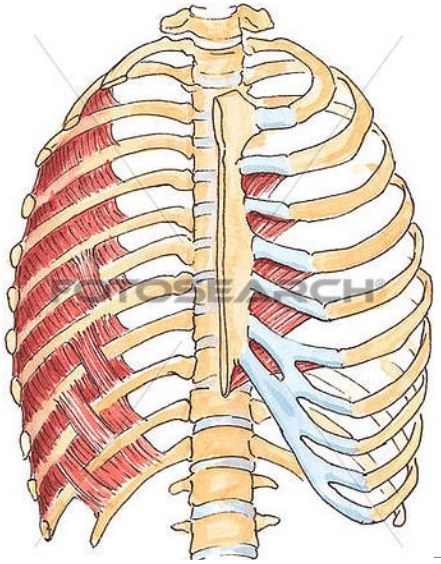
Jordan University
Faculty Of Medicine



# Thoracic Cage

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# Thoracic Cage

The thoracic cage is an Osseo cartilaginous which is composed of :

Anteriorly : sternum and costal cartilages

Posteriorly : vertebral column

On either side : ribs

# Function of Thorax Cage

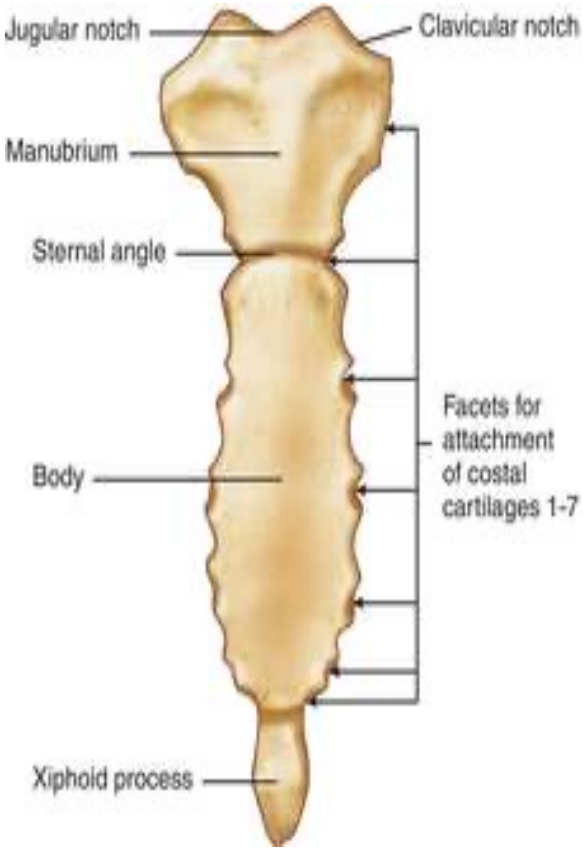
1- Protection of Thoracic organ and Abdominal organ e.g. Heart , lungs , vessels, Liver ,spleen.

2- Respiration

# Sternum

It has Three parts

- Manubrium
- Body
- Xiphoid process
- The sternal angle (angle of Louis) it formed by the articulation of the manubrium with the body of the sternum
- It is at the level of the second costal cartilage

