

وسهلا

أهلا



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دكتورة من جامعة كولونيا المانيا

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# Thoracic Cage

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**Thoracic cage**

**Ribs**

**Sternum**

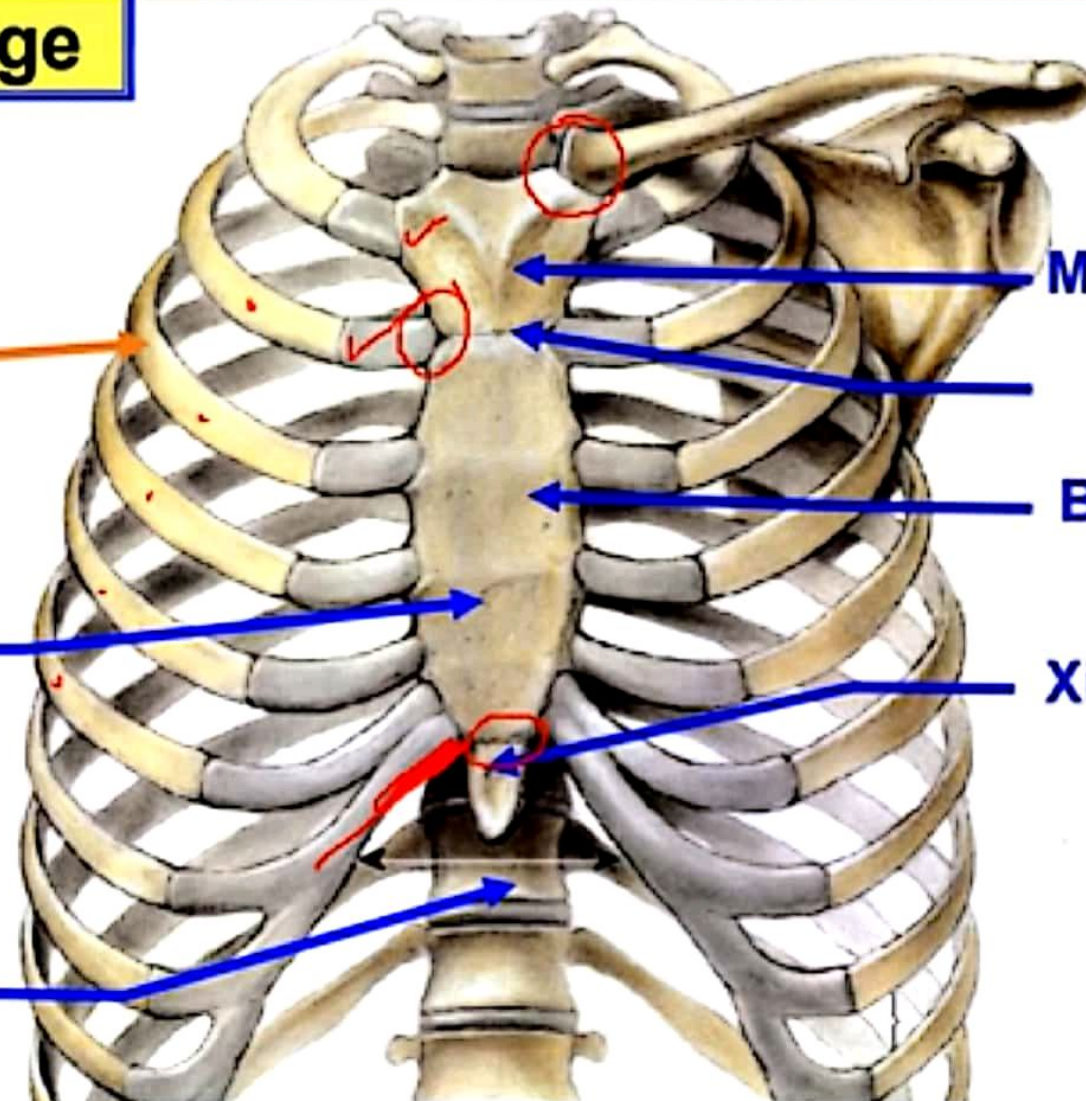
**Vertebral column**

**Manubrium sterni**

**Sternal angle**

**Body of sternum**

**Xiphoid process**



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## ❖ Manubrium Sterni

- The upper border carries the **suprasternal notch** in the middle.
- Its superolateral angle presents two **clavicular notches**, one on each side for articulation with the medial end of the clavicle (**Sternoclavicular joints**).
- The lateral border carries 2 notches for articulation with the costal cartilage of the **1st and the 2nd ribs**.
- Lower border of manubrium sterni articulates with body in an obtuse angle known as the **sternal angle (angle of Louis)**.
- The angle of Louis is a landmark for the **2nd costal cartilage** and it lies opposite the disc between the 4th and 5th thoracic vertebrae (T 4/5).

### \*\* Muscles attached;

A- **Anterior surface** gives attachment to Sternal head of **sternomastoid** and Sternal part of **pectoralis major** muscles.

B- **Posterior surface** gives attachment to **Sternohyoid and Sternothyroid** muscles.

### ❖ Body of sternum

- Its Lower border articulates with the xiphoid process (**Xiphisternal junction**).
- Its lateral border carries notches for articulation with the costal cartilage of the **2nd-6th** ribs.

#### \*\* Muscles attached;

- A- The **anterior** surface gives attachment to sternal part of **pectoralis major** muscle.
- B- The **posterior** surface gives attachment to **sternocostalis** muscle.
- **posterior surface** gives attachment to **Superior and inferior sternopericardial ligaments**.

### ❖ Xiphoid Process

- Its lateral border carries a small facet for articulation with the 7th costal cartilage.
- **It gives attachment to:**
  - 1- Sternal part of the **diaphragm** (posteriorly).
  - 2- **Rectus abdominis** (Anteriorly).
  - 3- **Linea Alba** (Tip).

