SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai

DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE TECHNOLOGY

COURSE NAME: Anatomy

UNIT II – Thorax and Lungs

TOPIC: Ribs

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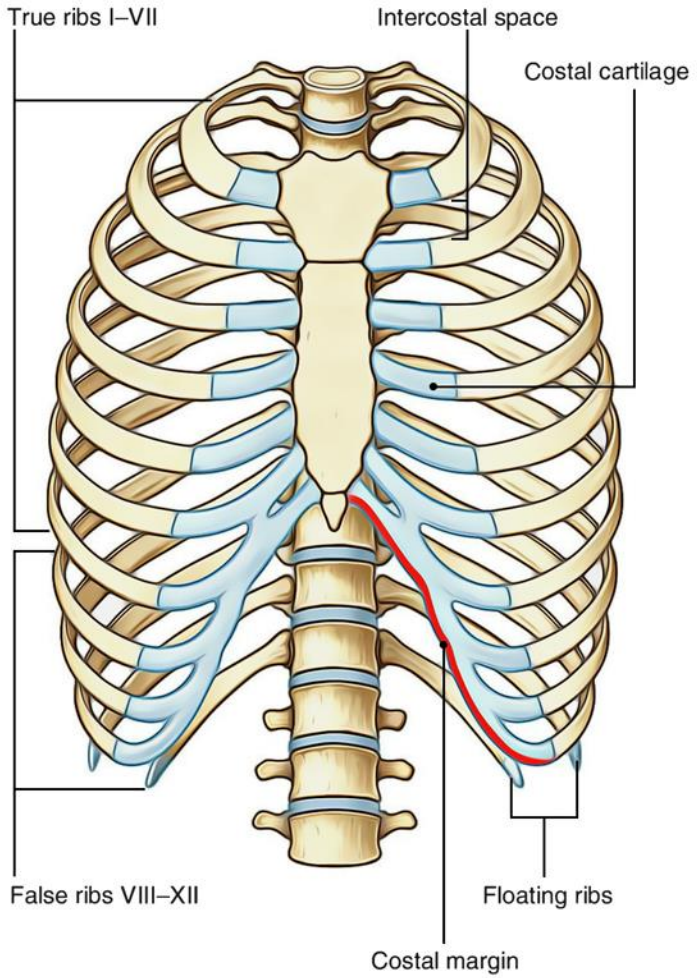
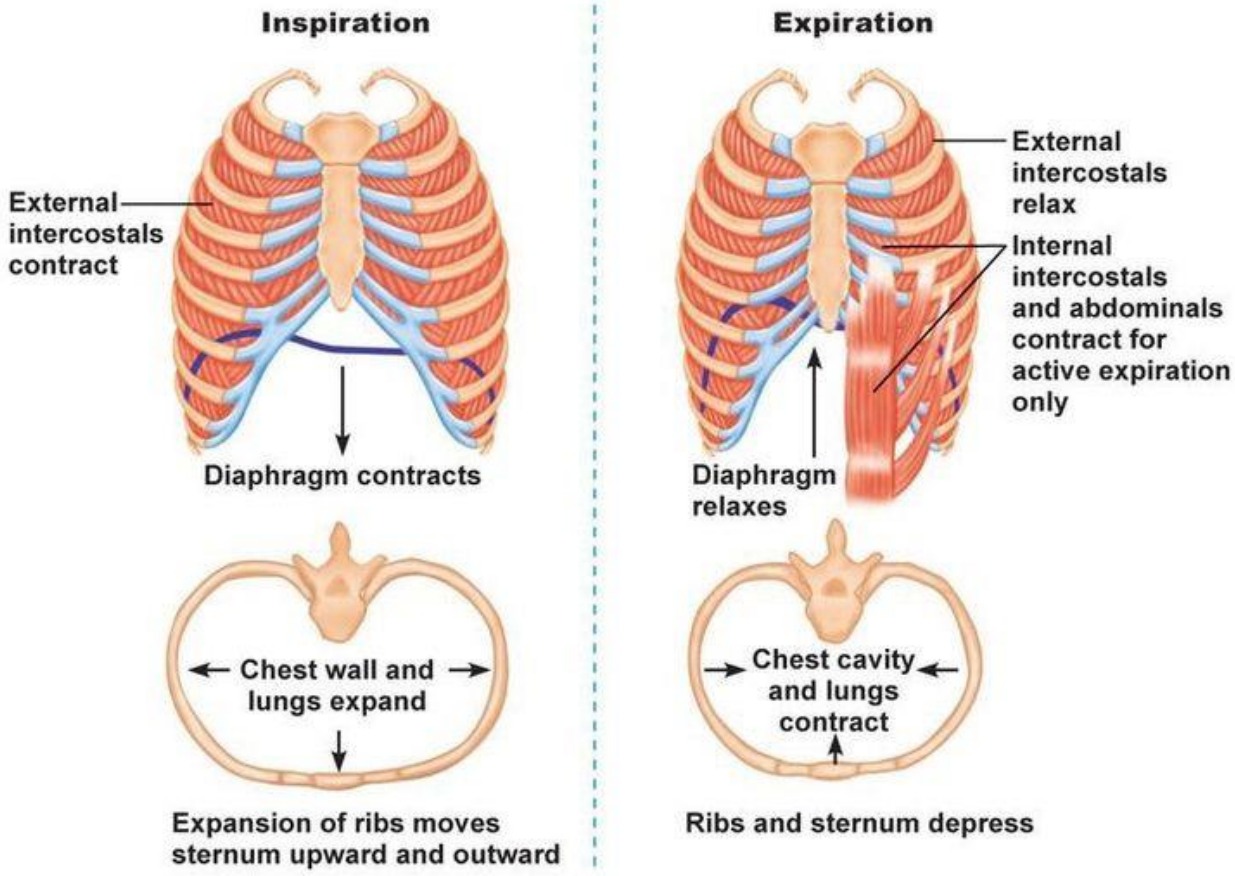
Empathize - Overview of Ribs – Basic Facts