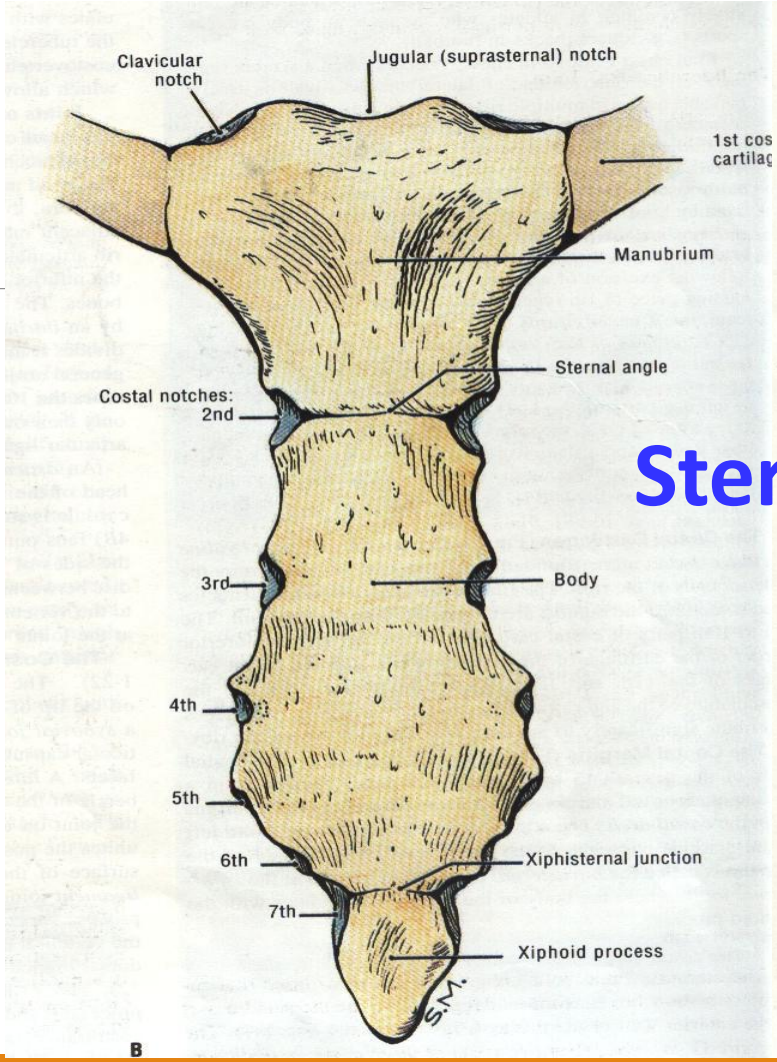


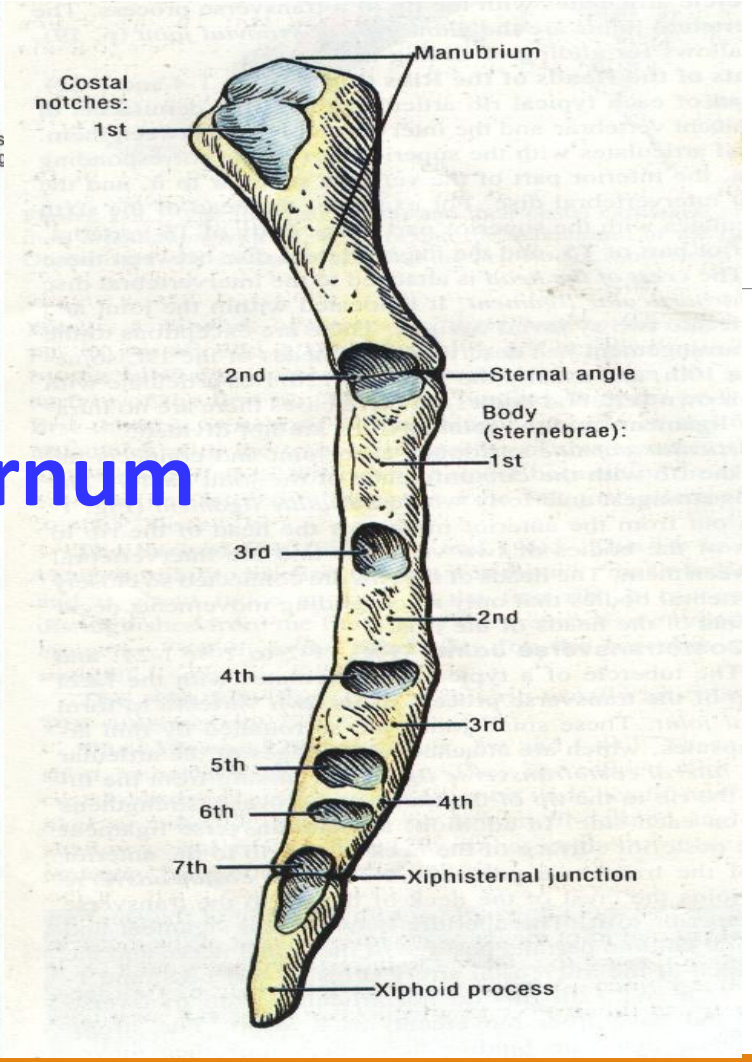

***Q. What is function of sternal angle ?***

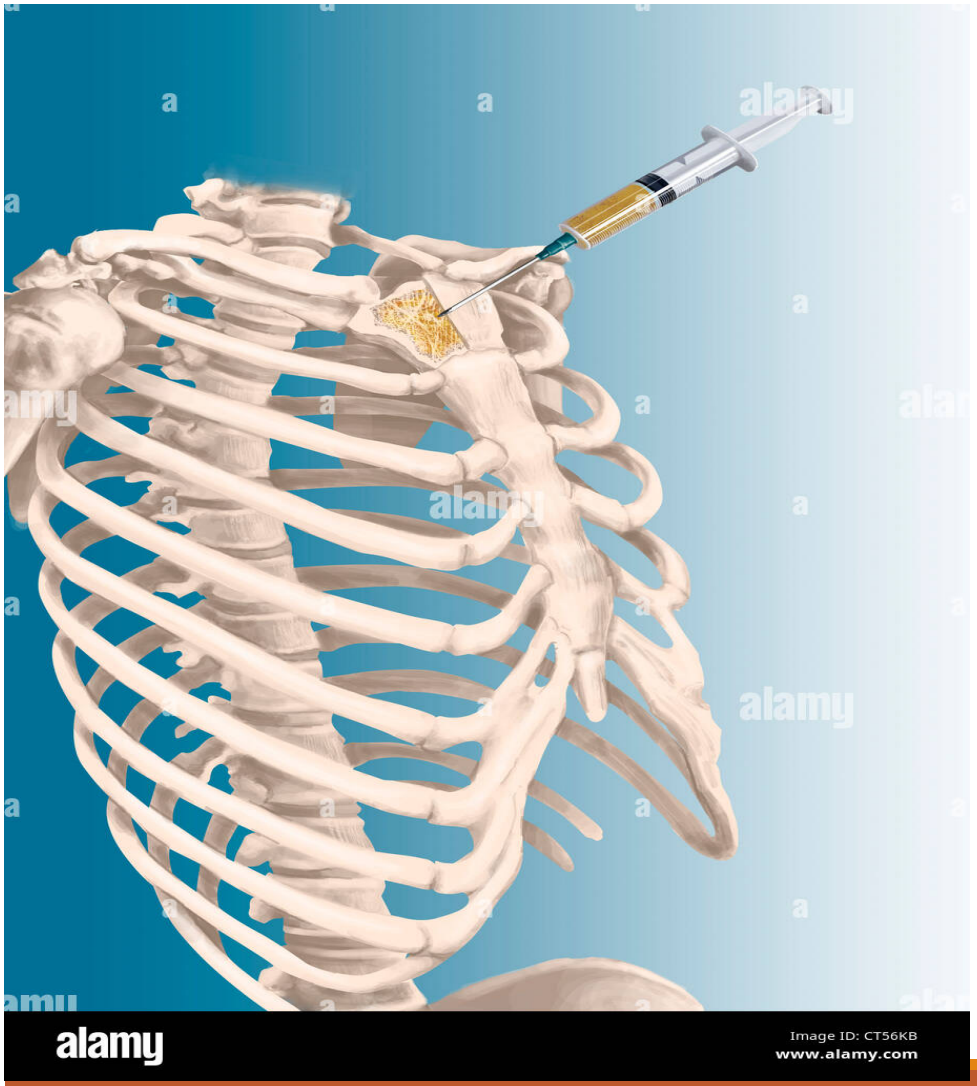
A. Counting of the ribs

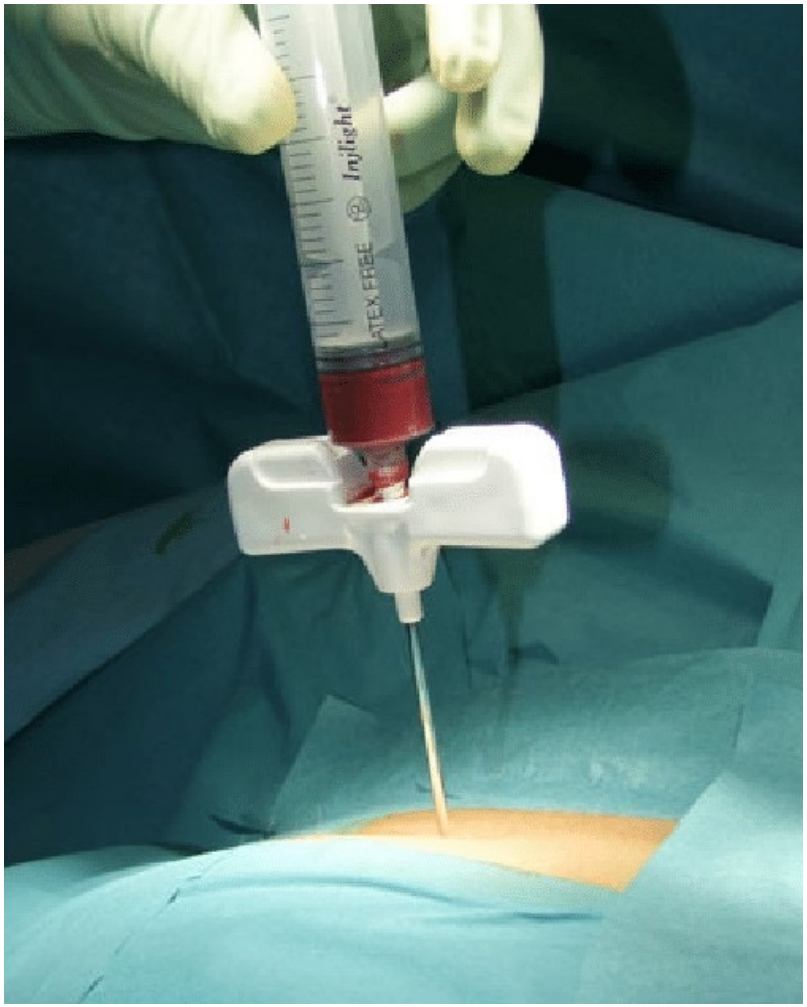
N.B : Sternum is one of sites to take Bone marrow biopsy

# Sternum


Clavicular notch
Jugular (suprasternal) notch
1st cos cartilag
Manubrium
Sternal angle
Costal notches:
2nd
3rd
Body
4th
5th
6th
Xiphisternal junction
7th
Xiphoid process
S.M.
B


Manubrium
Costal notches:
1st
2nd
Sternal angle
Body (sternebrae):
1st
3rd
2nd
4th
3rd
5th
6th
4th
7th
Xiphisternal junction
Xiphoid process




