

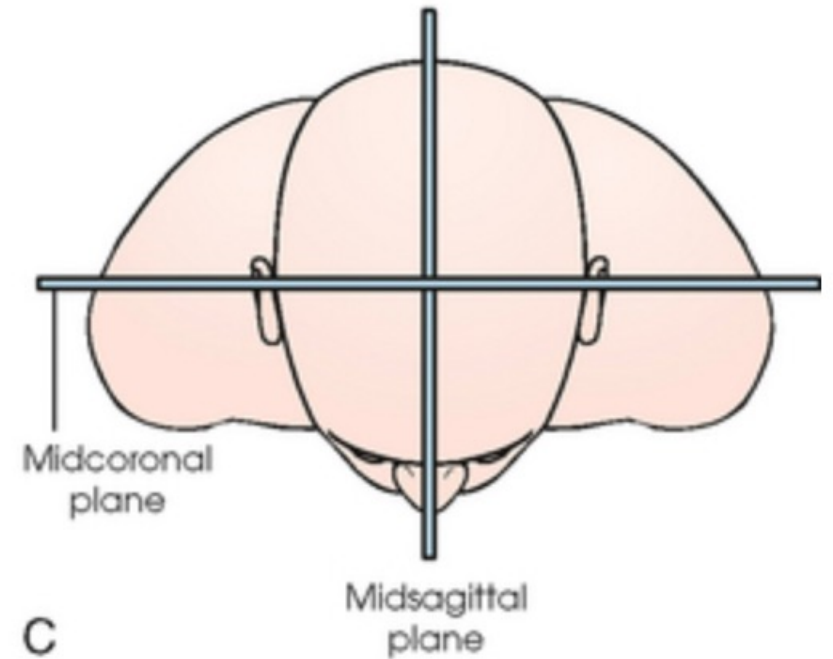
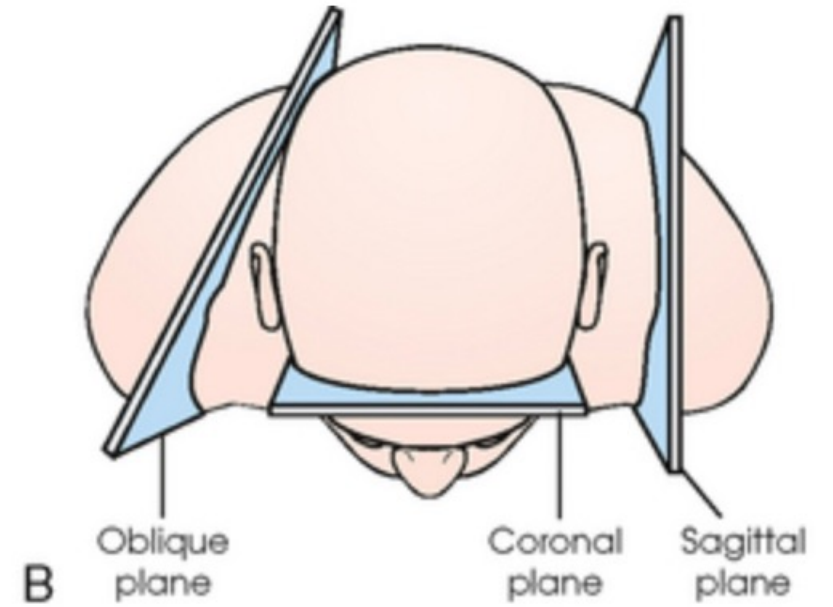
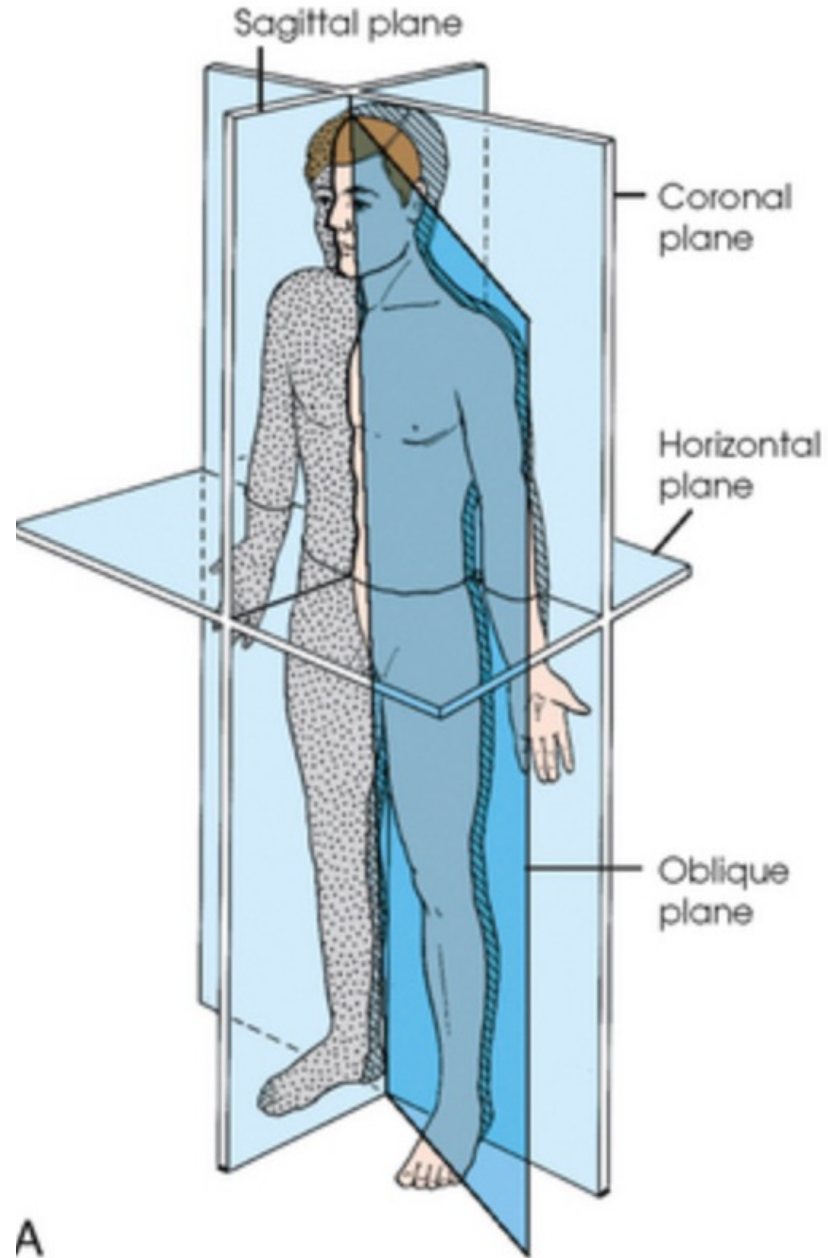


# **HUMAN ANATOMY**

**Dr. Daphne D. Daluping, RRT**

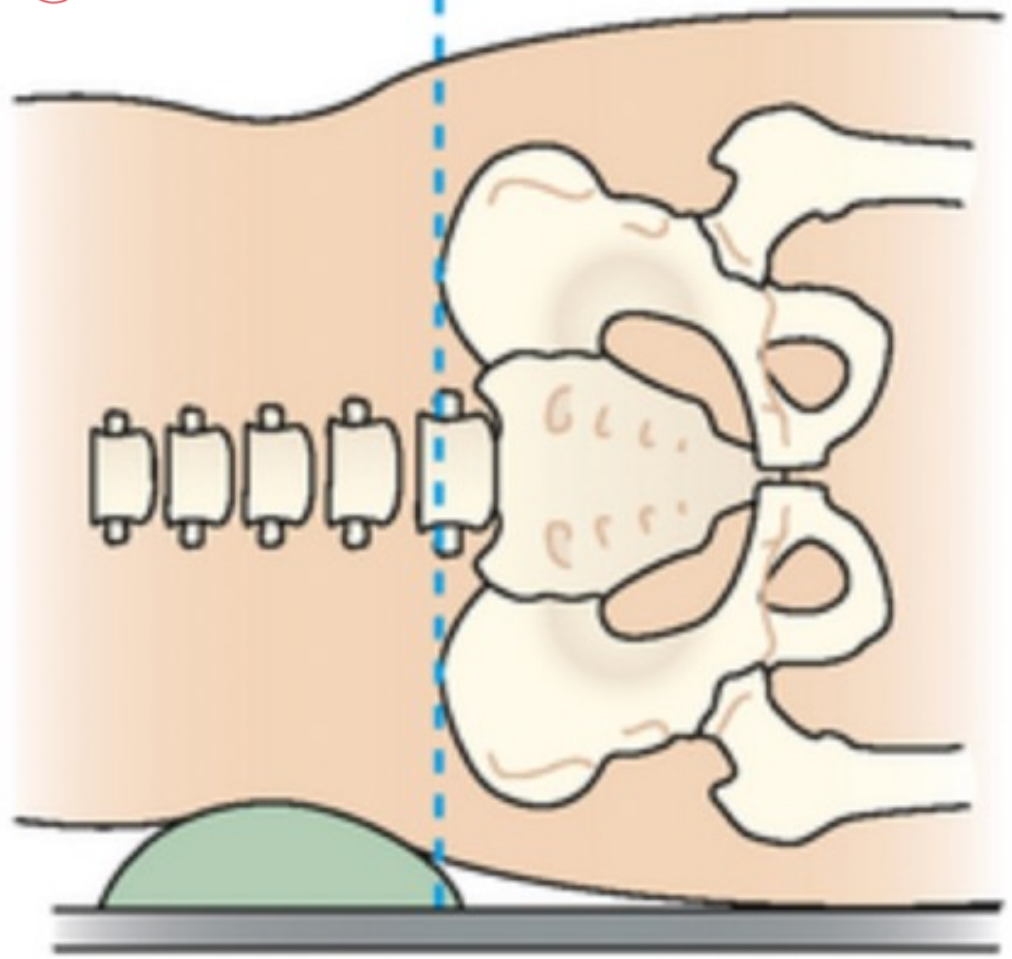
# **GENERAL ANATOMY**

# BODY PLANES

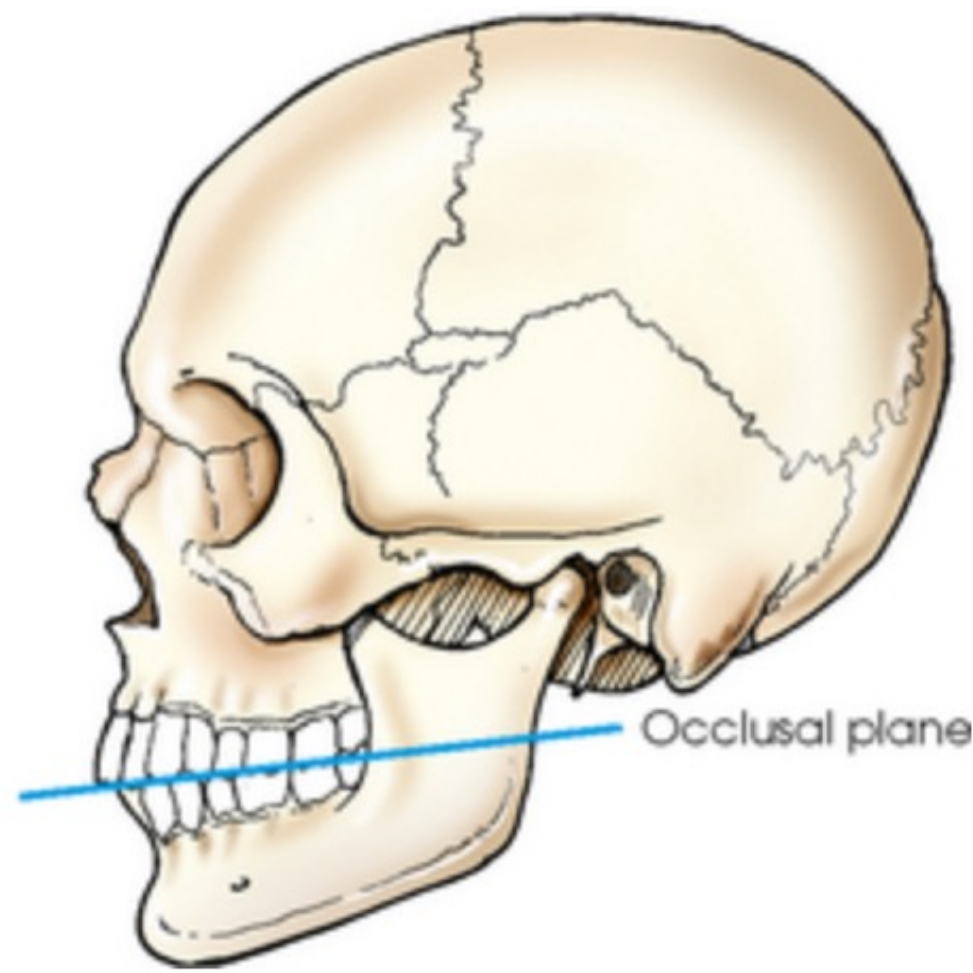


①

Interillac plane



A



B

Occlusal plane

# BODY CAVITIES

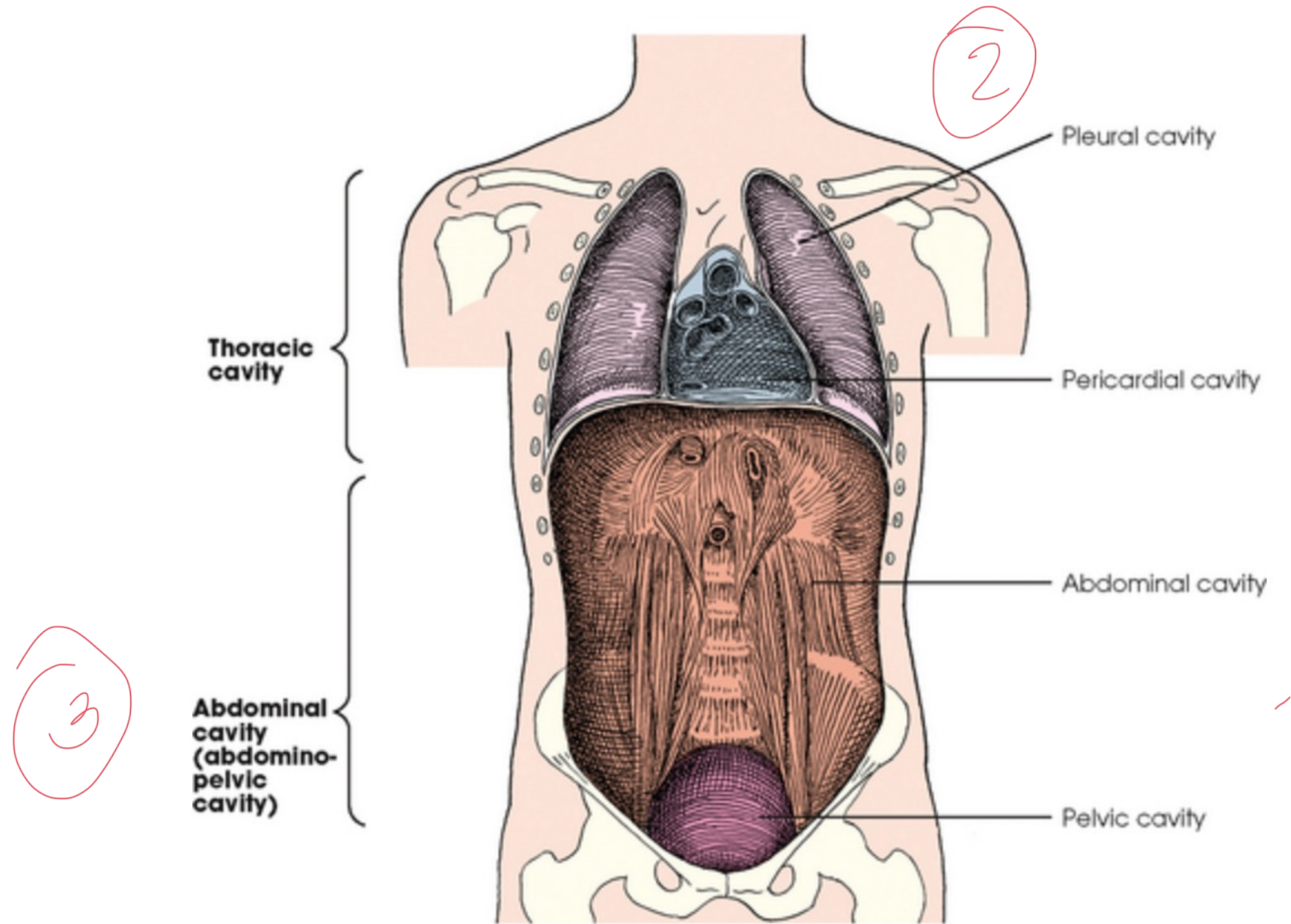
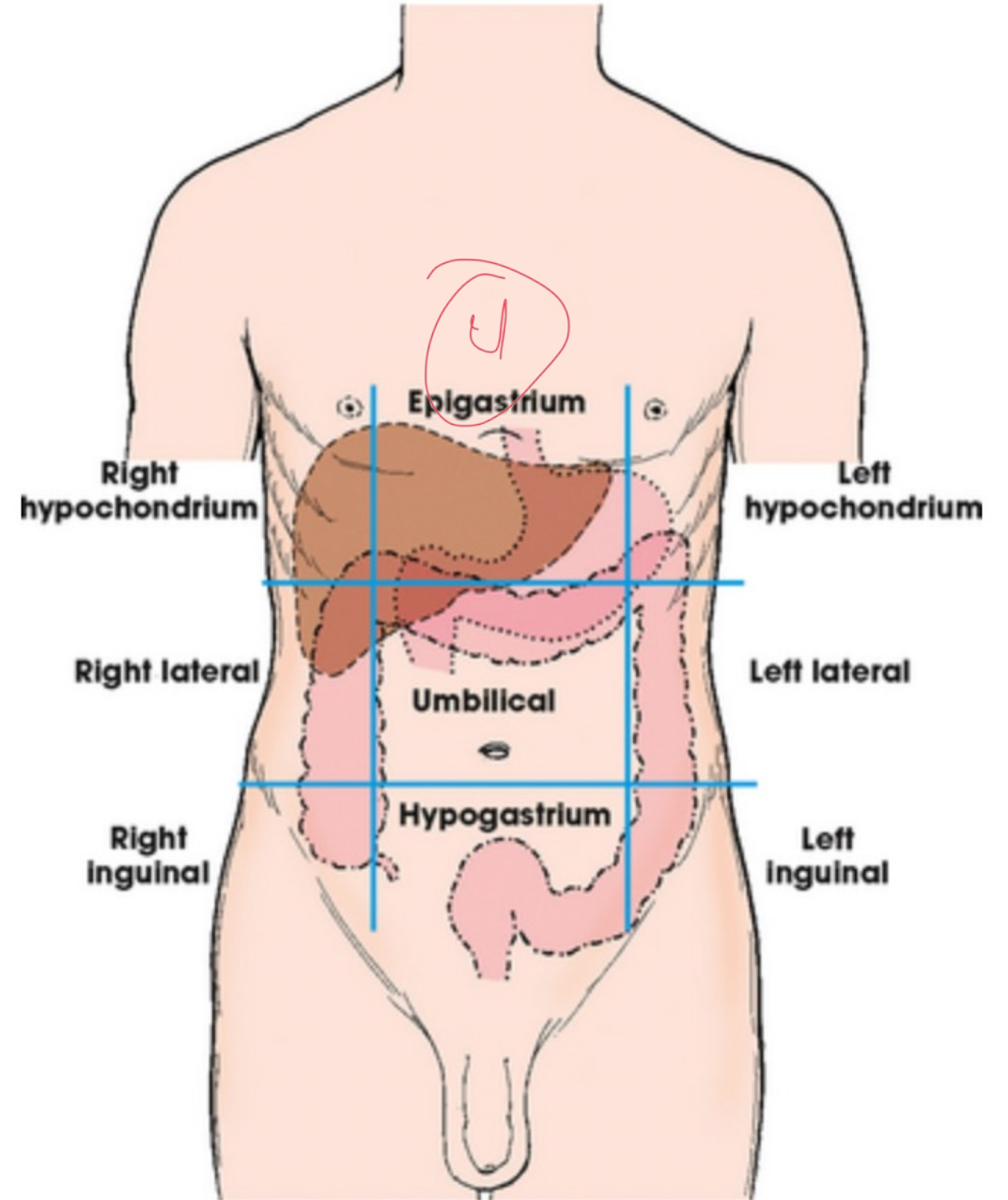
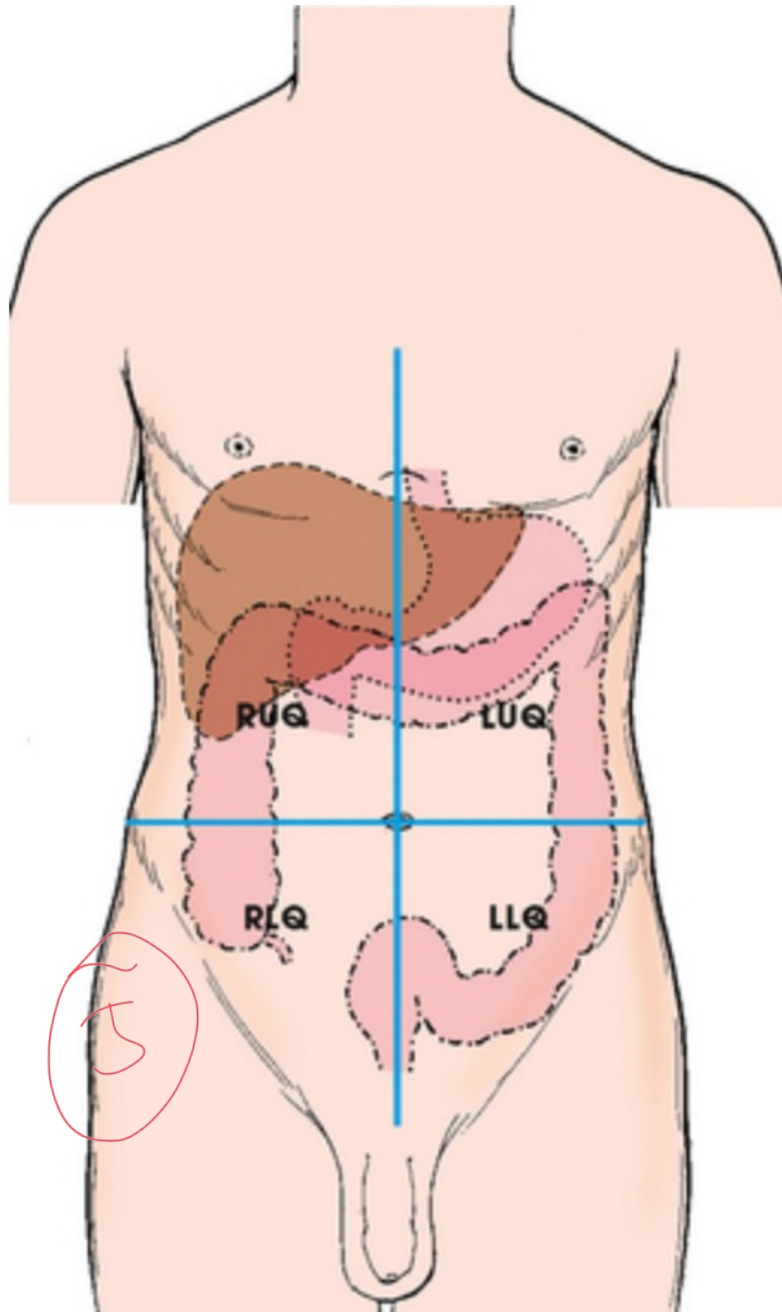


FIG. 3-5 Anterior view of torso showing two great cavities: thoracic and abdominopelvic.

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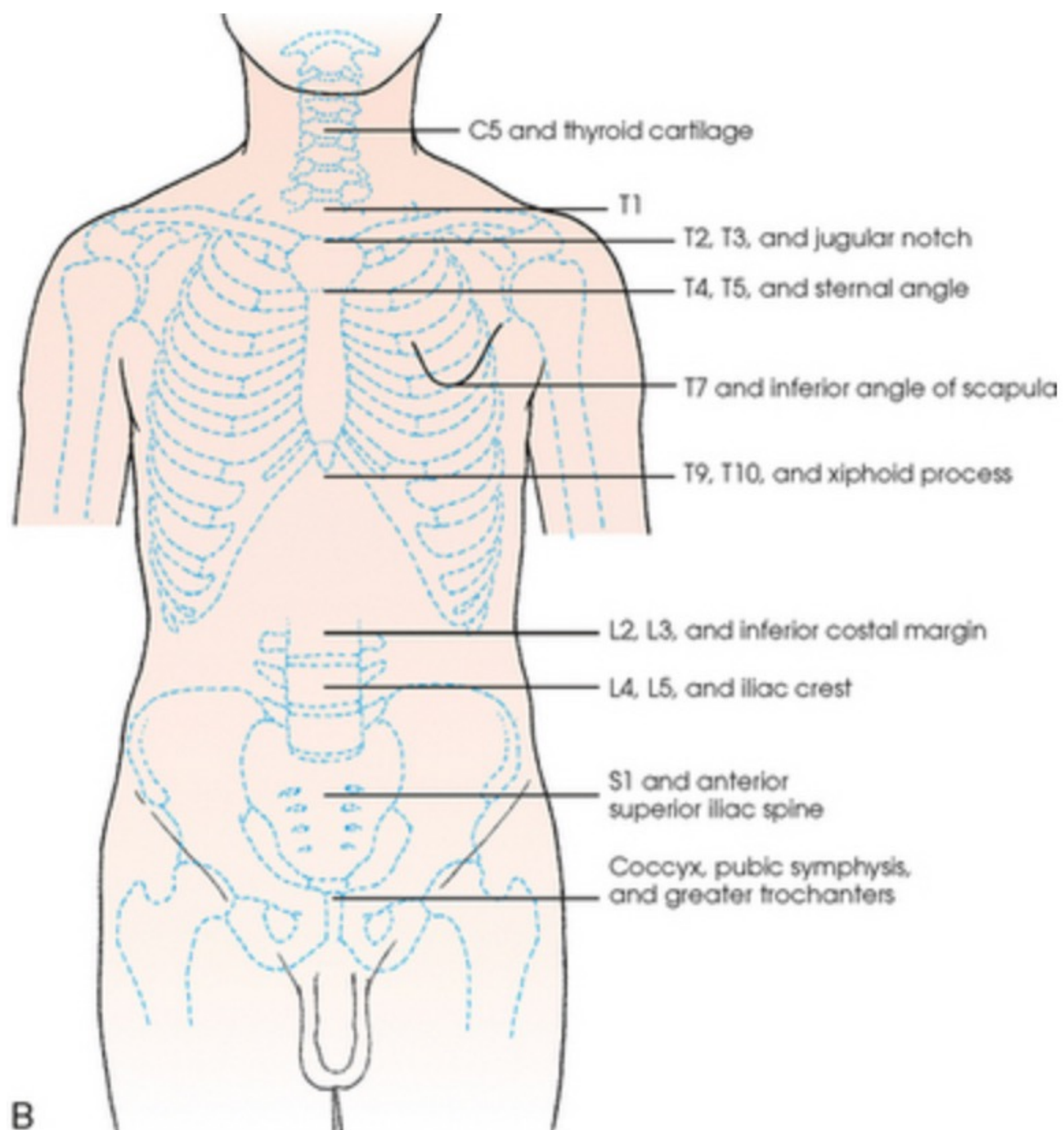
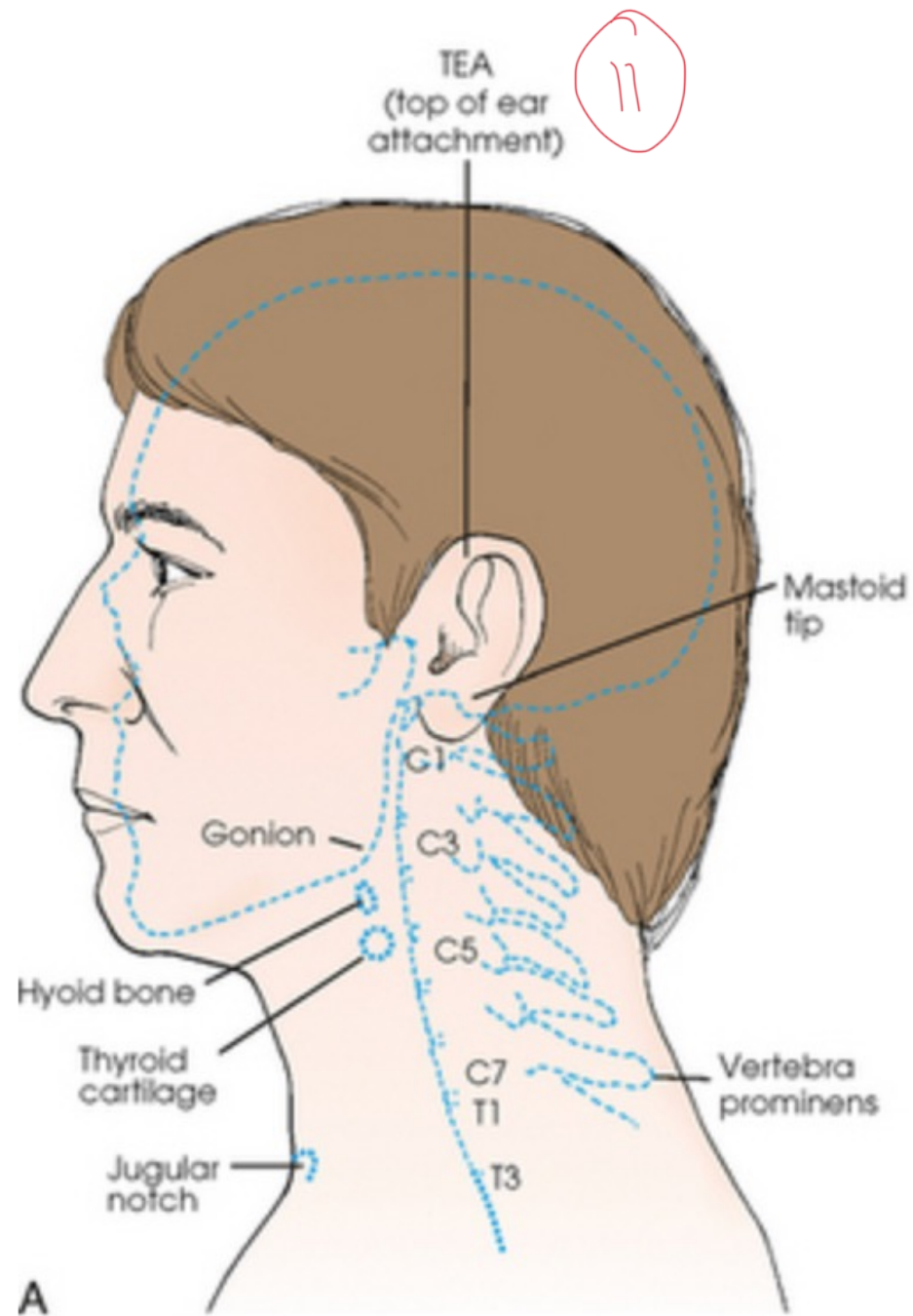
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N