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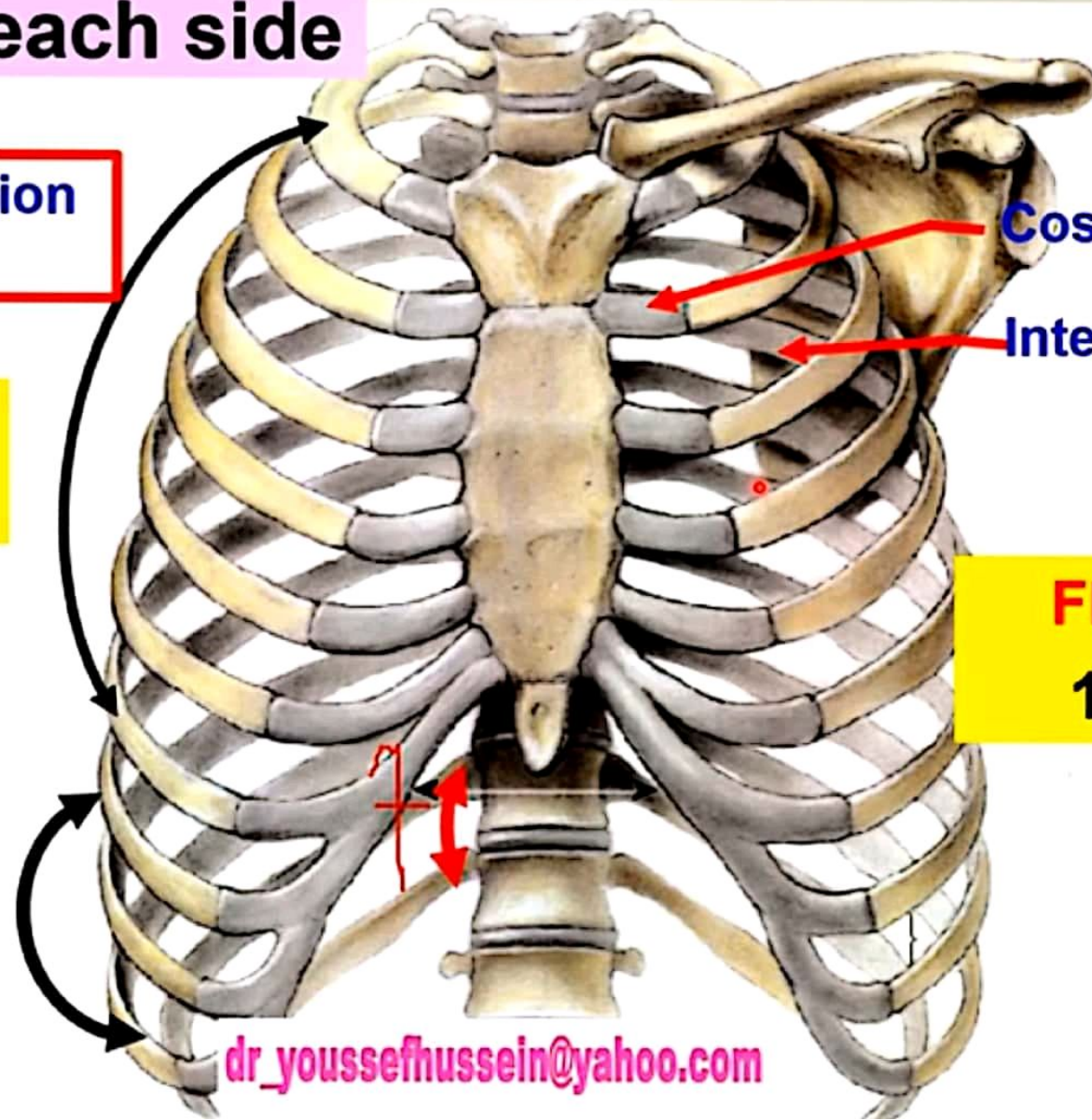
# 12 Ribs on each side

According to their relation to the sternum

**True Ribs**  
1~7

**False Ribs**  
8~10

**Floating Ribs**  
11~12

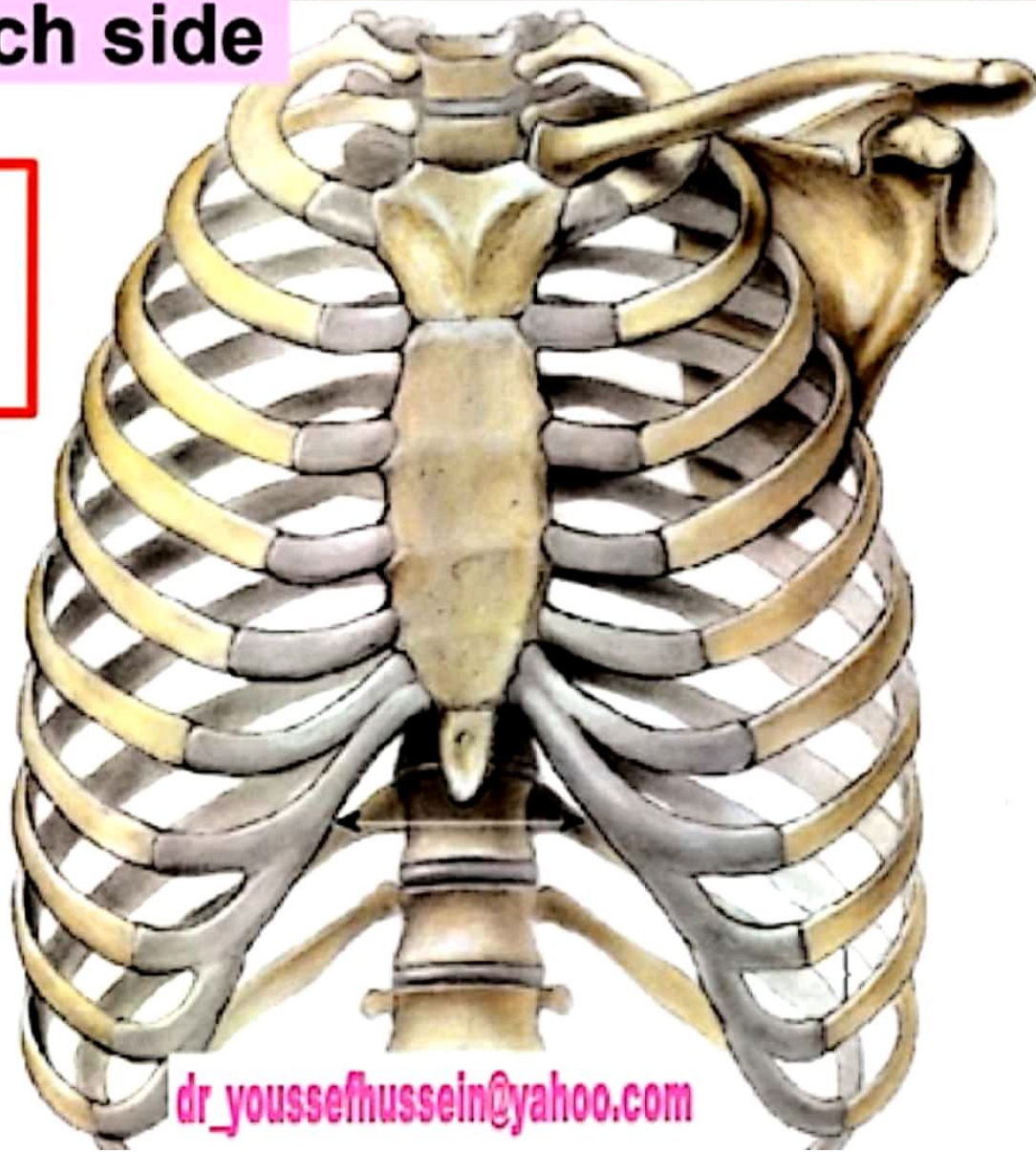


## 12 Ribs on each side

According to their relation to vertebral column

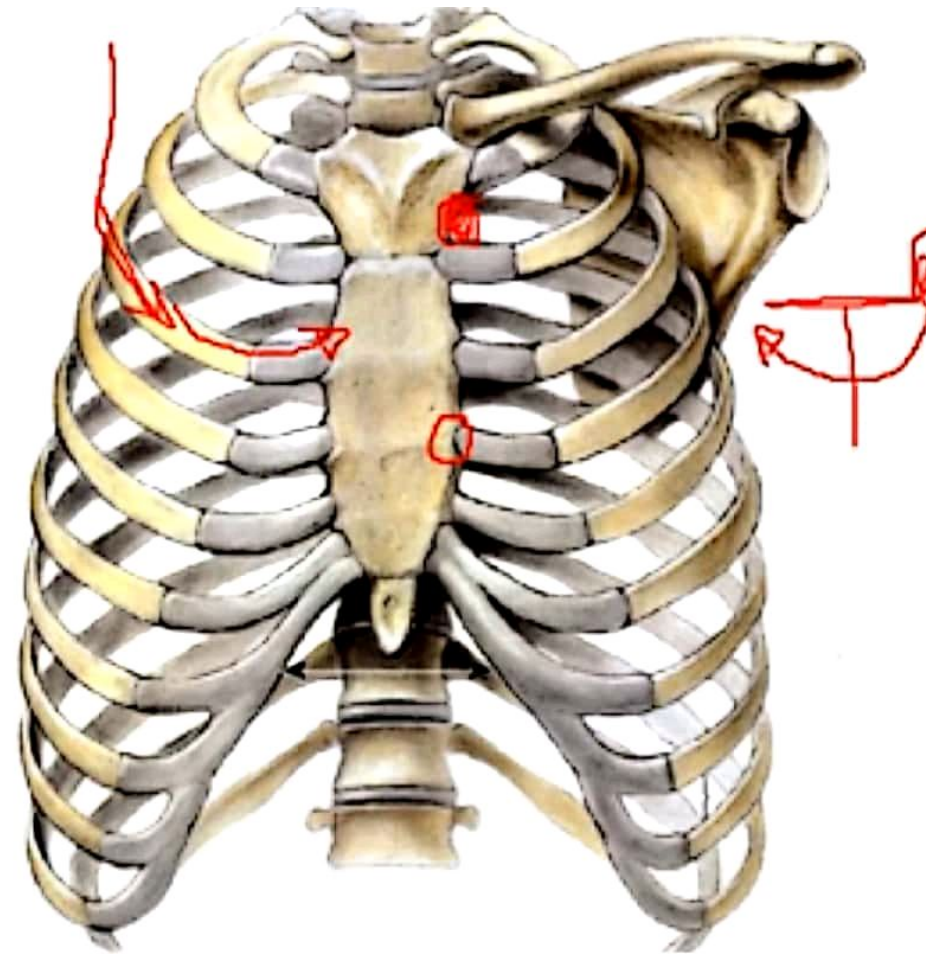
A) Typical ribs: From the 3rd to the 9th rib.