Bone marrow biopsy

# Ribs

12 Pairs

**True ribs**

$1^{st}$ to $7^{th}$ ribs

Attach to thoracic vertebrae and sternum

**False ribs**

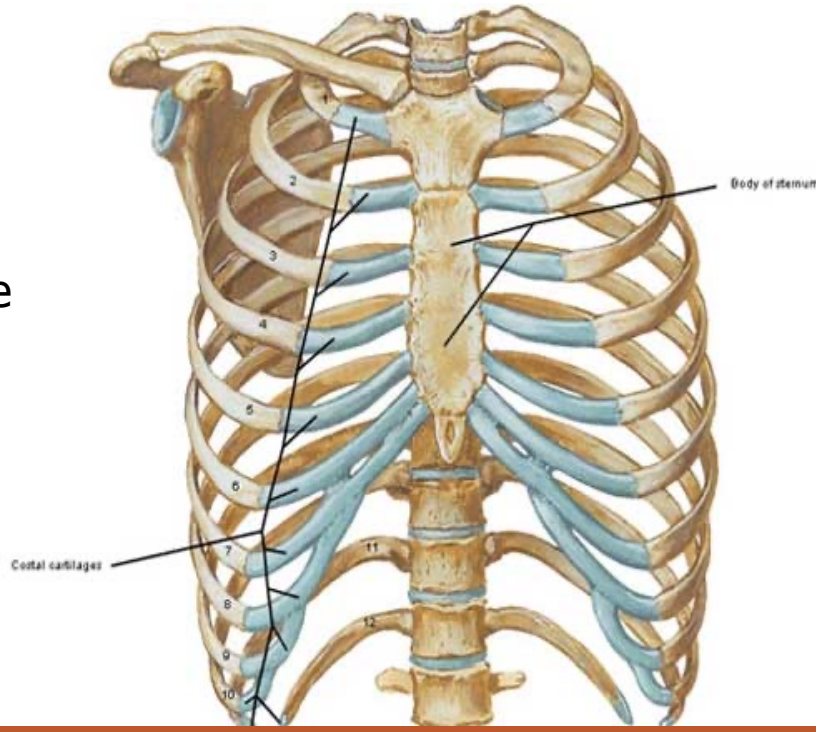
$8^{th}$ ,$9^{th}$ ,$10^{th}$ ribs

are attached anteriorly to each other and to the 7th rib

**Floating ribs**

$11^{th}$ ,$12^{th}$ ribs

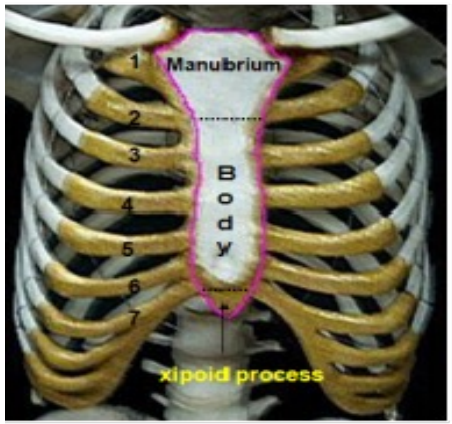
Have no attachment in the front



# THE RIBS

## Classification of ribs

- (A) According to attachment to sternum
  - True: Attached to the sternum (upper 7 ribs)
  - False: Not attached to the sternum (lower 5 ribs
- (B) According to their shape
  - Typical: 3rd-9th ribs
  - Non typical: 1,2 ….10,11 & 12




* Each typical rib consists of **3 parts**:

**I) Anterior or sternal end:**

- Cup-shaped and articulates with costal cartilage.

**II) Shaft:** formed of

- Two **borders**: **upper** rounded and **lower** sharp.
- Two **surfaces**: **outer** convex and **inner** concave.
- A **costal groove**: present in the lower part of the **inner** surface and **contains** intercostal vein, artery and nerve.
- **The angle**: divides the shaft into **anterior 3/4** (flat from side to side) and **posterior 1/4** (cylinder).

**III) Posterior or vertebral end:** formed of head, neck and tubercle:

**1.Head**: has 2 facets separated by a crest.

The **superior facet** articulates with **inferior demifacet** on the side of the body of the **vertebra above** it.

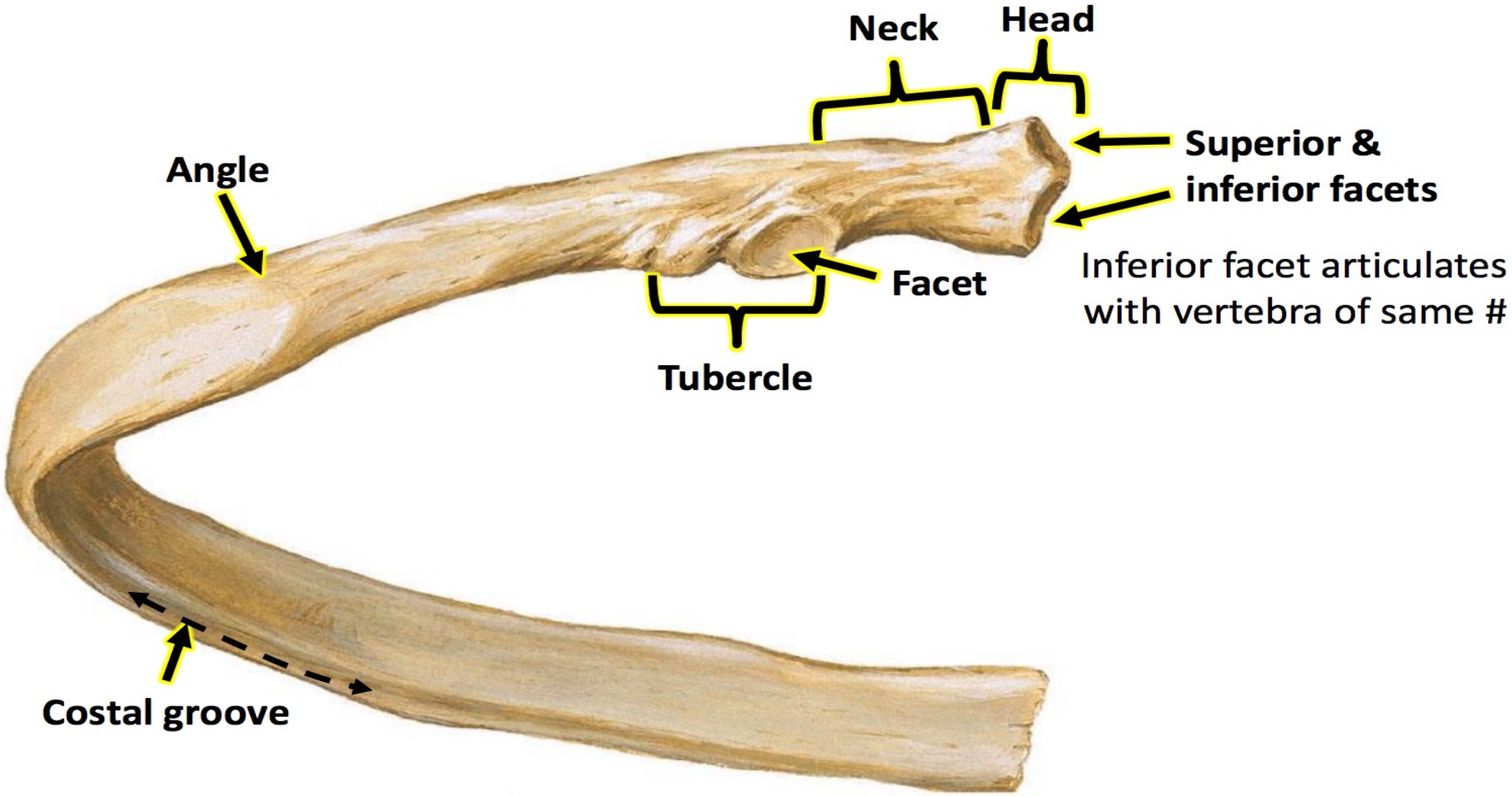
The **inferior** facet articulates with the **superior demifacet** on the side of the body of the **corresponding** vertebra.