- 12 pairs of curved, flat bones forming the thoracic cage.
- Total: Approximately 24 ribs in adults.
- They are curved strip of bones
- Ribs stretches from thoracic vertebra (posterior) to lateral edge of sternum (anterior)



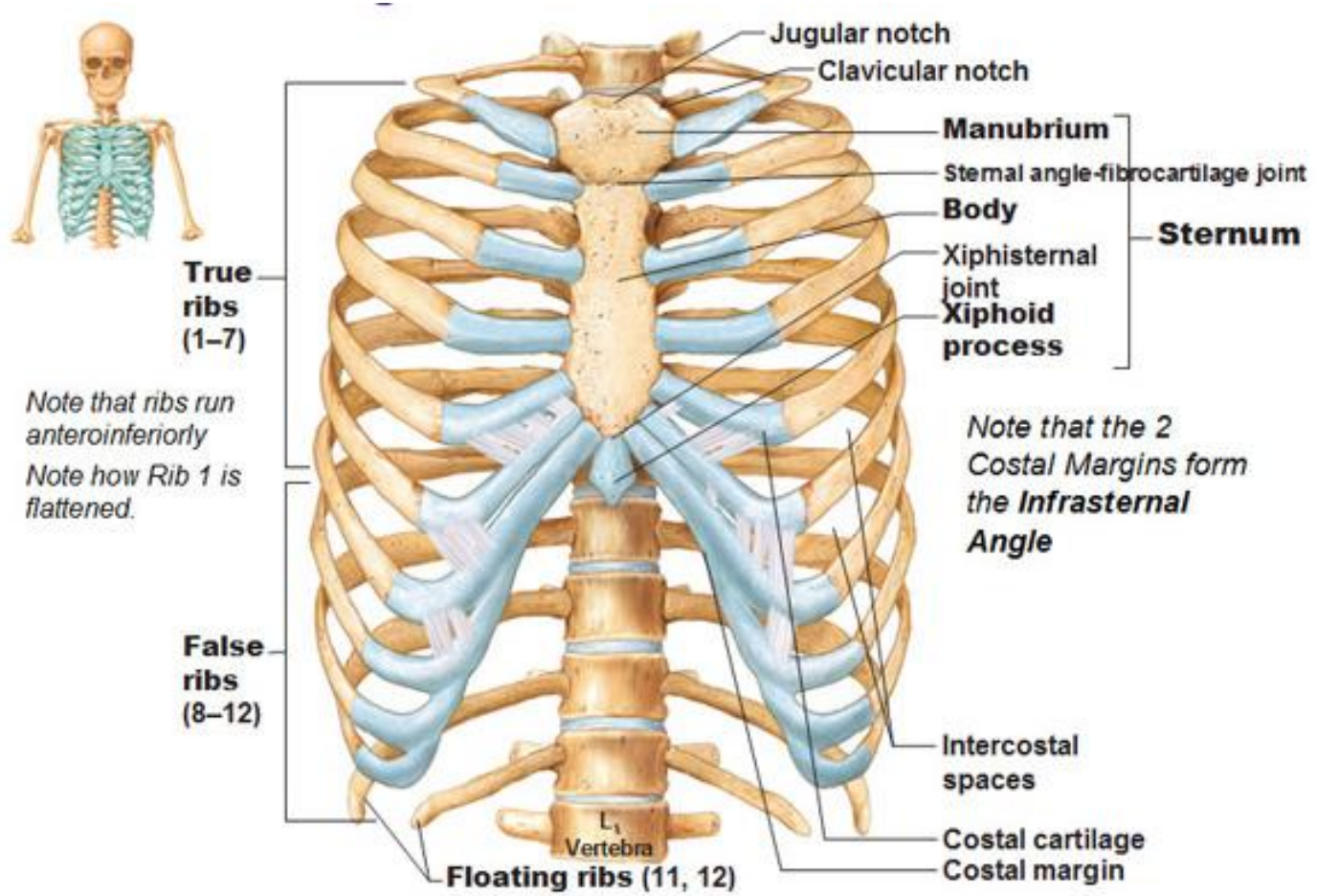
Overview of Ribs – Primary Functions

- Protect vital organs: Heart and lungs.
- Provide structural support for thorax (pectoral girdle and upper limbs)
- Enable dynamic movement for breathing (inspiration and expiration)
- Articulate with thoracic vertebrae T1-T12



Define - Thoracic Cage

- Thoracic Cage is a skeletal framework which supports the thorax.
