



# ARTHROLOGI

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LABORATORIUM ANATOMI

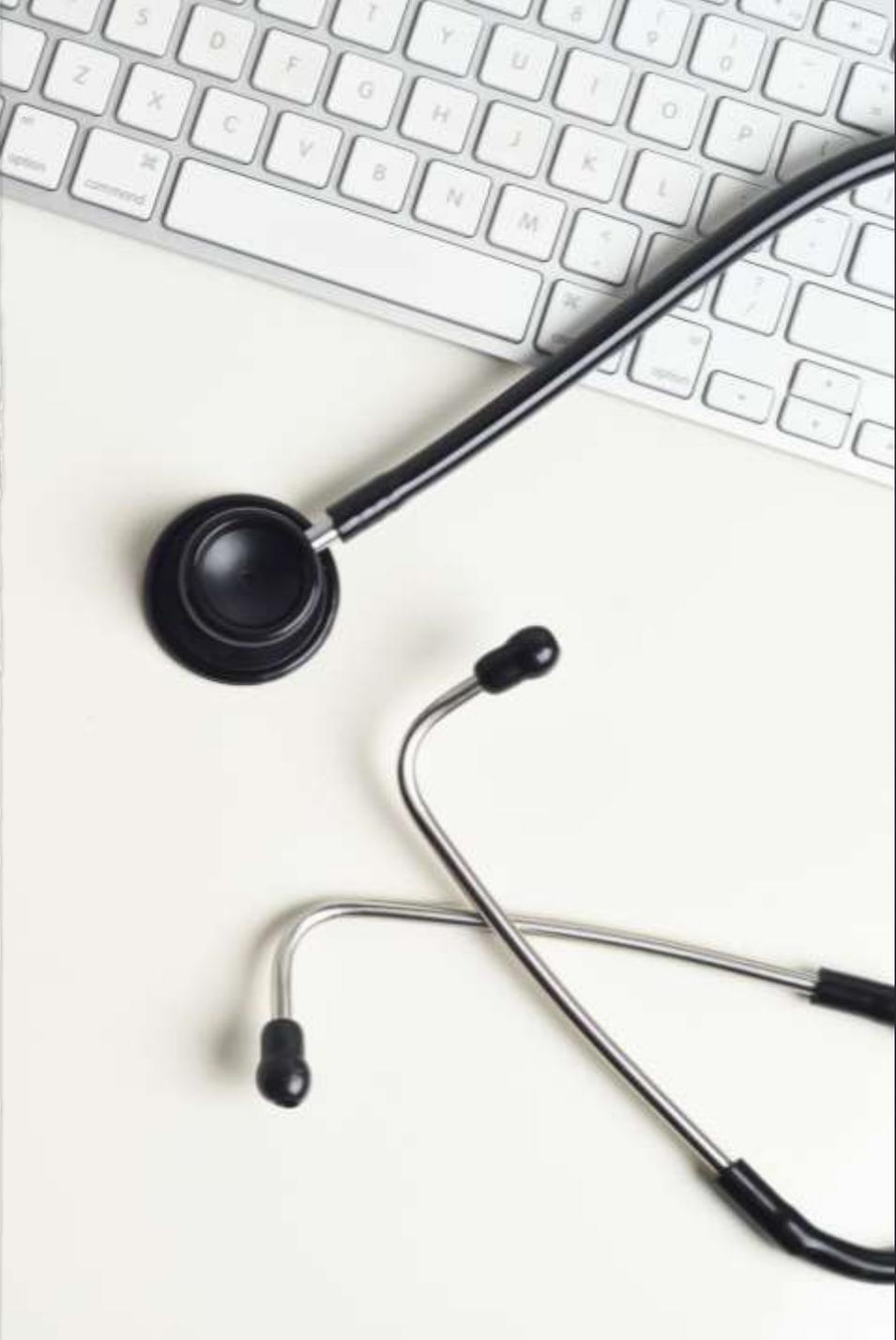
FAKULTAS KEDOKTERAN UMM

# TOPIK BAHASAN

Pengertian arthrologi

Klasifikasi persendian

Kaitan dengan kinesiologi



# ARTHROLOGI

- ◇ “Arthron : sendi”; “logos: ilmu”
- ◇ Adalah ilmu yang mempelajari tentang sendi, yaitu hubungan antara dua/lebih komponen kerangka
- ◇ Istilah lain “article” → articulatio
- ◇ Fungsi persendian:
  - ◇ Membantu Gerakan tubuh melalui kontraksi otot
  - ◇ Membantu perubahan ruang gerak, misal saat melahirkan

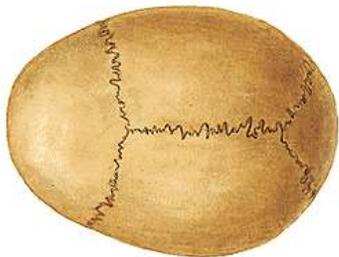
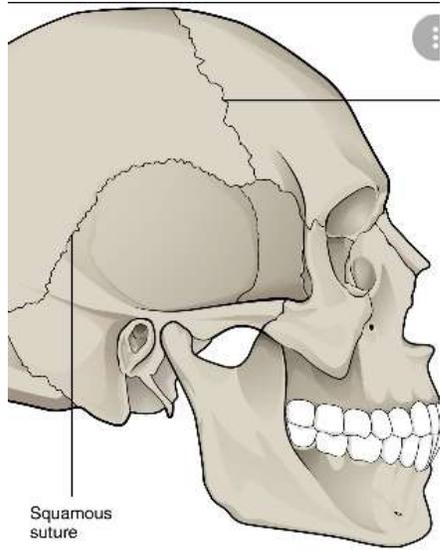
# KLASIFIKASI PERSENDIAN

## ◊ Berdasarkan Gerakan

- ◊ Tidak dapat bergerak
- ◊ Sedikit gerak
- ◊ Bebas bergerak

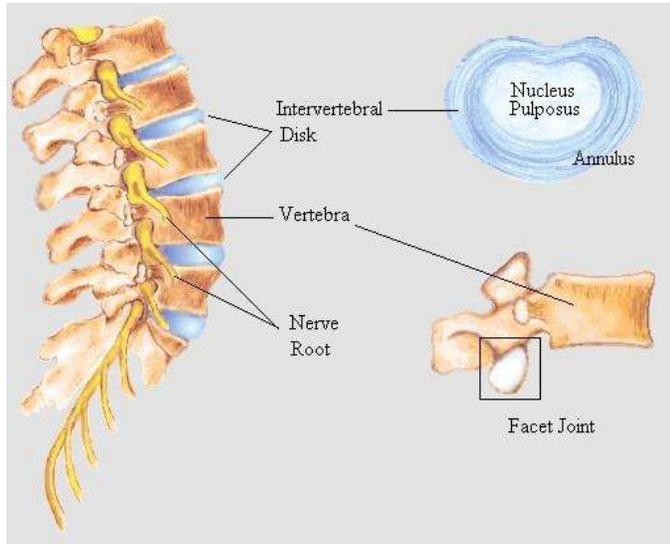
## ◊ Berdasarkan jaringan penghubung

- ◊ Oleh jaringan fibrous atau kolagen
- ◊ Oleh jaringan kartilago hialin/fibrokartilago
- ◊ Oleh membrane synovial yang akan menghasilkan cairan synovial