The **crest** articulates with the intervertebral **disc**.

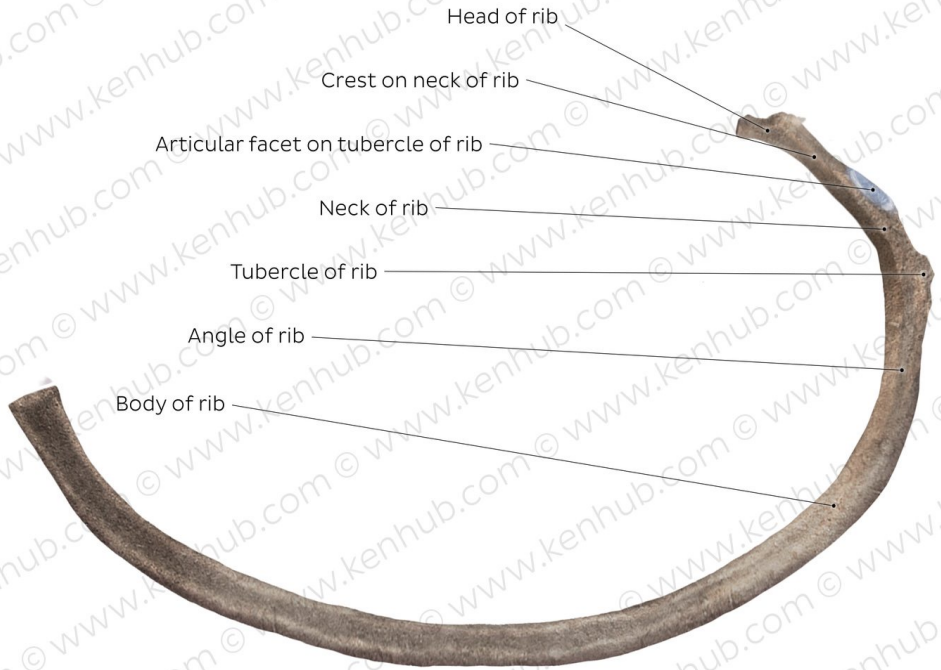
**2.Neck:** constricted part following the head.

**3.Tubercle:** formed of 2 parts :

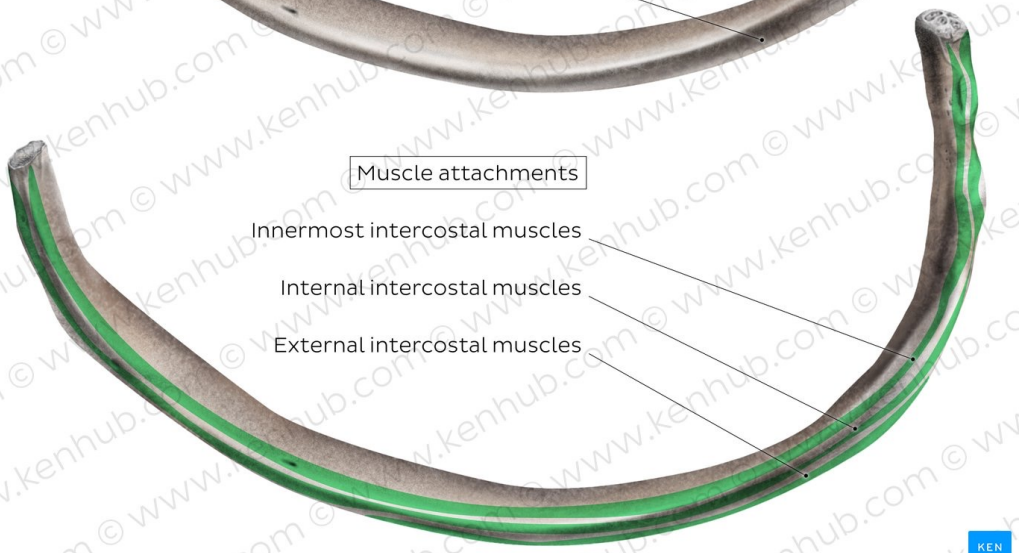
- A rough **lateral** non-articular part.
- A smooth **medial** part, which **articulates** with the facet on the **transverse process** of the corresponding vertebra .




Left rib: Posterior view







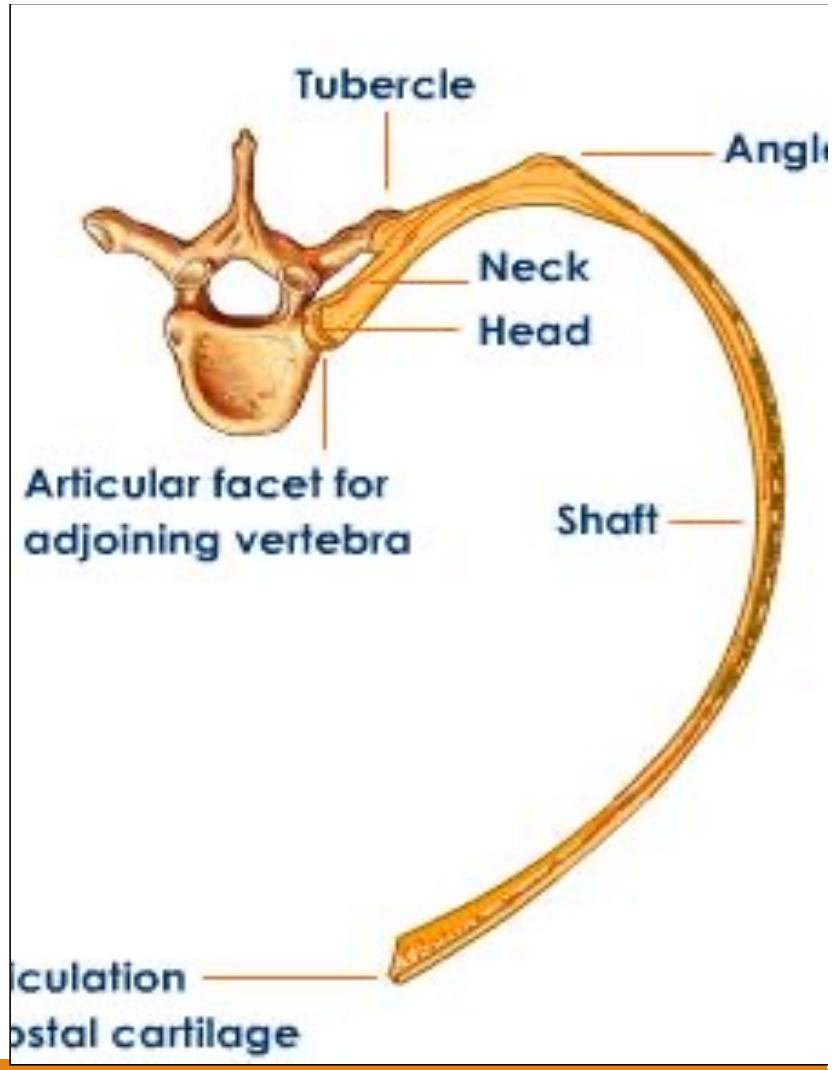
## Typical Rib should has these landmarks

- Head
- Neck
- Tubercle
- Angle
- Shaft or body
- **Subcostal Groove** , contains