# Surface Landmarks

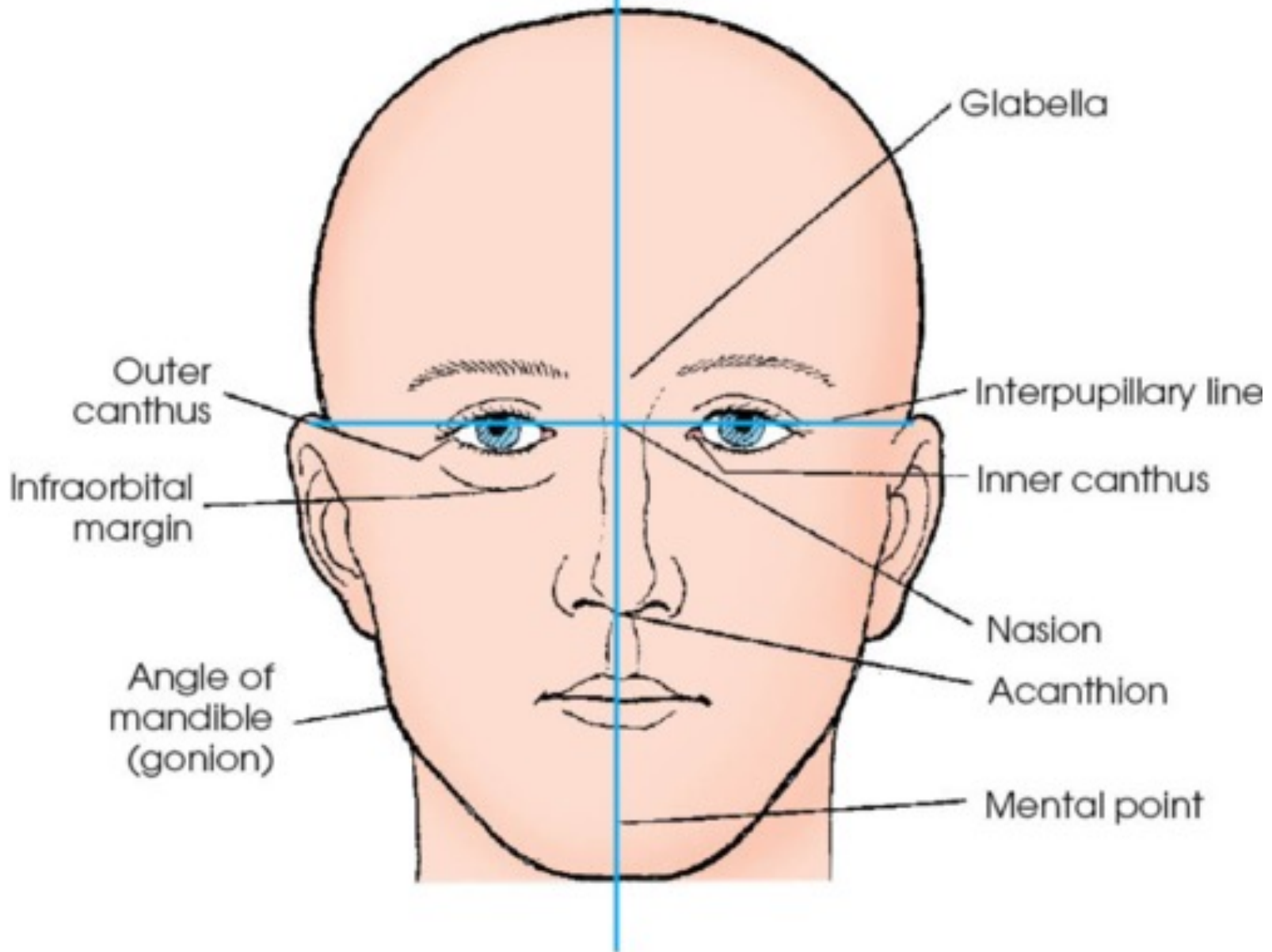
# External landmarks related to body structures at the same level

Body structures	External landmarks
<b>Cervical area (see Fig. 3-6)</b>	
C1	Mastoid tip
C2, C3	Gonion (angle of mandible)
C3, C4	Hyoid bone
C5	Thyroid cartilage
C7, T1	Vertebra prominens
<b>Thoracic area</b>	
T1	Approximately 2 inches (5 cm) above level of jugular notch
T2, T3	Level of jugular notch
T4, T5	Level of sternal angle
T7	Level of inferior angles of scapulae
T9, T10	Level of xiphoid process
<b>Lumbar area</b>	
L2, L3	Inferior costal margin
L4, L5	Level of superiormost aspect of iliac crests
<b>Sacrum and pelvic area</b>	
S1, S2	Level of anterior superior iliac spine (ASIS)
Coccyx	Level of pubic symphysis and greater trochanters

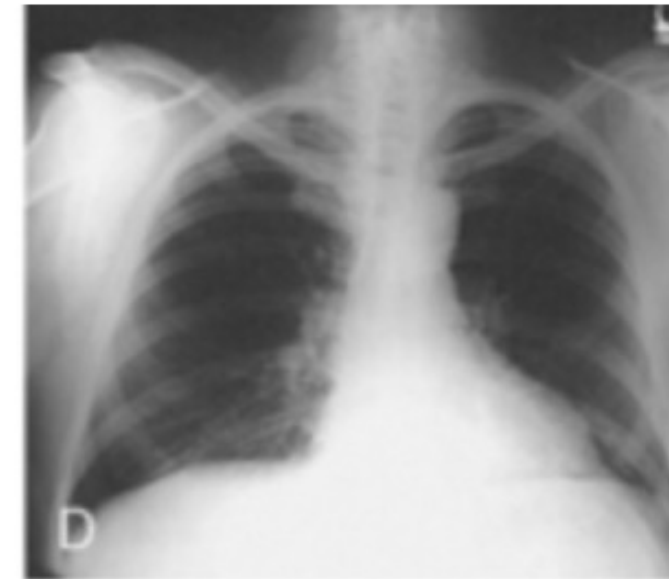


Midsagittal plane

12



# BODY HABITUS

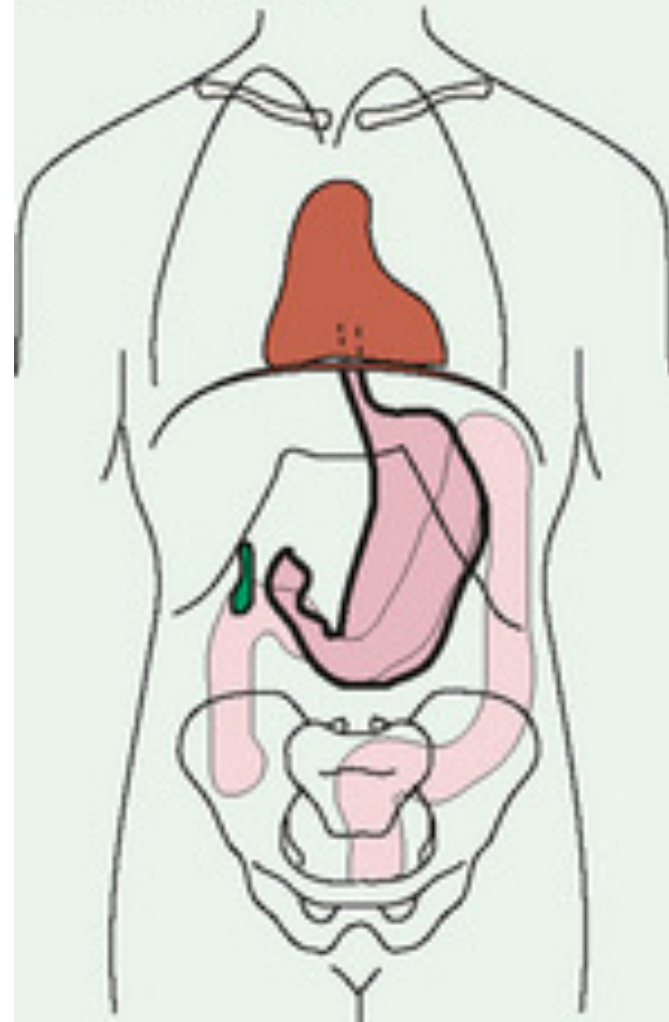


# Four types of Body Habitus

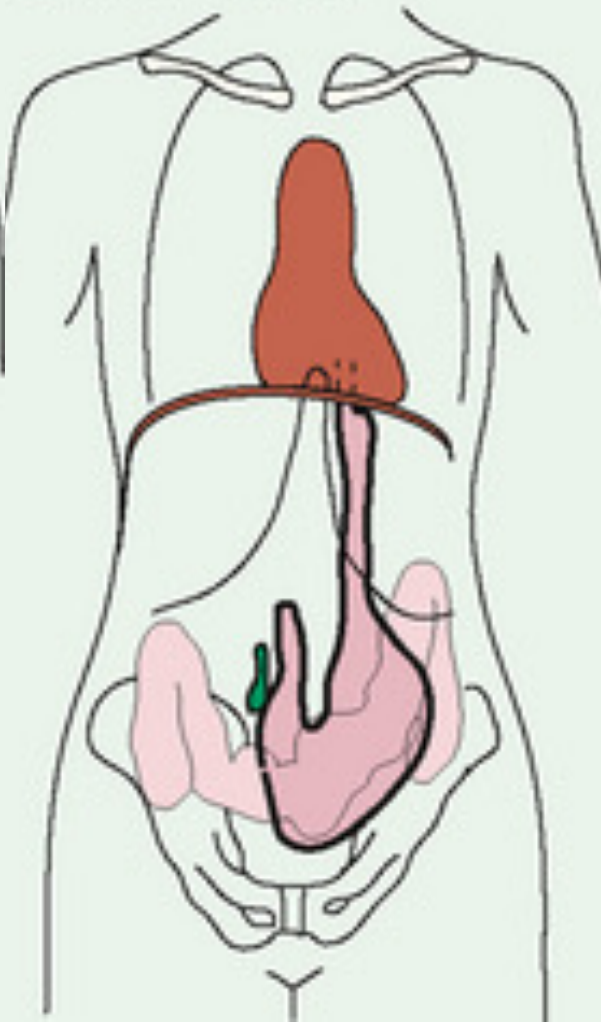
14

13

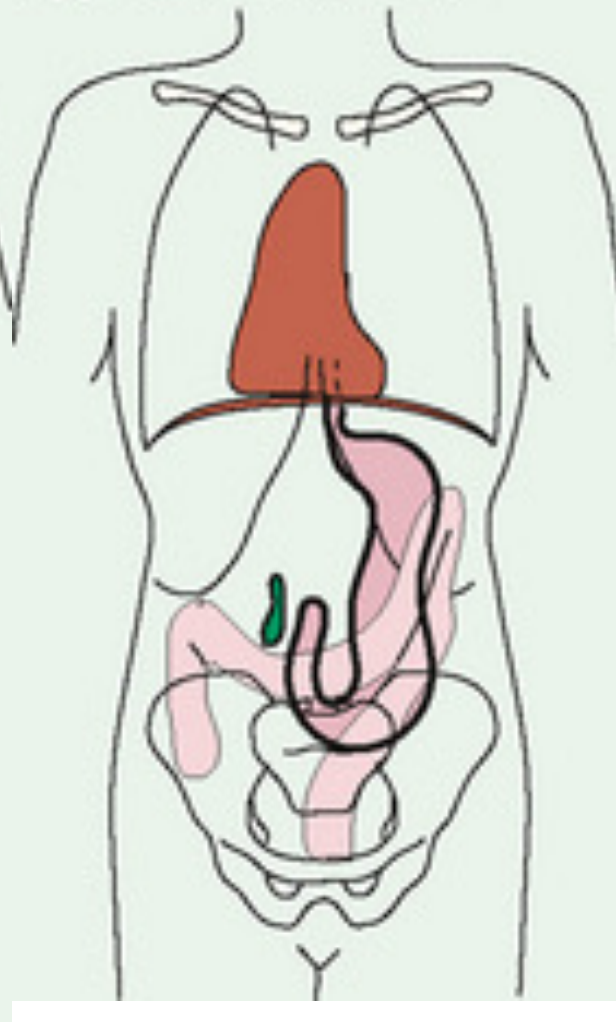
Sthenic, 50%



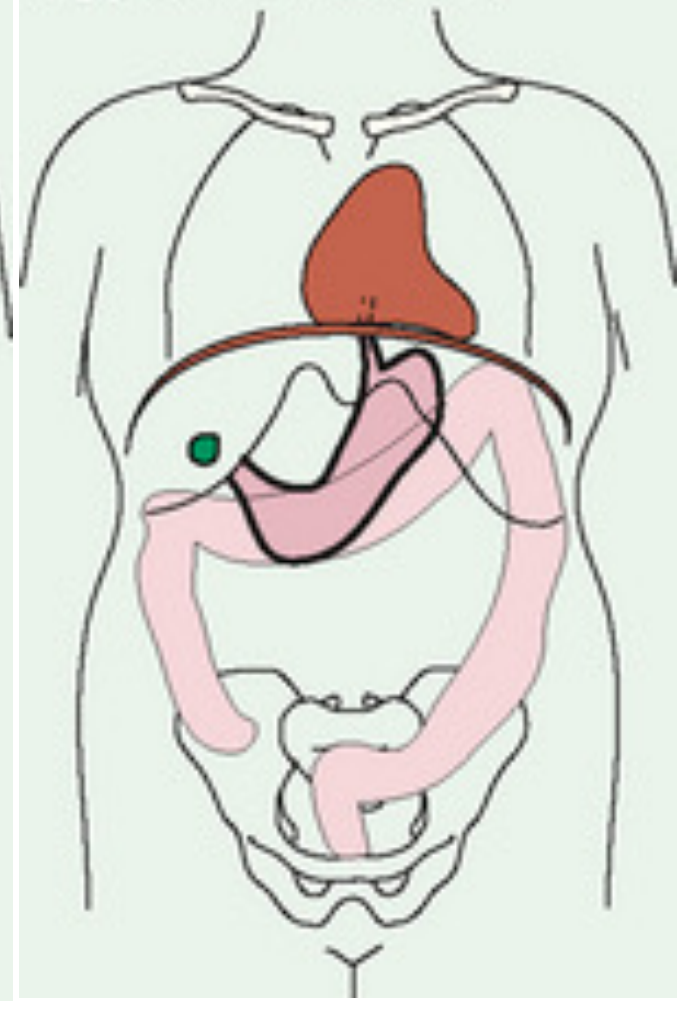
Asthenic, 10%



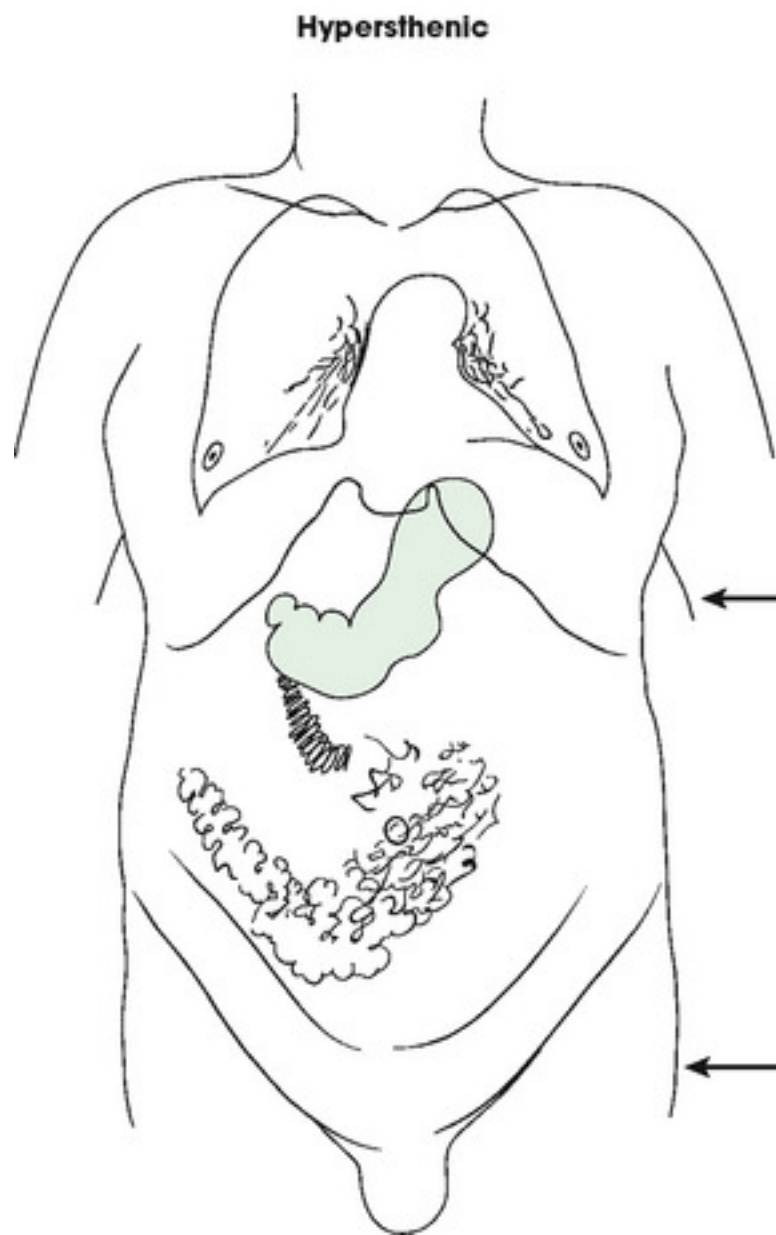
Hyposthenic, 35%



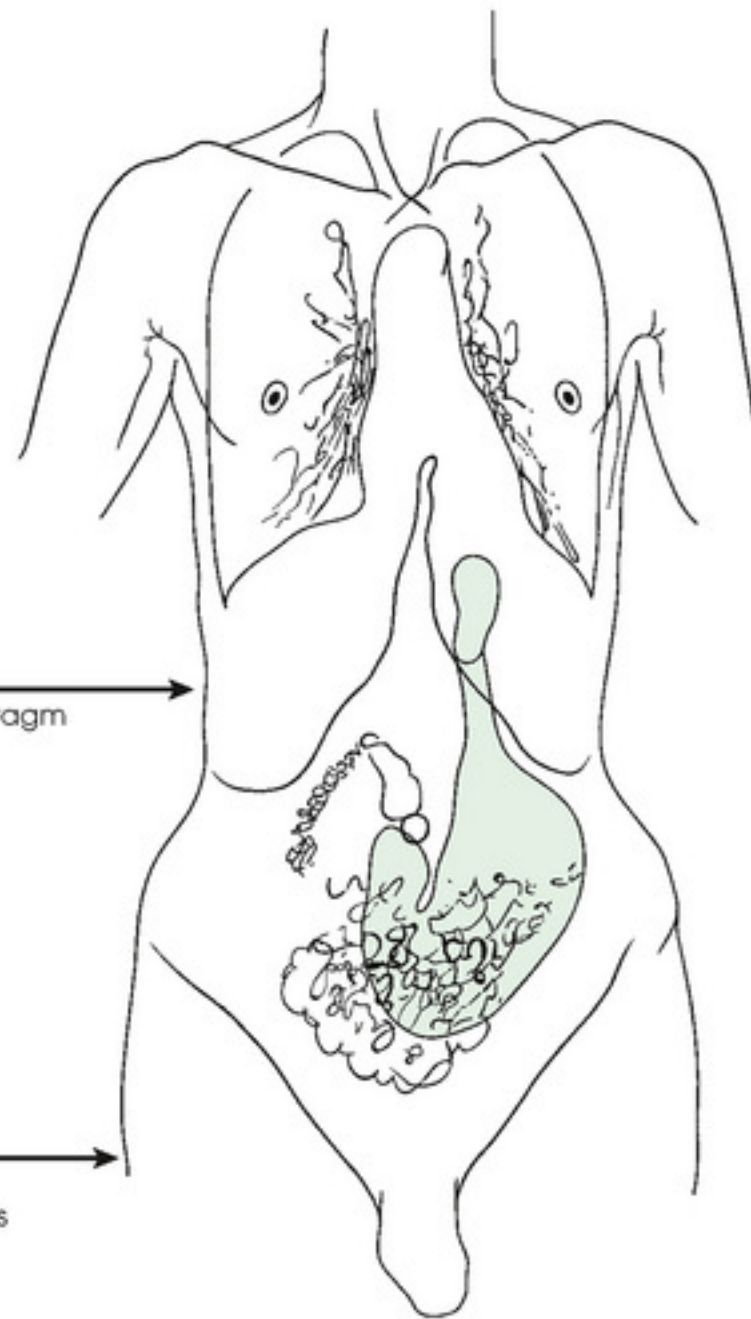
Hypersthenic, 5%



<b>Organs</b>	<b>Sthenic (35%)</b>	<b>Asthenic (10%)</b>	<b>Hyposthenic (35%)</b>	<b>Hypersthenic (5%)</b>
<b>Heart</b>	Moderately transverse	Nearly vertical and at midline		Axis nearly transverse
<b>Lungs</b>	Moderate length	Long, apices above clavicles, may be broader above base		Short, apices at or near clavicles
<b>Diaphragm</b>	Moderately high	Low		High
<b>Stomach</b>	High, upper left	Low and medial, in the pelvis when standing		High, transverse, and in the middle
<b>Colon</b>	Spread evenly; slight dip in transverse colon	Low, folds on itself		Around periphery of abdomen
<b>Gallbladder</b>	Centered on right side, upper abdomen	Low and nearer the midline		High, outside, lies more parallel
<b>Characteristics</b>				
<b>Built</b>	Moderately heavy	Frail		Massive
<b>Abdomen</b>	Moderately long	Short		Long
<b>Thorax</b>	Moderately short, broad, and deep	Long, shallow		Short, broad, deep
<b>Pelvis</b>	Relatively small	Wide		Narrow



Diaphragm



Pubic symphysis

# Osteology

206 bones

- Axial (80)

- Appendicular (126)

15



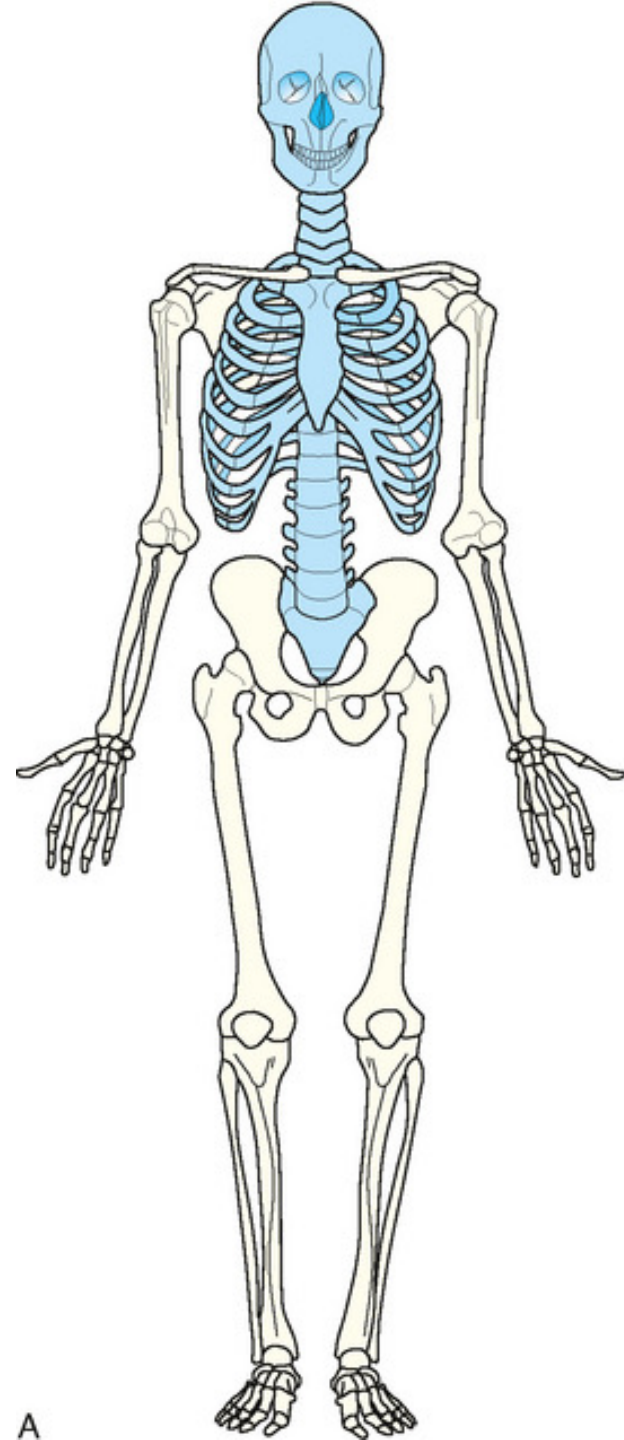
22 bones

16

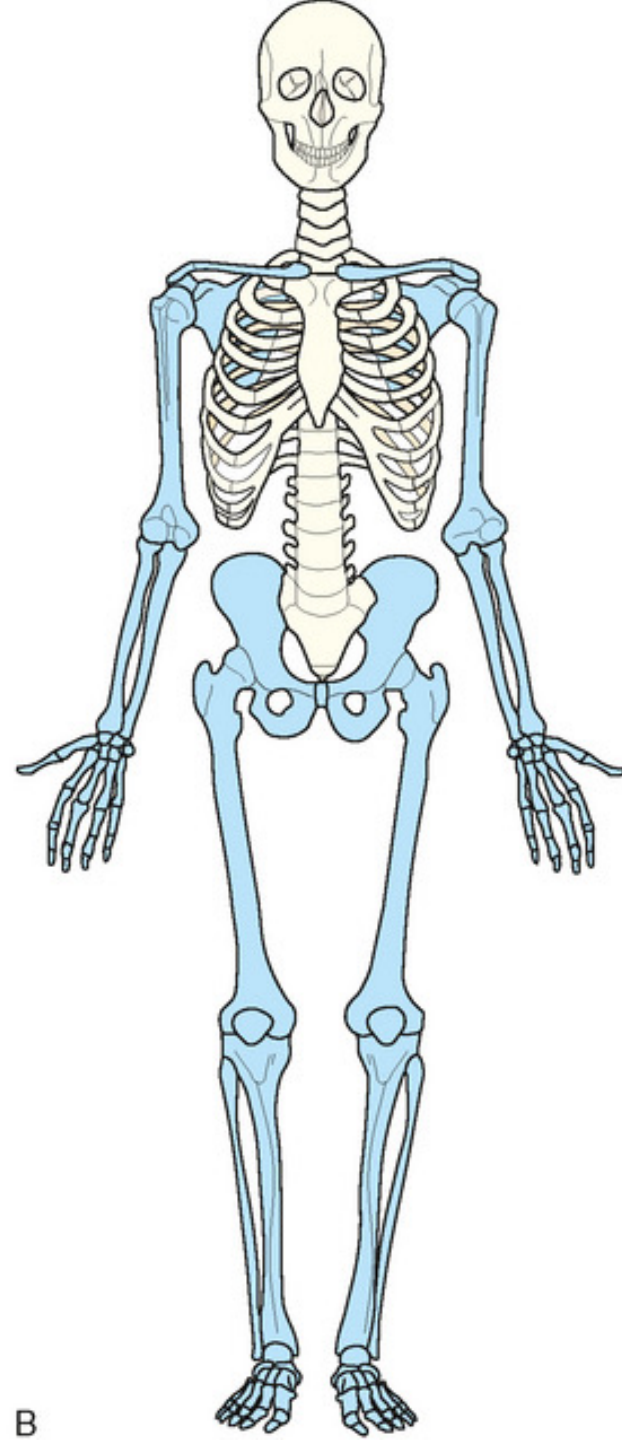


206 bones

Area	Bones	No.	Area	Bones	No.
Skull	Cranial	8	Shoulder girdle	Clavicles	2
	Facial	14		Scapulae	2
	Auditory ossicles*	6	Upper limbs	Humeri	2
Neck	Hyoid	1		Ulnae	2
	Sternum	1		Radii	2
Thorax	Ribs	24		Carpals	16
	Vertebral column	Cervical		7	Metacarpals
Thoracic		12	Phalanges	28	
Lumbar		5	Lower limbs	Femora	2
Sacrum		1		Tibias	2
Coccyx		1		Fibulae	2
				Patellae	2
		Tarsals		14	
			Metatarsals	10	
			Phalanges	28	
			Pelvic girdle	Hip bones	2