B) Atypical ribs: 1st, 2nd, 10th, 11th and 12th ribs.



- **General features**

- \* **Direction;** downward while their costal cartilages take an upward direction.
- \* **The sternal end** of each rib lies at a **lower** level than the vertebral end.
- \* Both ribs and cartilages **increase in length** progressively from **1st to 7th**.
- \* The **transverse diameter** of the thorax increases progressively from **1st to 8th**.
- \* The **obliquity of the ribs** increases progressively from **1st to 9th**.



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# Typical ribs

**Rough part of tubercle** gives attachment to the lateral costotransverse ligament

Tubercle  
Neck  
Head

**Upper articular facets** articulate with the bodies of the vertebra **above**

**lower articular facets** articulate with bodies of the **same** numerically vertebra

**Smooth part (facet)** articulate with transverse process of the **same** numerically vertebra

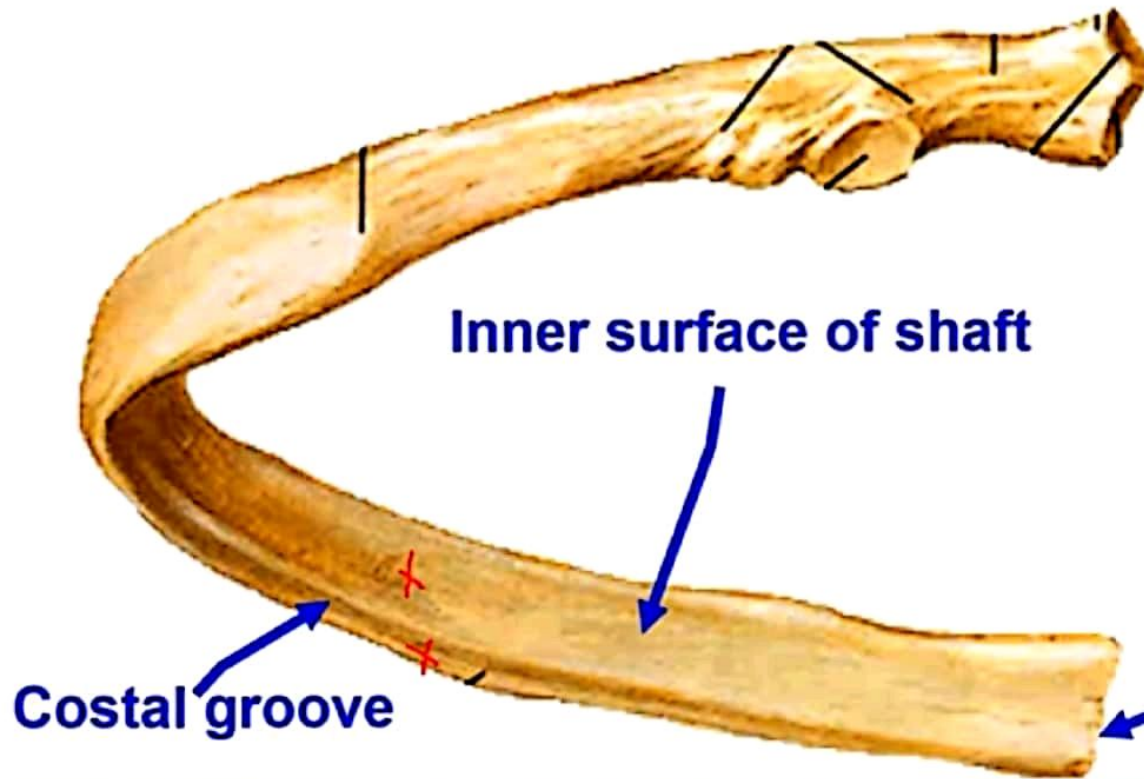


**Angle**

**Shaft**

**Anterior end cup shaped**

**Shaft** has 2 surfaces (outer and inner)  
2 borders (upper and lower)



**\*\* How to identify the side**

- **Costal groove** presents near lower border of inner surface
- **Anterior** end Cup-shaped concavity.
- **Posterior**, head and neck.
- **Laterally**, the shaft is convex