- It's nature is osteocartilaginous and elastic.
- The thoracic vertebrae, ribs, costal cartilages, and sternum form the thoracic cage.

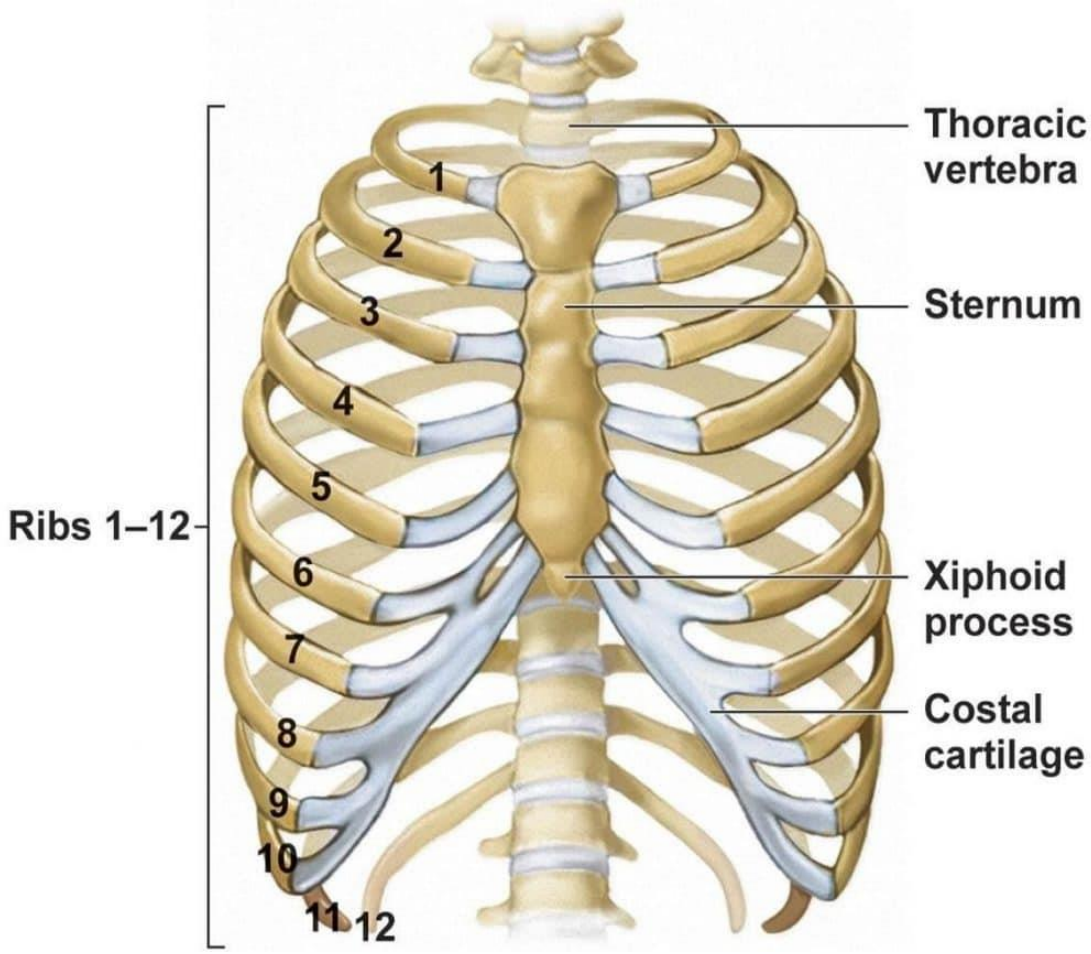


Ideate - Categorization

Characteristics	Features
According to features	Typical ribs: 3^{rd} - 9^{th} , Atypical ribs: 1^{st} , 2^{nd} , 10^{th} , 11^{th} , and 12^{th} .
According to relationship with the sternum	True ribs: 1^{st} -7^{th} , False ribs: 8^{th} -10^{th}, Floating ribs: 11^{th} - 12^{th}
According to articulation	Vertebro-sternal ribs: 1^{st} -7^{th} , Vertebro-chondral ribs: 8^{th} -10^{th} , Vertebral (floating) ribs: 11^{th} and 12^{th}