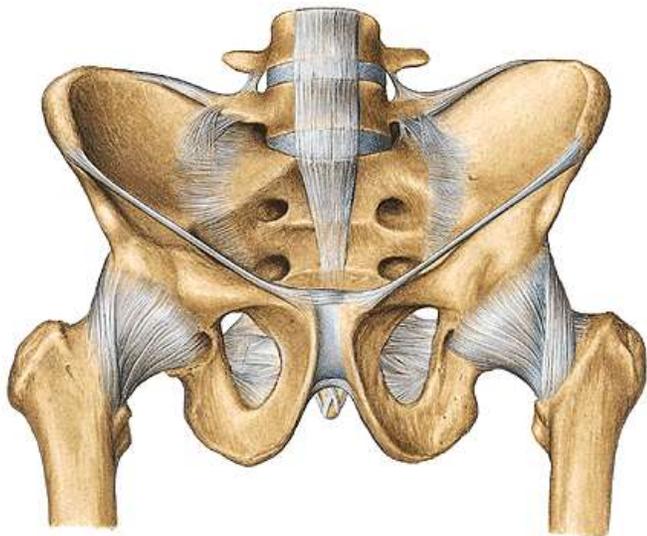
# SINARTHROSIS

- ◇ Persendian yang tidak dapat digerakkan
- ◇ Contoh: persendian antar tulang penyusun cranium (sutura)
- ◇ Sebutkan sutura yang kalian temukan:
  - ◇ 1.
  - ◇ 2.
  - ◇ 3.
  - ◇ 4.
  - ◇ 5.



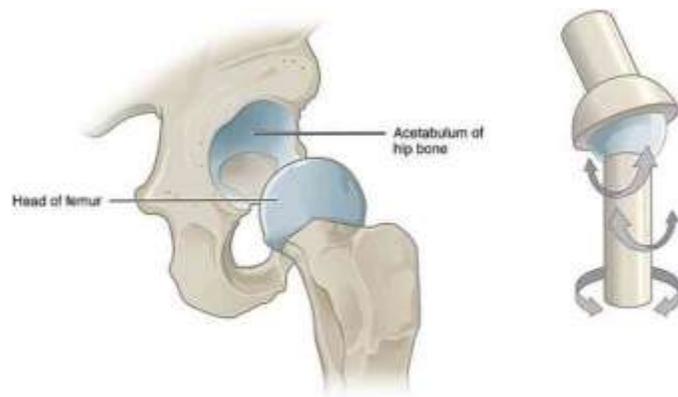
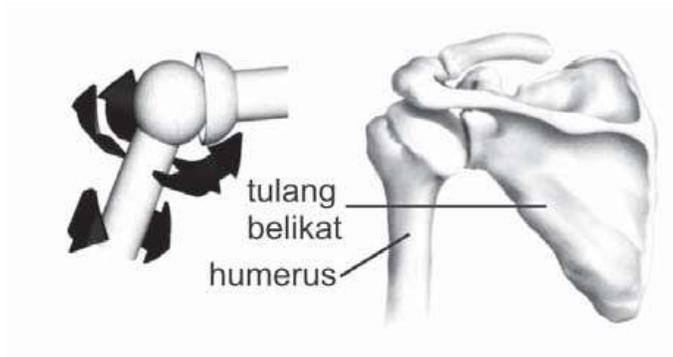
# AMPHIARTHROSIS

- ◇ Persendian yang dapat **sedikit bergerak**;
- ◇ Contoh: articulatio pada columna vertebralis, symphysis pubis



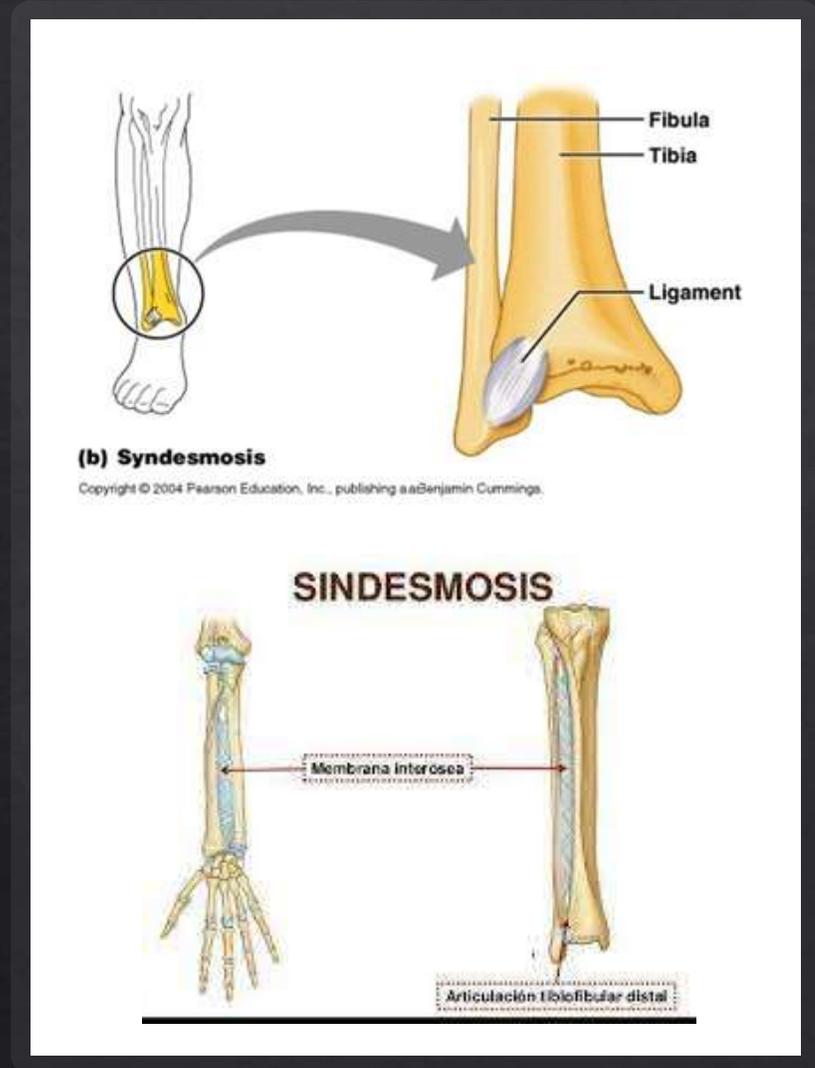
# DIARTHROSIS

- ◇ Persendian yang dapat **bergerak bebas**
- ◇ **Contoh:** articulatio humeri, articulatio coxae