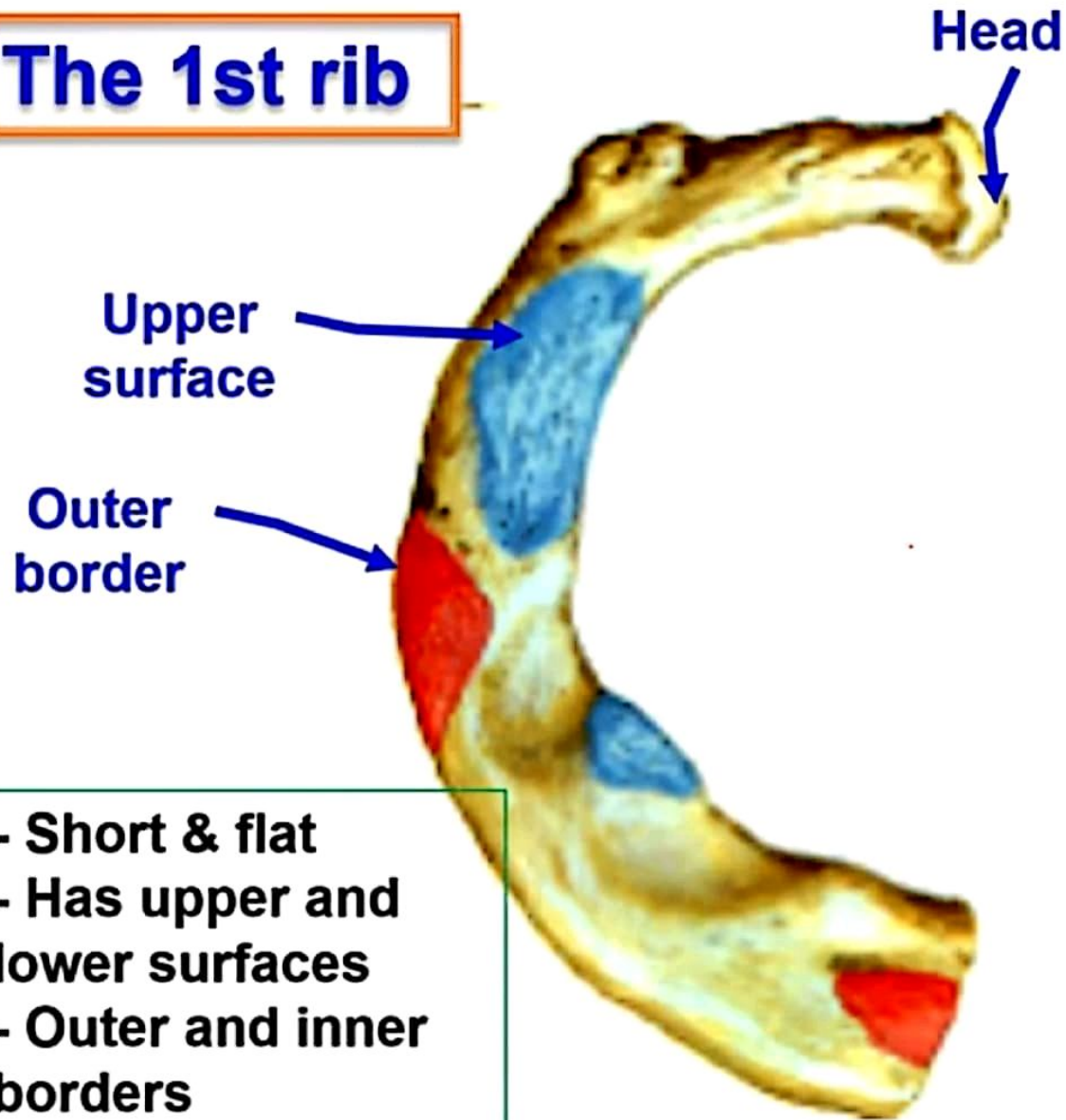
Costal groove

Anterior end cup shaped

- **Costal groove** presents near lower border of inner surface
- It contains (V, A, N) from above downwards:
  - Posterior intercostal **vein**, Posterior intercostal **artery** and intercostal **nerve**.

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## The 1st rib



- Short & flat
- Has upper and lower surfaces
- Outer and inner borders

### \*\* Identification of the side:

- Head, posteriorly.
- The upper surface is rough while the lower is smooth.
- The outer border is convex while the inner is concave.