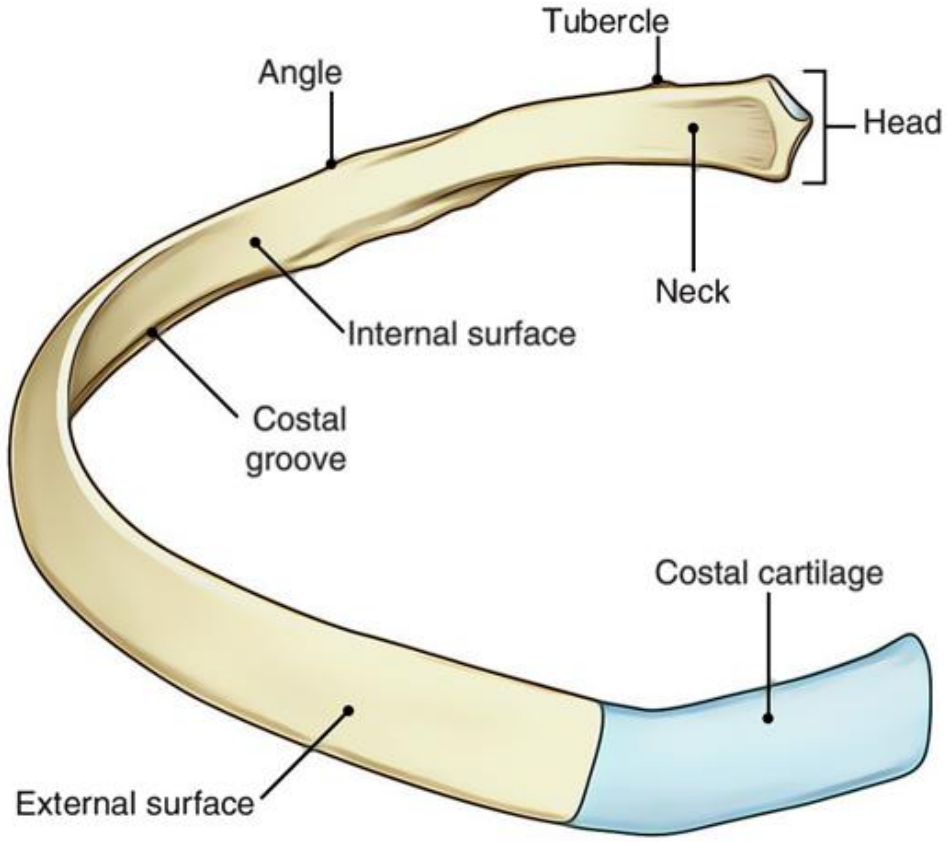
Costal Cartilages

- The anterior ends of first 7 ribs are joined to the sternum via their costal cartilages.
- The cartilages at the anterior ends of 8th, 9th, and 10th ribs are joined to the next higher cartilage.
- The anterior ends of 11th and 12th ribs are free and hence named floating ribs.