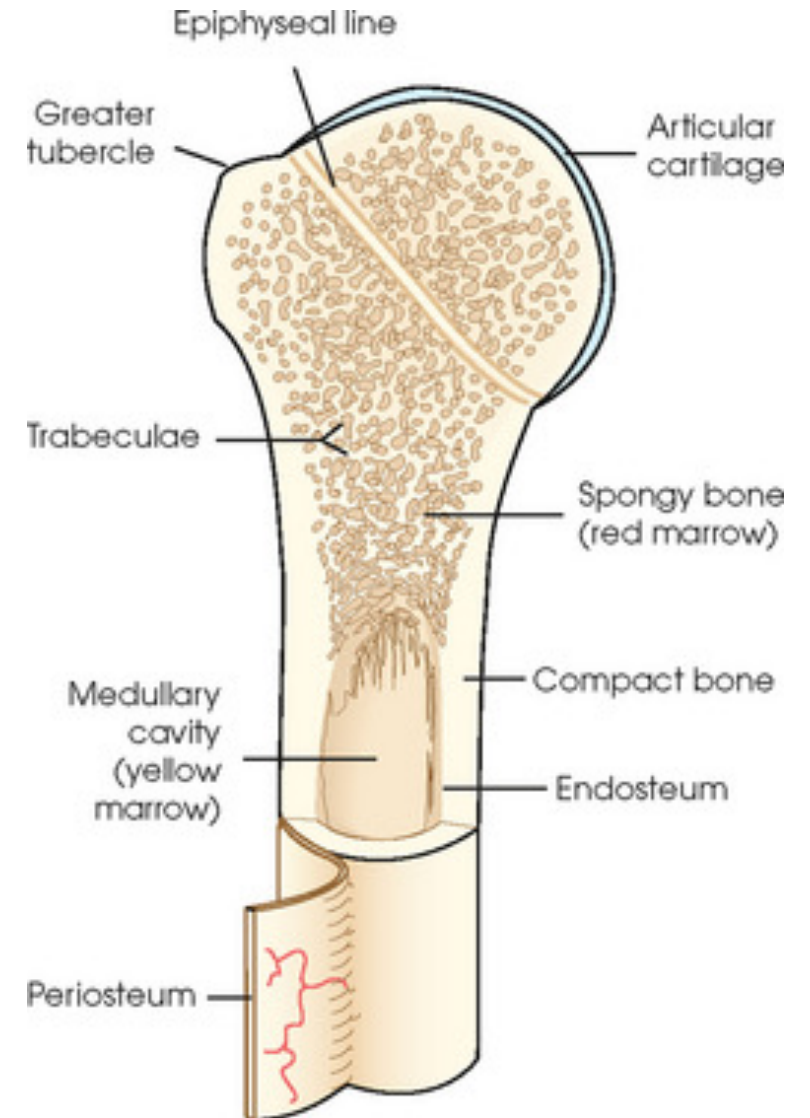
A



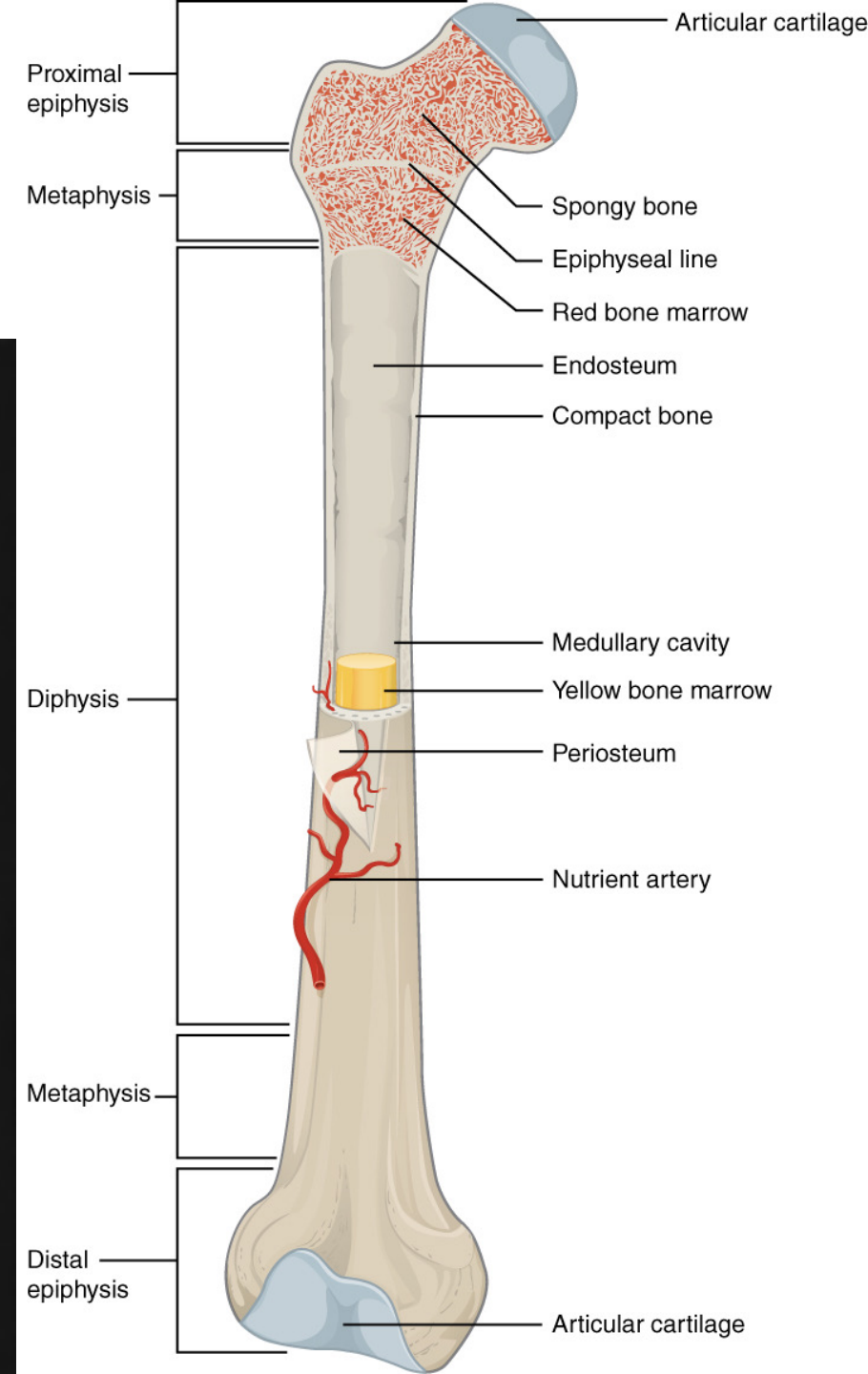
B

# GENERAL BONE FEATURES

- *compact bone*
  - strong, dense
  - protects the bone and gives it strength for supporting the body
- *spongy bone*
  - inner portion of less dense
  - contains a spiculated network of interconnecting spaces (trabeculae)

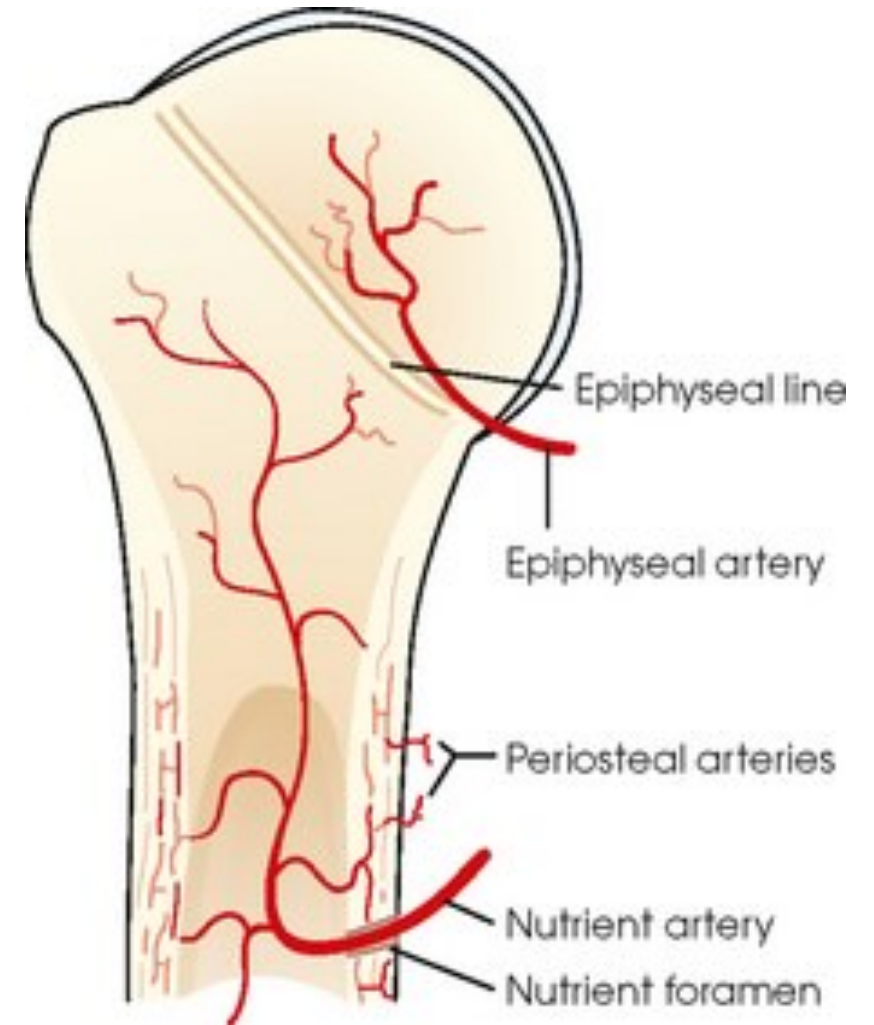


- Trabeculae
  - Red marrow
  - Yellow marrow



# BONE VESSELS AND NERVES

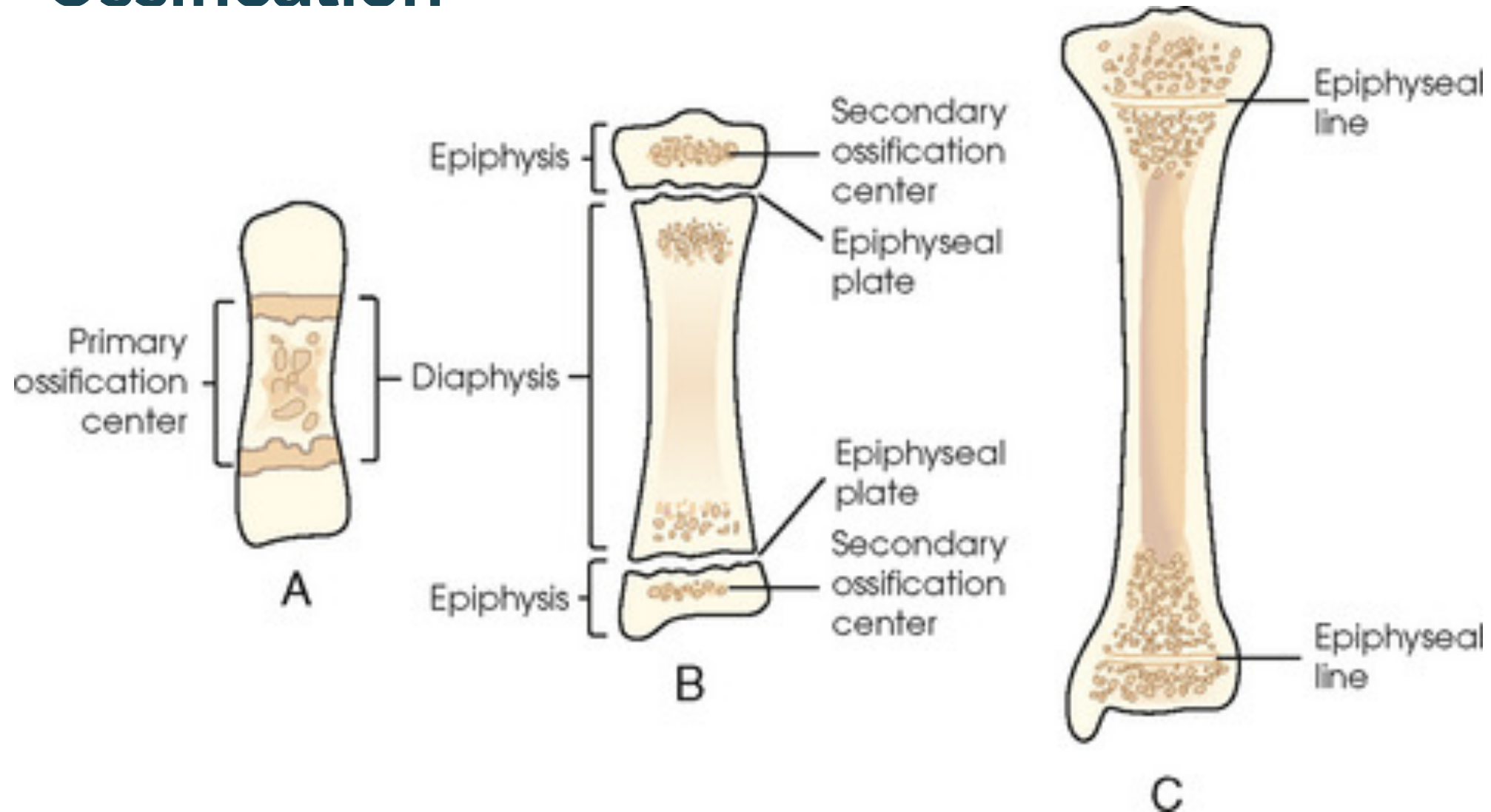
- Nutrient Artery: supplies the cancellous bone and marrow
- Epiphyseal Artery: supplies the end of the long bone
- Periosteal Arteries : supply the compact bone



# BONE DEVELOPMENT

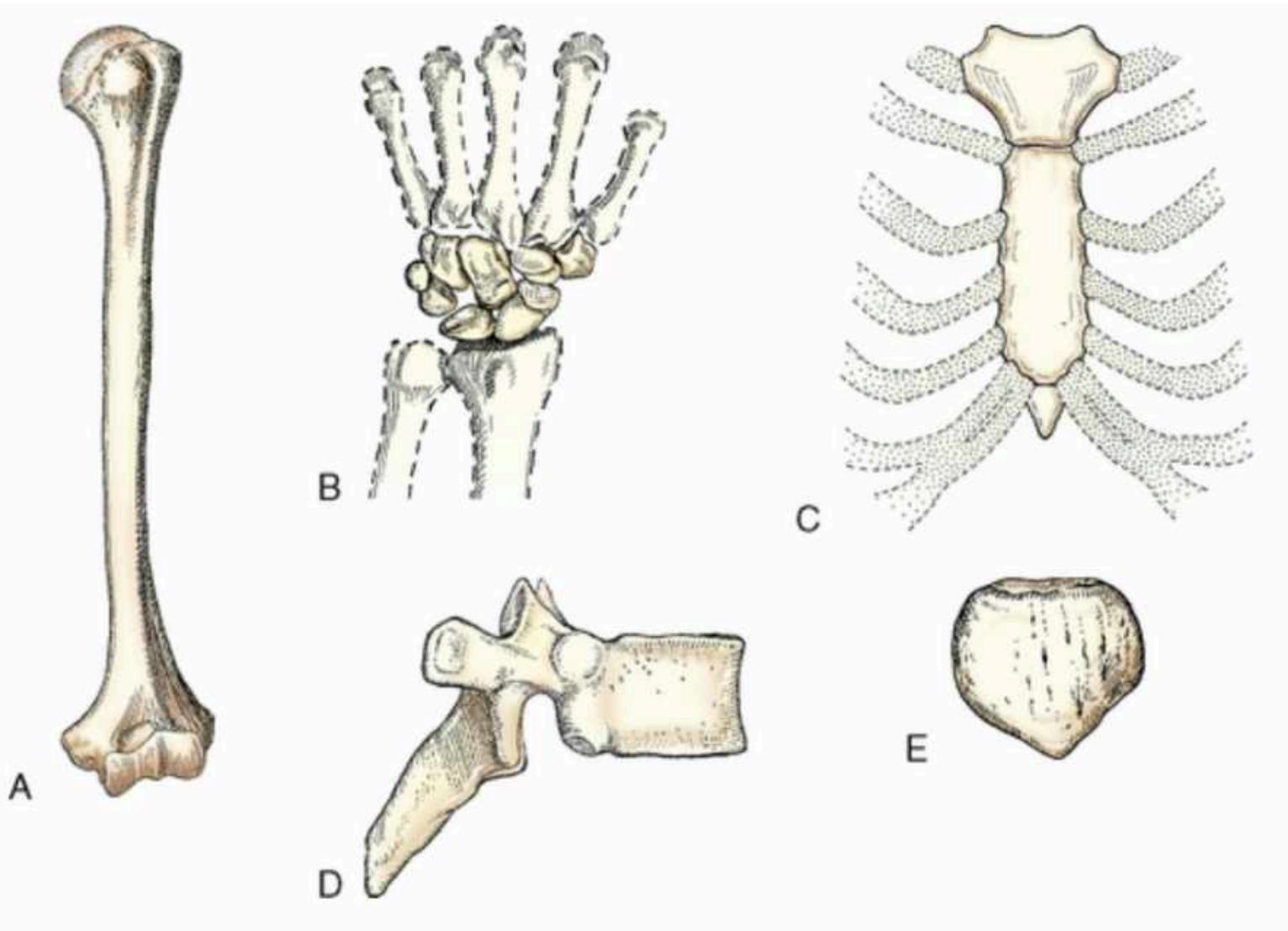
- Ossification
  - ***Intermembranous ossification***
    - From fibrous membranes : flat bones
  - ***Endochondral ossification***
    - From hyaline cartilage in the embryo: short, irregular, and long bones.
    - Primary ossification
    - Secondary Ossification

# Primary Ossification and Secondary Ossification





# Classification of Bones



- A. Long Bone
- B. Short Bones
- C. Flat Bone
- D. Irregular Bone
- E. Sesamoid Bone

17

18

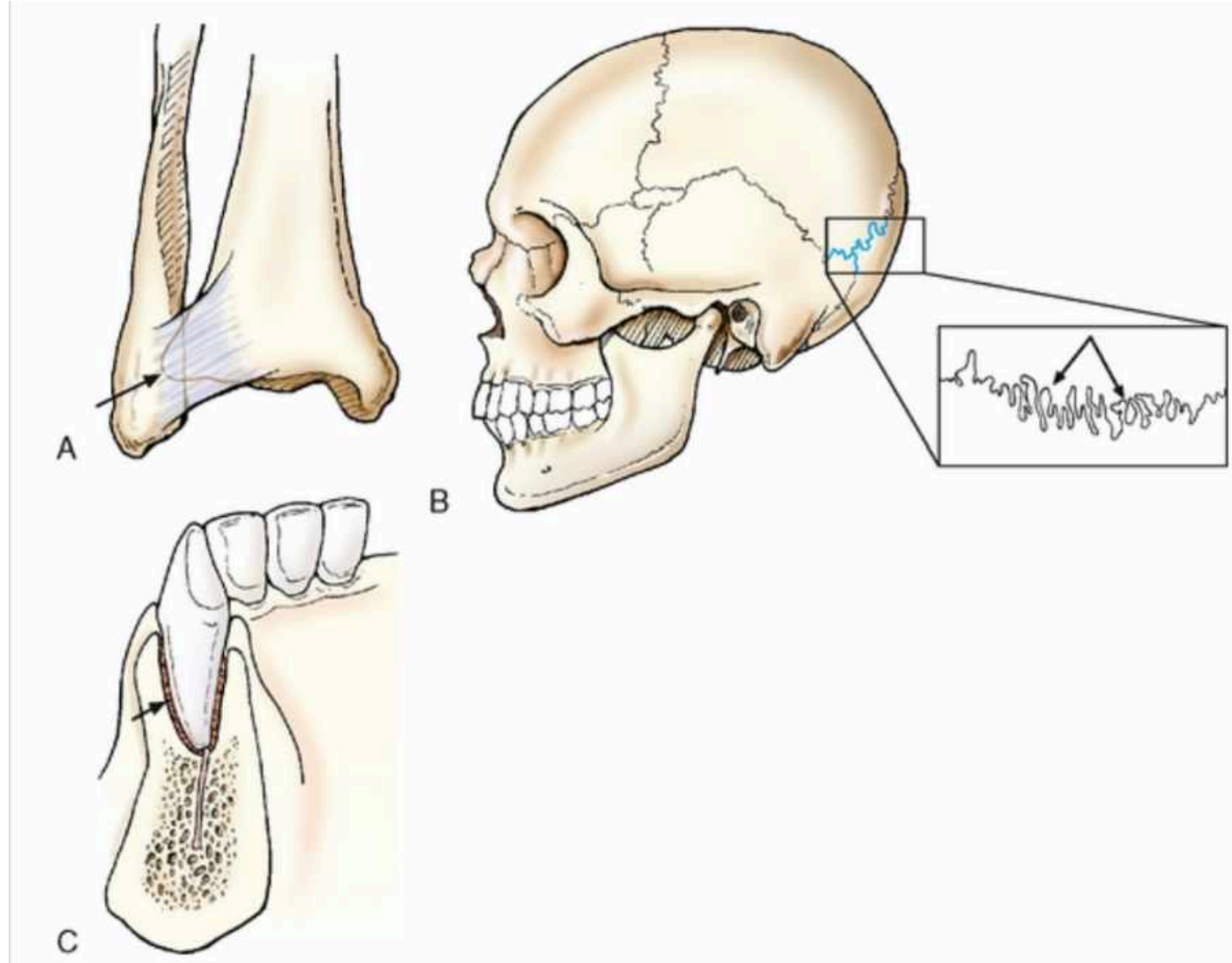
- Functional Classification
  - Synarthroses : immovable
  - Amphiarthroses: slightly moveable
  - Diarthroses: freely movable

### Structural classification of joints

Connective tissue	Classification	Movement
Fibrous	1. Syndesmosis	Slightly movable
	2. Suture	Immovable
	3. Gomphosis	Immovable
Cartilaginous	4. Symphysis	Slightly movable
	5. Synchondrosis	Immovable
Synovial	6. Gliding	Freely movable
	7. Hinge	Freely movable
	8. Pivot	Freely movable
	9. Ellipsoid	Freely movable
	10. Saddle	Freely movable
	11. Ball and socket	Freely movable

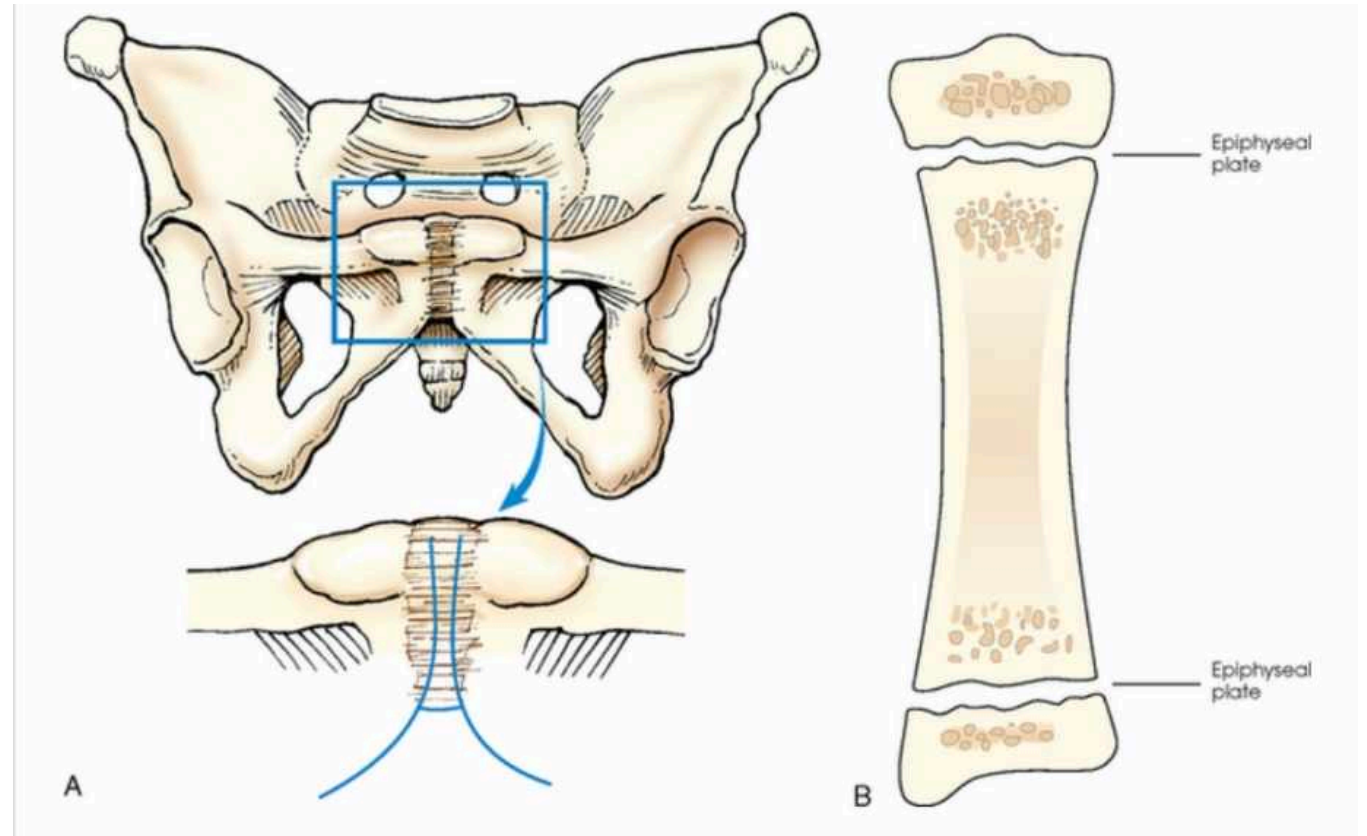
# Fibrous Joints

- A. Syndesmoses : inferior tibiofibular joint
- B. Suture: Skull
- C. Gomphoses: roots of the teeth



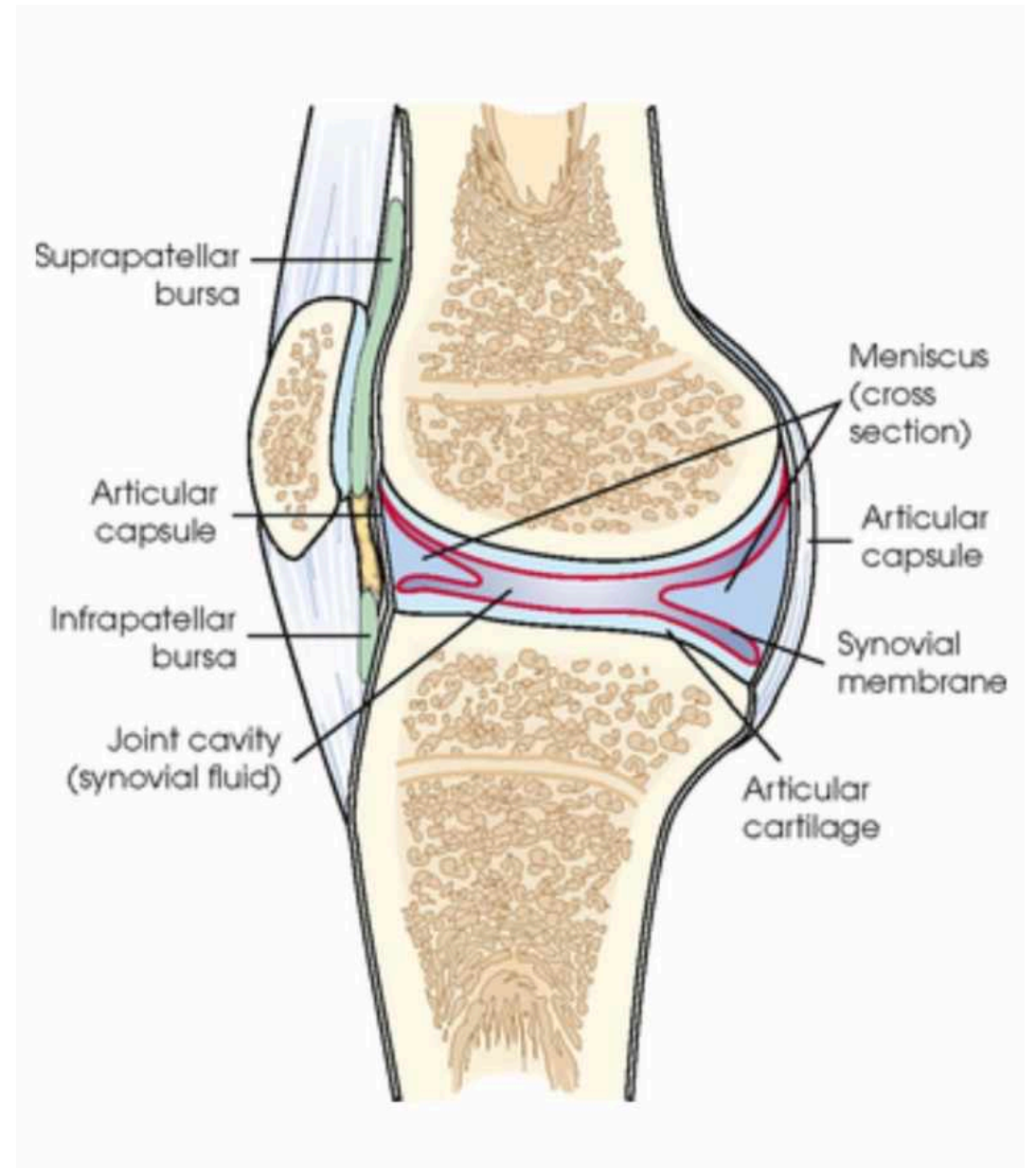
# Cartilaginous Joints

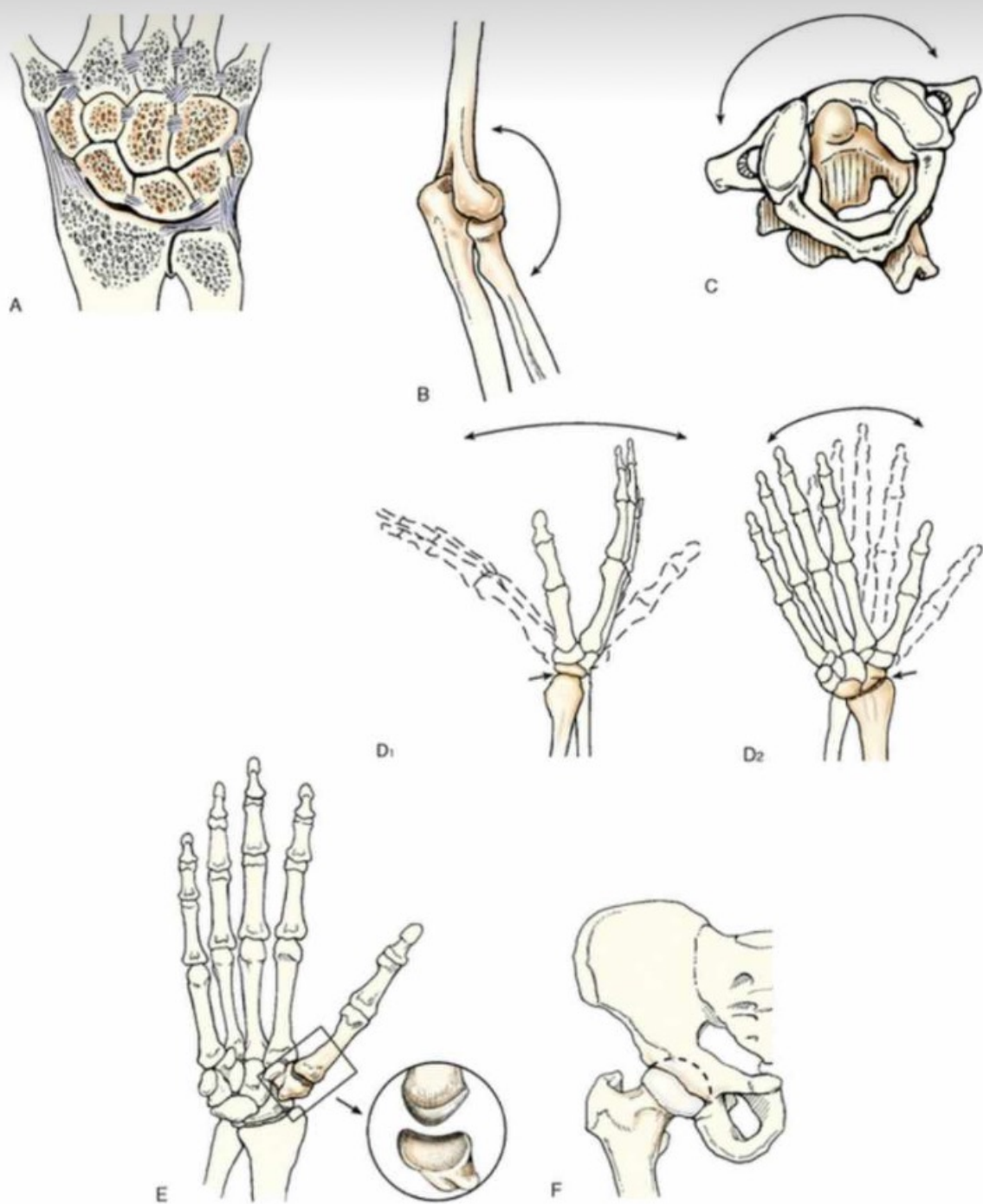
- Symphysis: For strength and absorbency.
  - Pubic symphysis
- Synchondrosis: epiphyseal plate