A-Intercostal **V**ein

B-Intercostal **A**rtery

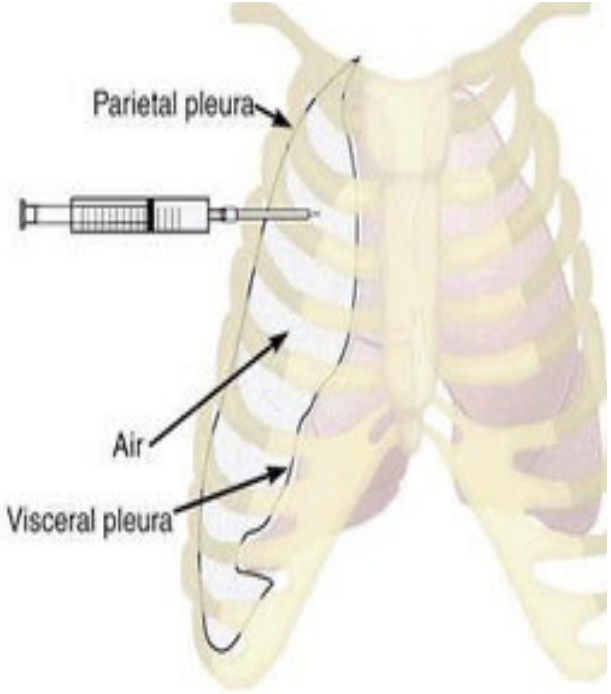
C-Intercostal **N**erve

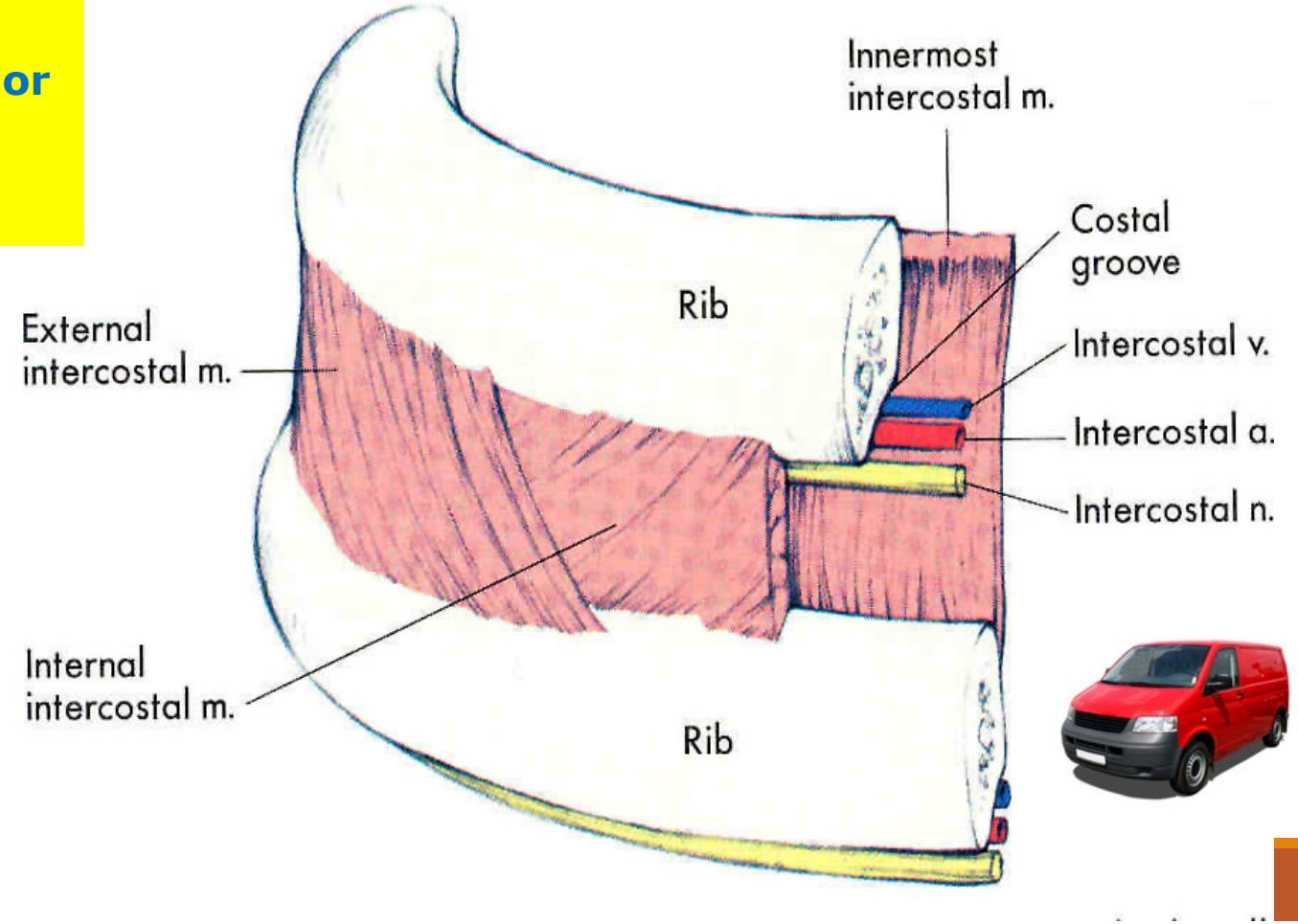


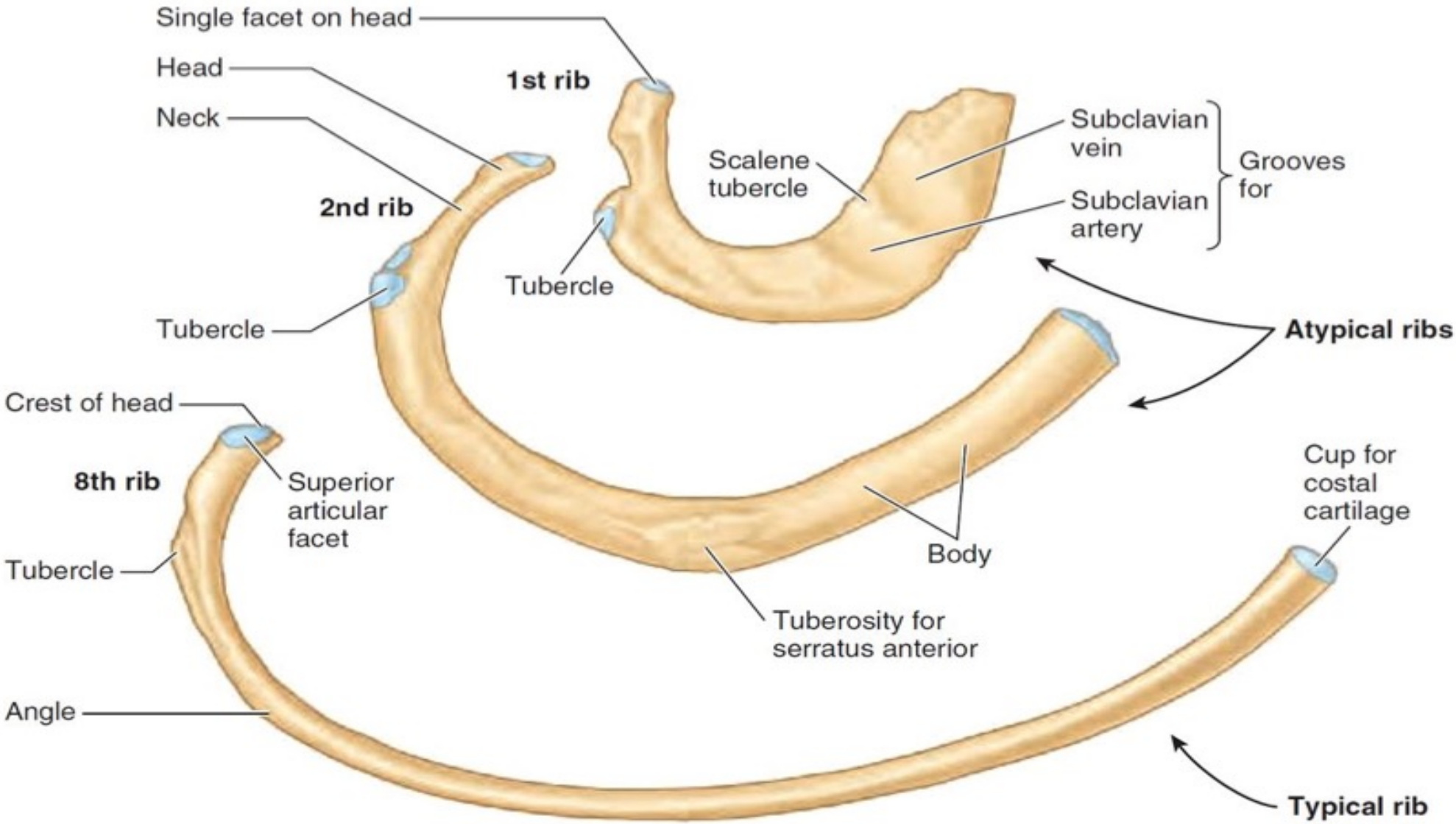
**Subcostal Groove** : contains; Intercostal vein Intercostal artery and Intercostal nerve