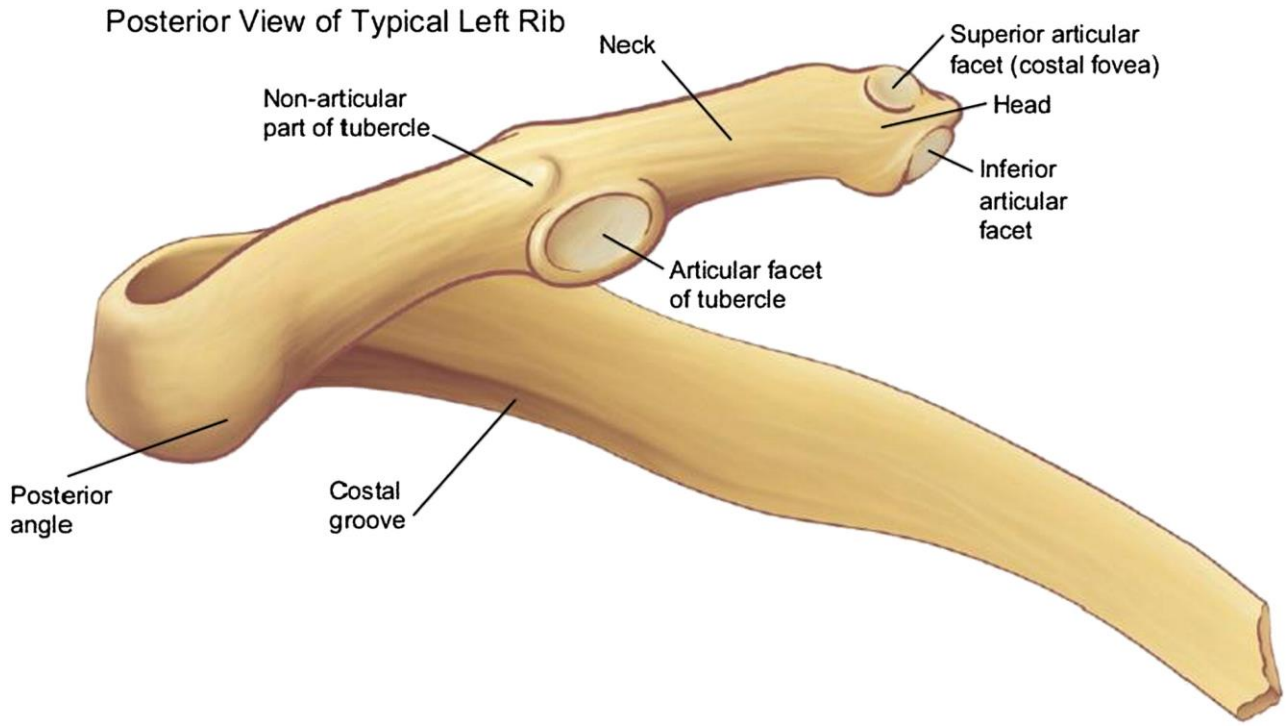
Define - Structure of the Typical Rib

- Focus on ribs **3-9**: Standard curved, flat bone.
- **Posterior:** Vertebral end; **Anterior:** Cartilage.
- **Length:** Peaks at 7th rib (~25 cm)
- External convexity, internal concavity.
- Twists along shaft for optimal mechanics.
- **2 Surfaces :** Anterior and Posterior
- **2 Borders:** Superior and Inferior



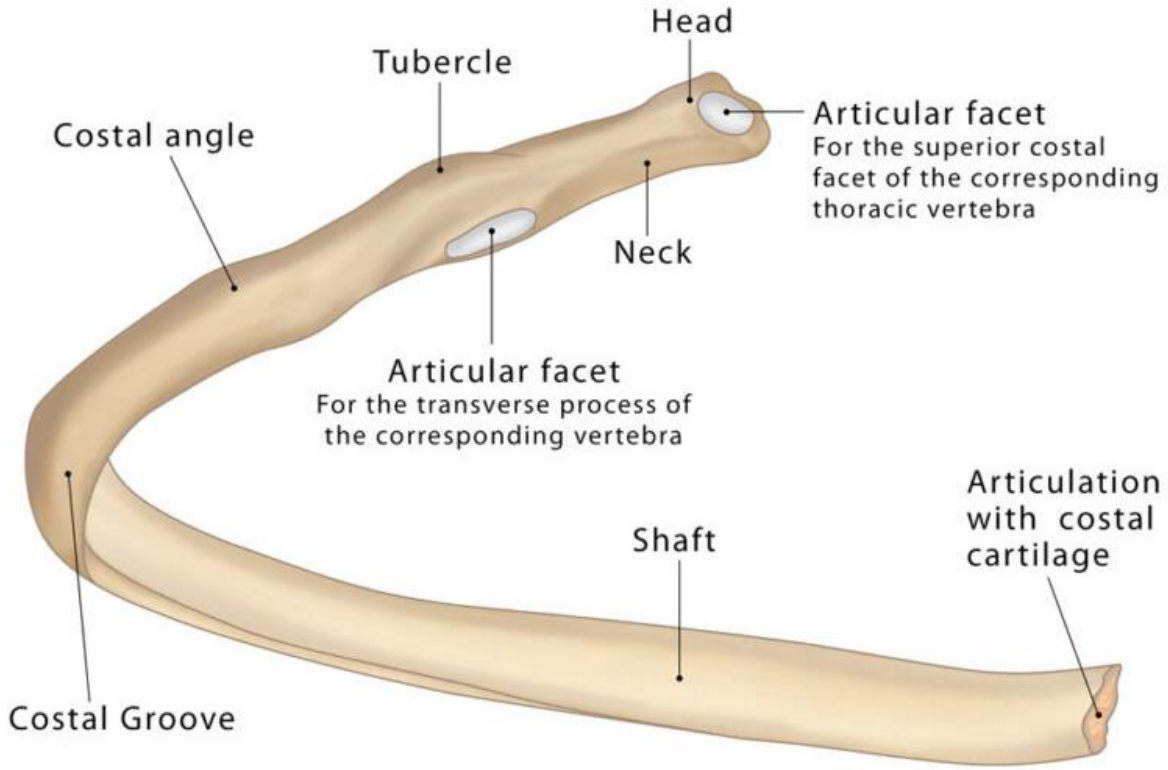
Parts of Typical Rib

- **Head:** Wedge-shaped; 2 facets (superior to lower vertebra, inferior to own); crest separates.
- **Neck:** 2-3 cm flat constriction; downward-angled; links head to tubercle.
- **Tubercle - pierced by foramina:** Neck-shaft prominence; articular facet (to transverse process); rough non-articular (ligaments).