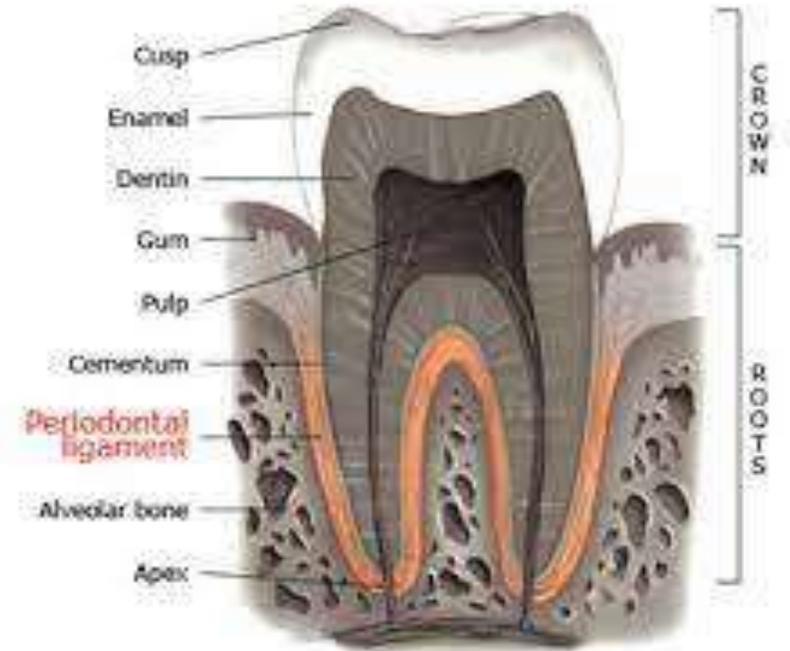
# ARTICULATIO FIBROSA

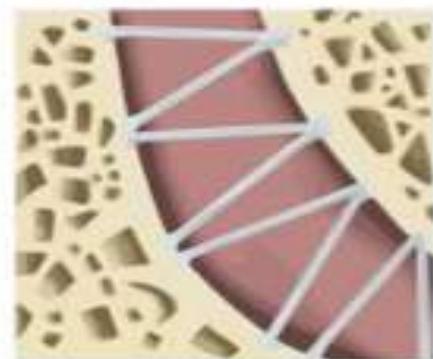
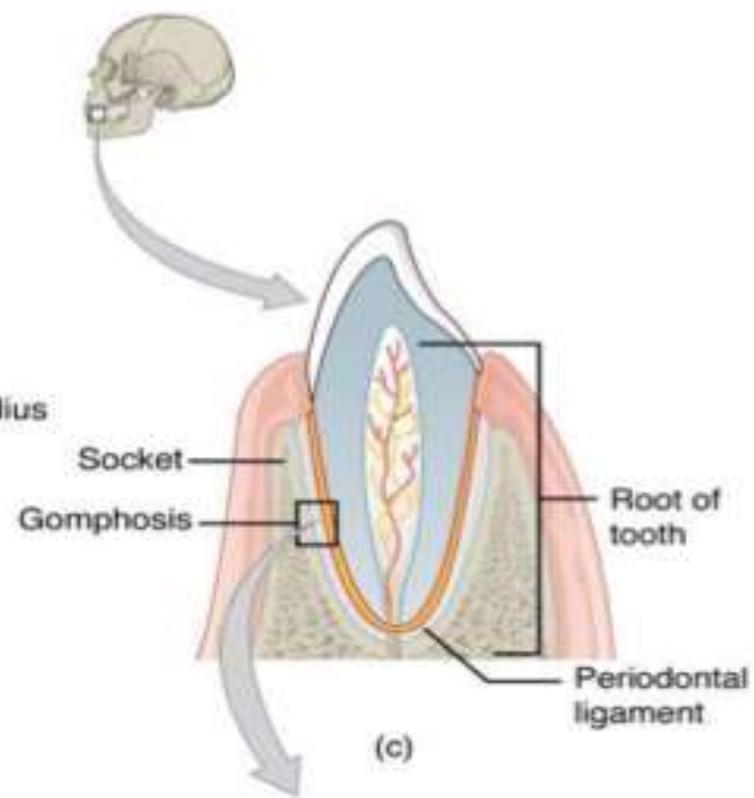
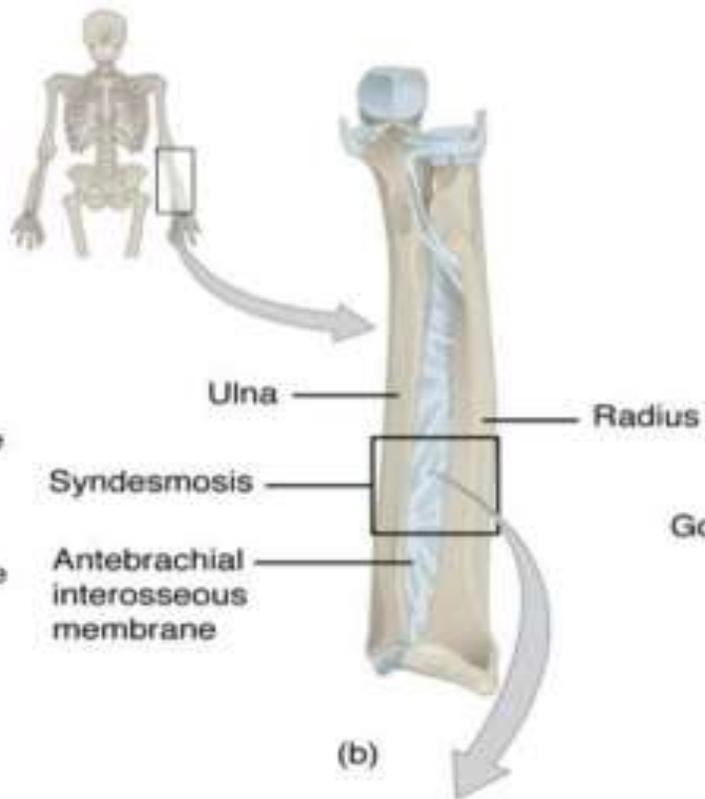
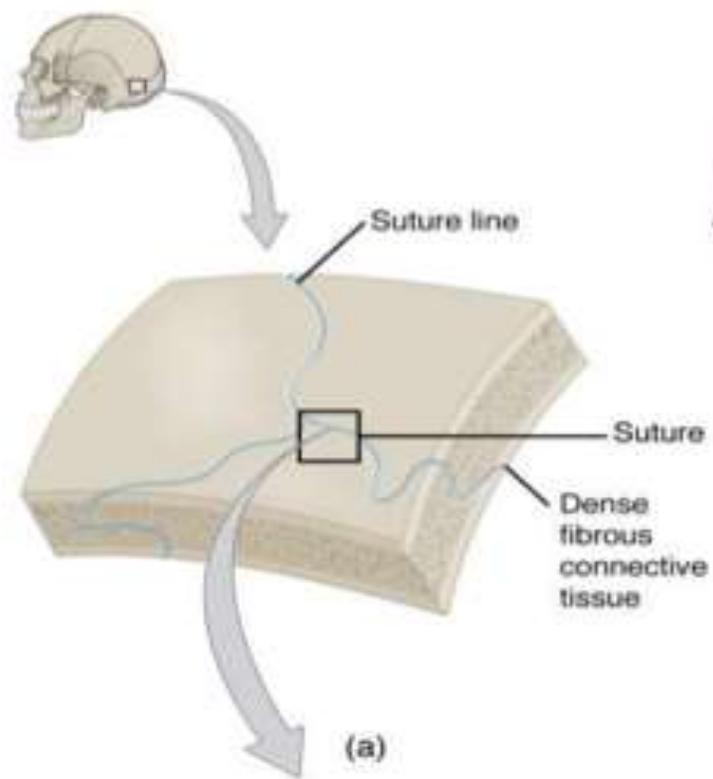
- ◇ Persendian fibrous
- ◇ Menghasilkan sedikit gerak atau tidak sama sekali
- ◇ Macam articulatio fibrosa:
  - ◇ **1. Sutura (antar tulang tengkorak)**
    - ◇ Dihubungkan oleh ligamentum sutura
    - ◇ Gerakan : tidak dapat bergerak (.....)
  - ◇ **2. Syndesmosis**
    - ◇ Dihubungkan oleh membrana interossea atau ligamentum
    - ◇ Gerakan: sedikit gerak (.....)
    - ◇ Contoh: articulatio radioulnar, articulatio tibiofibular