# Synovial Joints

- Freely moveable
- Most complex joints
- Synovial fluid: lubricates space to reduce friction between two bones





**A. Gliding**

**B. Hinge**

**C. Pivot (trochoid)**

**D. Ellipsoid joint**

**E. Saddle joint**

**F. Ball and Socket**

# Fracture : Types



Compression



Open/Compound



Simple



Greenstick



Transverse



Spiral/Oblique



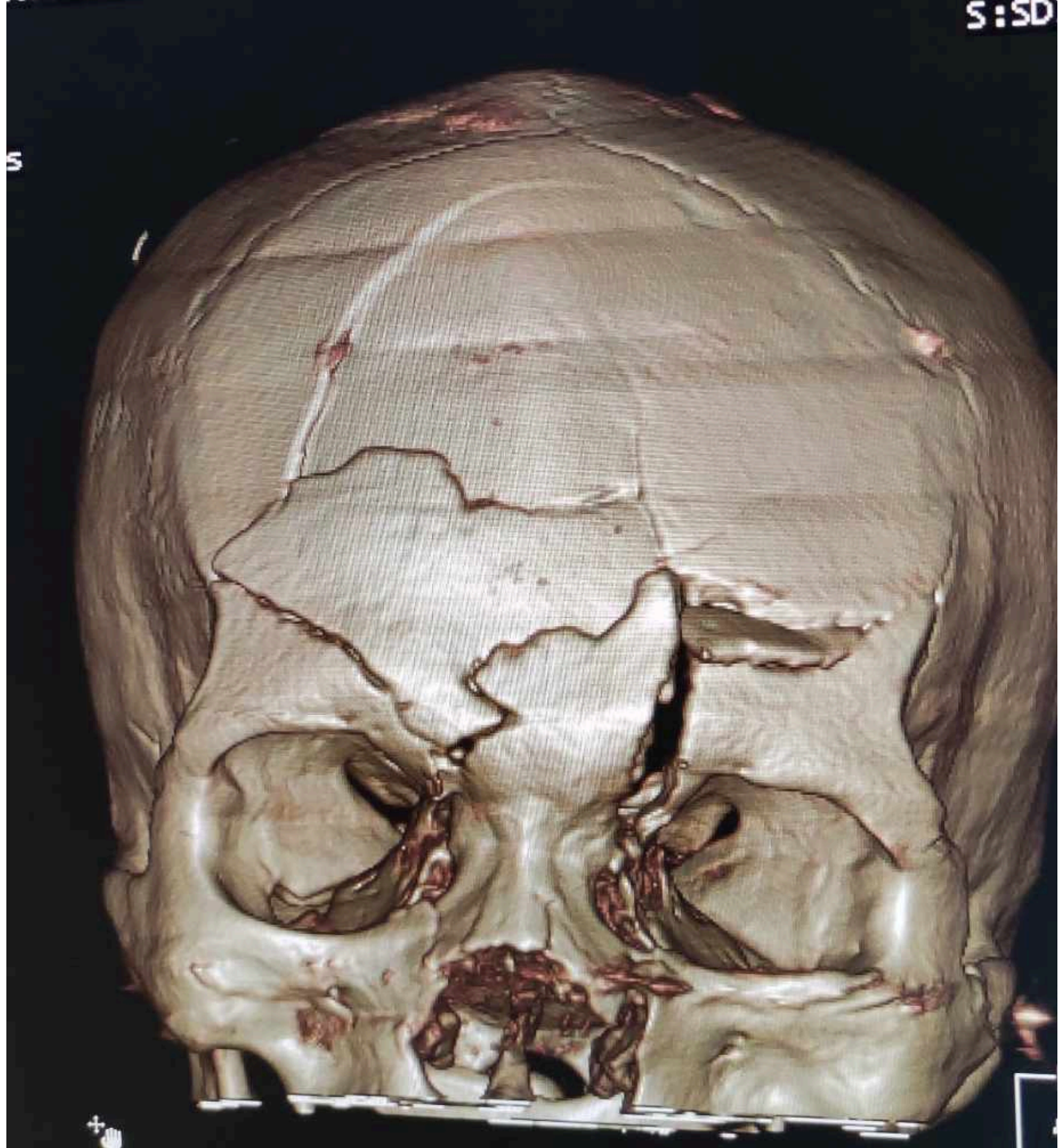
Comminuted



Impacted





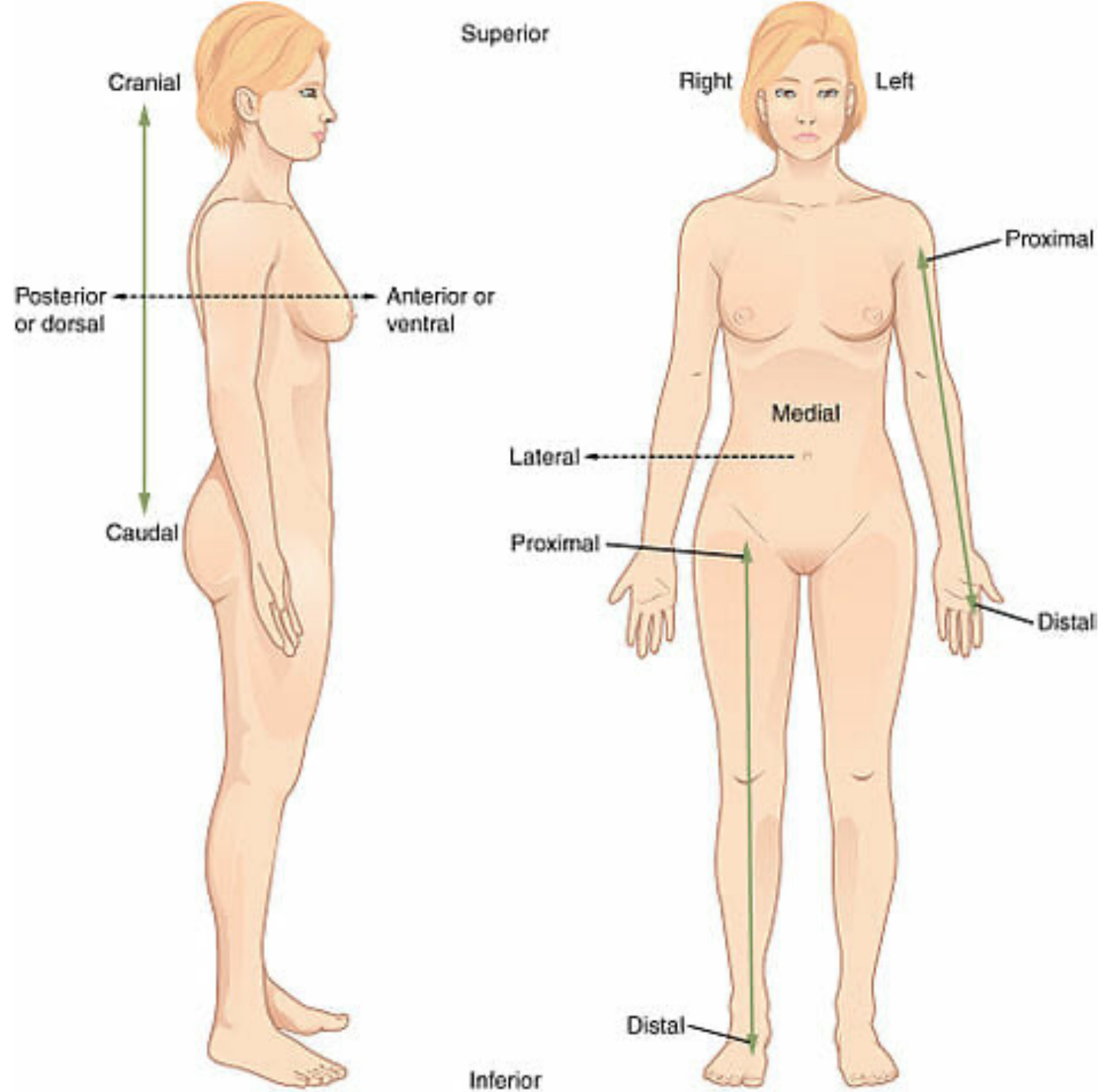


# Anatomic Relationship Terms

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Anterior (Ventral)	Refers to forward or front part of body or forward part of an organ
Posterior (Dorsal)	Refers to back part of body or organ
Caudad	Refers to parts away from the head of the body
Cephalad	Refer to parts toward the head of the body
Inferior	Refers to nearer the feet or situated below
Superior	Refers to nearer the head or situated above
Central	Near the midline
Peripheral	Away form the midline

20



<b>Projections</b>	<b>Positions (general body)</b>	<b>Radiographic Body Positions</b>
Anteroposterior/ Posteroanterior	Upright	Lateral
Lateral	Seated	Right Oblique
AP Oblique/ PA Oblique	Supine	RPO
Axial	Prone	LPO
AP Axial /PA Axial	Recumbent	RAO
AP Axial Oblique/ PA Axial Oblique	Fowler	LAO
Axiolateral Oblique	Trendelenburg	Right Lateral Decubitus
Transthoracic		Left Lateral Decubitus
Craniocaudal		Ventral Decubitus
Tangential		Dorsal Decubitus
Inferosuperior/ Supero inferior		Lordotic
Plantodorsal / Dorsoplantar		
Lateromedial/ Mediolateral		
SMV		
Acanthioparietal / Parietoacanthial		
Orbitoparietal /Parietoorbital		

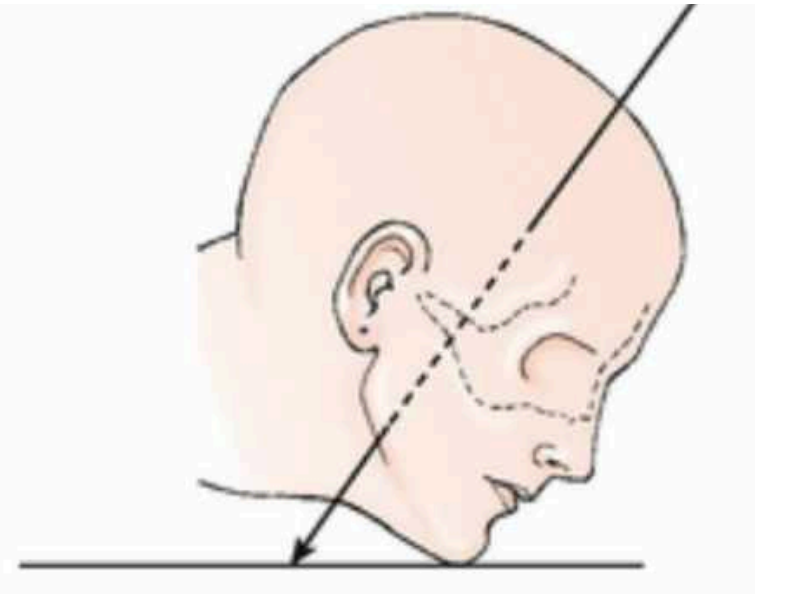
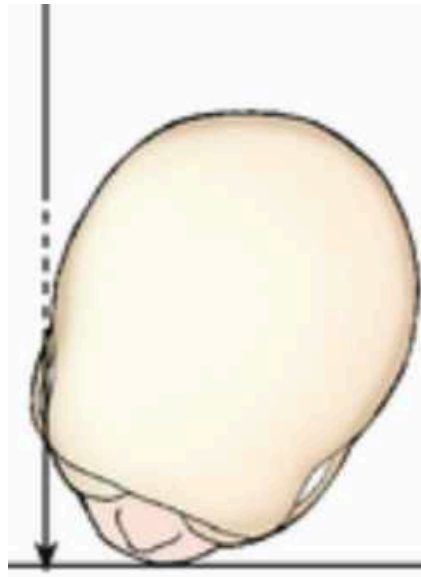
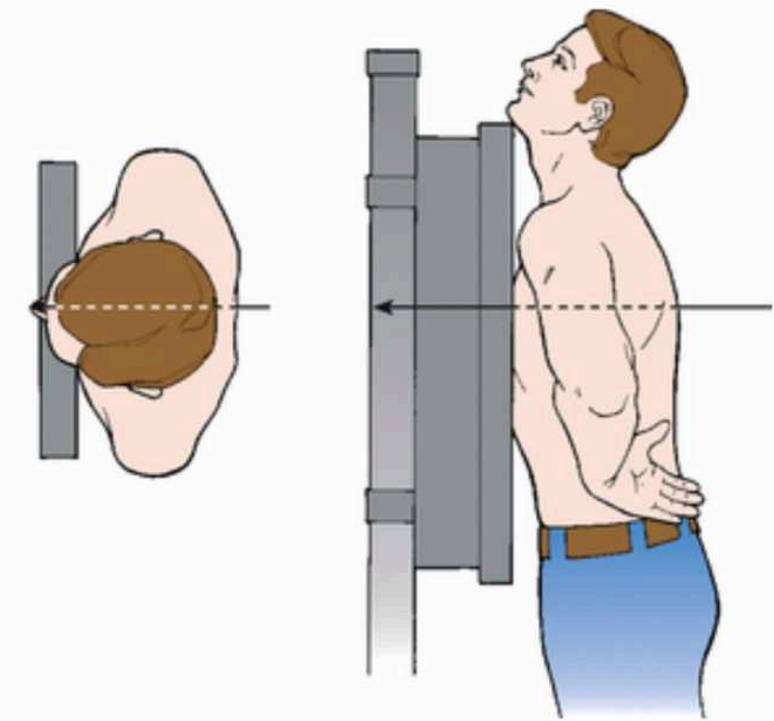
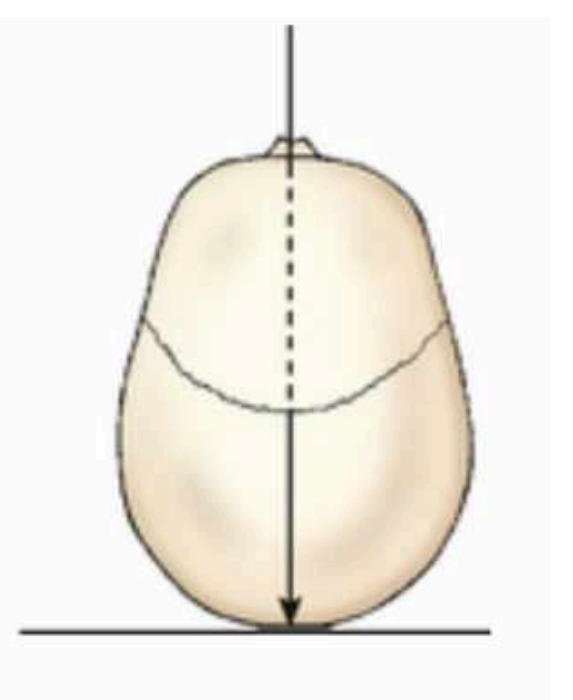
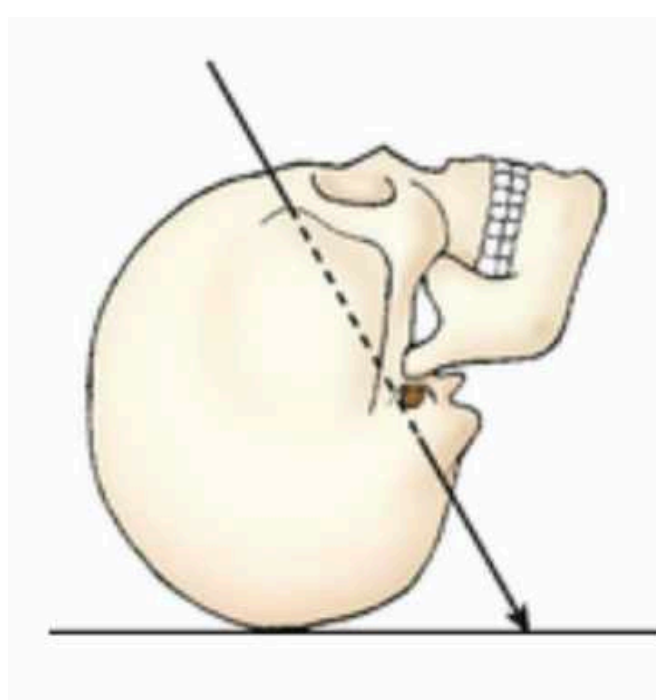
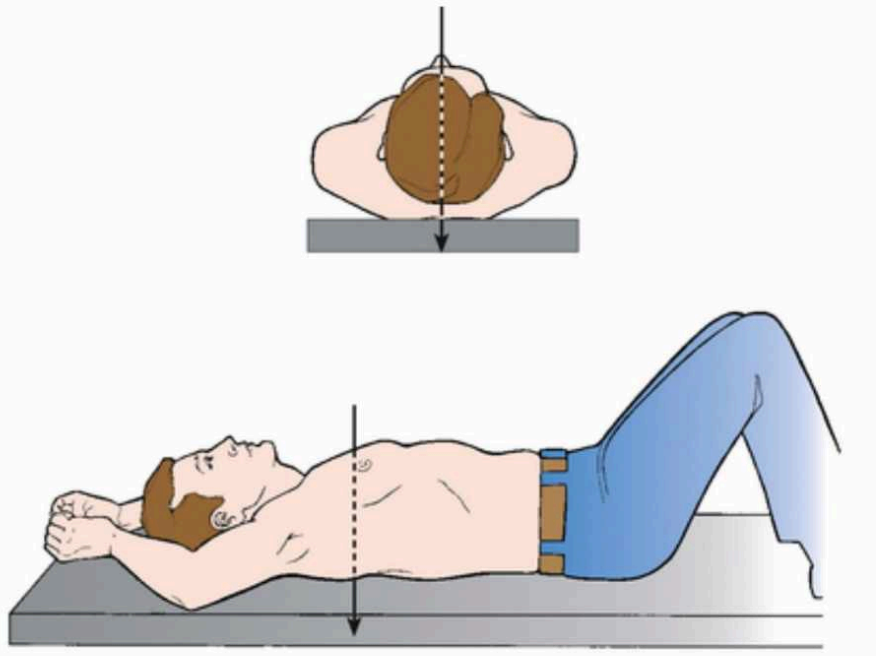
# Importance of lateral view and AP view in X-ray.

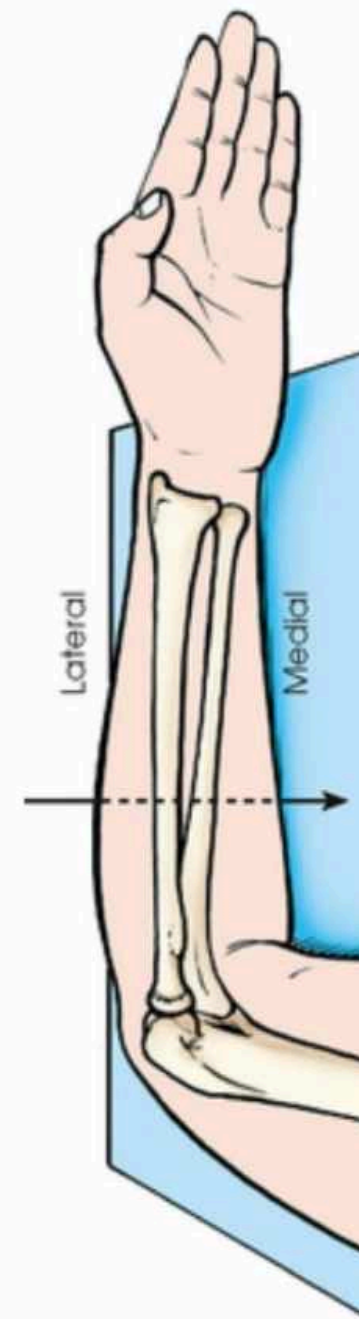
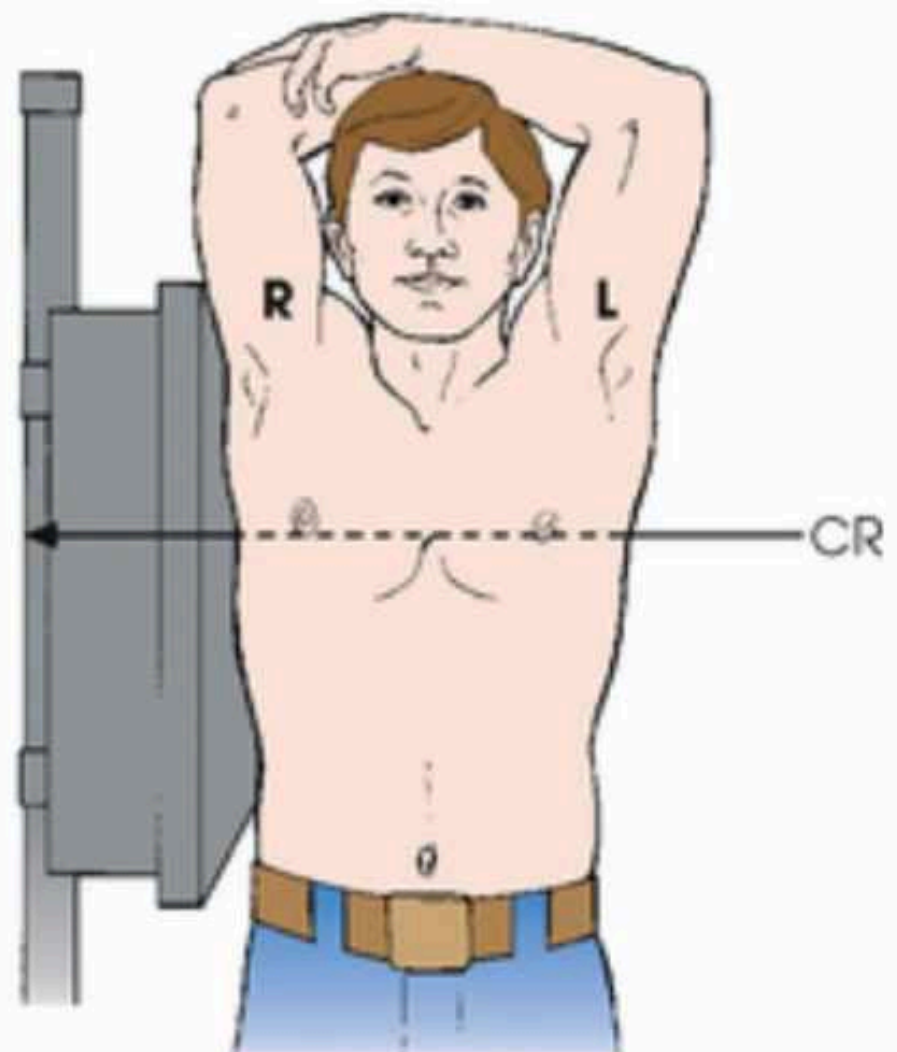
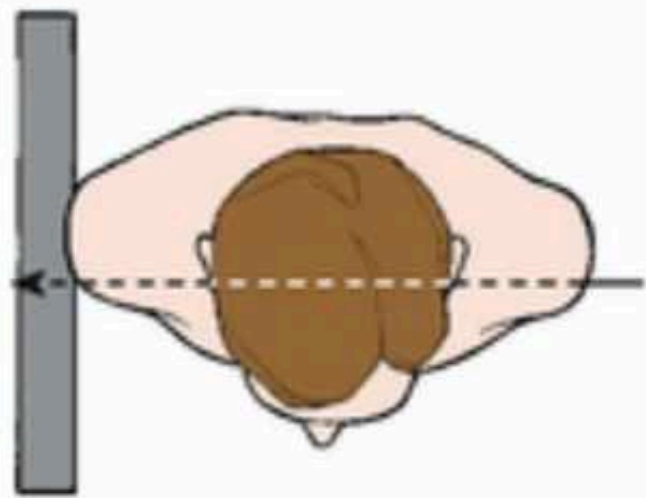


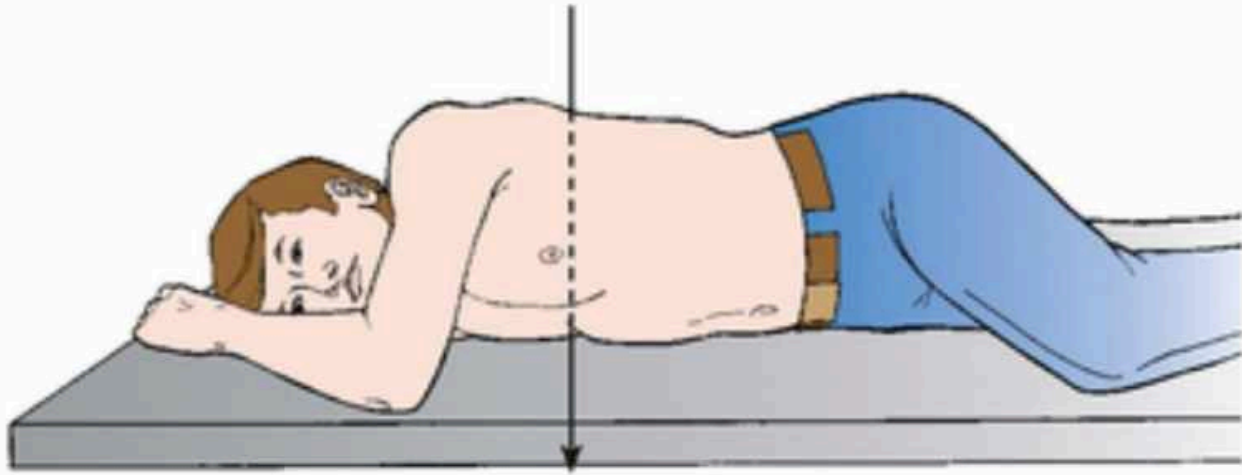
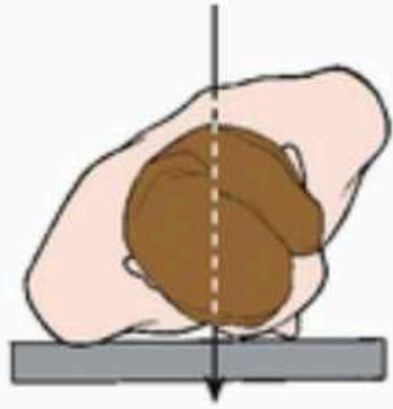
(a)



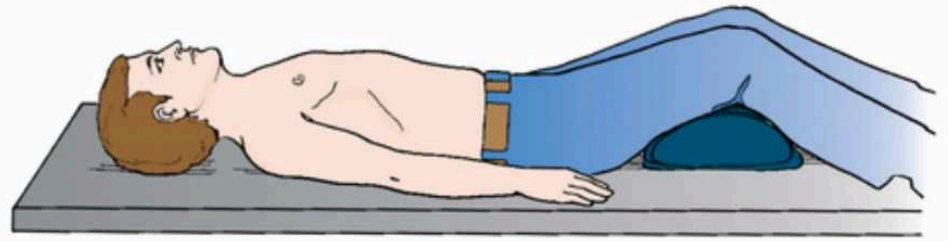
(b)



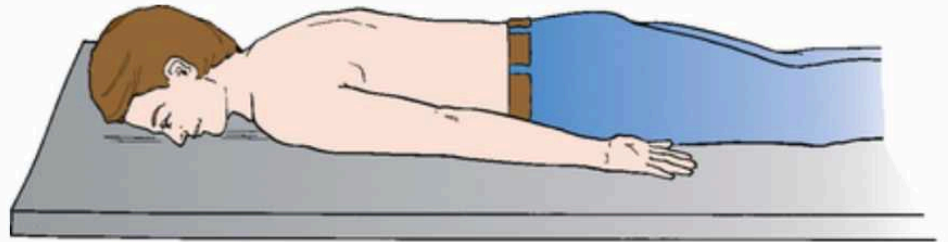




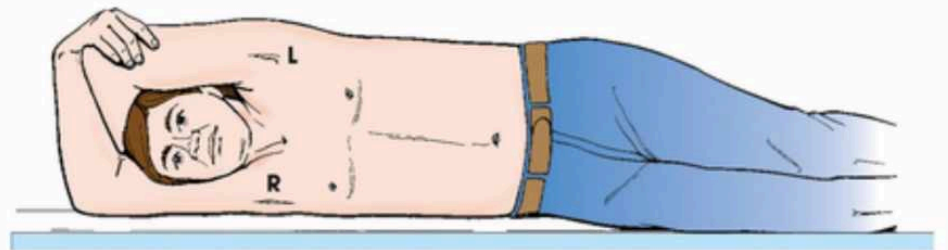
**FIG. 3-31** PA oblique projection of chest. Central ray enters posterior aspect of body (even though it is rotated) and exits anterior aspect.