**VAN**

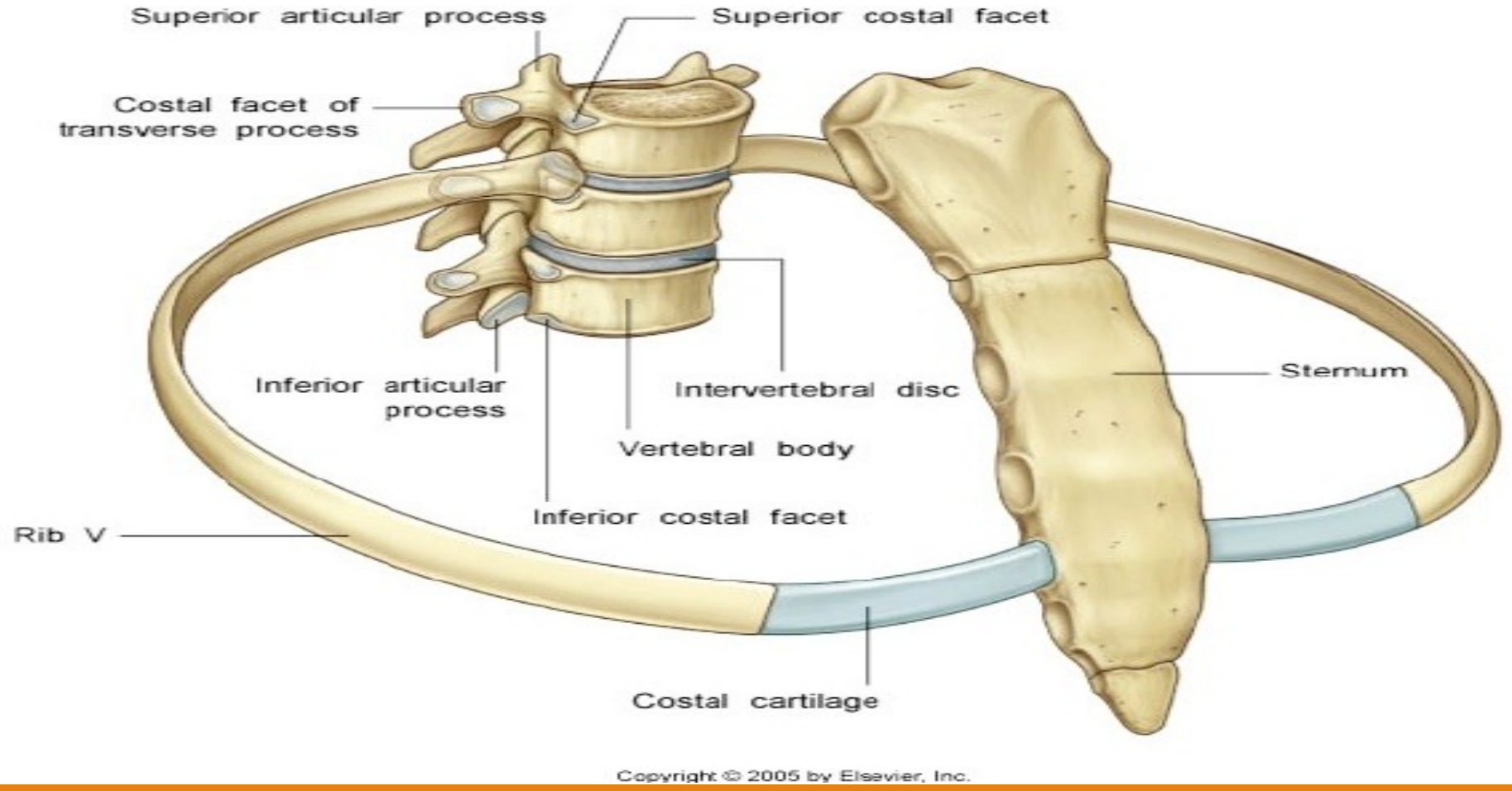
**The needle should be inserted above the superior border of the rib**




Single facet on head
Head
Neck
1st rib
2nd rib
Tubercle
Tubercle
Scalene tubercle
Subclavian vein
Subclavian artery
Grooves for
Atypical ribs
Crest of head
8th rib
Superior articular facet
Tubercle
Body
Tuberosity for serratus anterior
Cup for costal cartilage
Angle
Typical rib

# Joints of the Thoracic Wall



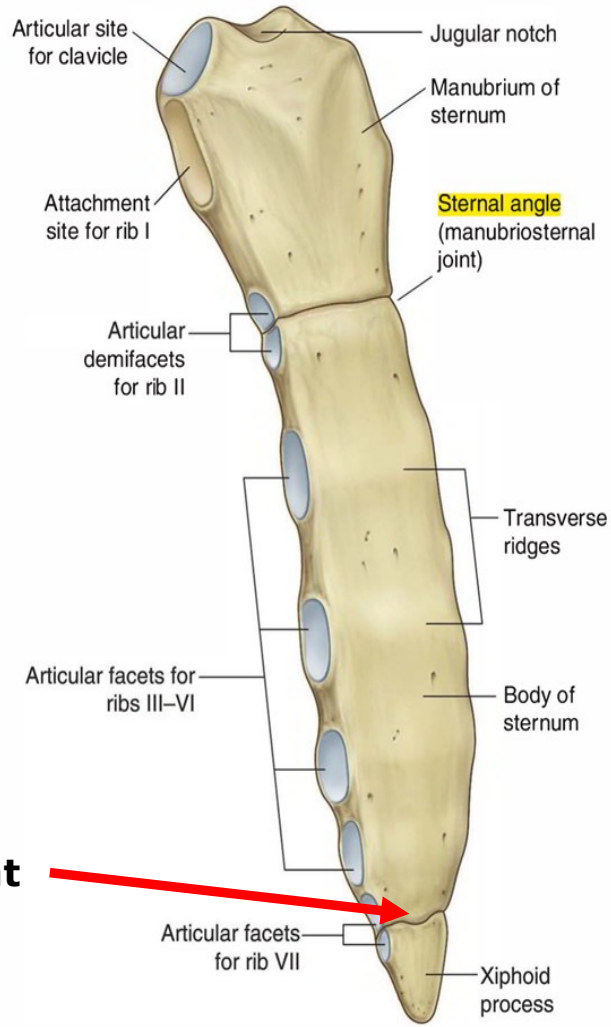
## I- Joints of the Sternum

### A.Manubriosternal joint

**Secondary cartilaginous joint** between the manubrium and the body of the sternum.
A small amount of angular movement is possible during respiration.