**N.B.** if you put the rib on the table both anterior and posterior end touch it at the same time.

# The 1st rib

Insertion of **scalenus Medius** M

Origin of **serratus anterior** M

Groove for **subclavian artery**

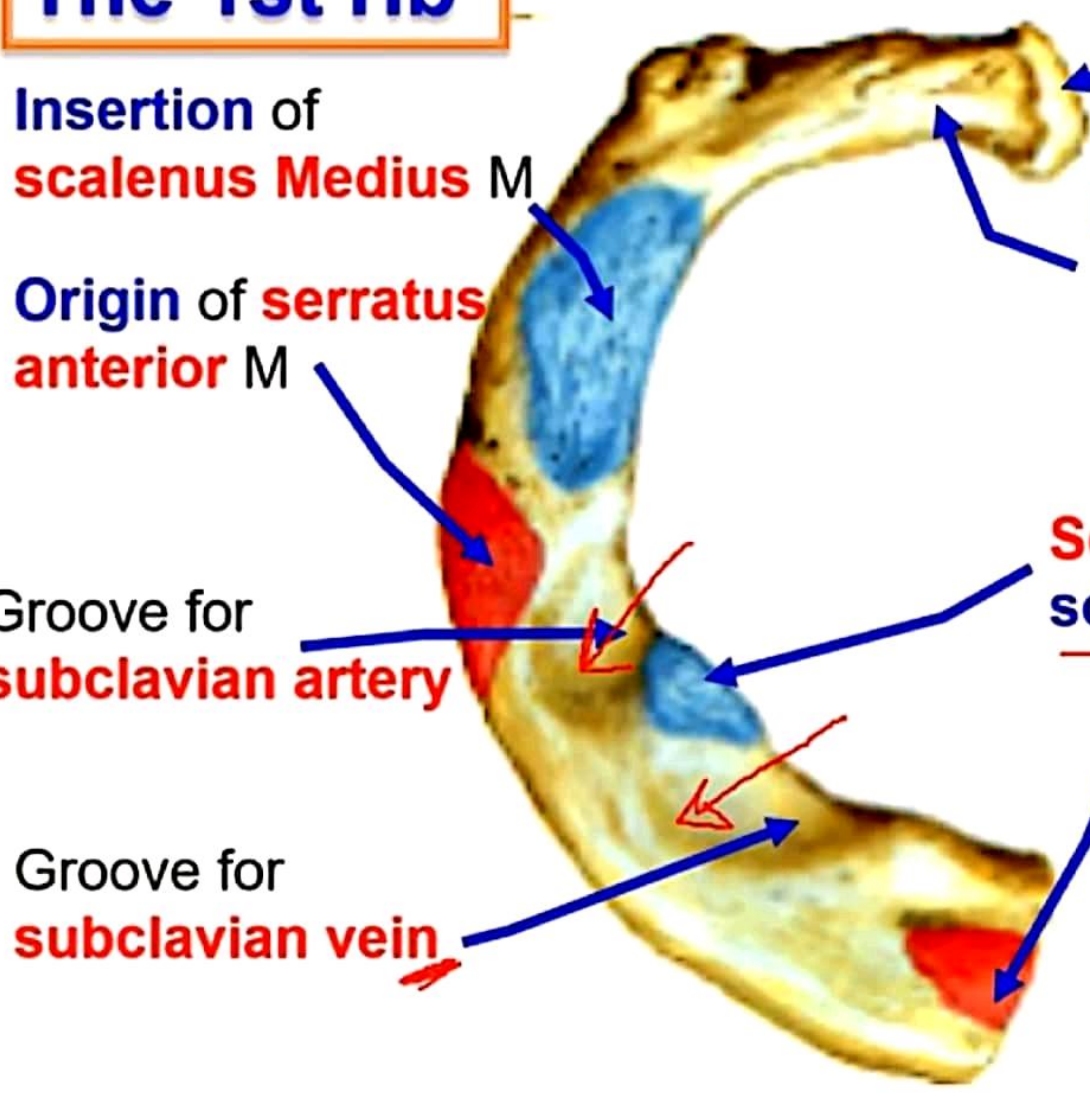
Groove for **subclavian vein**

**Head** articulates with the 1st thoracic vertebrae

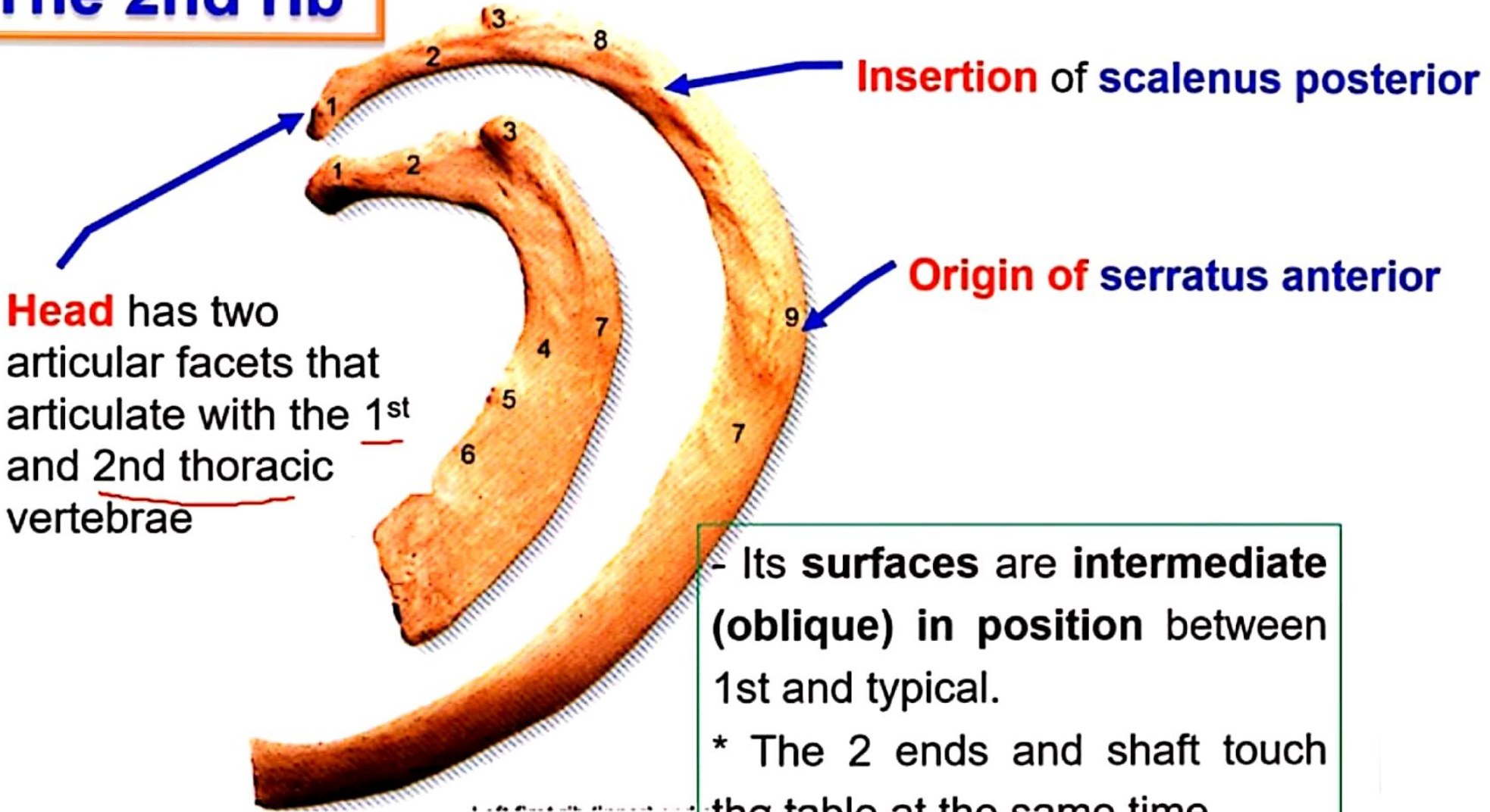
**Neck** is crossed from medial to lateral by:  
1) Sympathetic trunk  
2) Superior intercostal artery.  
3) Ventral ramus of T1 to brachial plexus.