**FIG. 3-32** Supine position of body, also termed *dorsal recumbent position*. The patient's knees are flexed for comfort.



**FIG. 3-33** Prone position of body, also termed *ventral recumbent position*.



**FIG. 3-34** Recumbent position of body, specifically *right lateral recumbent position*.

# POSSIBILITIES

**Trendelenburg position** supine position with head tilted downward (Fig. 3-35)

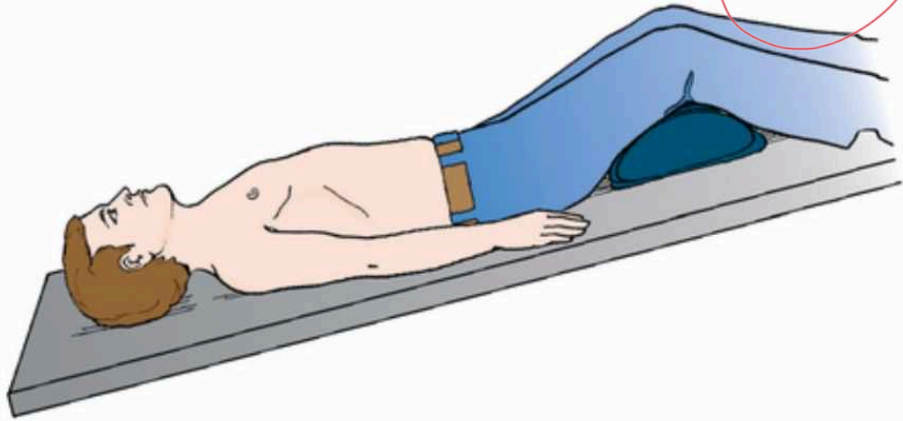


FIG. 3-35 Trendelenburg position of body. Feet are higher than the head.

**Fowler position** supine position with head higher than the feet (Fig. 3-36)

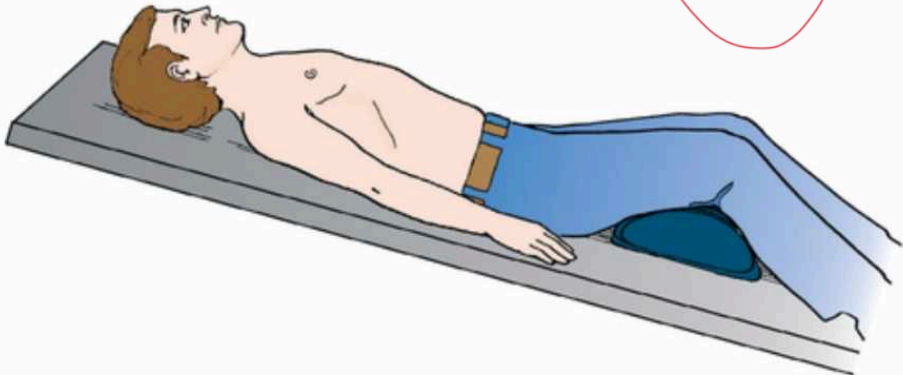


FIG. 3-36 Fowler position of the body. Head is higher than the feet.

**Sims position** recumbent position with the patient lying on the left anterior side (semiprone) with left leg extended and right knee and thigh partially flexed (Fig. 3-37)

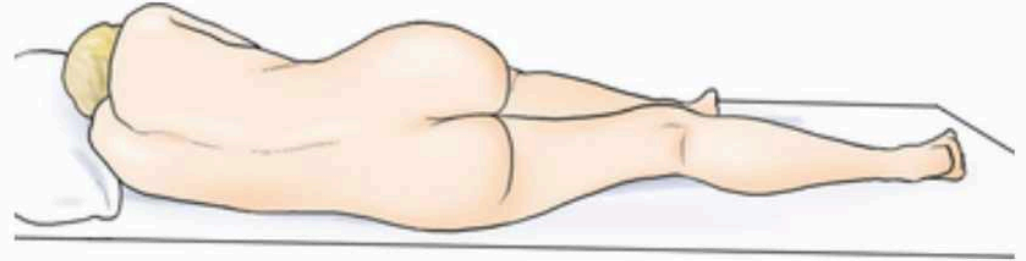


FIG. 3-37 Sims position of body. The patient is on the left side in recumbent oblique position.

**lithotomy position** supine position with knees and hip flexed and thighs abducted and rotated externally, supported by ankle or knee supports (Fig. 3-38)



FIG. 3-38 Lithotomy position of body. Knees and hips are flexed, and thighs are abducted and rotated laterally.

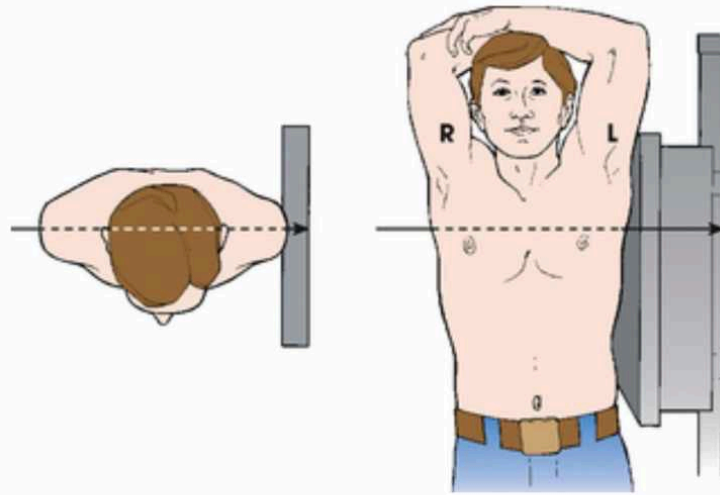


FIG. 3-39 Left lateral radiographic position of chest results in lateral projection.

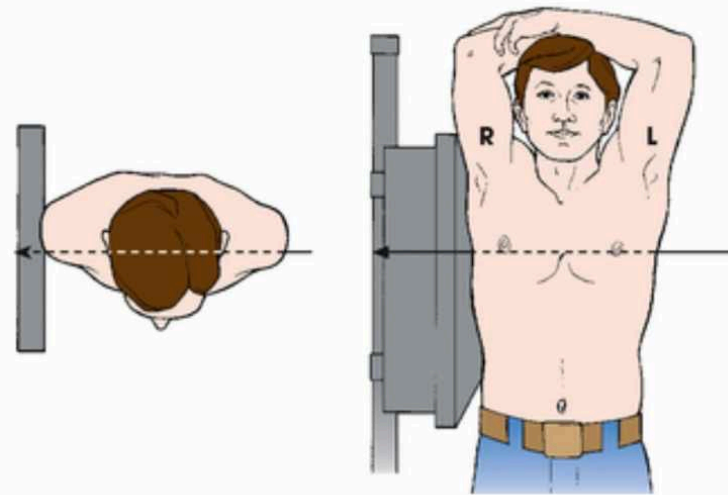


FIG. 3-40 Right lateral radiographic position of chest results in lateral projection.

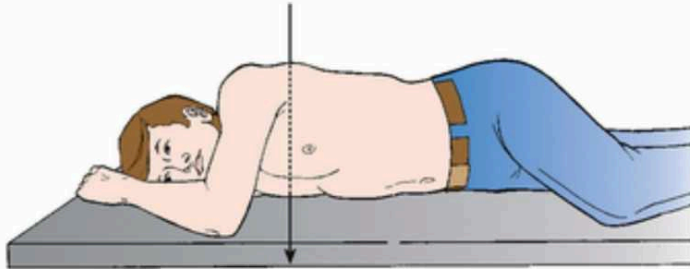
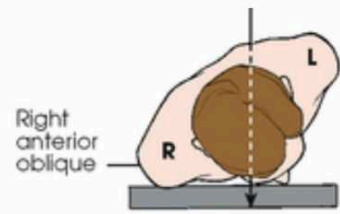


FIG. 3-41 RAO radiographic position of chest results in PA oblique projection.

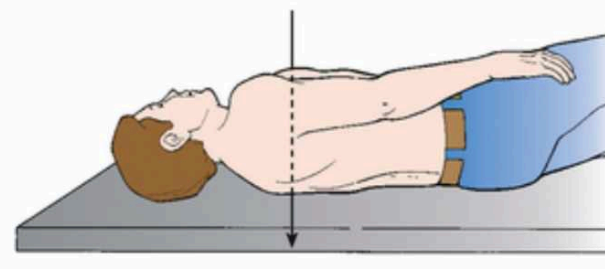
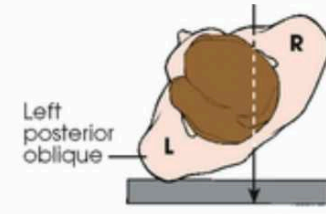
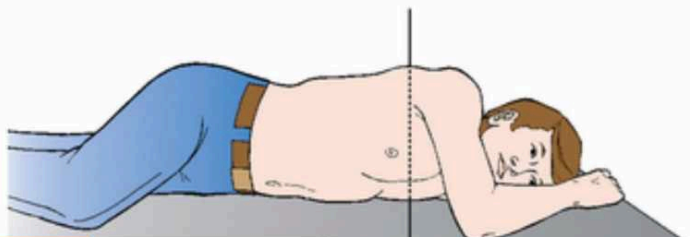
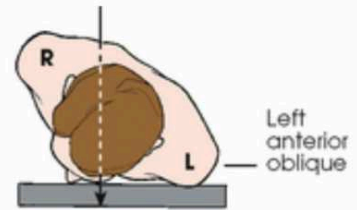
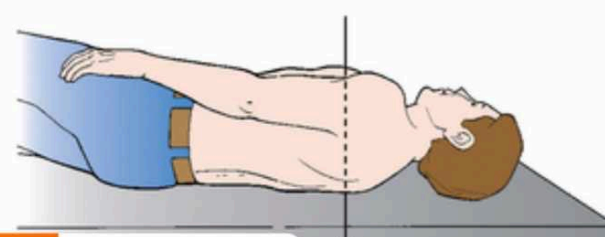
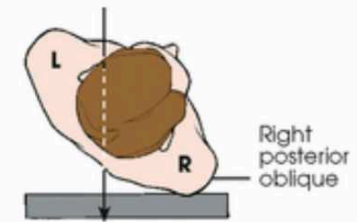


FIG. 3-43 LPO radiographic position of chest results in AP oblique projection.



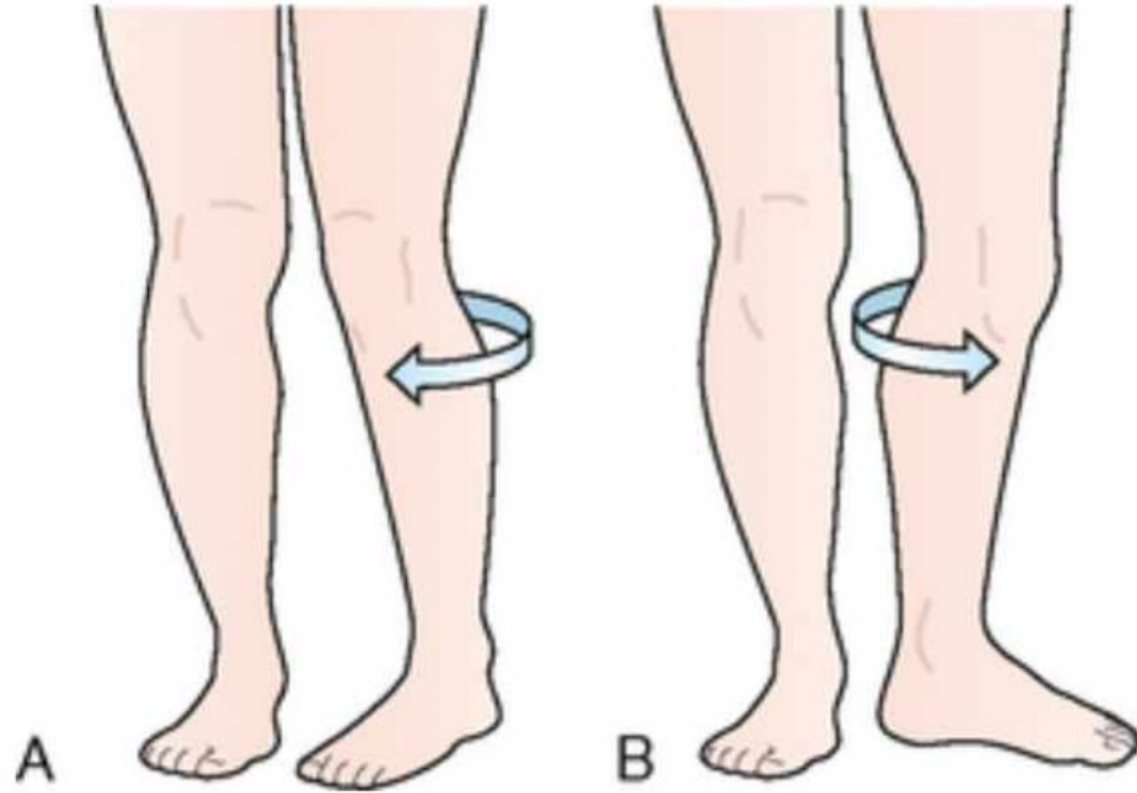
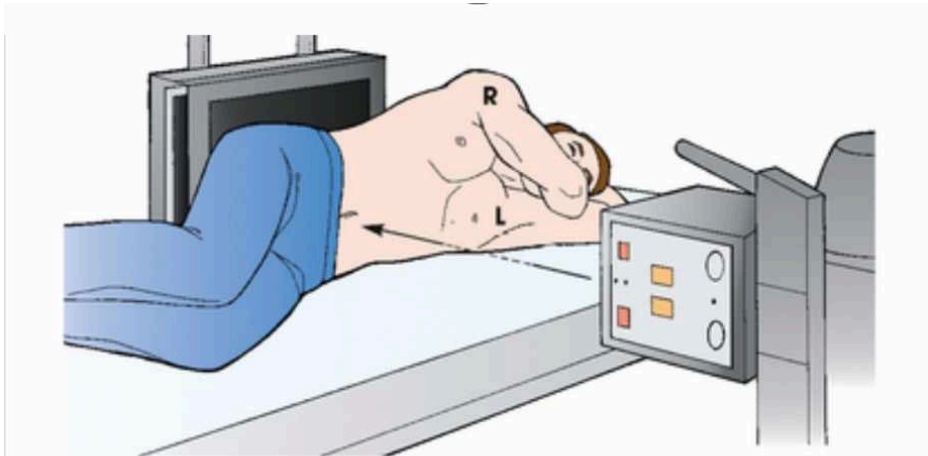
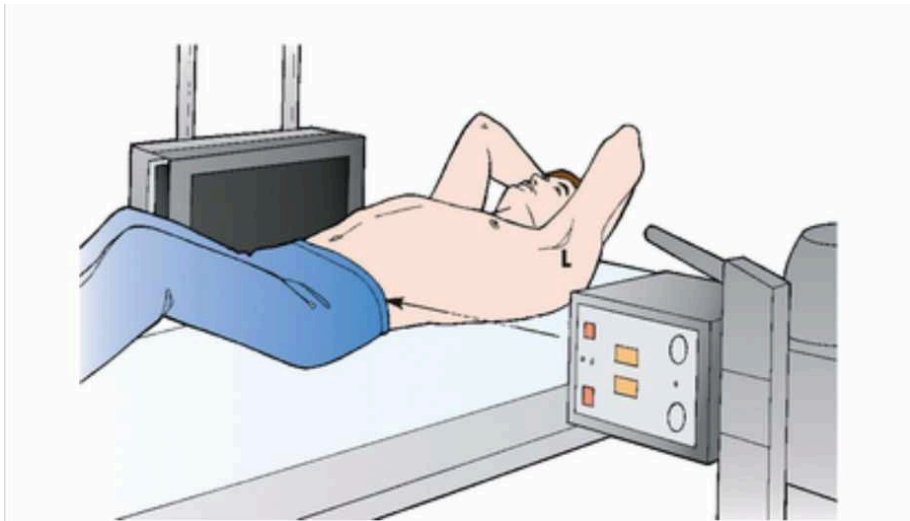


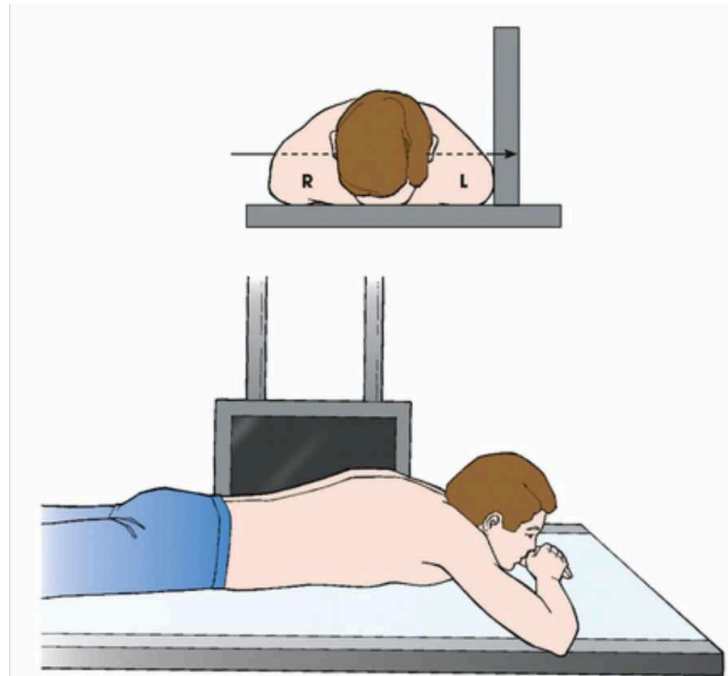
FIG. 3-45 A, Medial rotation of knee. B, Lateral rotation of knee.



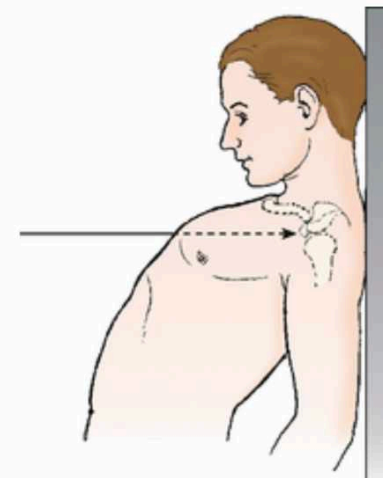
**FIG. 3-46** Left lateral decubitus radiographic position of abdomen results in AP projection. Note horizontal orientation of central ray.



**FIG. 3-47** Right dorsal decubitus radiographic position of abdomen results in right lateral projection. Note horizontal orientation of central ray.



**FIG. 3-48** Left ventral decubitus radiographic position of abdomen results in left lateral projection. Note horizontal orientation of central ray.



**FIG. 3-49** Lordotic radiographic position of chest results in AP axial projection. Central ray is not angled; however, it enters chest axially as a result of body position.

# Body Movement Terminology

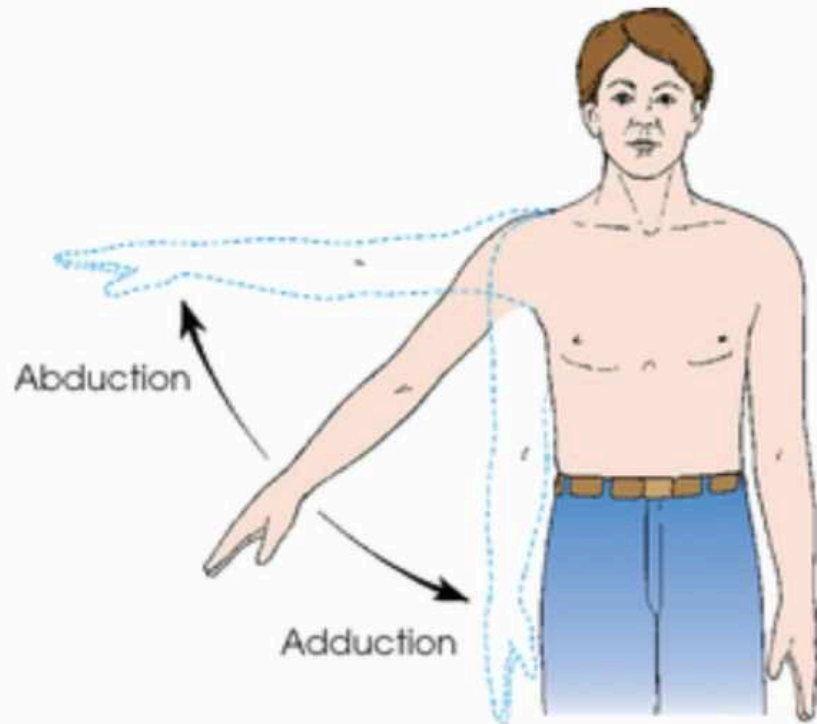


FIG. 3-50 Abduction and adduction of arm.

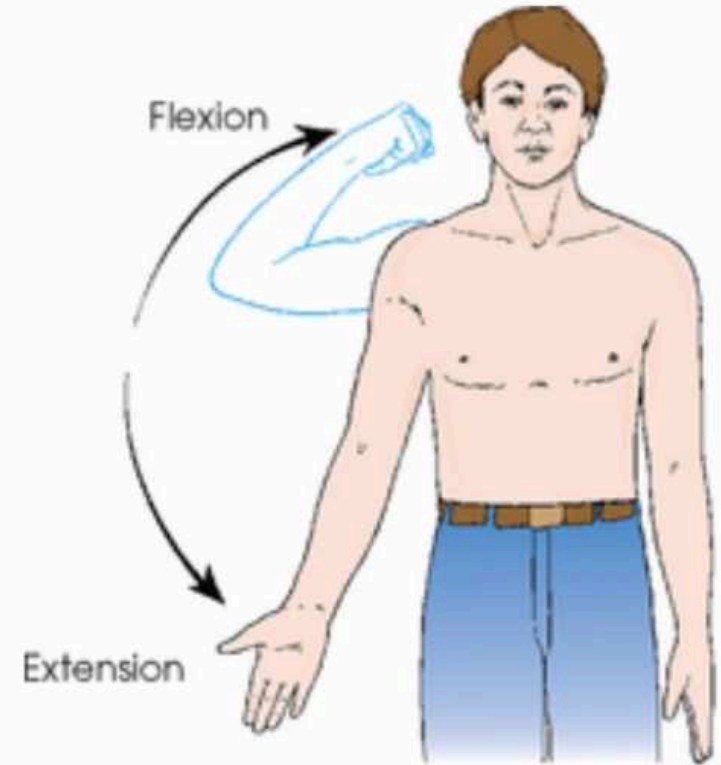


FIG. 3-51 Extension of arm (anatomic position) and flexion (bending).

Hyperflexion

Extension

Hyperextension

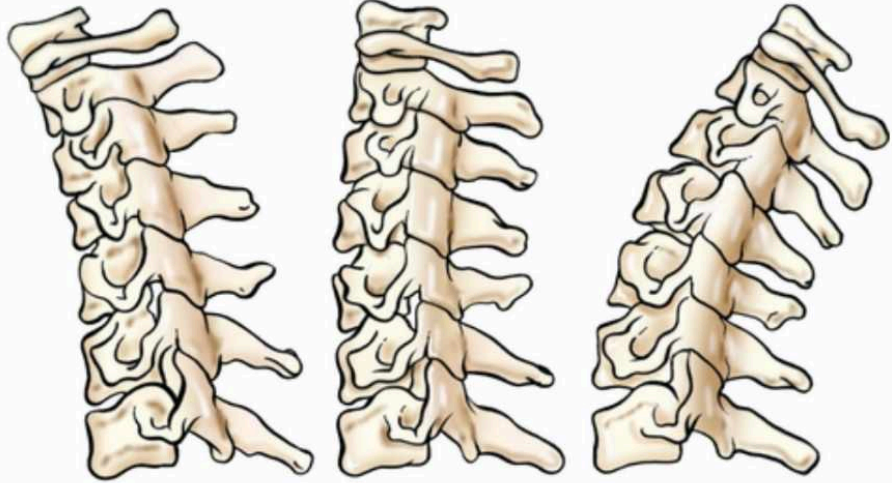
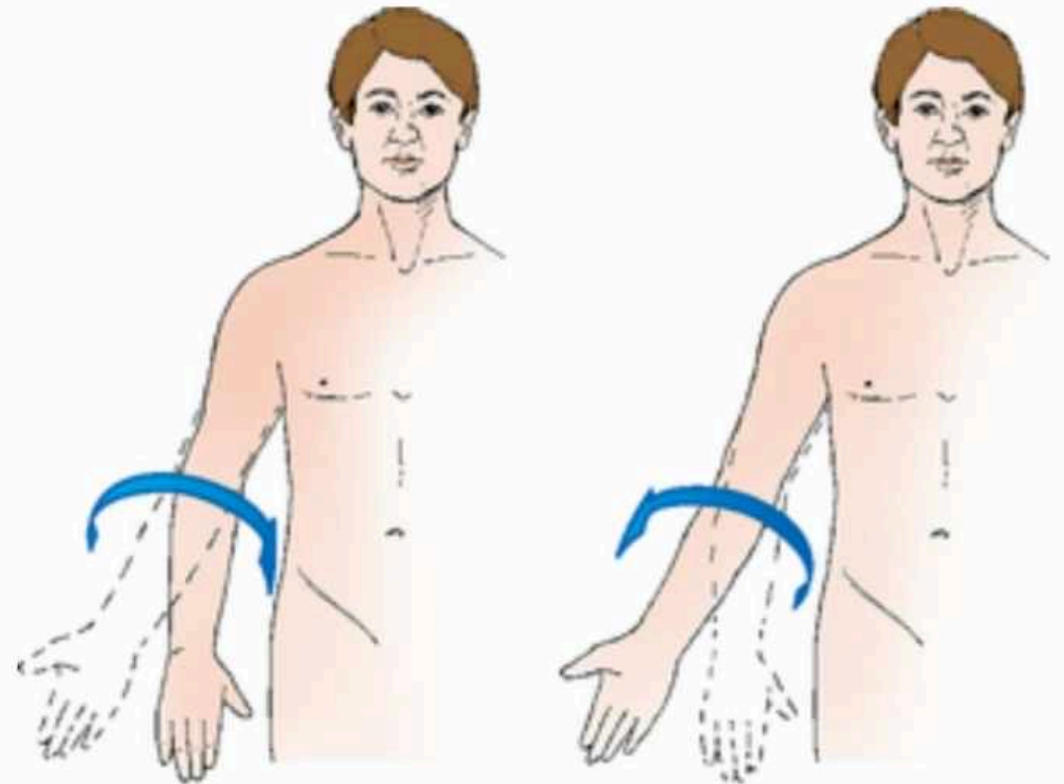


FIG. 3-52 Hyperextension, extension, and hyperflexion of neck.



