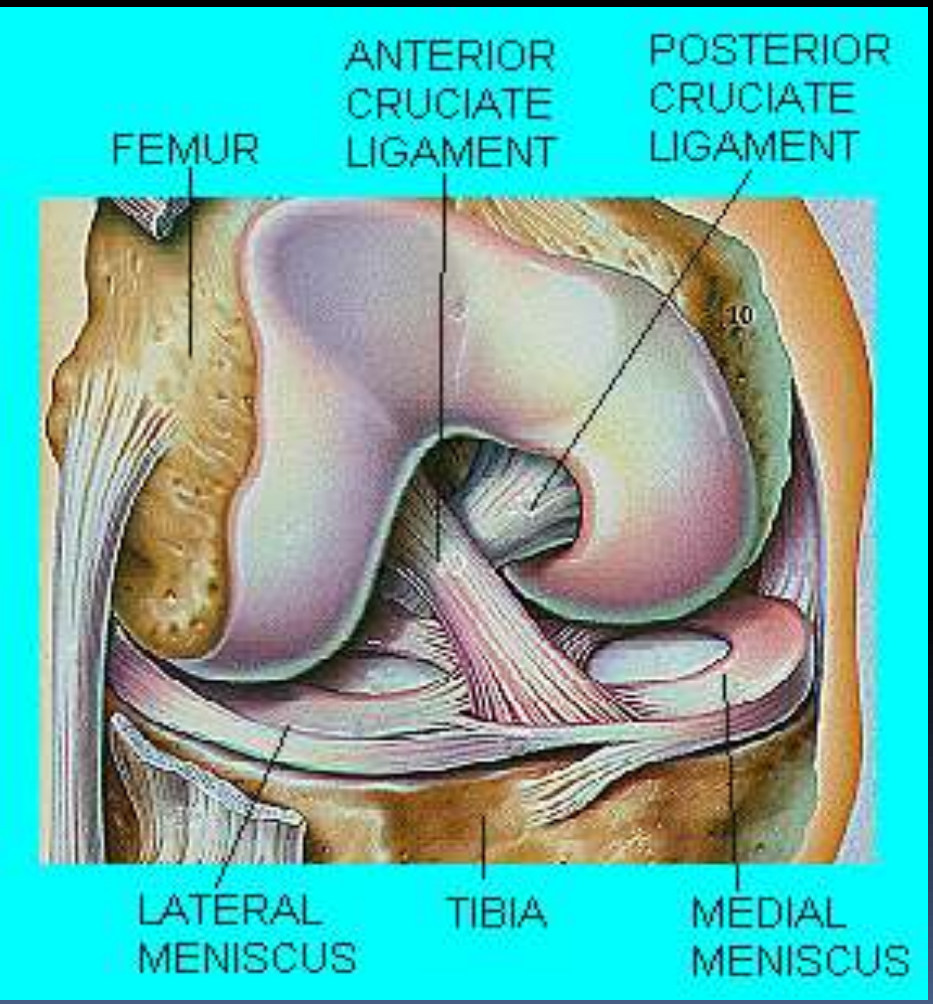




Articulatio genu, FLEKSI DAN EKSTENSI SAAT FLEKSI – SEDIKIT ROTASI -Ligamen dalam kapsul artikularis



- MENISCUS MEDIALIS
- MENISCUS LATERALIS
- LIGAMENTUM CRUCIATUM ANTERIOR DAN POSTERIOR


ANTERIOR CRUCIATE LIGAMENT
POSTERIOR CRUCIATE LIGAMENT
FEMUR
LATERAL MENISCUS
TIBIA
MEDIAL MENISCUS

Articulatio talocruralis (ankle joint)
articulatio subtarsalis
articulatio metatarsophalangea
articulatio interphalangea

Ankle joint (TALOCRURALIS) & Subtalar joint

- DORSIFLEKSI DAN PLANTARFLEKSI
- Subtalar joint for Eversi & inversi