**Scalene tubercle** for insertion of scalenus anterior M

Origin of **subclavius** M



# The 2nd rib

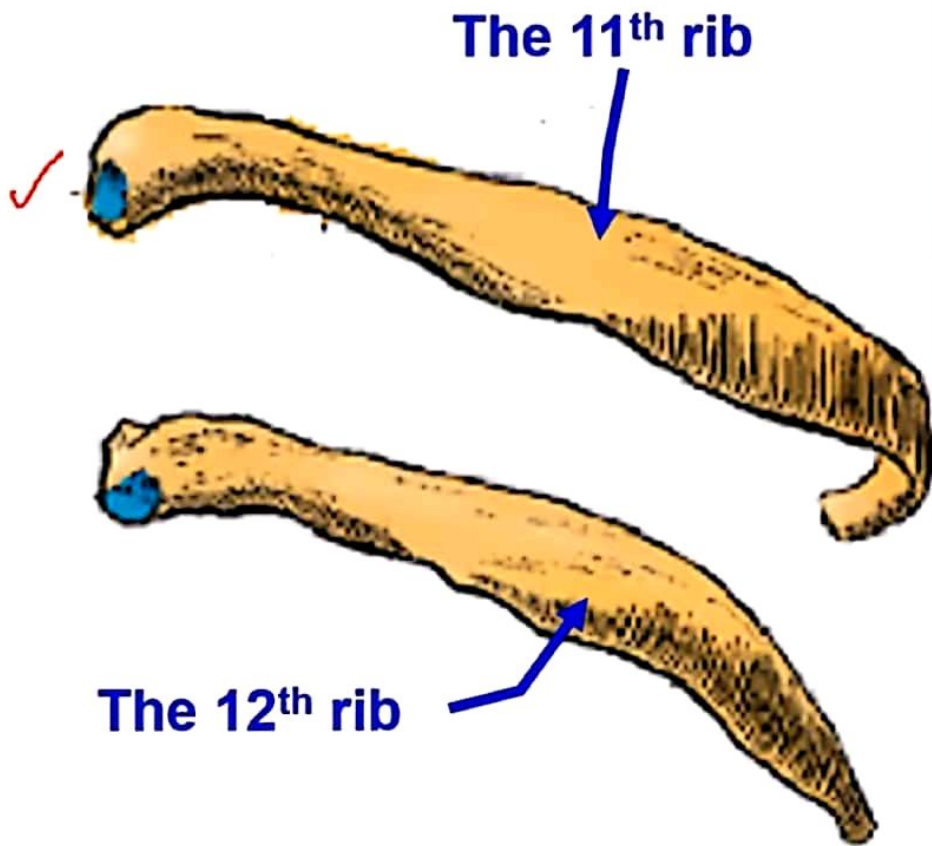


**Head** has two articular facets that articulate with the 1<sup>st</sup> and 2nd thoracic vertebrae

**Insertion** of **scalenus posterior**

**Origin** of **serratus anterior**

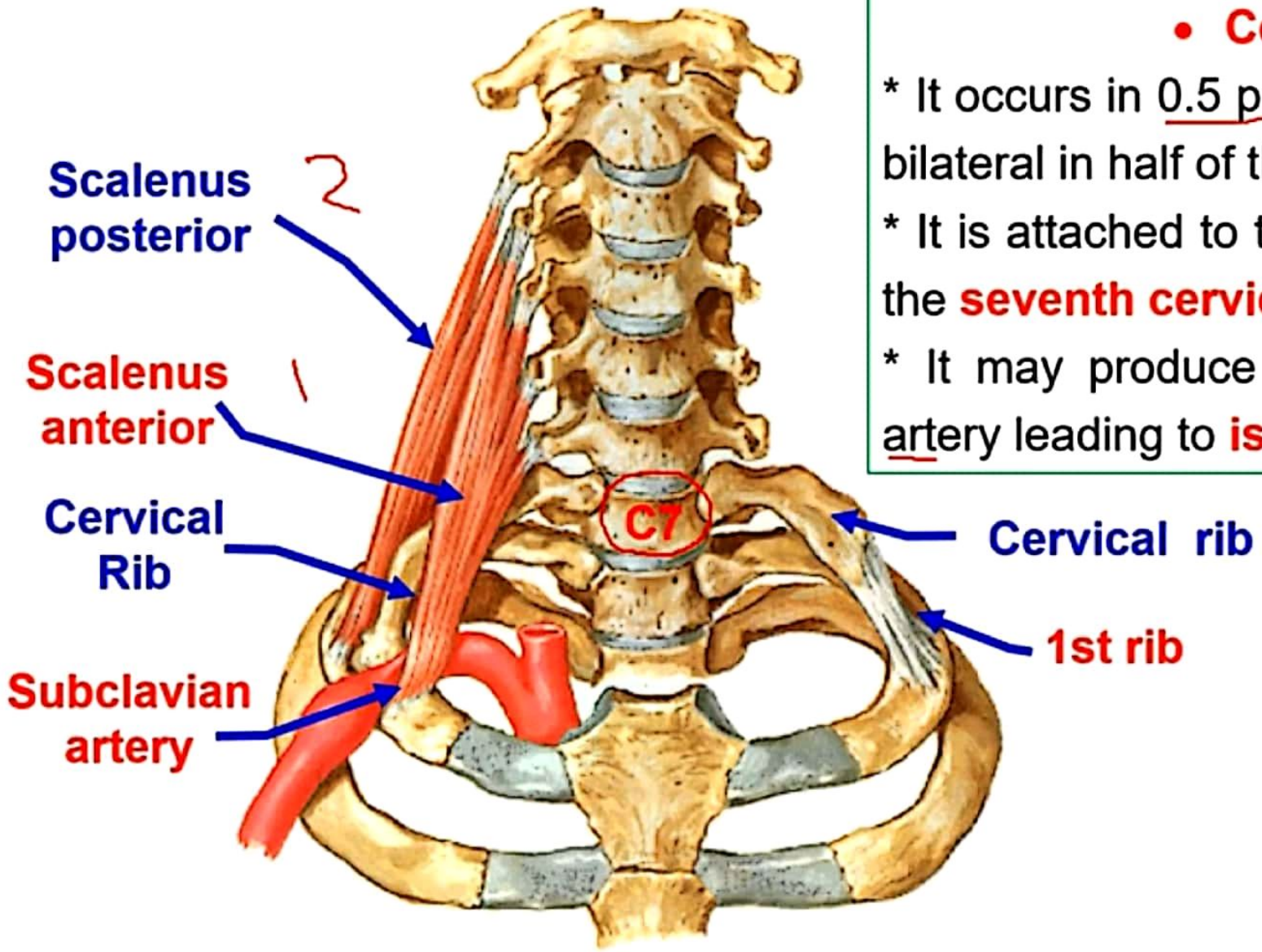
- Its **surfaces** are **intermediate (oblique)** in position between 1st and typical.  
\* The 2 ends and shaft touch the table at the same time.



## \*\* The 11th and 12th Ribs

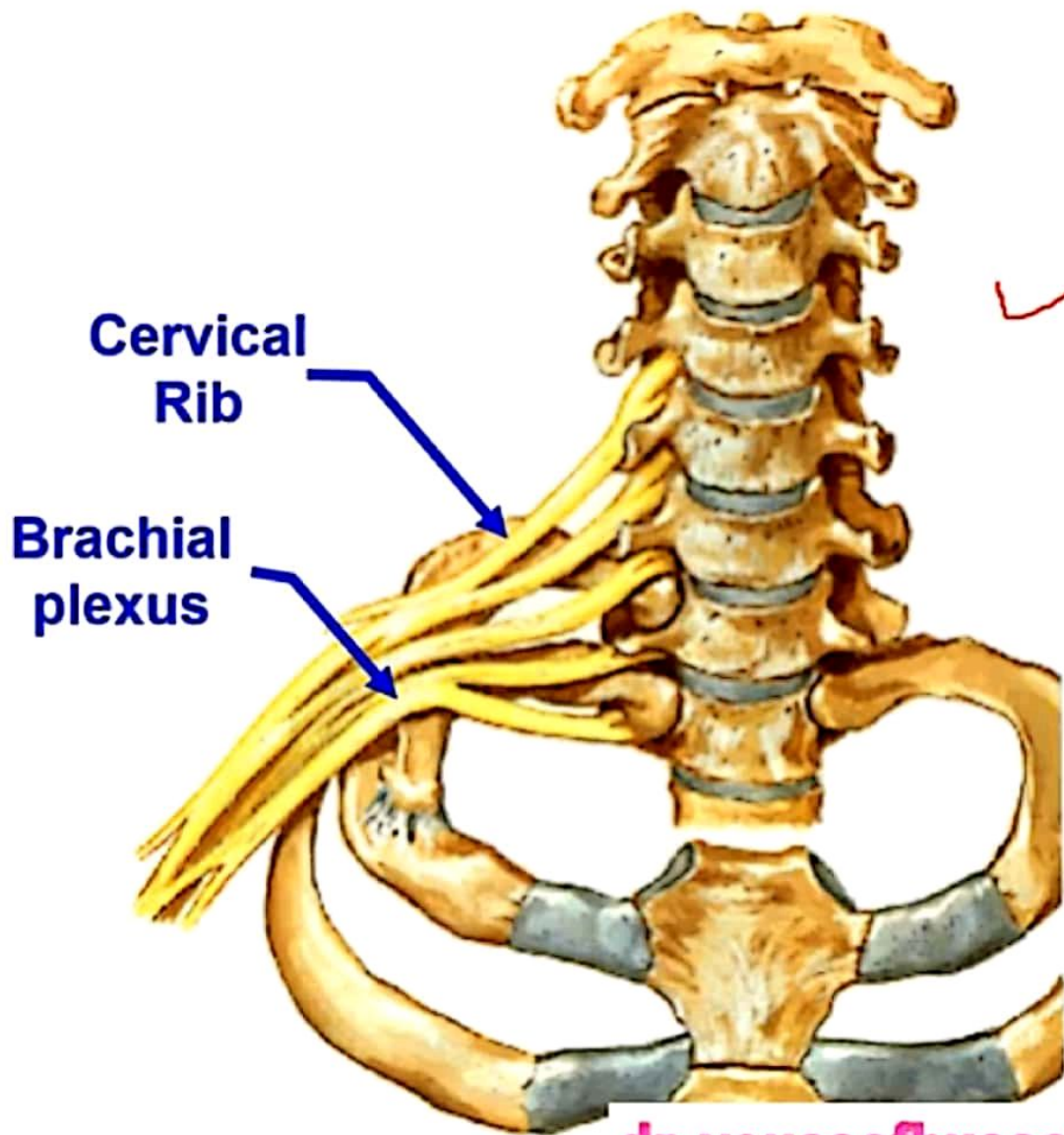
- \* They are short and have no tubercle, no angle.
- They have **tapering anterior end.**
- \* Head has **only one articular facet.**
- The **11th** rib has **shallow costal groove.**
- The **12th** rib has **no costal groove.**

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- **Cervical Rib**

- \* It occurs in 0.5 per cent of subjects and is bilateral in half of the cases.
- \* It is attached to the transverse process of the **seventh cervical vertebra** (C7).
- \* It may produce pressure on subclavian artery leading to **ischemia of upper limb**



- **Cervical Rib**

\* It may produce stretch on the **lower trunk of brachial plexus** leading to

✓ **Klumpke's paralysis :**

1- Tingling and numbness along the ulnar border of the forearm and hand.

2- Wasting of the small muscles of the hand, inability to carry out fine movement.