Parts of Typical Rib

- **Angle**: 5-8 cm bend from tubercle; back muscle attachment.
- **Shaft**: Curved body; convex external, concave internal; twists; max length ~25 cm (7th rib), width 1-2 cm.
- **Costal Groove**: Inferior shaft groove; shields neurovascular bundle (VAN: vein-artery-nerve below).
- **Costal Cartilage**: Anterior hyaline extension; flexible, age-ossifying; aids breathing.

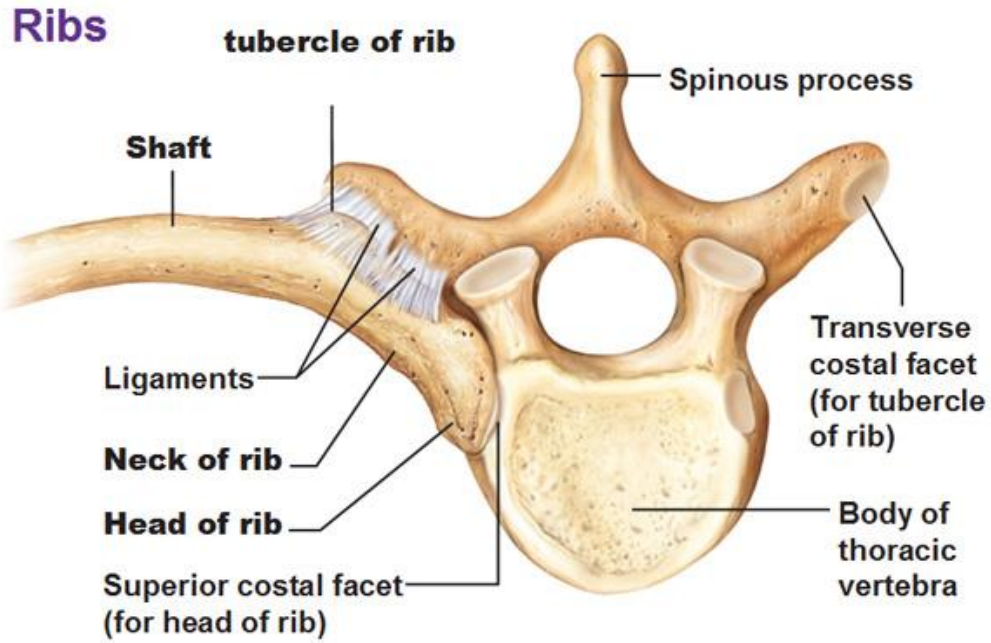


Anterior End & Posterior End

Anterior End

- It is lower than the vertebral end.
- Presents as a cup shaped depression, which articulates with own costal cartilage

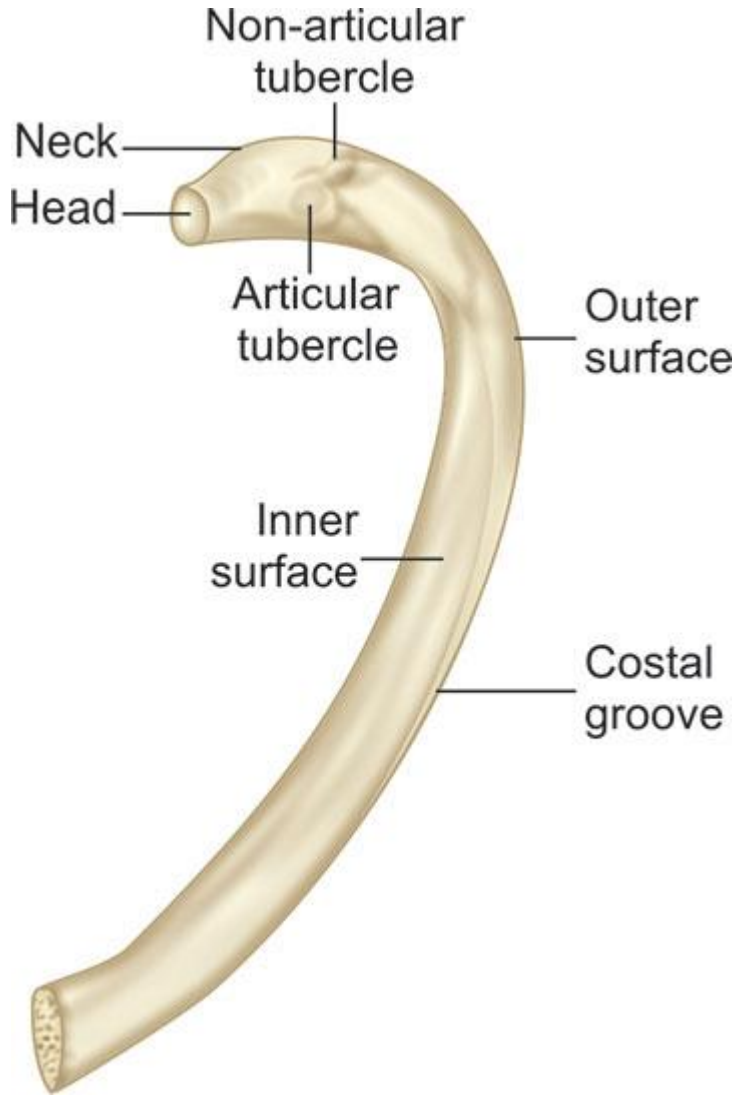
Posterior End - Head	
Features	• Crest separates Upper & Lower Facet • Lower Facet – Articulate with thoracic vertebra • Upper Facet – Articulate with Vertebra above
Attachments	Capsular ligament, Radiate Ligament, Intra-articular ligament