# ARTICULATIO FIBROSA (2)

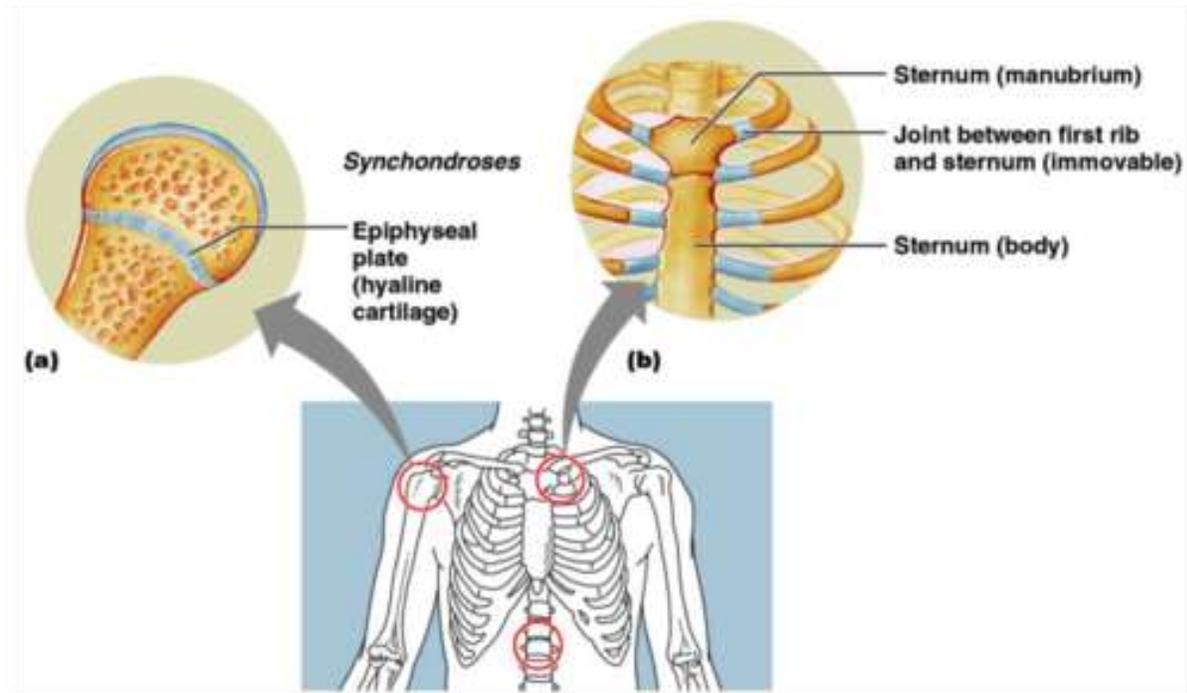
- ◇ Persendian fibrous
- ◇ Menghasilkan sedikit gerak atau tidak sama sekali
- ◇ Macam articulatio fibrosa:
  - ◇ **3. Gomphosis**
    - ◇ Antara tulang berbentuk conus dengan socketnya
    - ◇ Dihubungkan oleh ligamentum periodontal
    - ◇ Contoh: persendian antara gigi dengan rahang (art.dentoalveolaris)
    - ◇ Gerakan : tidak dapat bergerak (.....)





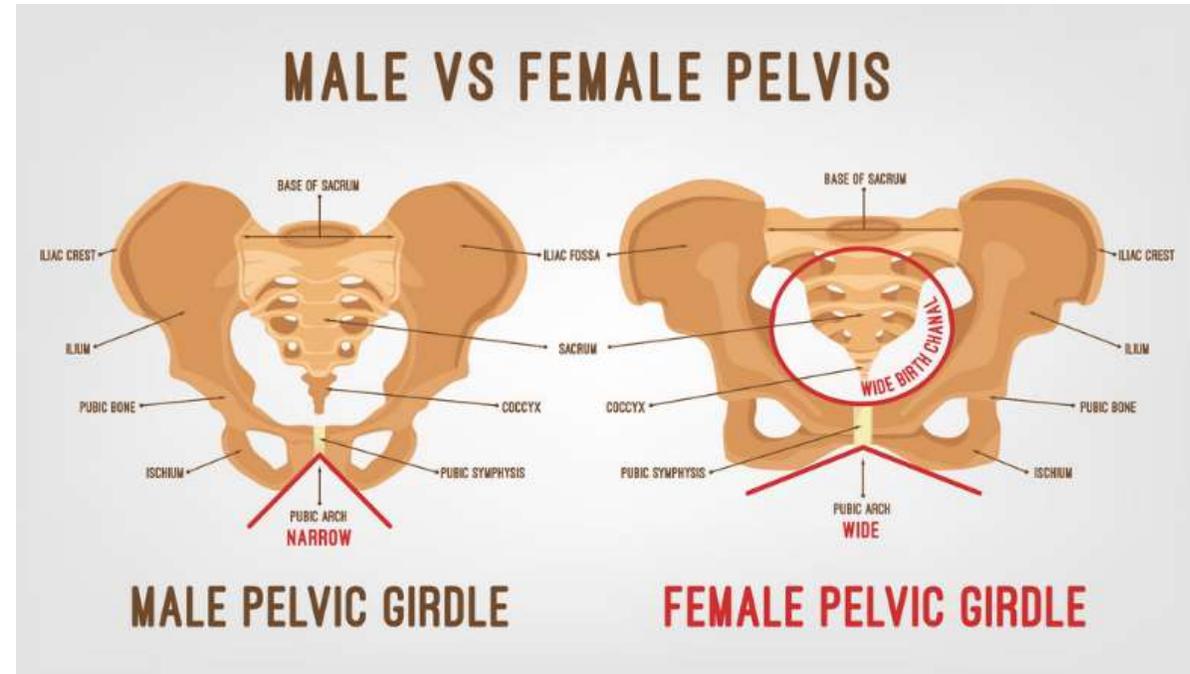
# ARTICULATIO CARTILAGENES

- ◇ Persendian yang dihubungkan oleh kartilago
- ◇ **1. Synchondrosis**
  - ◇ Dihubungkan oleh kartilago hyalin
  - ◇ Contoh: persendian antara epifisis dan diafisis, manubrium sterni dan costa I
  - ◇ Gerakan: Sinarthrosis (.....)