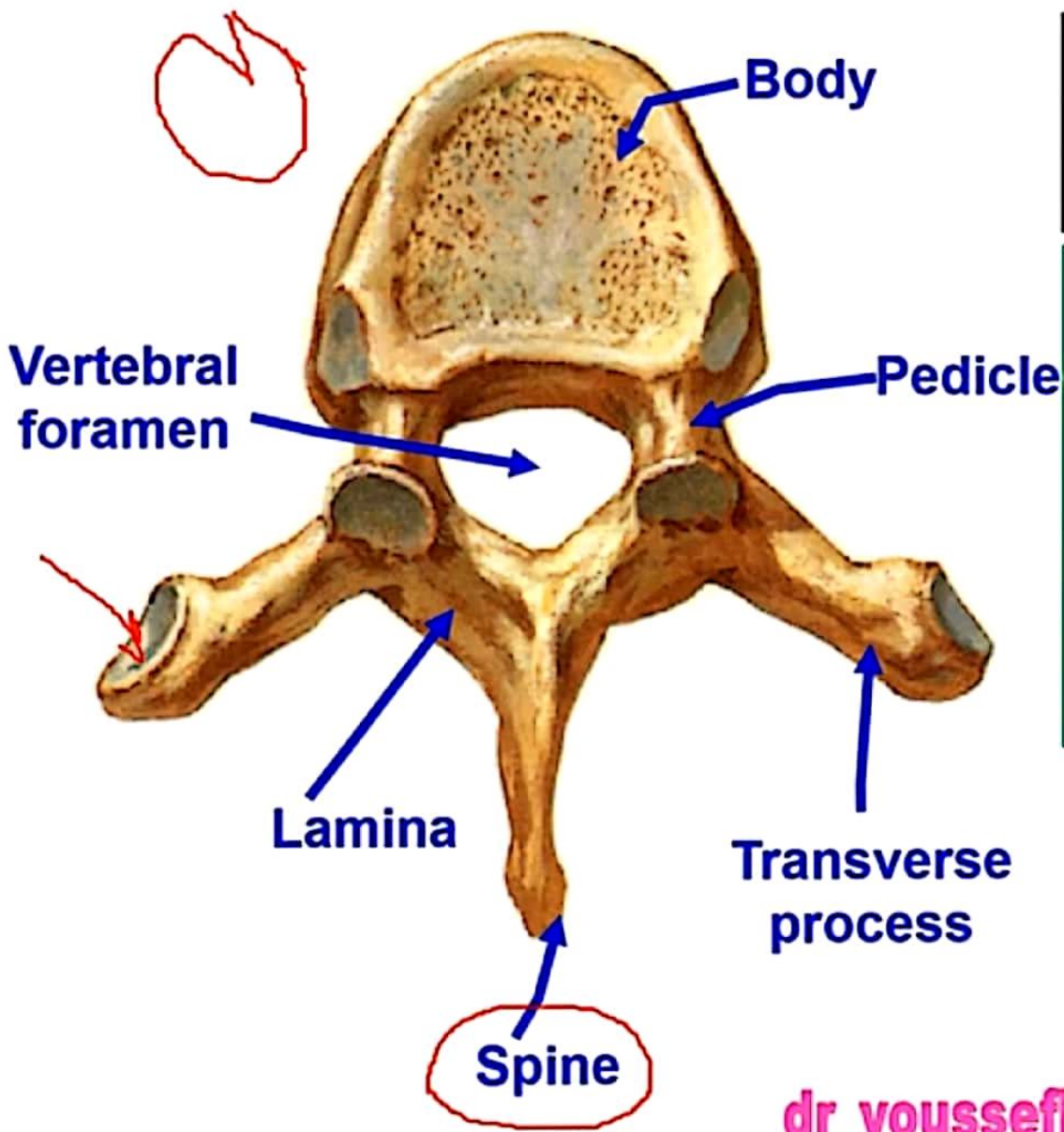
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# Thoracic vertebrae

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- **Superior view of typical thoracic vertebrae**
- **From 2nd - 8th**

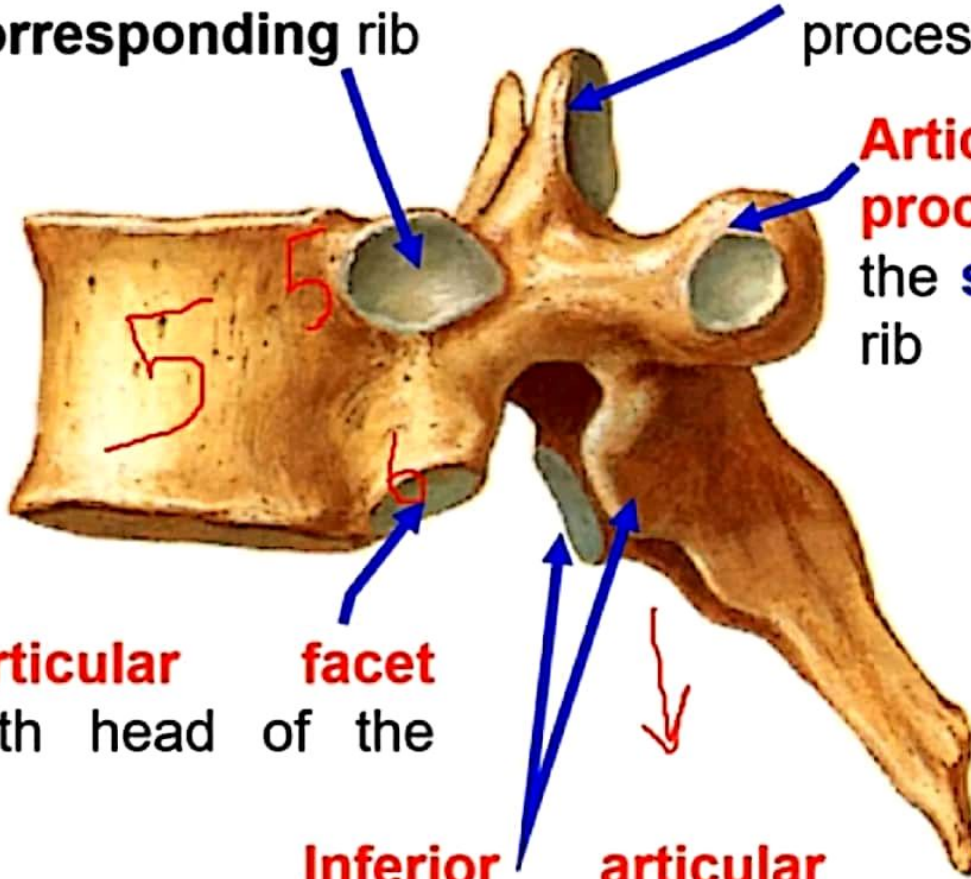
- **Characters of typical thoracic vertebrae**
- 1- **Two demifacets (large superior & small inferior) on each side of body:**
- 2- **An articular facet on transverse process.**
- 3- **Body is heart shaped.**
- 4- **Spine is long and directed backwards and downwards**

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**Superior articular facet** articulates with head of **same** numerically **corresponding** rib