### B.Xiphisternal joint

**Secondary cartilaginous joint** between the xiphoid proces and the body of the sternum.



## Joints related to the rib:

### B) Joints of the posterior end: (Plane Synovial joint)

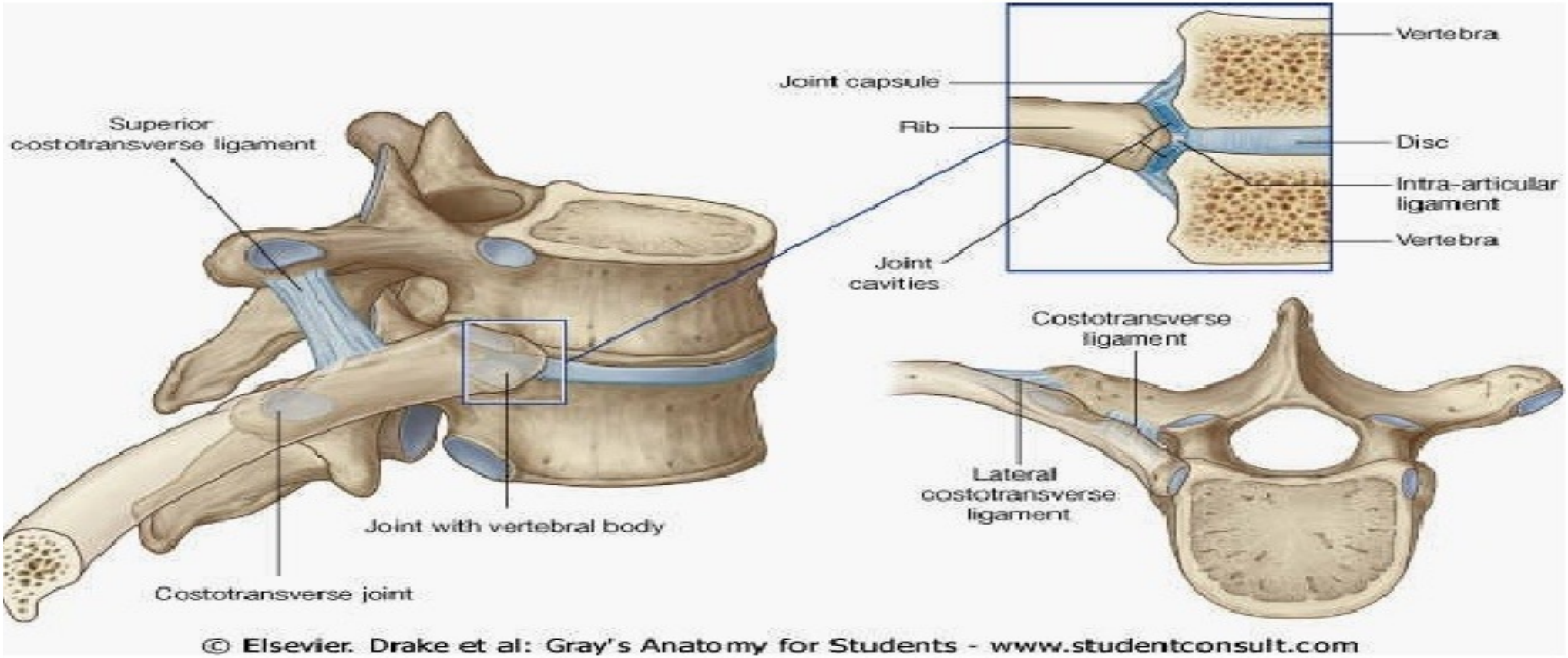
**1. Costo-vertebral joints**

- Between head of a typical rib and the corresponding vertebra and the vertebra above and their intervertebral disc.
- The head of $1^{st}$, $10^{th}$ , $11^{th}$ and $12^{th}$ ribs carries only one facet to articulate with the body of the corresponding vertebra only.

**1.Costo- transverse joint:**

- The smooth articular part of the **tubercle** of the rib articulates with the articular facet on the **transverse process** of the corresponding vertebra.
- The **$11^{th}$ and $12^{th}$** ribs carry **no** tubercles and therefore have no costo-transverse joints.

# Costovertebral joints.



## III- Joints of the Costal Cartilages

### A.Sternocostal Joint

- Plane Synovial joint
- Between sternum and costal cartilage of true ribs
- The 1st costal cartilages articulate with the manubrium, by primary cartilaginous joints with no movement