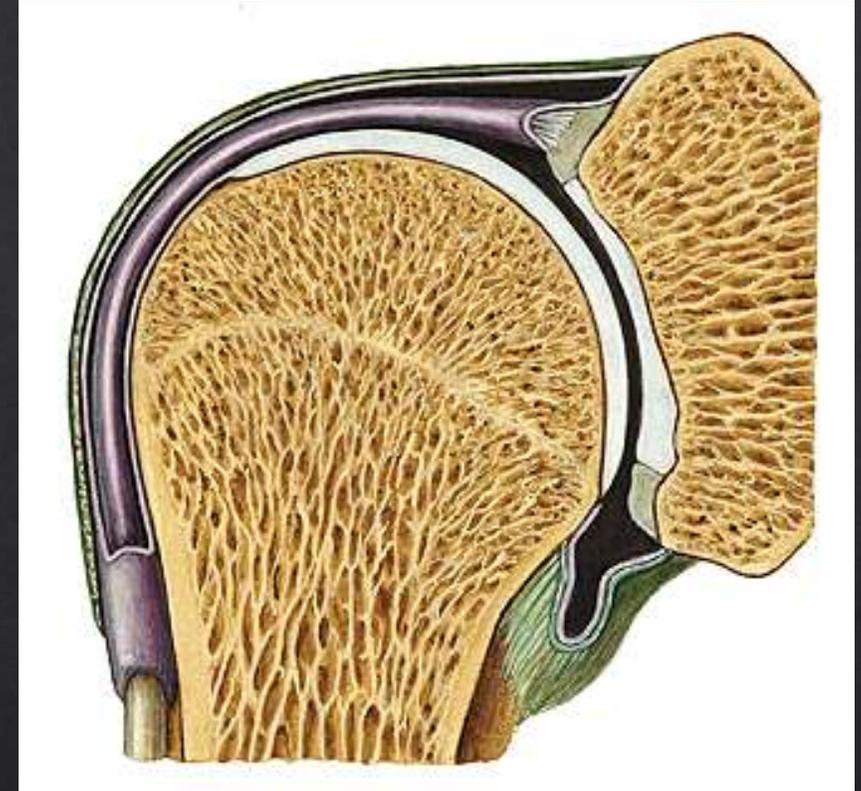
# ARTICULATIO CARTILAGENES (2)

- ◇ Persendian yang dihubungkan oleh kartilago
- ◇ **1. Simphisis**
  - ◇ Dihubungkan oleh kartilago hyalin dan fibrokartilago
  - ◇ Contoh: simphisis pubis
  - ◇ Gerakan: Amphiarthrosis  
(.....)



# ARTICULATIO SYNOVIALIS

- karakteristik → ruangan “cavitas articularis”
- gerakan > bebas
- cairan “synovialis” sbg pelumas, dihasilkan o/ lapisan dalam pembungkus sendi (kapsul sendi) → “membrana synovialis” ujung tulang dilapisi tulang rawan diperkuat di luarnya dengan kapsul sendi dan ligamentum.
- Dua lapisan kapsul sendi:
  - luar : stratum (membrana) fibrosum
  - dalam : stratum (membrana) synovialis



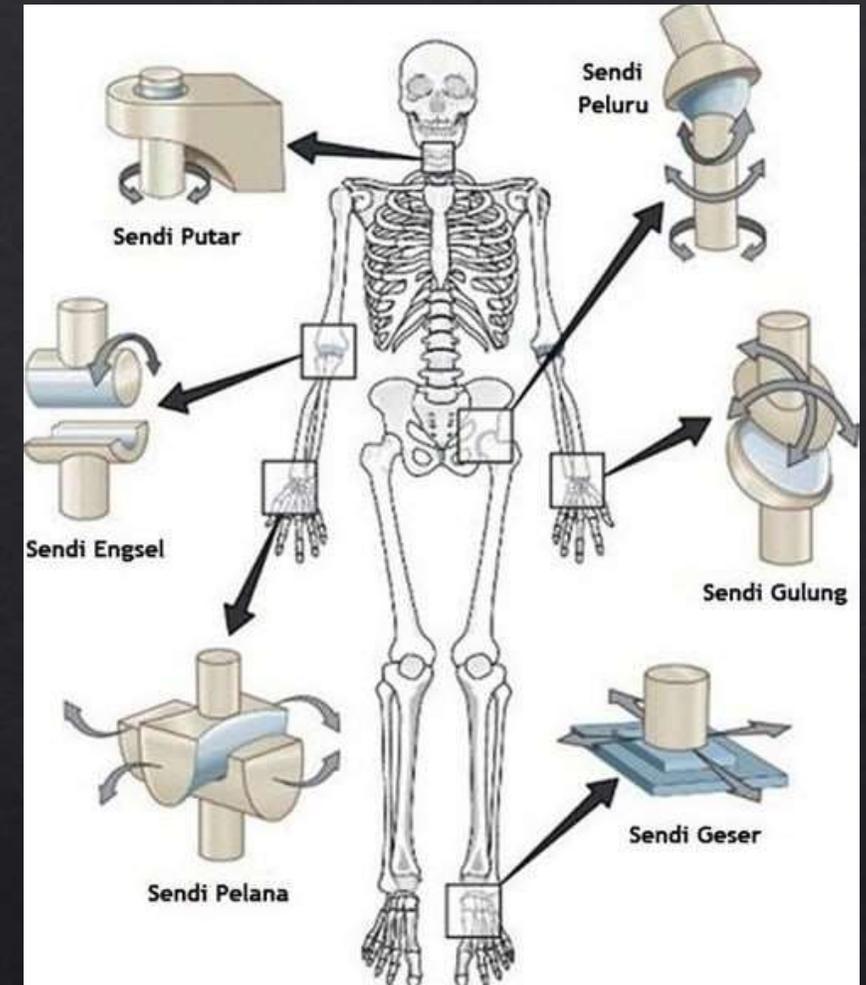
# BAGIAN ART.SYNOVIALIS

- ◇ Tulang rawan sendi: lapisan tulang rawan hyalin yg melapisi ujung tulang yg bersendi
- ◇ Rongga sendi: ruangan di antara 2 tulang yg bersendi , terisi oleh cairan synovial
- ◇ Kapsul sendi: penutup rongga sendi
- ◇ Cairan sinovial: cairan albumin yang berguna sebagai pelumas dan makanan bagi sel-sel tulang rawan
- ◇ Membran synovial: melapisi bagian dalam rongga sendi kecuali pada rawan sendi
- ◇ Membran fibrosa: lapisan sebelah luar kapsul sendi
- ◇ Bursa: kantong2 kecil berisi cairan sinovial □ berguna untuk mengurangi gesekan