**Superior articular process and its facet** articulates with inferior articular processes of the vertebra **above**

**Articular facet of transverse process** articulates with tubercle of the **same** numerically corresponding rib



**Inferior articular facet** articulates with head of the **next** rib

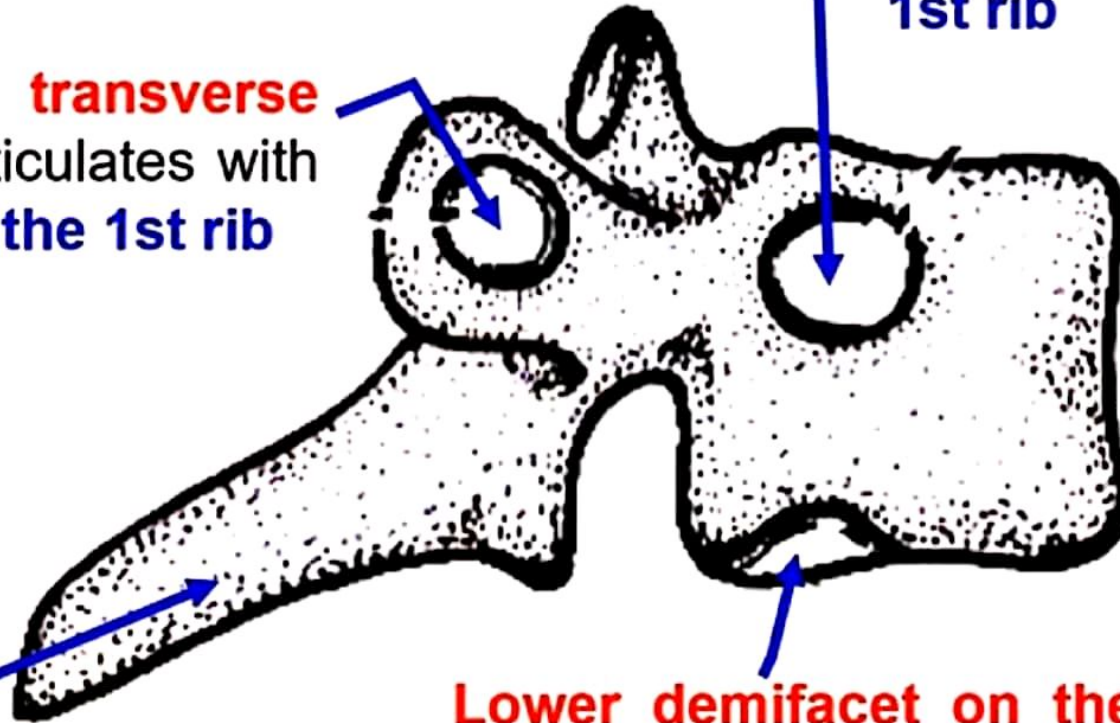
**Inferior articular process and facet**

• **Lateral view**

• The 1st Th. vertebrae

Facet on transverse process articulates with tubercle of the 1st rib

Upper complete facet on the side of body articulates with the head of the 1st rib



Spine is thick, long and nearly horizontal

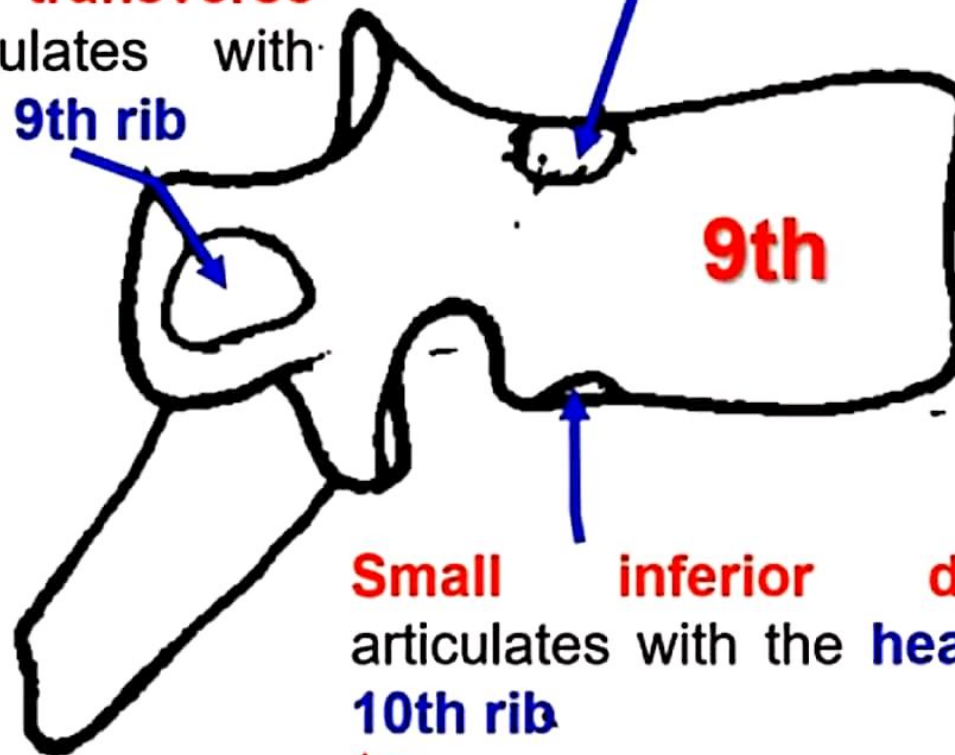
Lower demifacet on the side of body articulates with the head of the 2nd rib

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- **The 9th Th. vertebrae**

**Facet on transverse process** articulates with **tubercle of the 9th rib**

**Large superior demifacet** articulates with the **head of the 9th rib**



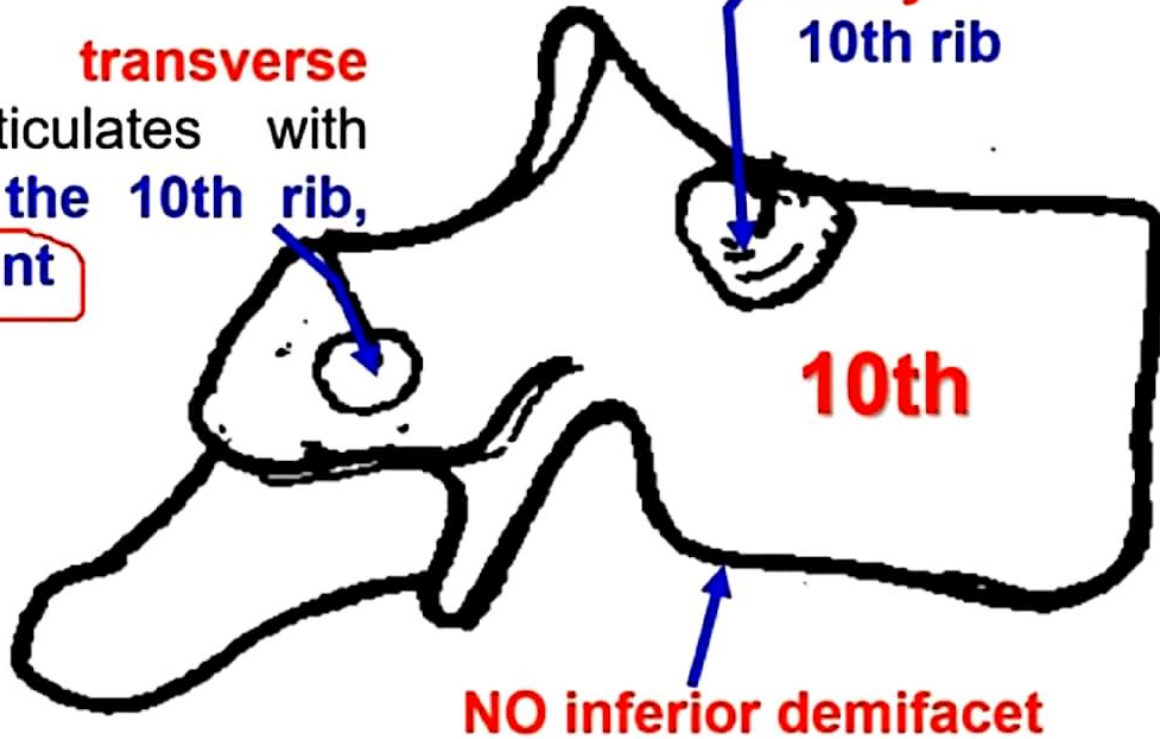
**Small inferior demifacet** articulates with the **head of the 10th rib**

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• The 10th Th. vertebrae

Facet on transverse process articulates with tubercle of the 10th rib, may be absent

Upper complete facet on the side of body articulates with the head of the 10th rib



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• The 11th & 12th Th. vertebrae

**Articular facet of Inferior articular process** directed forward

**Transverse process** has no articular facet

**Articular facet of Inferior articular process** directed laterally

**Complete circular facet** close to upper border of the body, articulates with head of 11th rib

**Complete circular facet** away from upper border of body and extending on the pedicle, articulates with head of 12th rib