(c) Superior view of the articulation between a rib and a thoracic vertebra

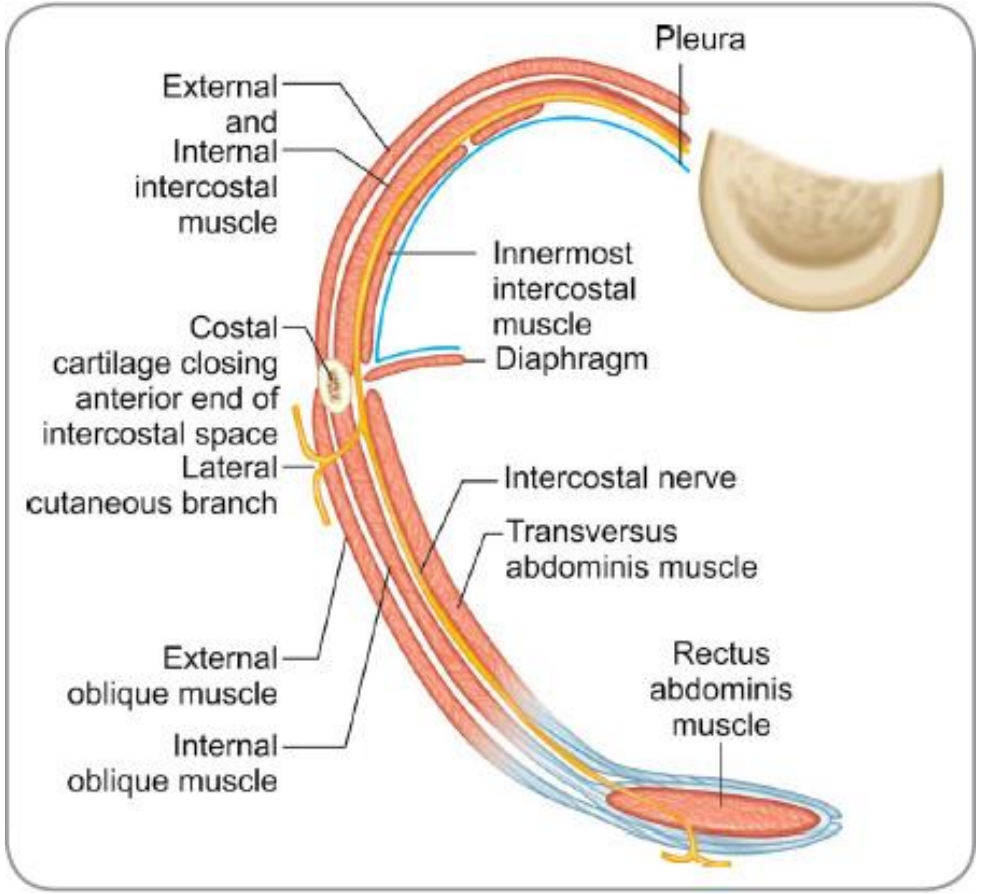
Posterior End

Neck	
Features	• It continues with head • It has length about 2.5cm • Upper border of neck is called crest • Tubercle – Demarcation between neck & shaft • Tubercle presents with Medial articular & Lateral Non- articular part.
Attachments	Superior, Inferior, Lateral Costotransverse Ligament, Internal Intercostal Membrane, Costal Pleura.