# Bentuk ART.SYNOVIALIS

## BERIKAN CONTOH MASING-MASING:

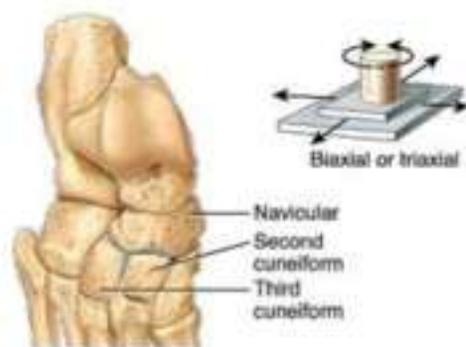
- ◇ **Sendi putar (PIVOT JOINT)** → permukaan silindris tulang masuk dalam cincin
- ◇ **Sendi engsel (HINGE JOINT)** → konkaf vs konvek
- ◇ **Sendi peluru (BALL AND SOCKET JOINT)** → permukaan tulang yang membulat bertemu dengan permukaan cekung tulang lainnya
- ◇ **Sendi geser (PLANE JOINT)** → tulang yang saling bersendi rata atau sedikit berlekuk
- ◇ **Sendi pelana (SADDLE JOINT)** → tulang yang bersendi keduanya punya permukaan konkaf dan konvek
- ◇ **Sendi gulung (CONDYLOID JOINT)** → elips bertemu dengan cekungan berbentuk elips



# Berdasar jumlah aksis sendi

1. **Art. MONOAXIAL**, mempunyai satu aksis  
misal: sendi ruas-ruas jari (art. Interphalangea).  
sendi antara humerus-ulna (art. Humeroulnaris).
2. **Art. BIAxIAL**, mempunyai 2 aksis  
misal: sendi antara humerus-radius (art. Humeroradialis)  
sendi lutut (art. Genu)
3. **Art. TRIAXIAL**, mempunyai 3 aksis  
misal: sendi bahu (art. Humeri)  
sendi panggul (art. Coxae)

# Types of Synovial Joints



(a) Plane joint between navicular and second and third cuneiforms of tarsus in foot



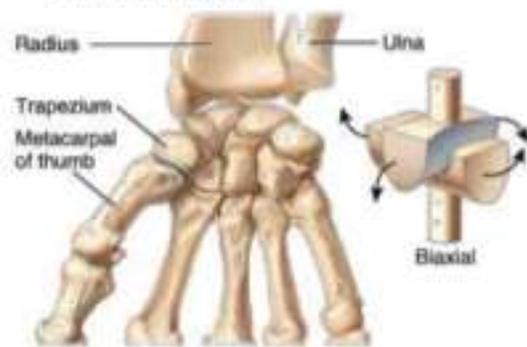
(b) Hinge joint between trochlea of humerus and trochlear notch of ulna at the elbow



(c) Pivot joint between head of radius and radial notch of ulna



(d) Condyloid joint between radius and scaphoid and lunate bones of carpus (wrist)



(e) Saddle joint between trapezium of carpus (wrist) and metacarpal of thumb



(f) Ball-and-socket joint between head of femur and acetabulum of hip bone

TABLE 8.2

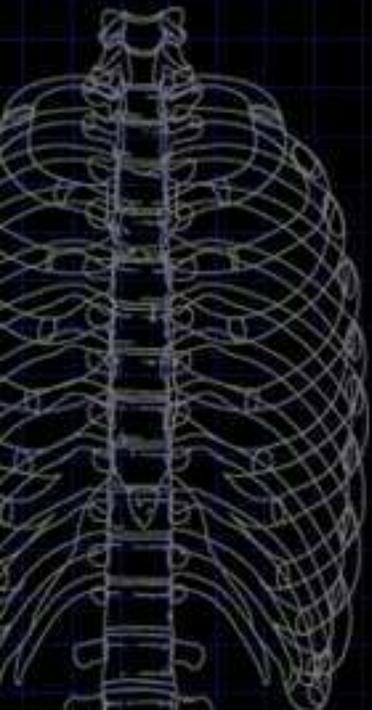
## Joints of the Body

Joint	Location	Type of Joint	Type of Movement
Skull	Cranial and facial bones	Suture, fibrous	Immovable, synarthrotic
Temporomandibular	Temporal bone, mandible	Modified hinge, synovial	Elevation, depression, protraction, retraction, diarthrotic
Atlanto-occipital	Atlas, occipital bone	Condylloid, synovial	Flexion, extension, diarthrotic
Atlantoaxial	Atlas, axis	Pivot, synovial	Rotation
Intervertebral	Between vertebral bodies	Symphysis, cartilaginous	Slight movement, amphiarthrotic
Intervertebral	Between articular processes	Gliding, synovial	Flexion, extension, slight rotation, diarthrotic
Sacroiliac	Sacrum and ilium	Gliding, synovial	Sliding movement, diarthrotic
Vertebrocostal	Vertebrae and ribs	Gliding, synovial	Sliding movement during breathing, diarthrotic
Sternoclavicular	Sternum and clavicle	Gliding, synovial	Sliding movement when shrugging shoulders, diarthrotic
Sternocostal	Sternum and rib 1	Synchondrosis, cartilaginous	Immovable, synarthrotic
Sternocostal	Sternum and ribs 2–7	Gliding, synovial	Sliding movement during breathing, diarthrotic
Acromioclavicular	Scapula and clavicle	Gliding, synovial	Protraction, retraction, elevation, depression, rotation, diarthrotic
Shoulder (glenohumeral)	Humerus and scapula	Ball-and-socket, synovial	Flexion, extension, adduction, abduction, rotation, circumduction, diarthrotic
Elbow	Humerus and ulna	Hinge, synovial	Flexion, extension, diarthrotic
Proximal radioulnar	Radius and ulna	Pivot, synovial	Rotation, diarthrotic
Distal radioulnar	Radius and ulna	Pivot, synovial	Pronation, supination, diarthrotic
Wrist (radiocarpal)	Radius and carpals	Condylloid, synovial	Flexion, extension, adduction, abduction, circumduction, diarthrotic
Intercarpal	Adjacent carpals	Gliding, synovial	Sliding movement, adduction, abduction, flexion, extension, diarthrotic