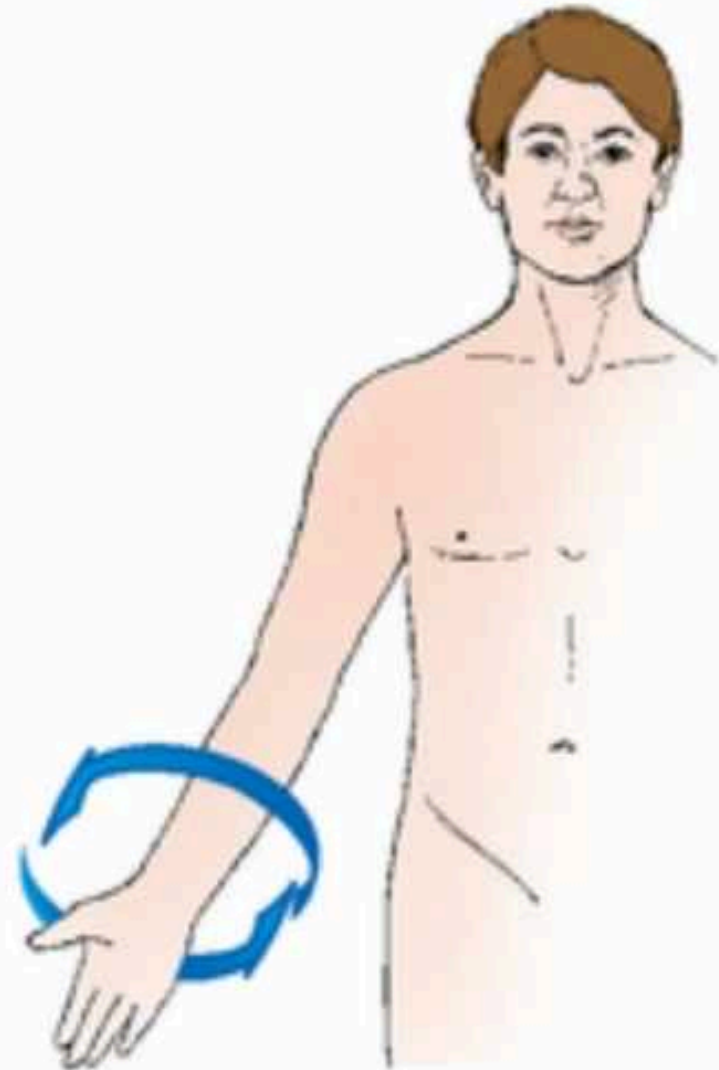
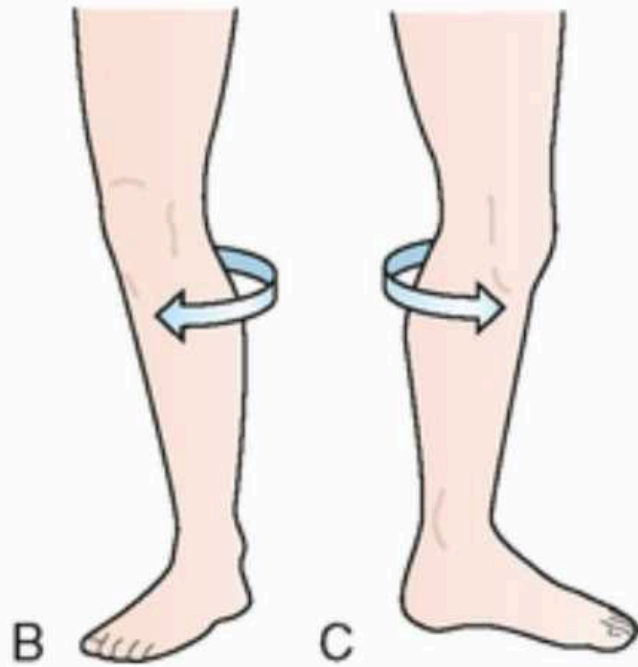
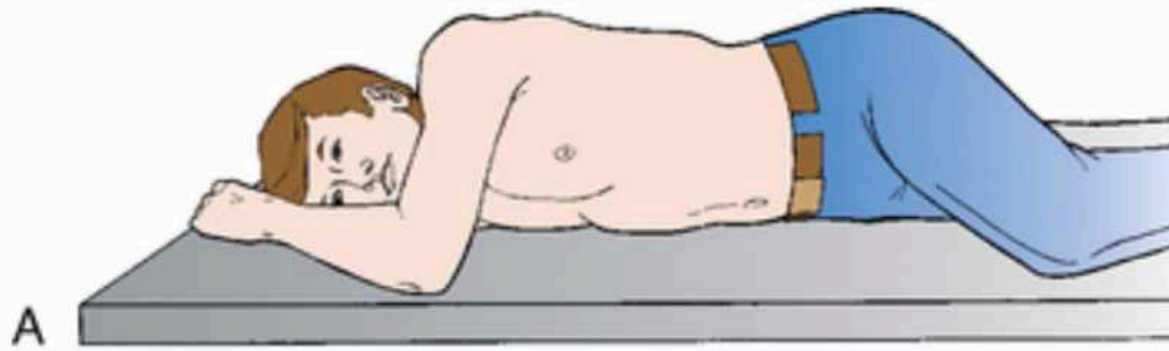
FIG. 3-53 Eversion and inversion of foot at ankle joint.



Pronate

Supinate

FIG. 3-54 Pronation and supination of forearm.



**FIG. 3-55** A, Rotation of chest and abdomen. The patient's arm and knee are flexed for comfort. B, Medial rotation of left leg. C, Lateral rotation of left leg.

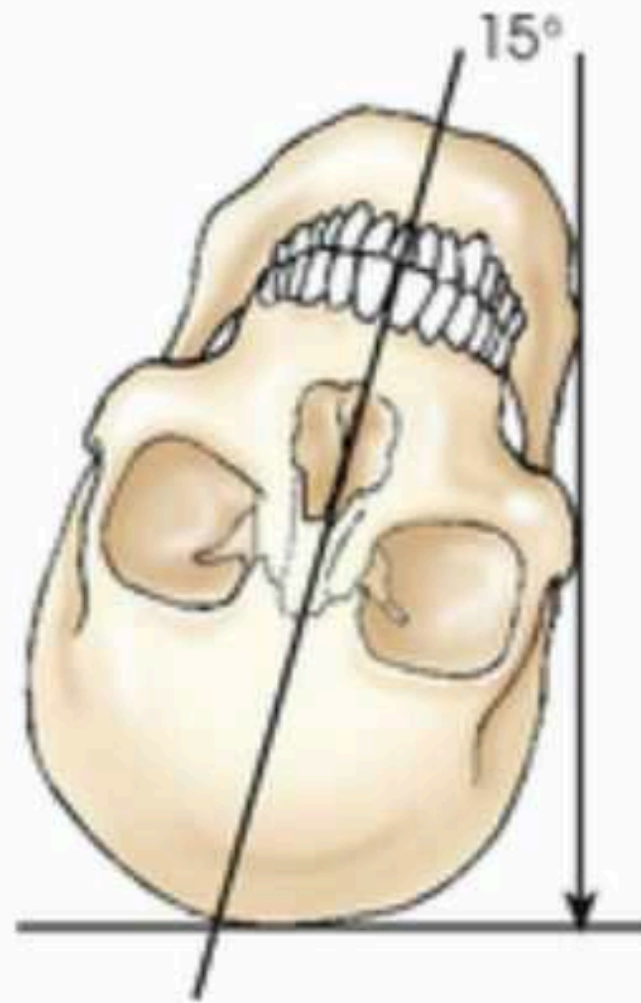


FIG. 3-57 Tilt of skull is 15 degrees from long axis.

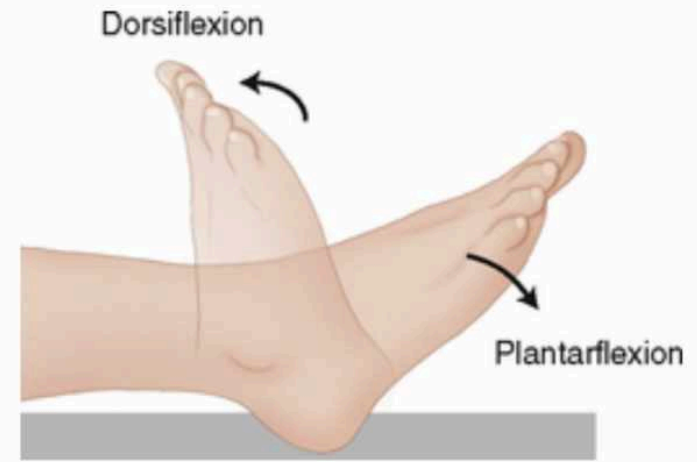
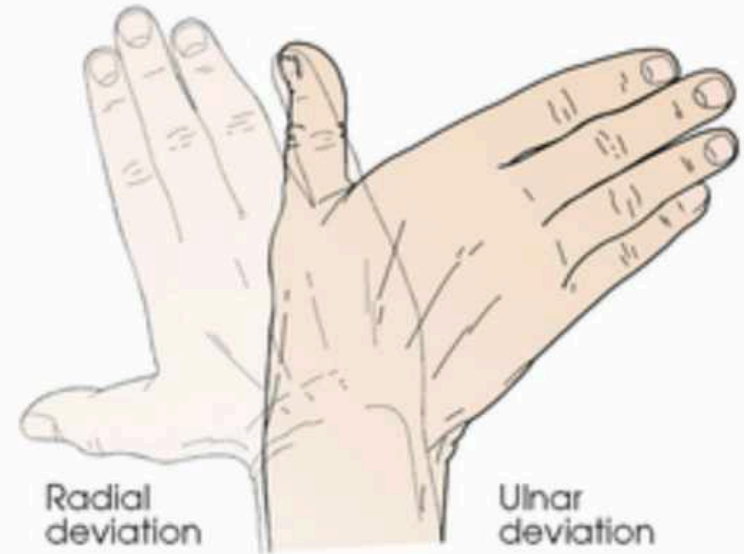
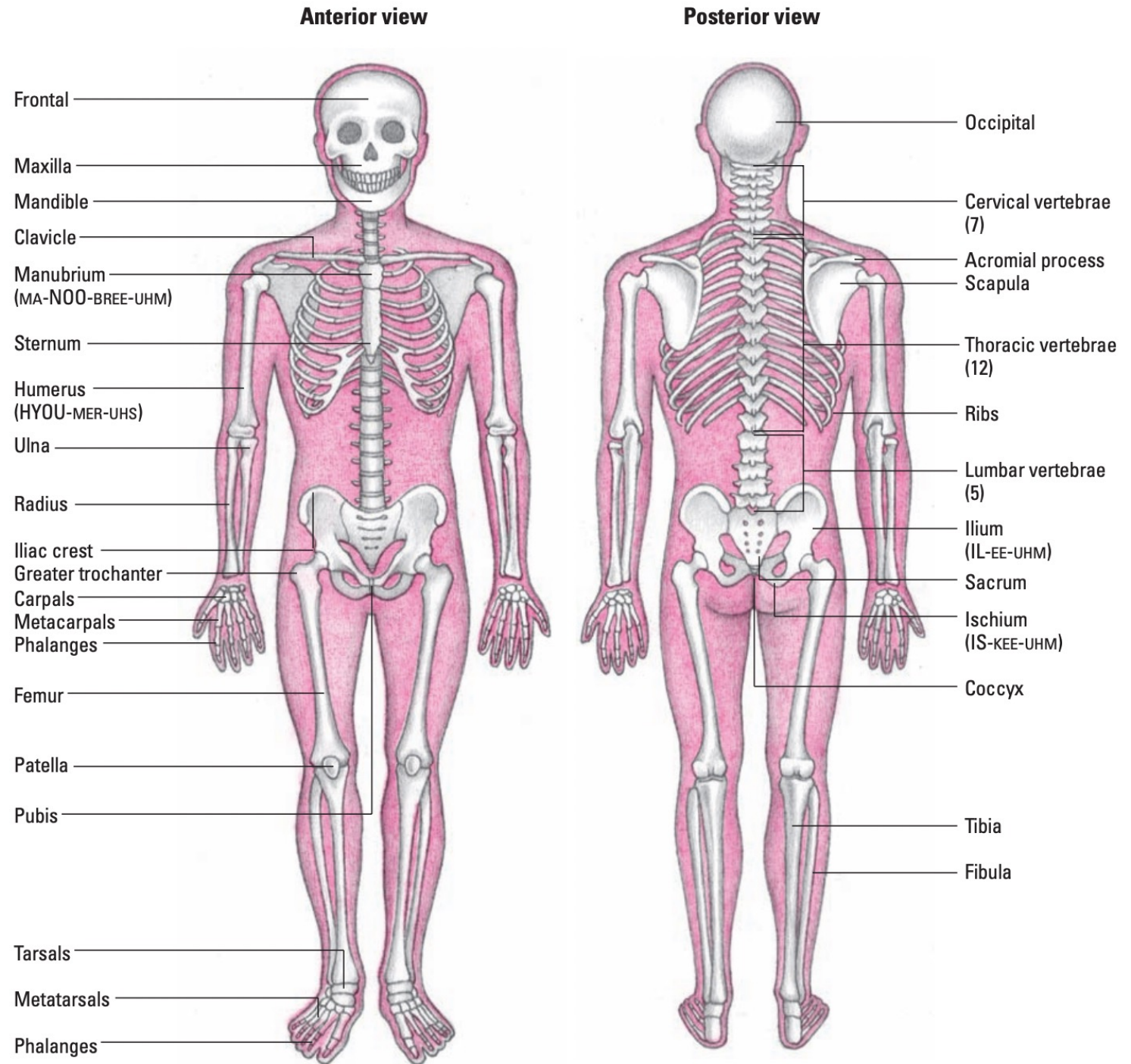


FIG. 3-59 Foot in dorsiflexion and plantar flexion. Note movement is at ankle joint.

# **SKELETAL SYSTEM**

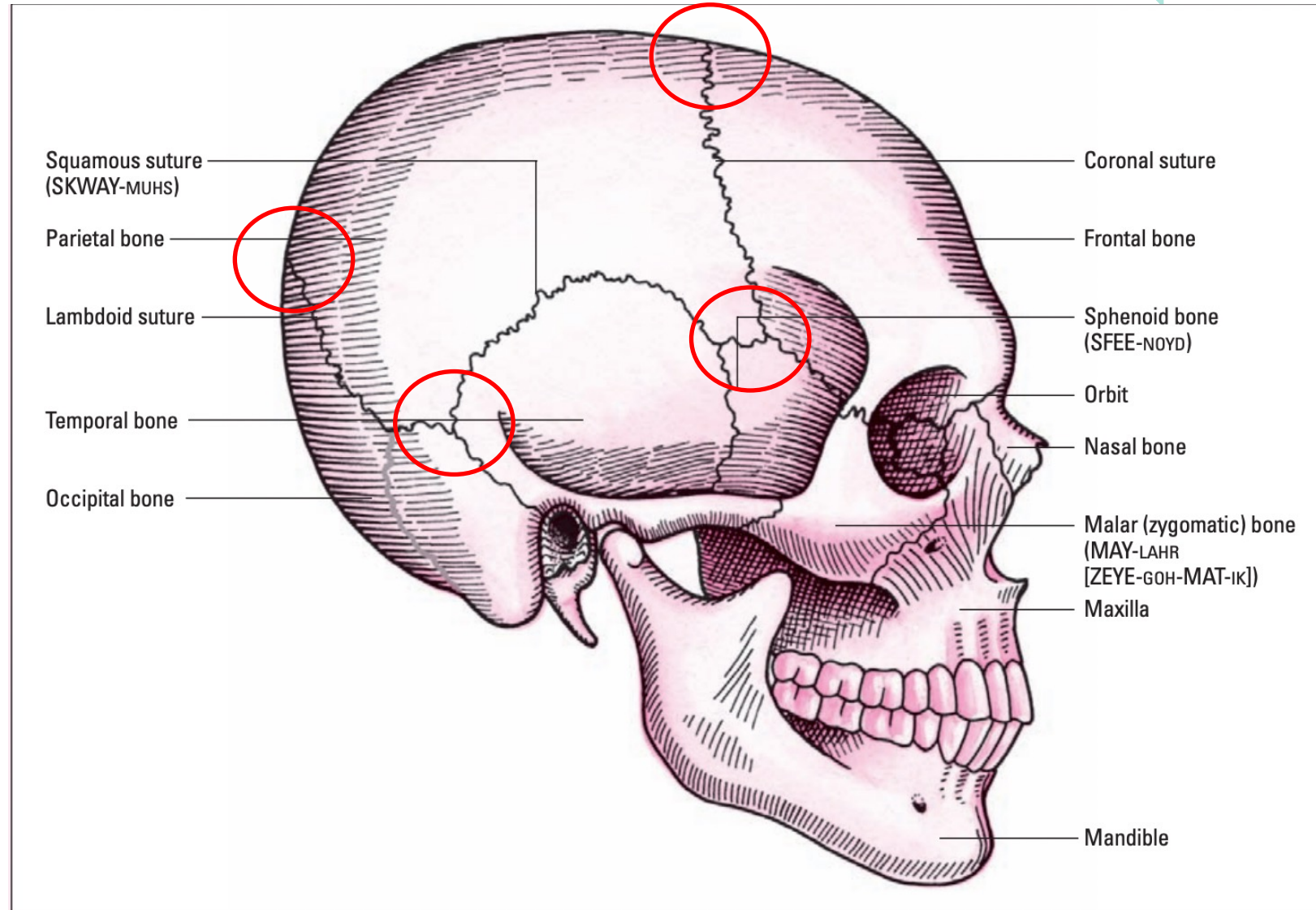
# Skeletal System



# **AXIAL SKELETON**

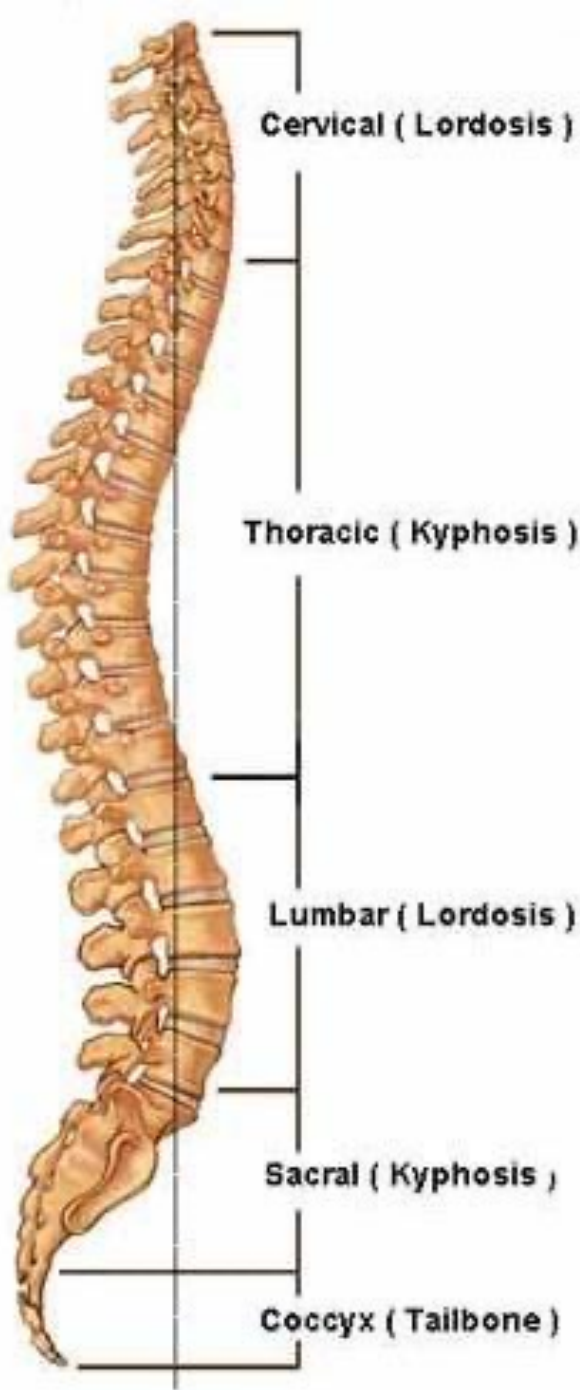
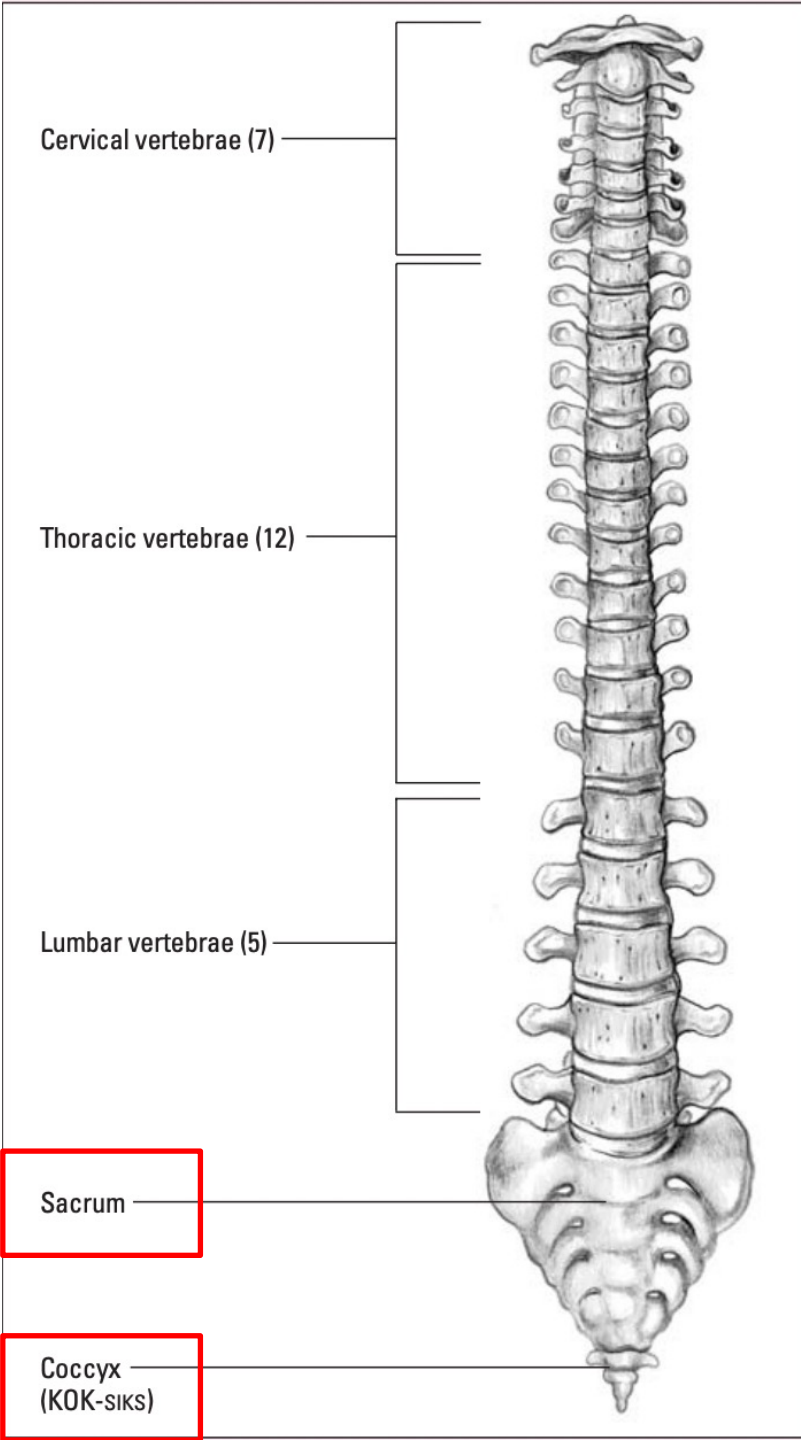
# Skull

- Cranium (8)
  - “Eight Osseous Parts Form The Skull”
- Facial (14)
  - “My Mandible Chews Nine Very Large Zucchini Pizzas”
- Ossicles (6)



# Spinal Column

- *Spina Lt. Spike*
- *Spondylo- vertebra*



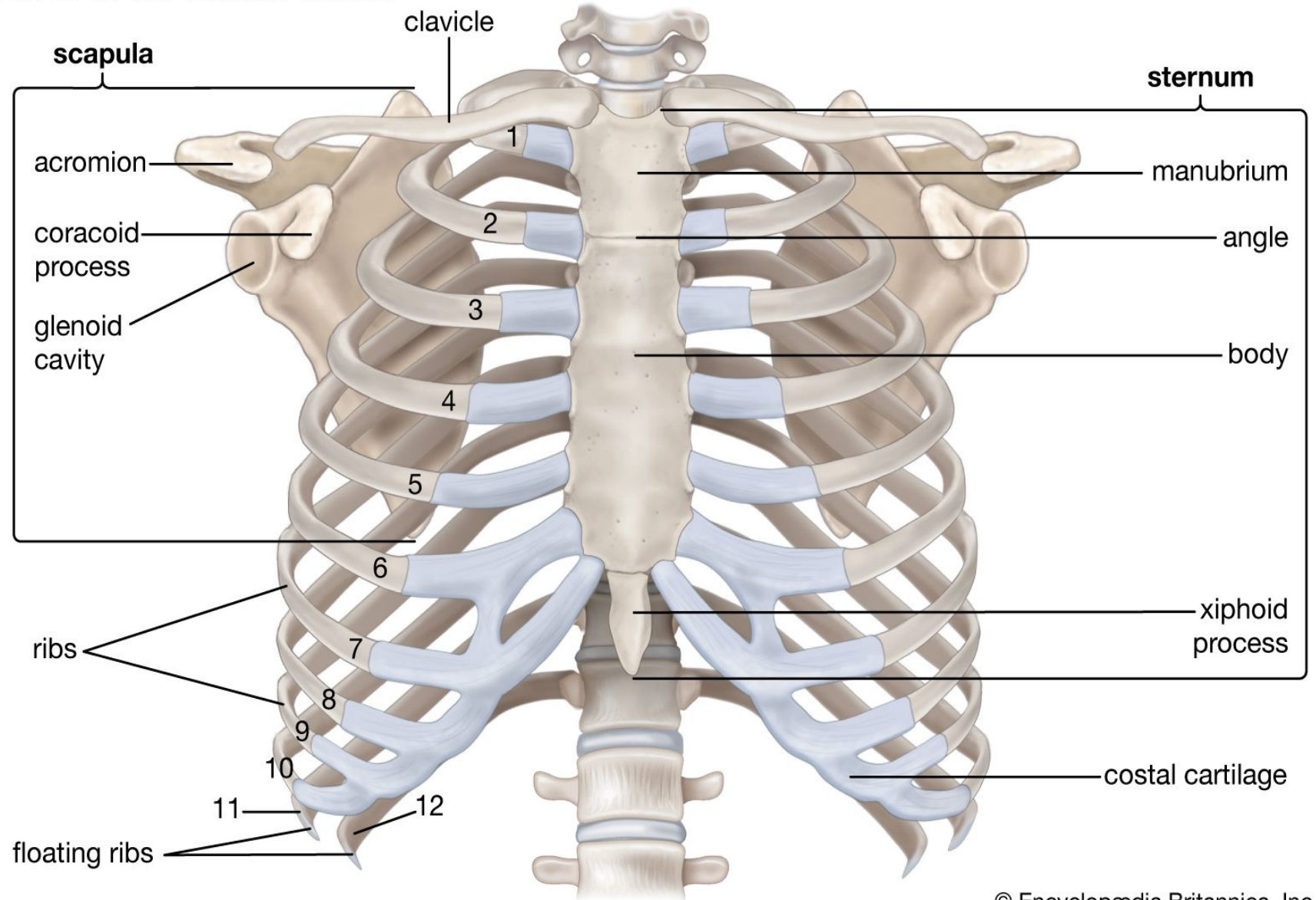
# Sternum

- Dagger bone

# Ribs

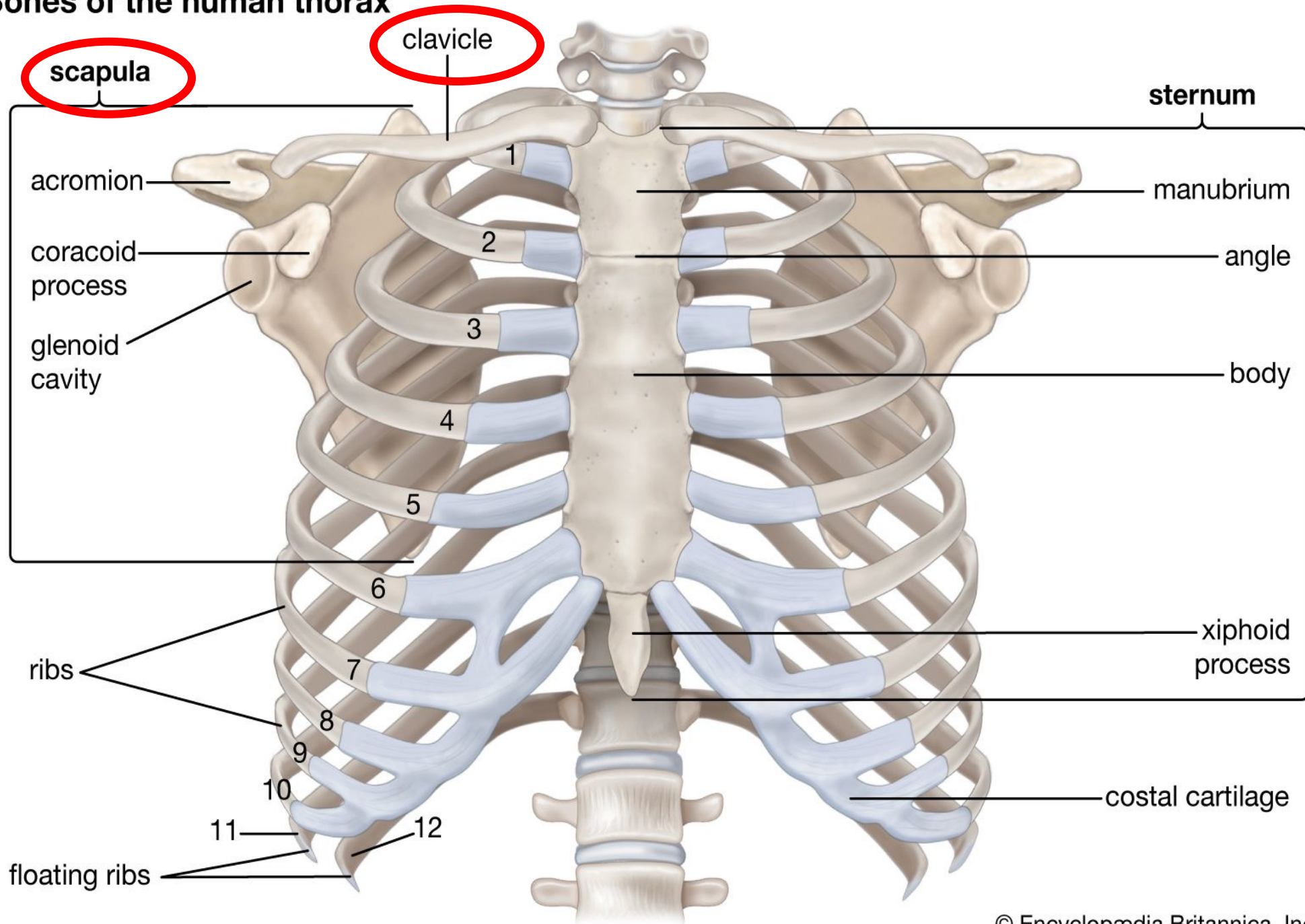
- *Costal*

Bones of the human thorax



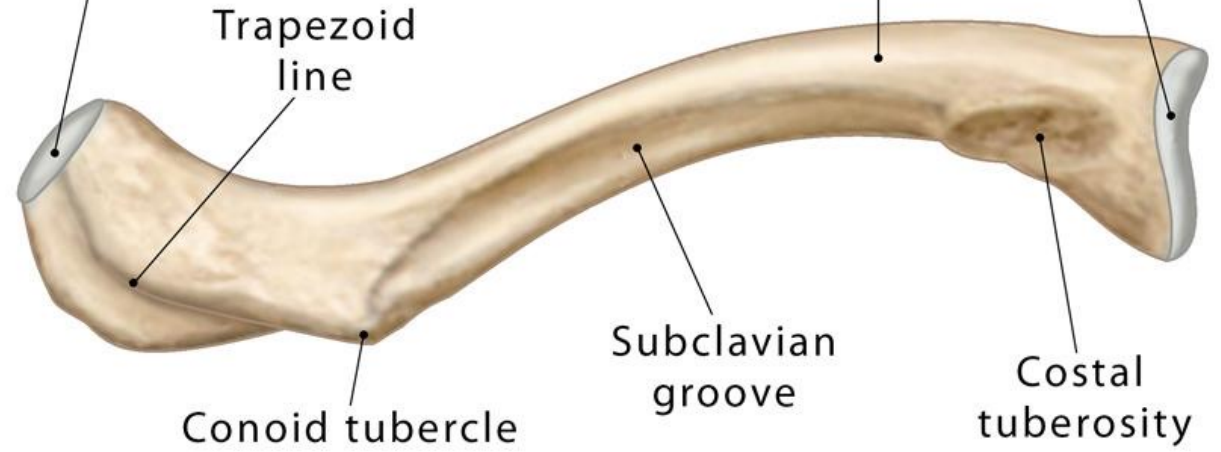
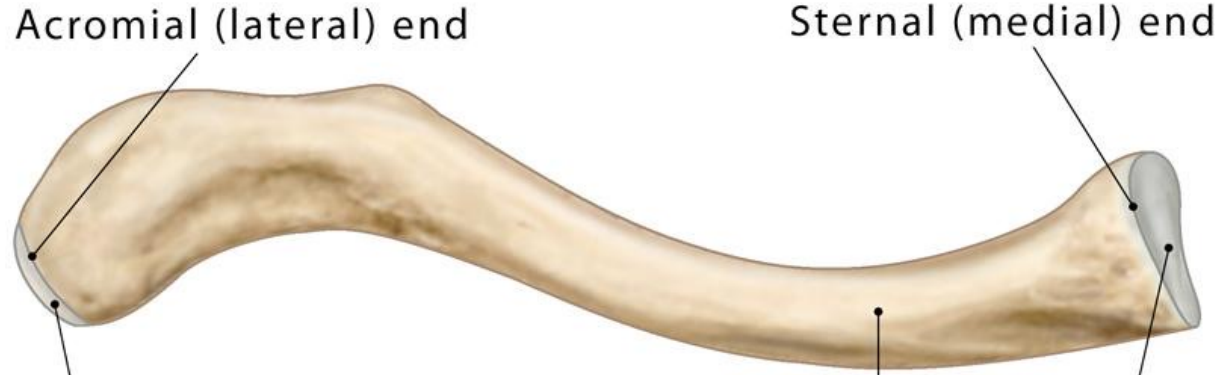
# **APPENDICULAR SKELETON**