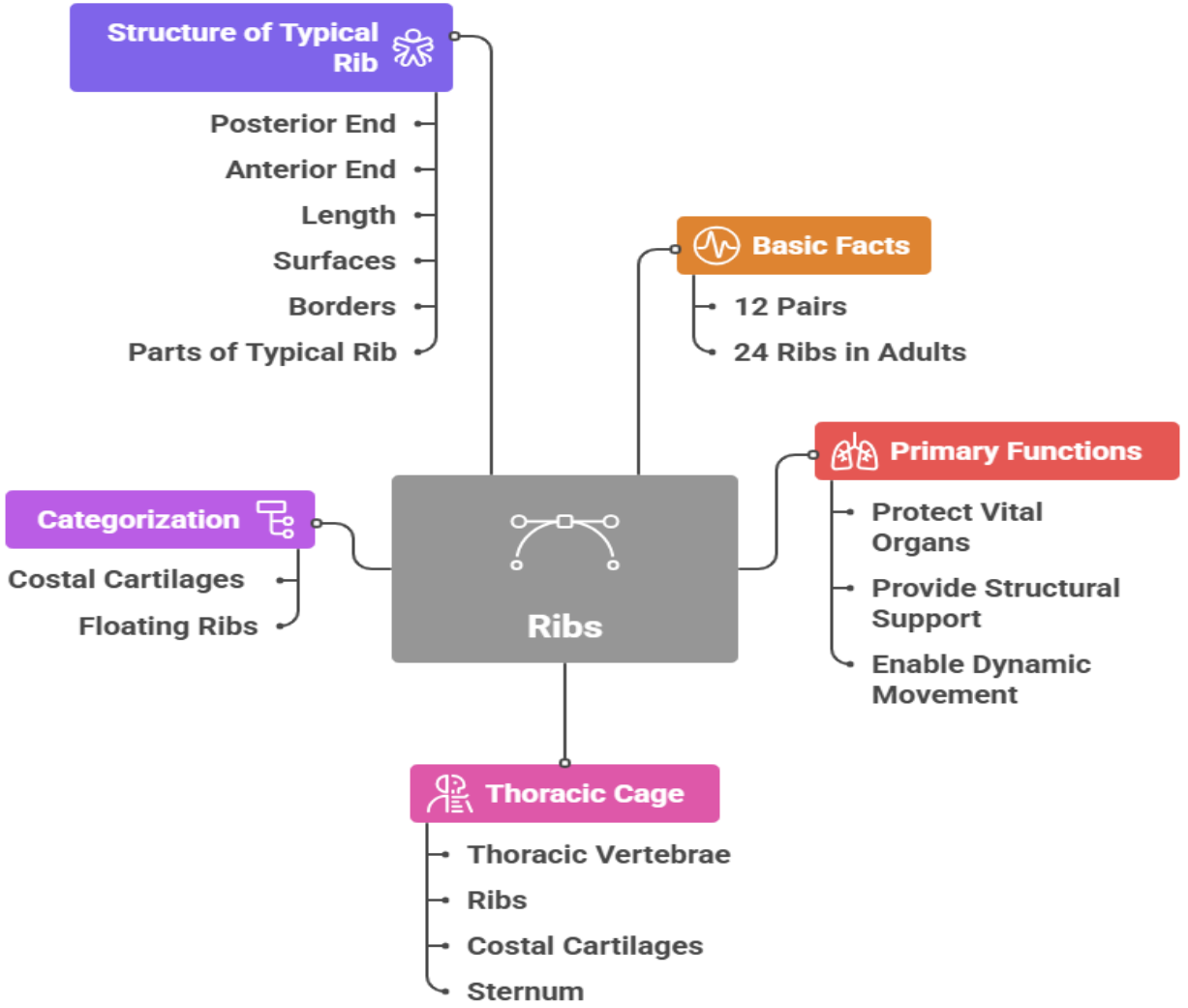


Posterior End

Shaft	
Features	• It is a flat, bend & twist • Outer – Convex, Inner – Concave • 5cm from tubercle is the angle of rib • Costal groove – present on the lower border
Attachments	External Oblique Abdominis, Serratus Anterior, Latissimus Dorsi, Intercostalis Intimus, Intercostalis Internus, Intercostalis Externus.



Summary


Structure of Typical Rib
Posterior End
Anterior End
Length
Surfaces
Borders
Parts of Typical Rib
Basic Facts
12 Pairs
24 Ribs in Adults
Primary Functions
Protect Vital Organs
Provide Structural Support
Enable Dynamic Movement
Categorization
Costal Cartilages
Floating Ribs
Ribs
Thoracic Cage
Thoracic Vertebrae
Ribs
Costal Cartilages
Sternum

References

- https://www.masnad.com.au/knowledge-centre/injury-hub/middle-back/rib-cartilage-injury/?srsltid=AfmBOooy2P_H-dJyee2Bt0B4EPOy_sv5u8rtNZGqHrc0g6RUXM-lGZmG
- https://antranik.org/thoracic-cage-ribs-fontanelles/
- https://www.kharty.com/diagram/EKez8DxZyJ
- https://my.clevelandclinic.org/health/body/rib-cage#:~:text=Your%20rib%20cage%20is%20the,(breastbone)%20in%20the%20front.

THANK YOU