Carpometacarpal	Carpal and metacarpal 1	Saddle, synovial	Flexion, extension, adduction, abduction, diarthrotic
Carpometacarpal	Carpals and metacarpals 2-5	Condylloid, synovial	Flexion, extension, adduction, abduction, circumduction, diarthrotic
Metacarpophalangeal	Metacarpal and proximal phalanx	Condylloid, synovial	Flexion, extension, adduction, abduction, circumduction, diarthrotic
Interphalangeal	Adjacent phalanges	Hinge, synovial	Flexion, extension, diarthrotic
Symphysis pubis	Pubic bones	Symphysis, cartilaginous	Slight movement, amphiarthrotic
Hip	Coxa and femur	Ball-and-socket, synovial	Flexion, extension, adduction, abduction, rotation, circumduction, diarthrotic
Knee (tibiofemoral)	Femur and tibia	Modified hinge, synovial	Flexion, extension, slight rotation when flexed, diarthrotic
Knee (femoropatellar)	Femur and patella	Gliding, synovial	Sliding movement, diarthrotic
Proximal tibiofibular	Tibia and fibula	Gliding, synovial	Sliding movement, diarthrotic
Distal tibiofibular	Tibia and fibula	Syndesmosis, fibrous	Slight rotation during dorsiflexion, amphiarthrotic
Ankle (talocrural)	Talus, tibia, and fibula	Hinge, synovial	Dorsiflexion, plantar flexion, slight circumduction, diarthrotic
Intertarsal	Adjacent tarsals	Gliding, synovial	Inversion, eversion, diarthrotic
Tarsometatarsal	Tarsals and metatarsals	Gliding, synovial	Sliding movement, diarthrotic
Metatarsophalangeal	Metatarsal and proximal phalanx	Condylloid, synovial	Flexion, extension, adduction, abduction, diarthrotic

# KINESIOLOGI

- ◇ Ilmu yang mempelajari gerak
- ◇ Gerak merupakan hasil kerja dari alat gerak aktif, alat gerak pasif dan sistem saraf motorik
- ◇ Stabilitas sendi dipengaruhi:
  - ◇ Bentuk permukaan sendinya
  - ◇ Ligamentum
  - ◇ Musculus



li separoh

roh bagian

**Superficial**  
Nearer to surface  
The muscles of the arm are superficial to its bone (humerus).

**Intermediate**  
Between a superficial and a deep structure  
The biceps muscle is intermediate between the skin and humerus.