# Bones of the human thorax

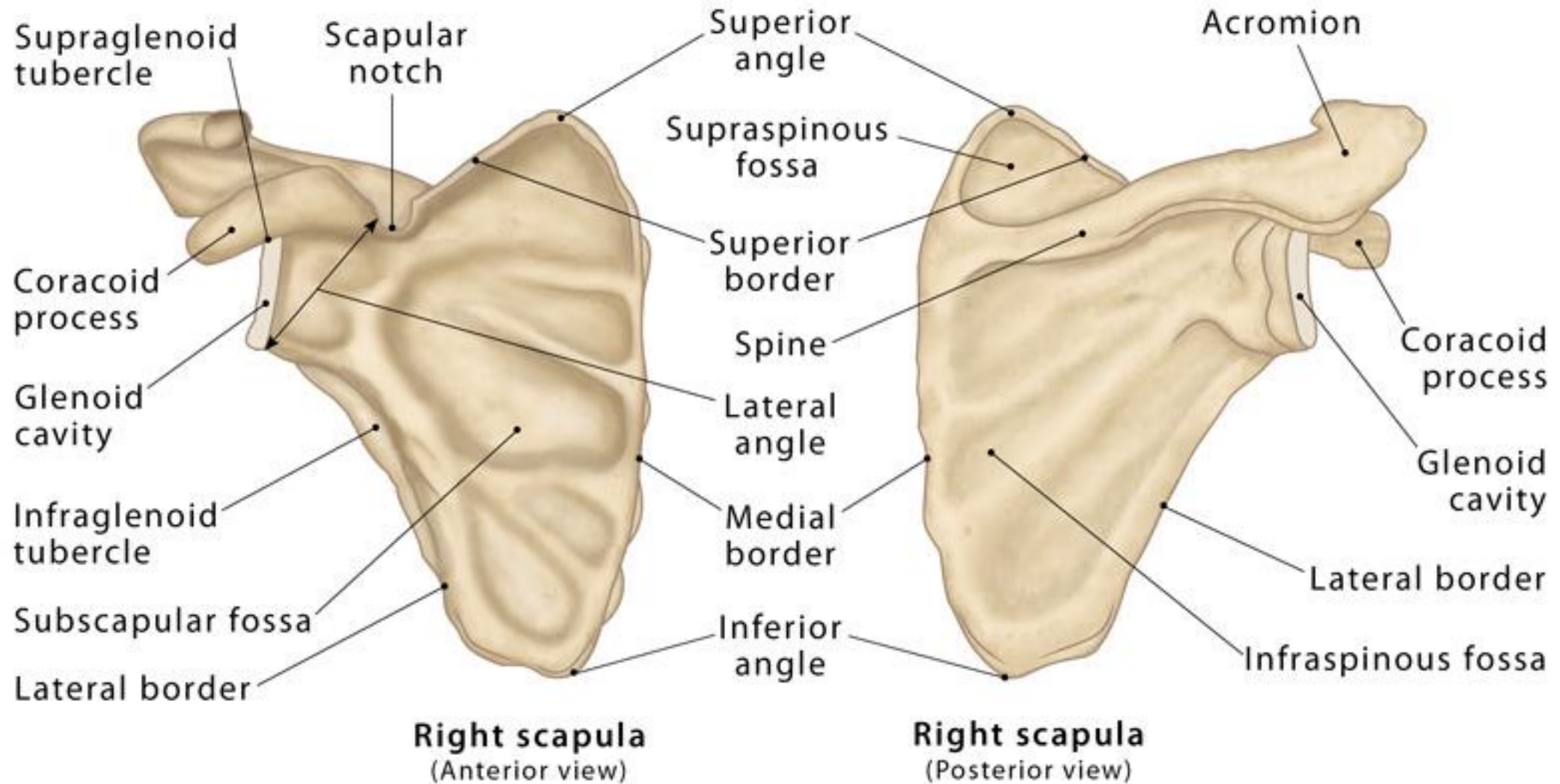


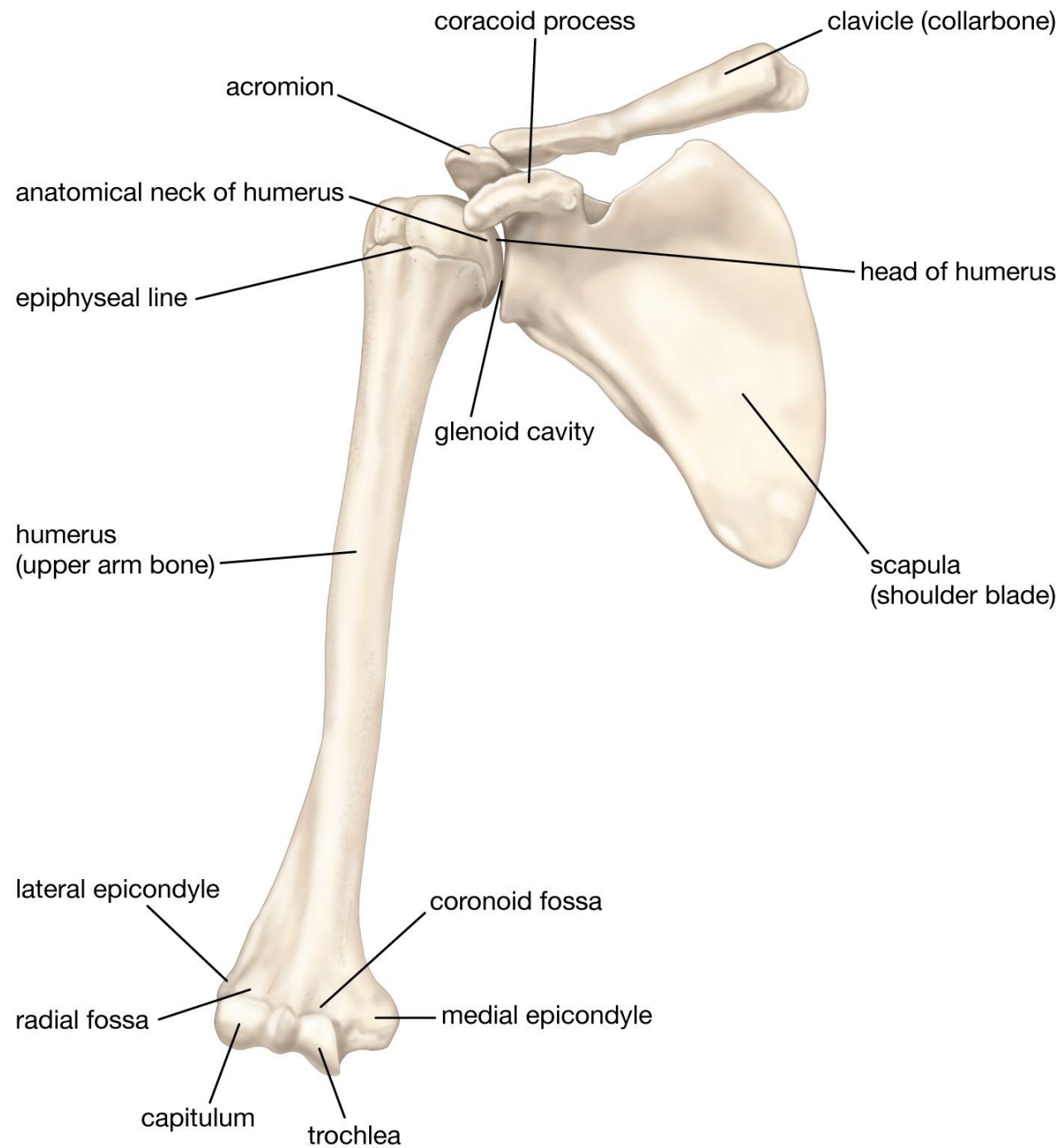
# Clavicle

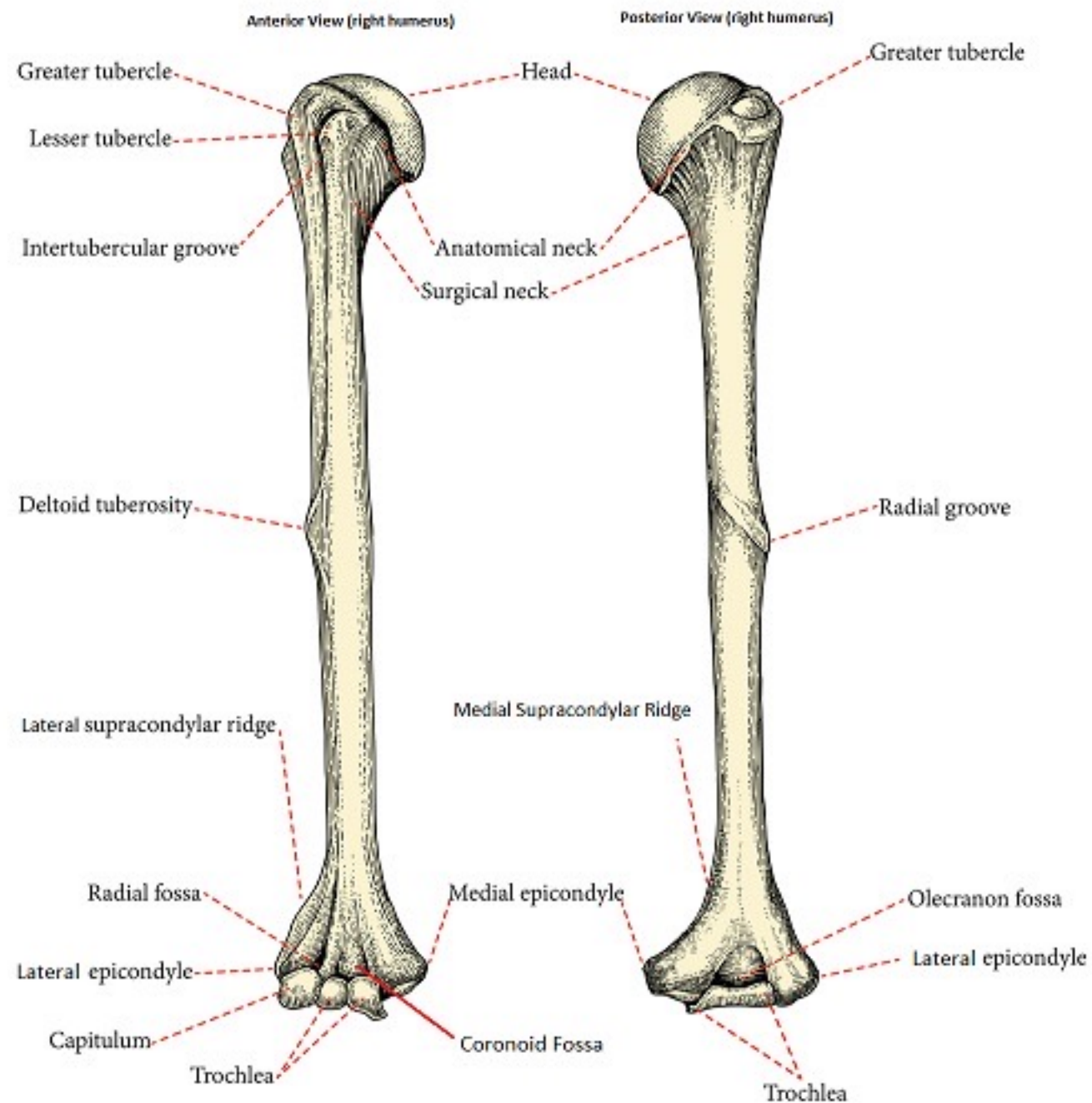
24  
ACM



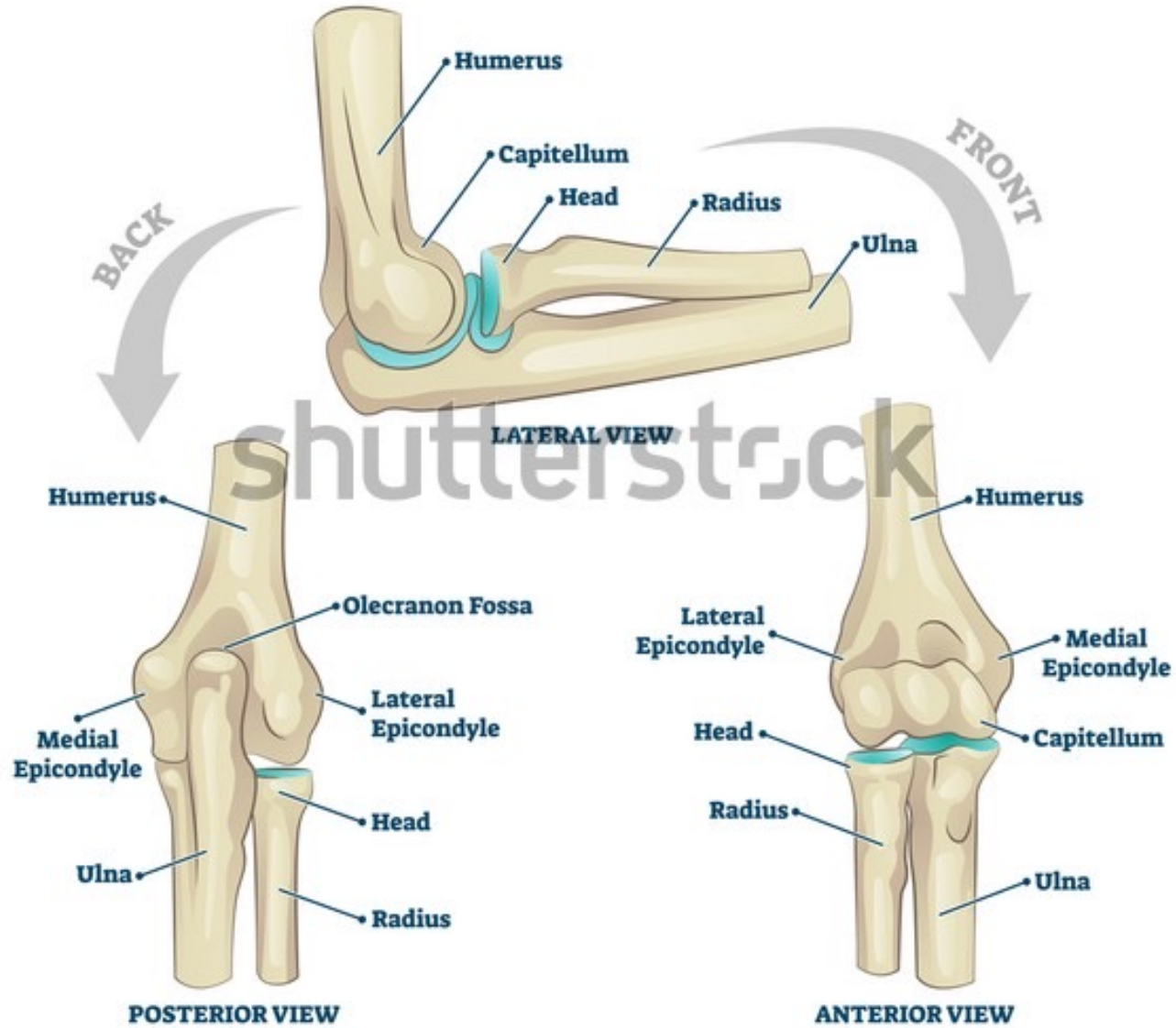
# Scapula

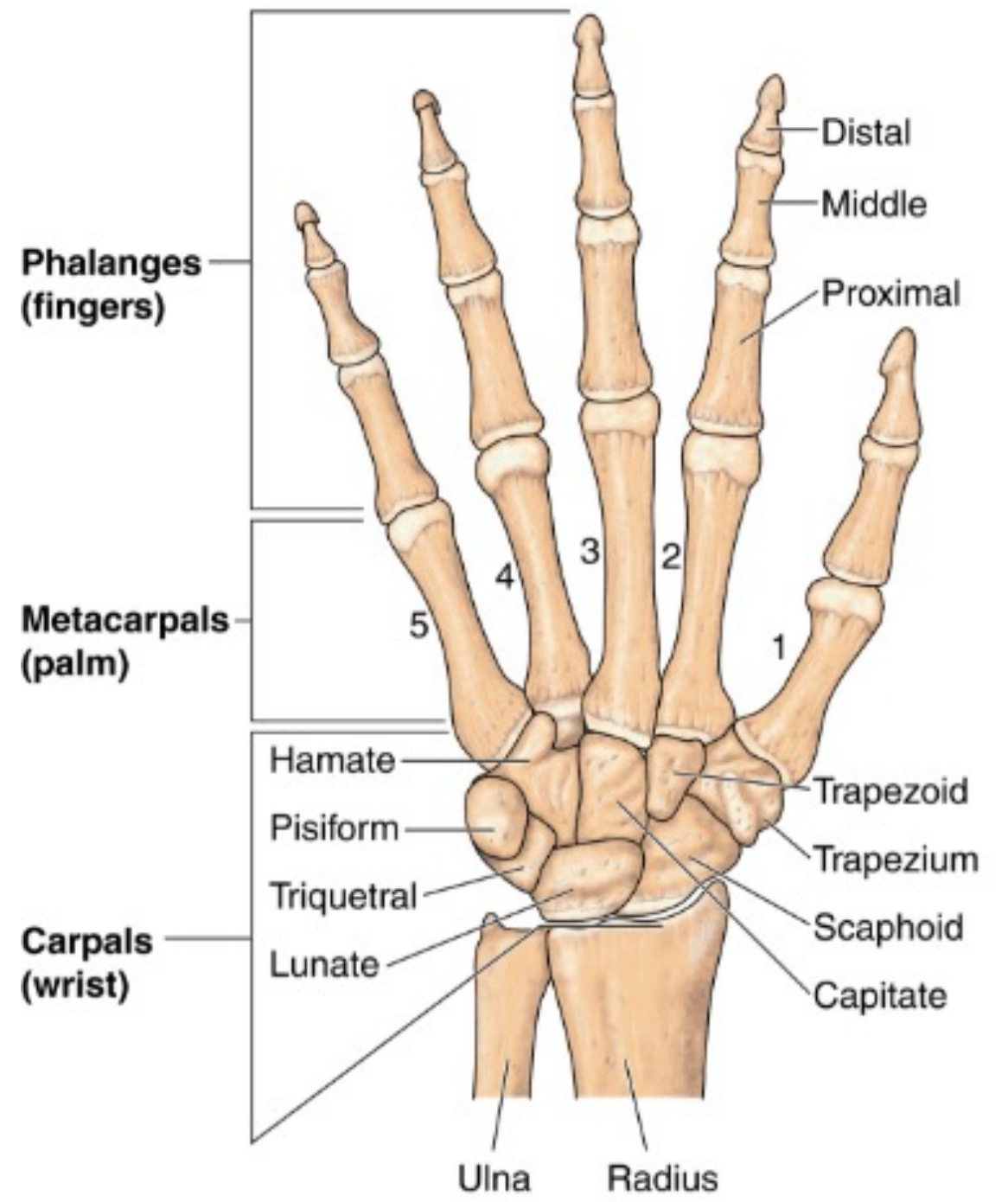
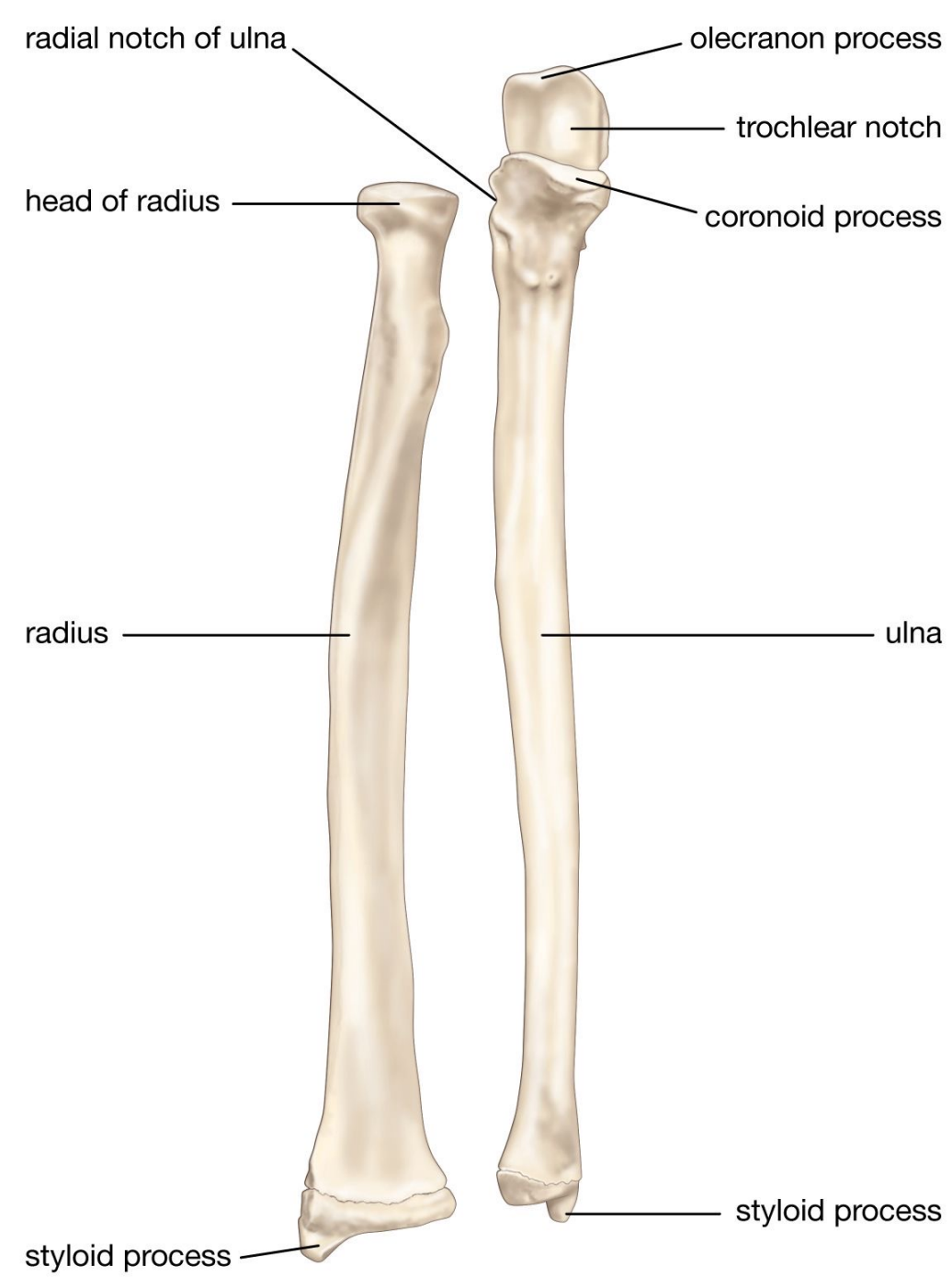