**Deep**  
Farther from surface  
The humerus is deep to the arm muscles.

**Medial**  
Nearer to median plane  
The 5th digit (little finger) is on the medial side of the hand.

**Lateral**  
Farther from median plane  
The 1st digit (thumb) is on the lateral side of the hand.

**Posterior (dorsal)**  
Nearer to back  
The heel is posterior to the toes.

**Superior (cranial)**  
Nearer to head  
The heart is superior to the stomach.

**Hand**  
Dorsal surface (dorsum)  
Palmar surface (palm)

Dorsum Palm



**Foot**  
Dorsal surface (dorsum)  
Plantar surface (sole)

Dorsum Sole

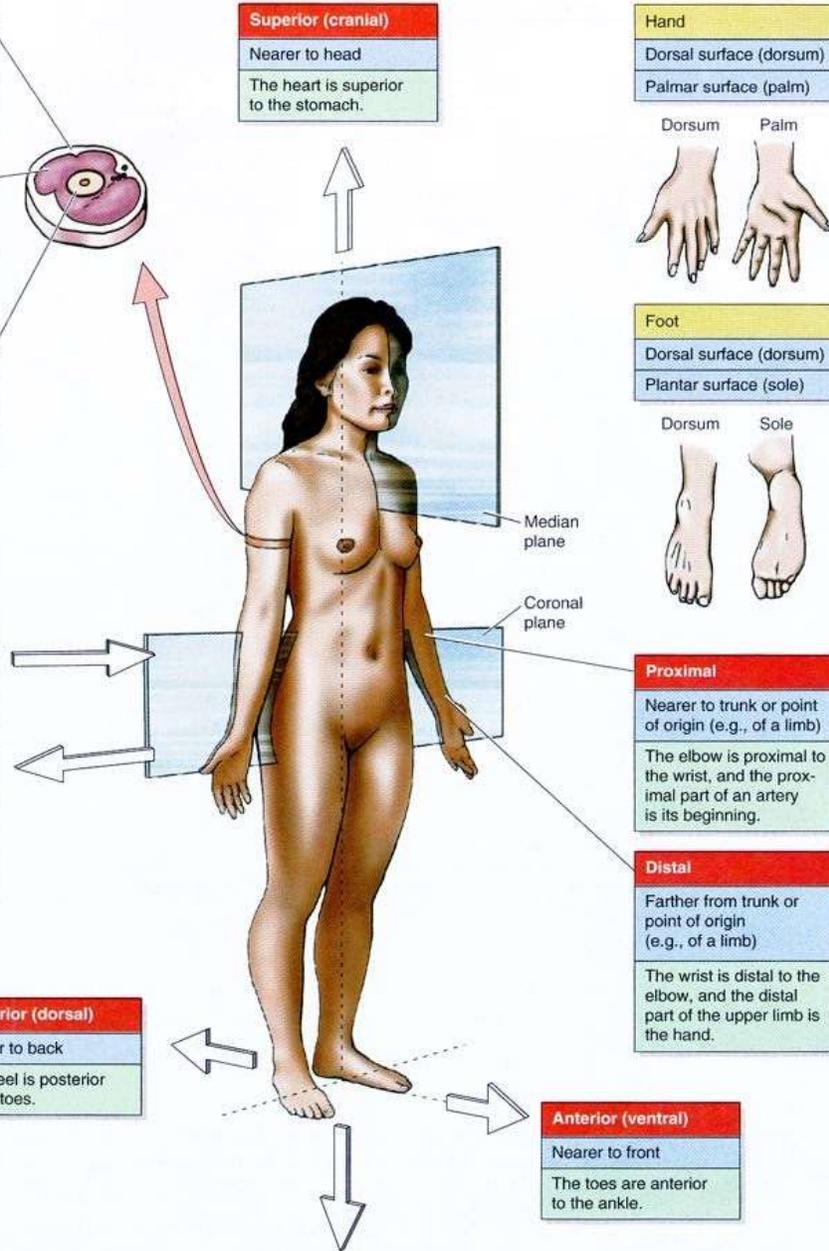


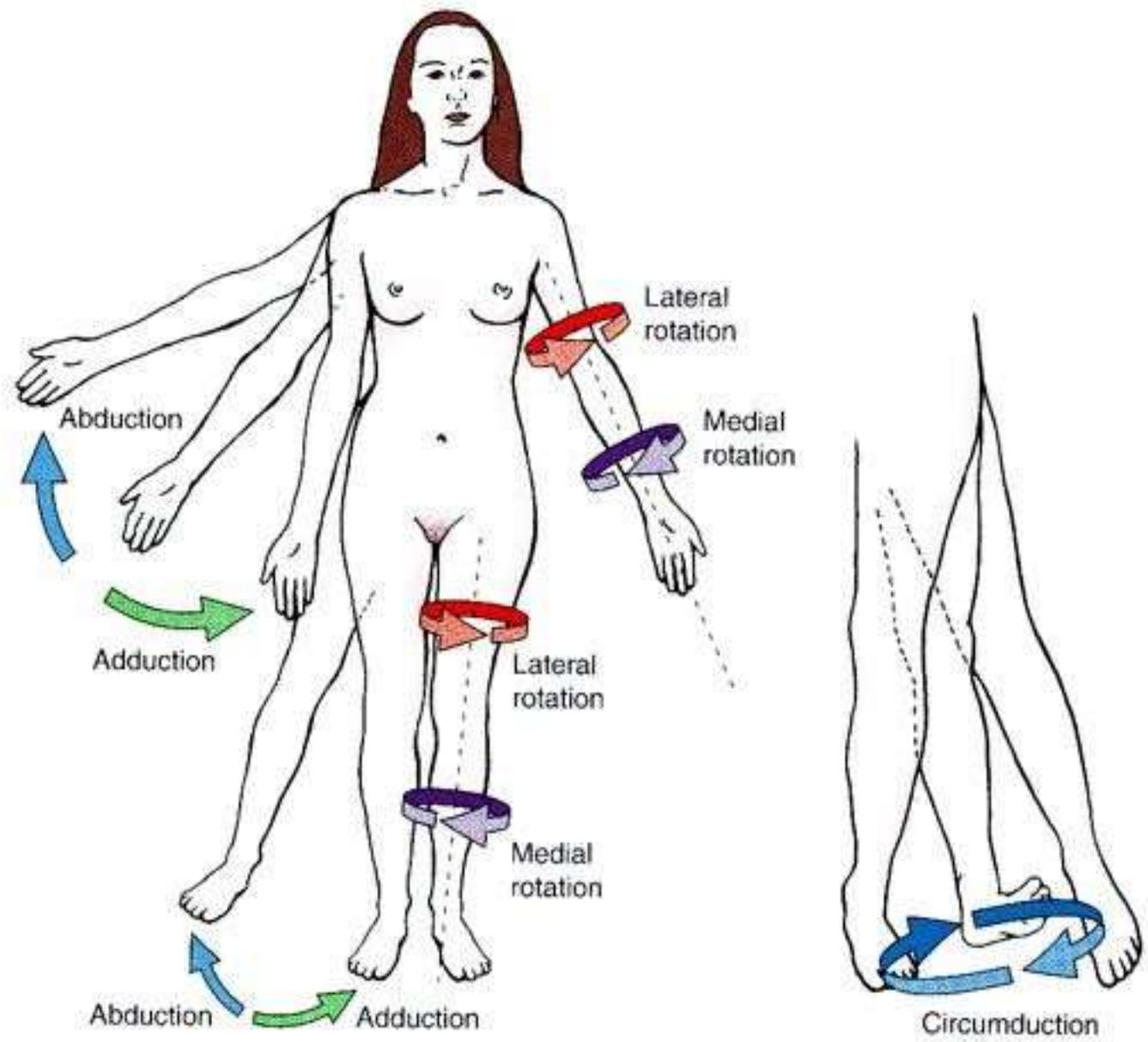
**Proximal**  
Nearer to trunk or point of origin (e.g., of a limb)  
The elbow is proximal to the wrist, and the proximal part of an artery is its beginning.

**Distal**  
Farther from trunk or point of origin (e.g., of a limb)  
The wrist is distal to the elbow, and the distal part of the upper limb is the hand.

**Anterior (ventral)**  
Nearer to front  
The toes are anterior to the ankle.

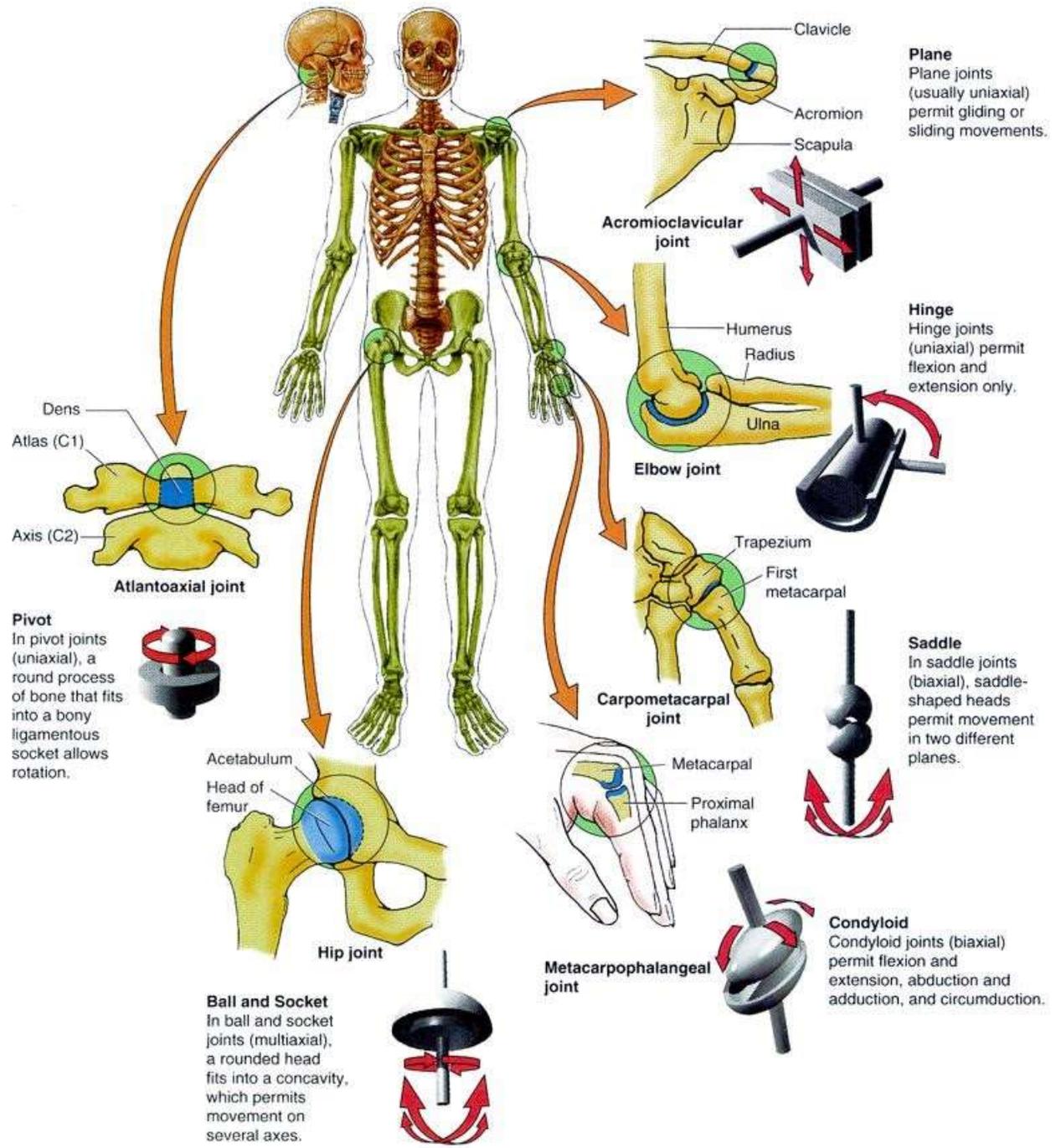
**Inferior (caudal)**  
Nearer to feet  
The stomach is inferior to the heart.





Abduction and adduction of right limbs and rotation of left limbs at the shoulder and hips joints, respectively

Circumduction (circular movement) of lower limb at hip joint





الْحَمْدُ لِلَّهِ

that I'm  
able to be  
thankful.

tuffix