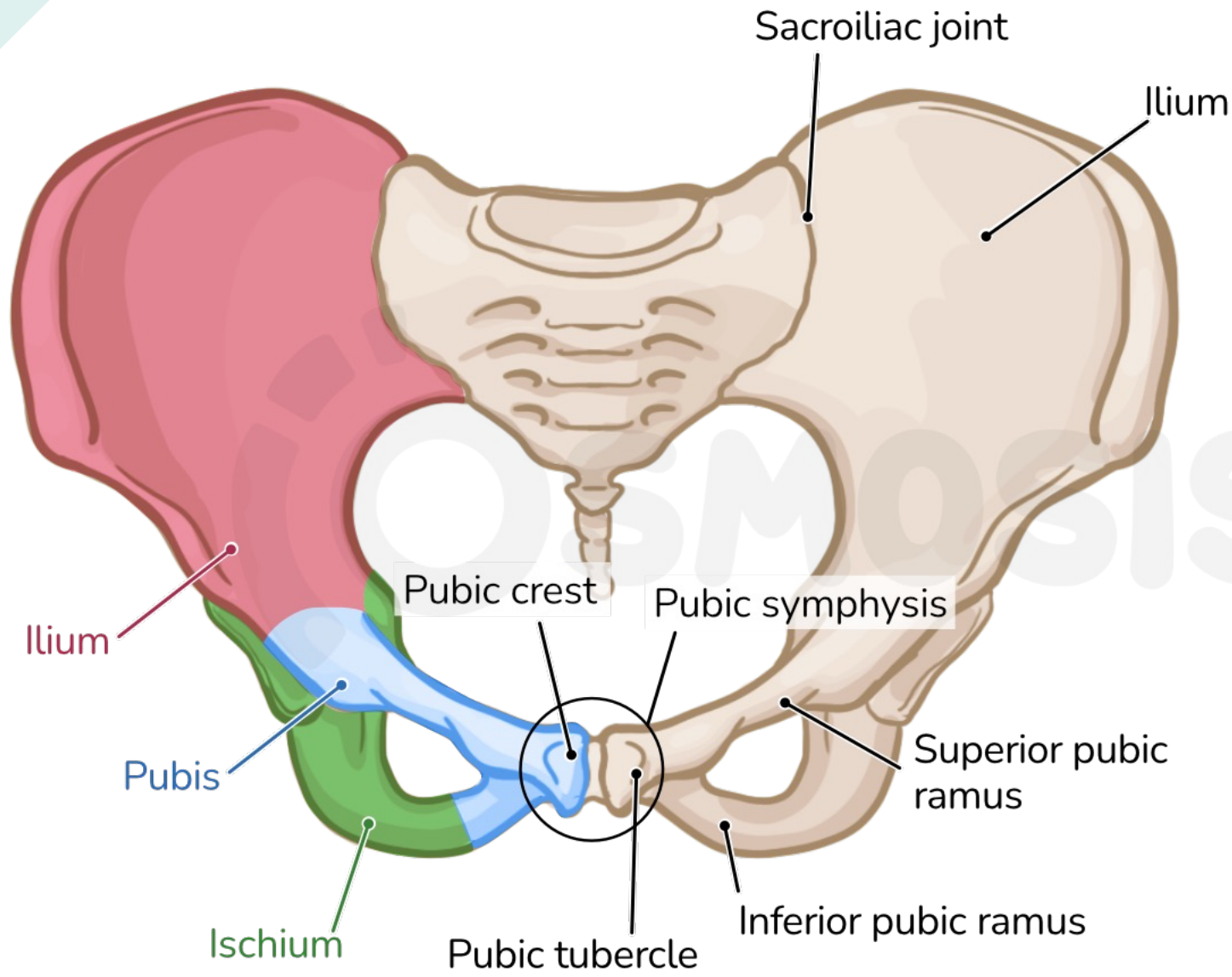


# ANATOMY OF ELBOW

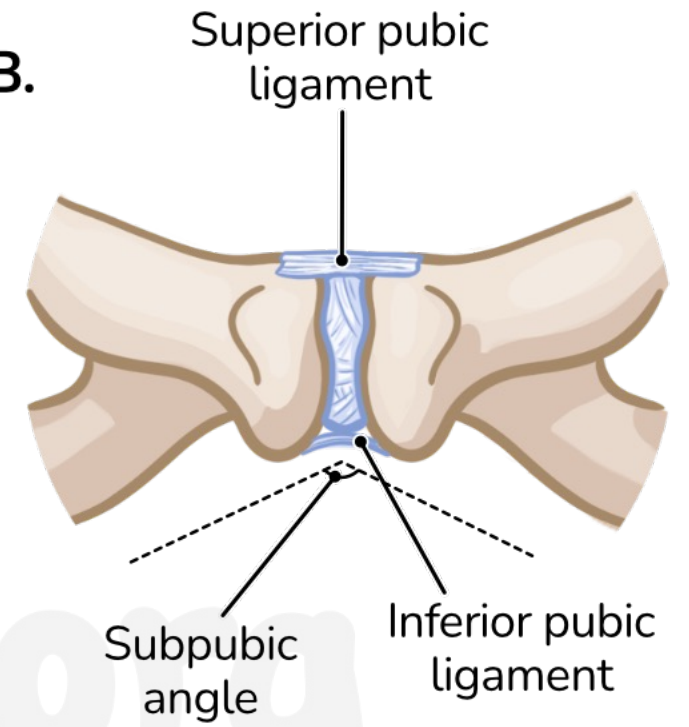


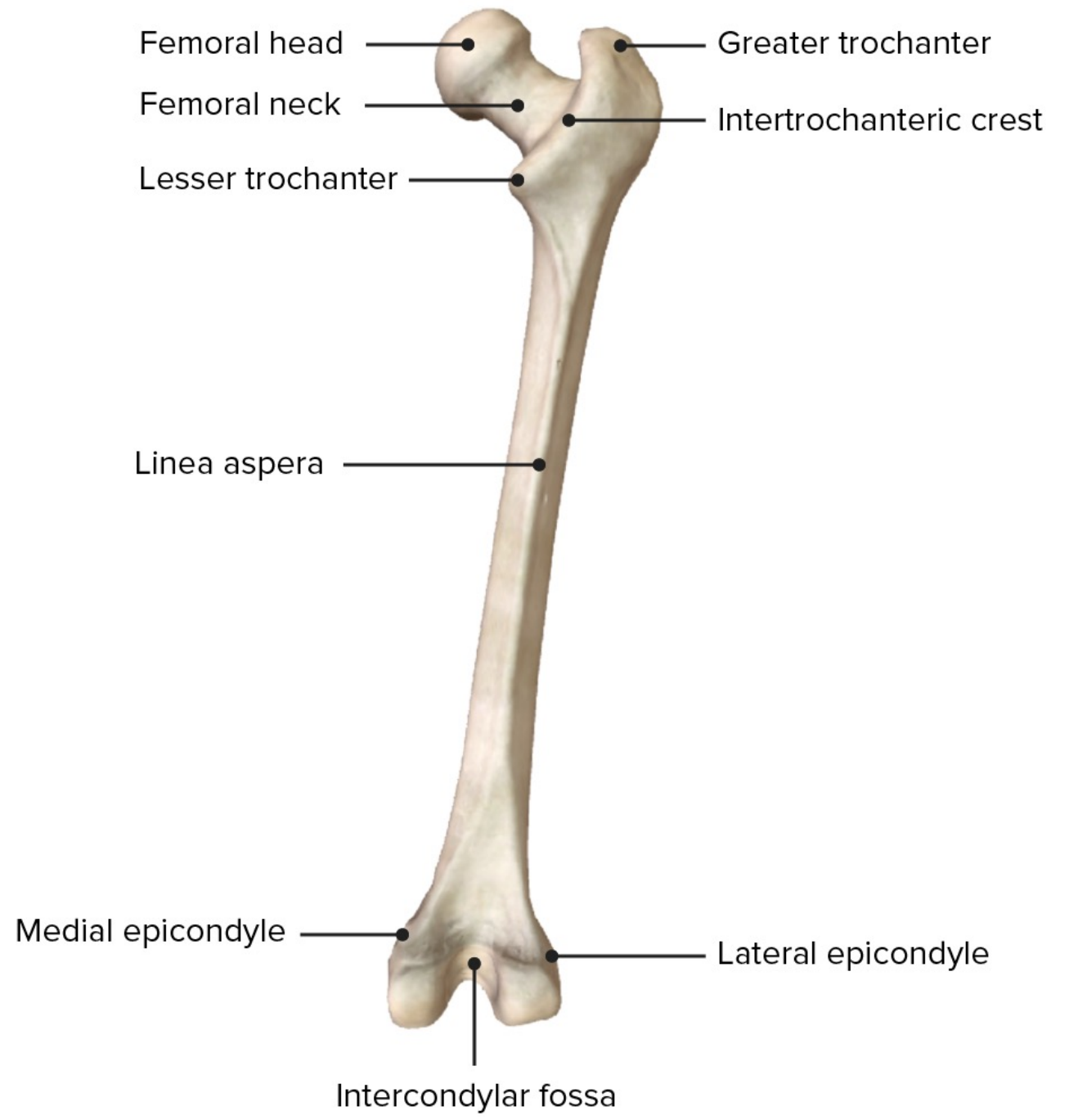
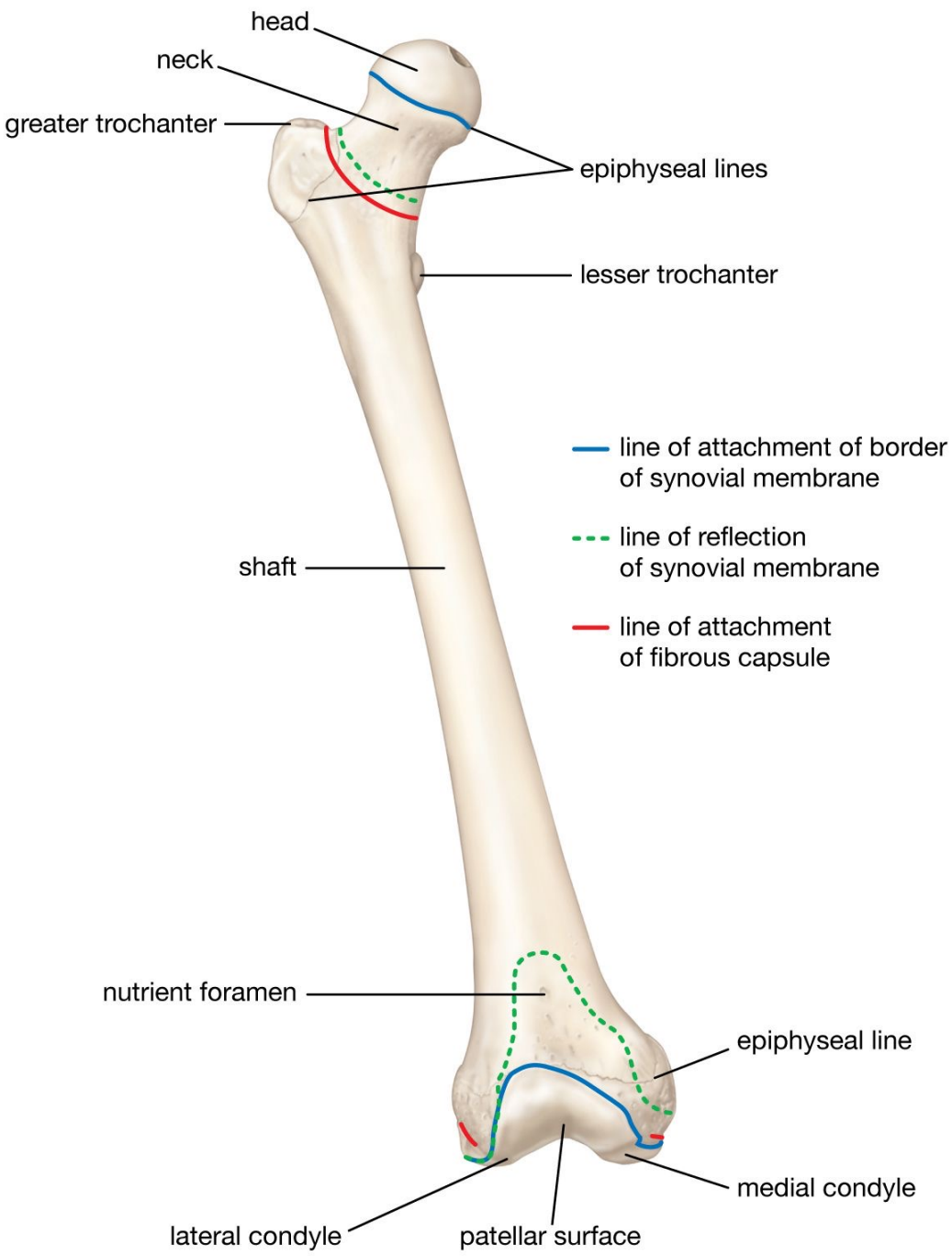


A.

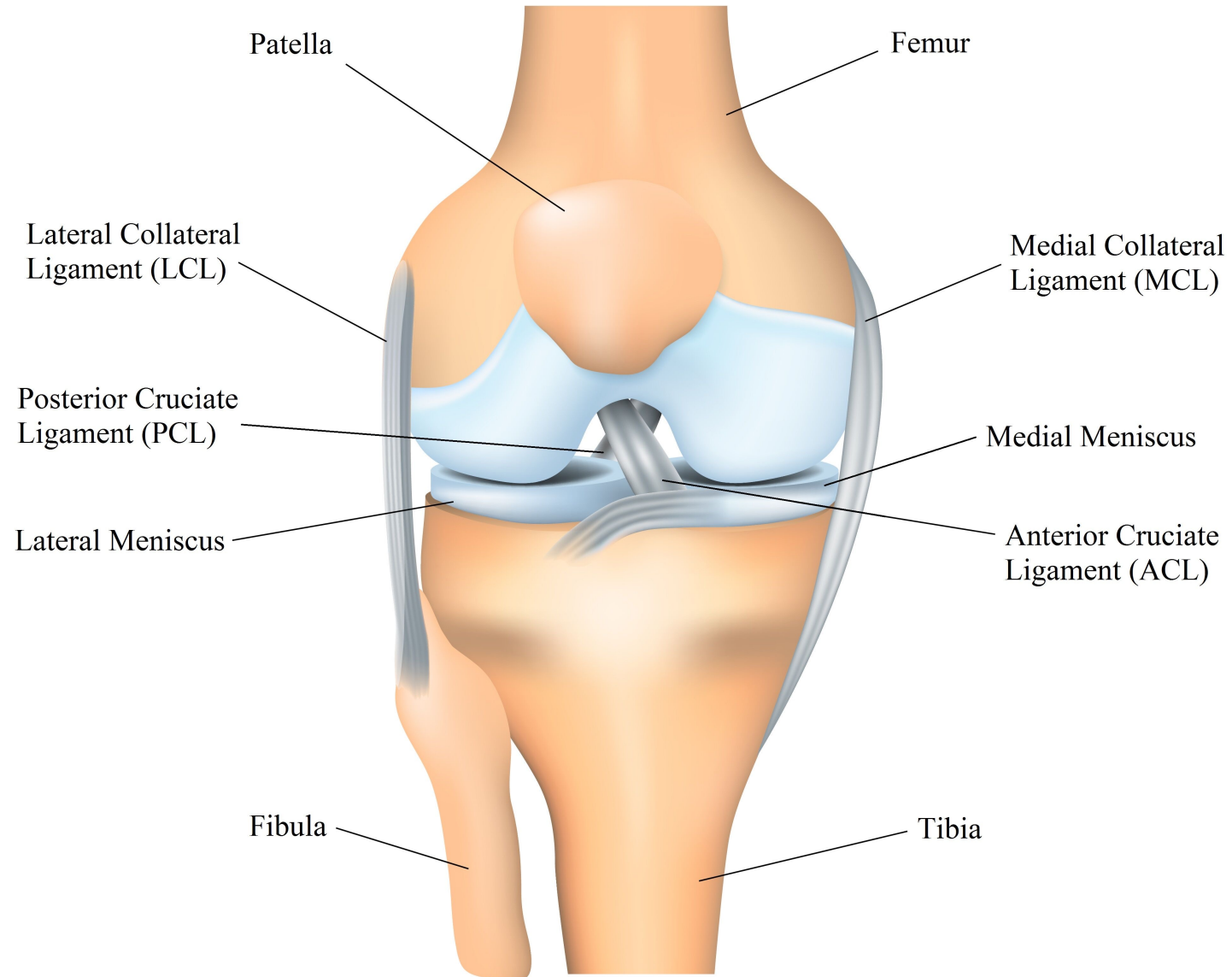


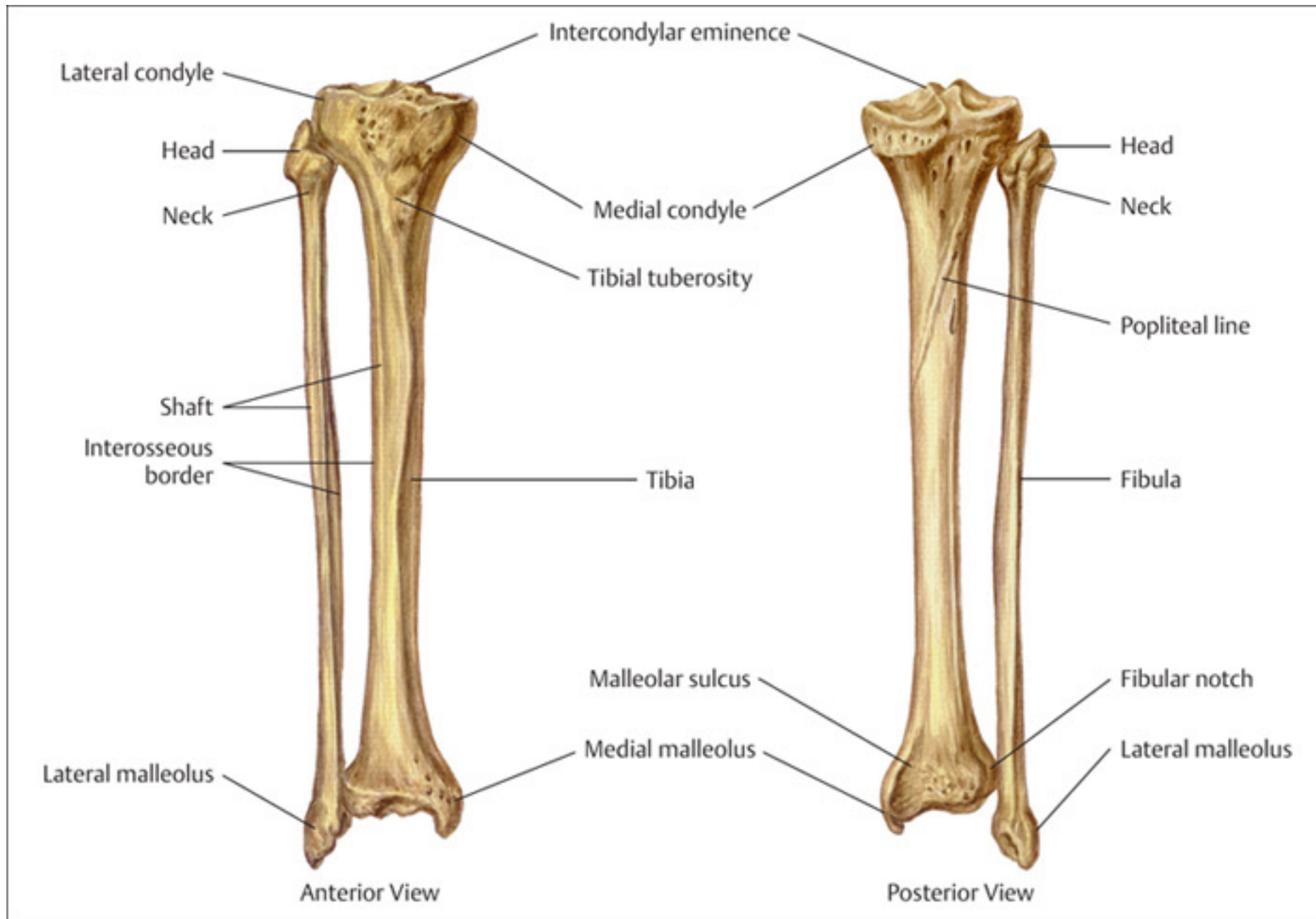
B.



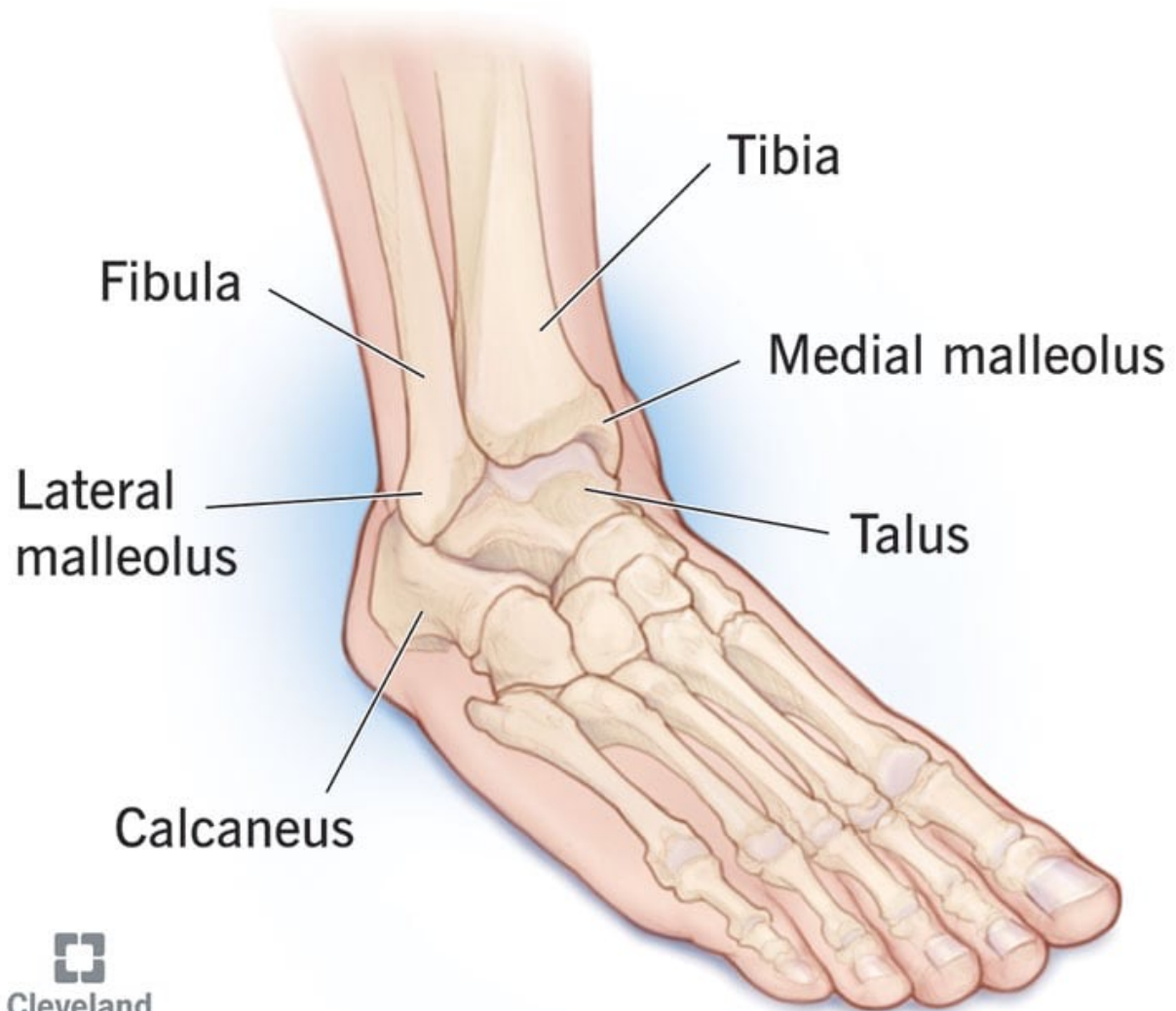


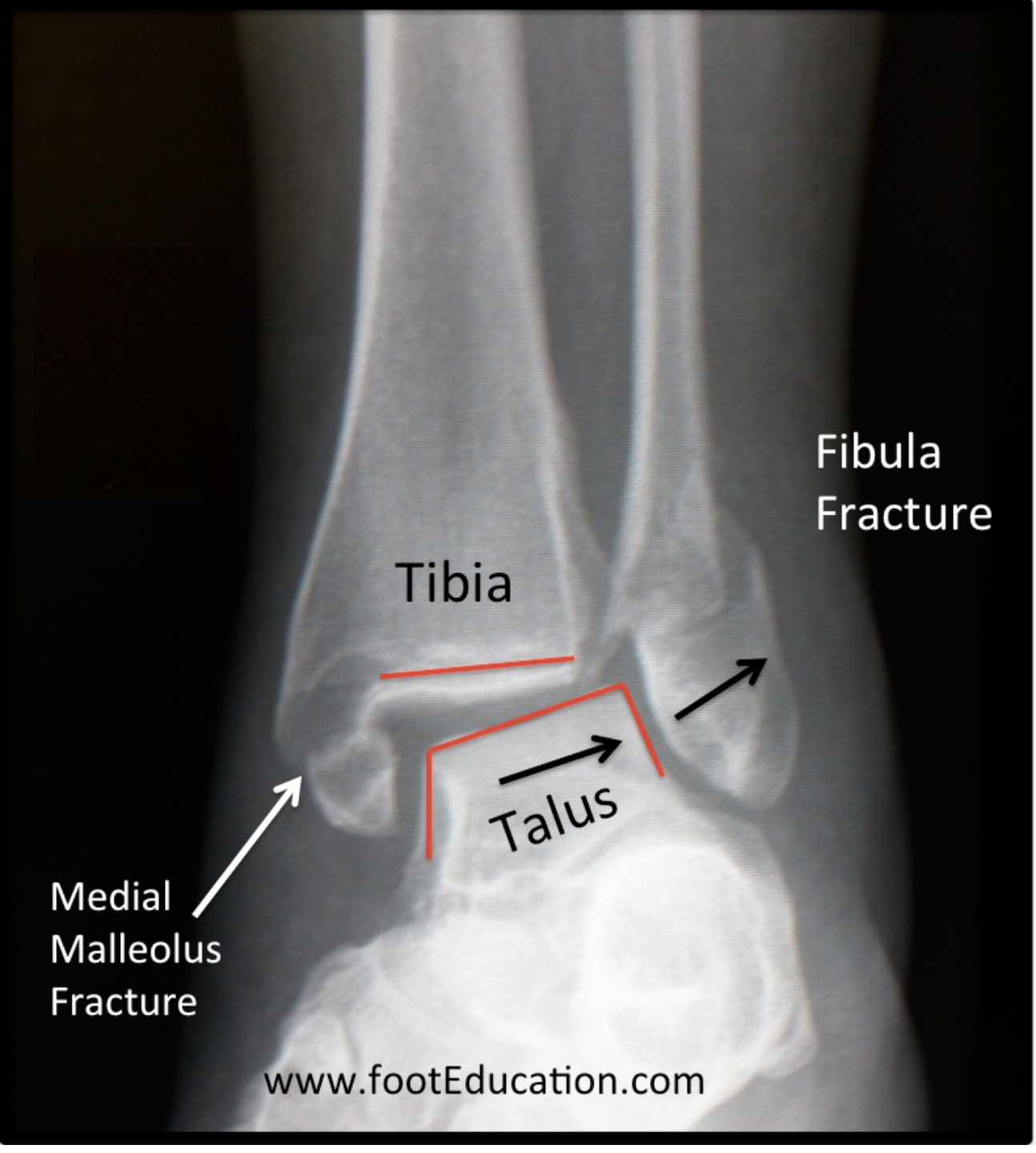
# THE HUMAN KNEE

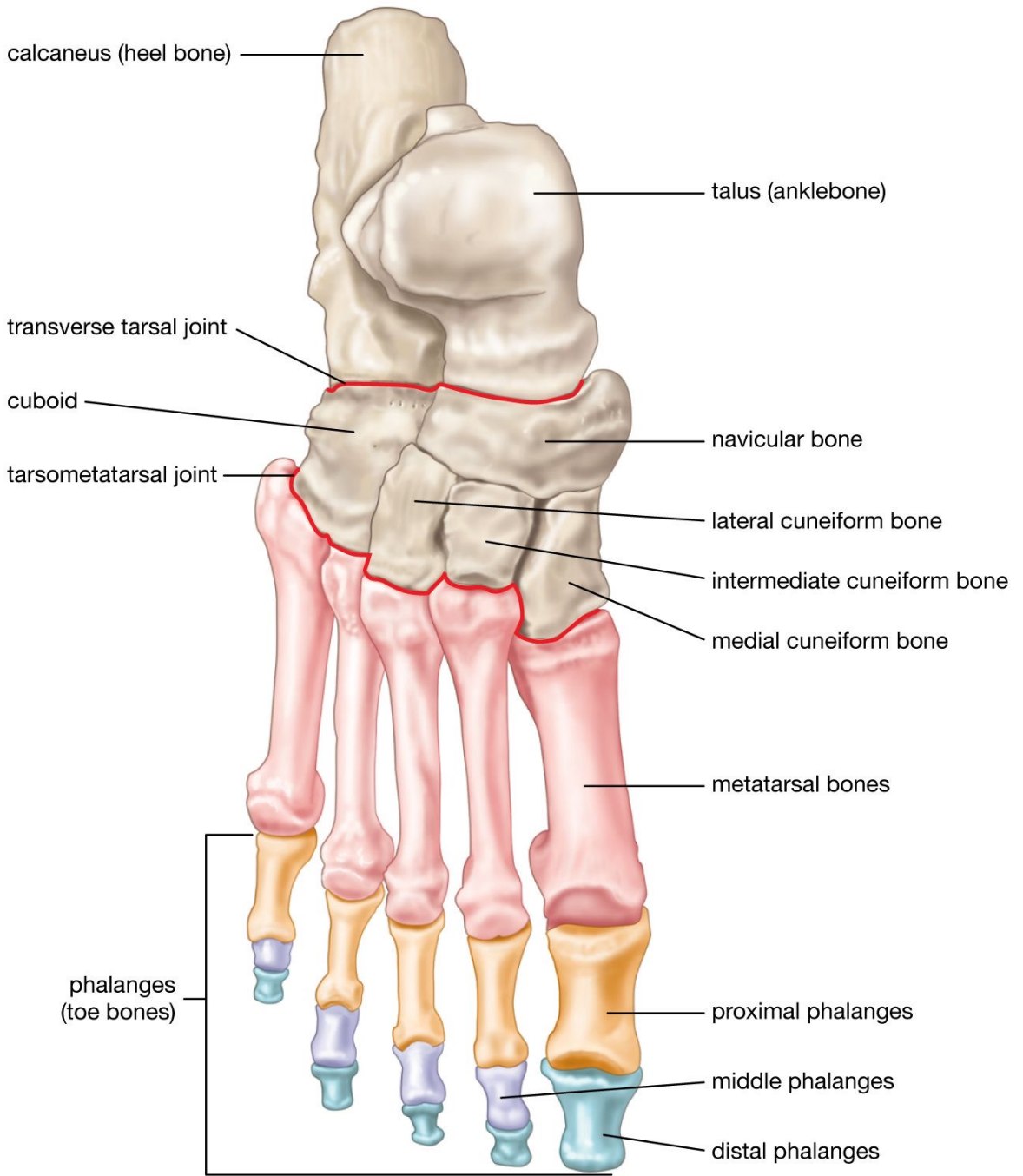




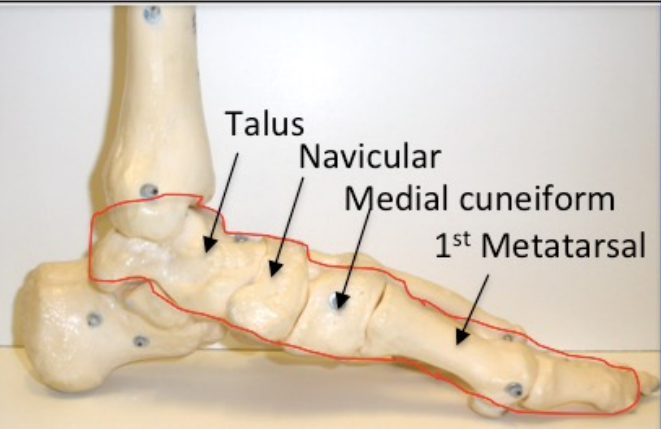
# Ankle Joint







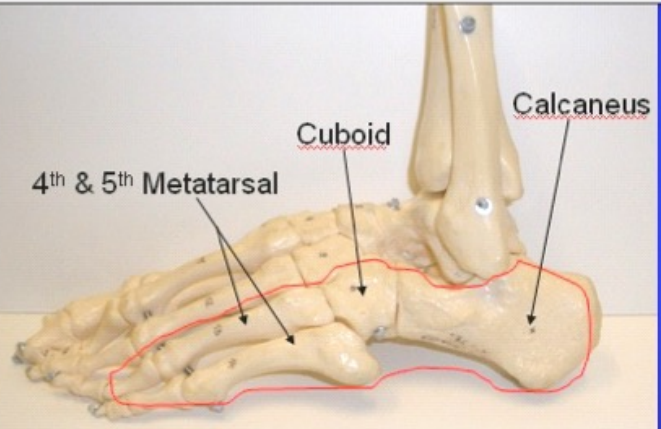
# Medial Column of the Foot



Inside (Medial) aspect of the foot



# Lateral Column of the Foot



Outside (lateral) aspect of foot