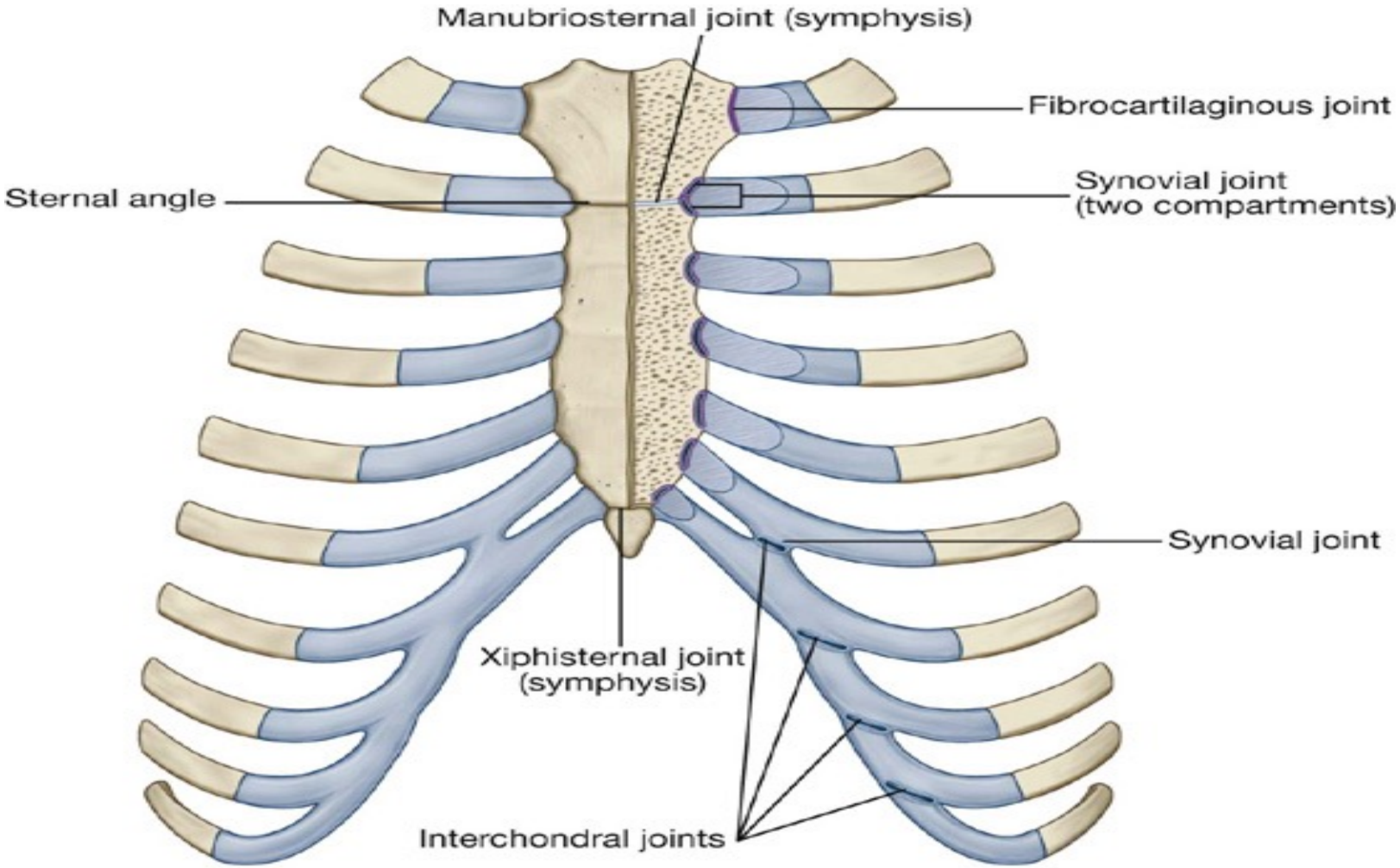
### B. Chostochondral Joint

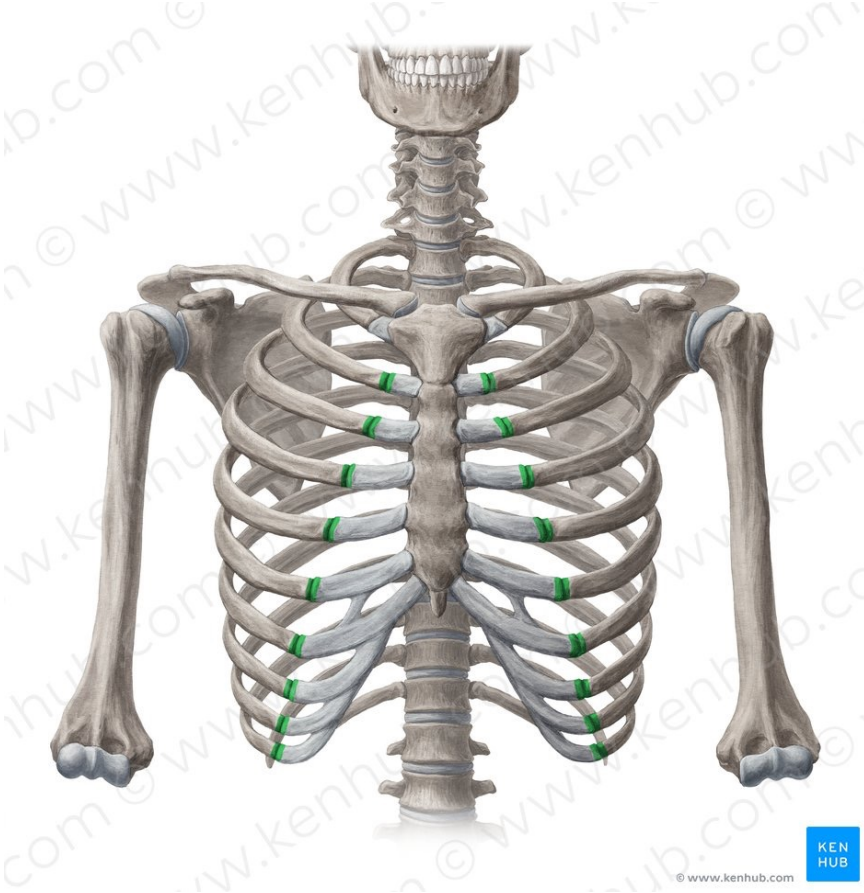
- primary Cartilaginous joints.
- Between ribs and costal cartilage .
- No movement is possible.

### C. Interchondral joints

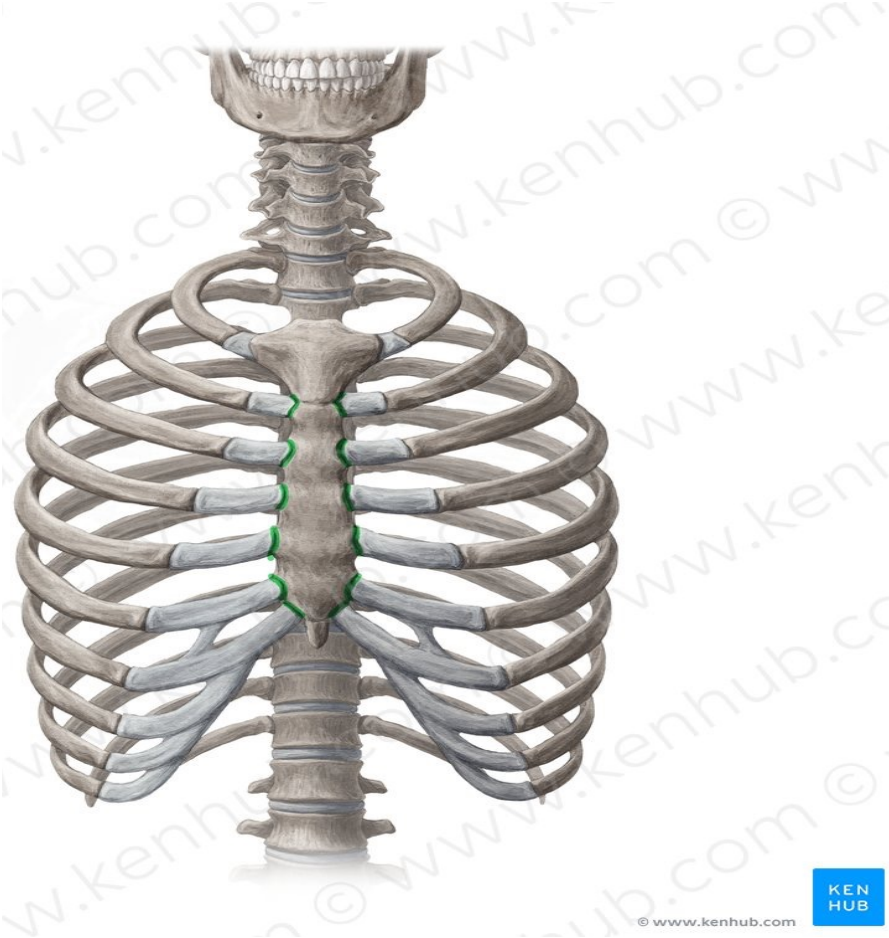
Between 6-9 costal cartilages .

Plane synovial Joint


Manubriosternal joint (symphysis)
Fibrocartilaginous joint
Sternal angle
Synovial joint
(two compartments)
Synovial joint
Xiphisternal joint
(symphysis)
Interchondral joints




**Costochondral joints**




**Sternochondral joints**

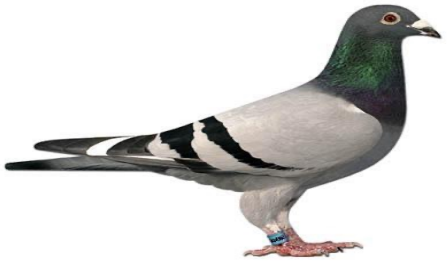
## Chest wall abnormalities

### 1- Pectus excavatum (sunken or funnel chest)

It is a congenital deformity in which several ribs and the sternum grow abnormally, producing a concave, or caved-in, appearance in the anterior chest wall.

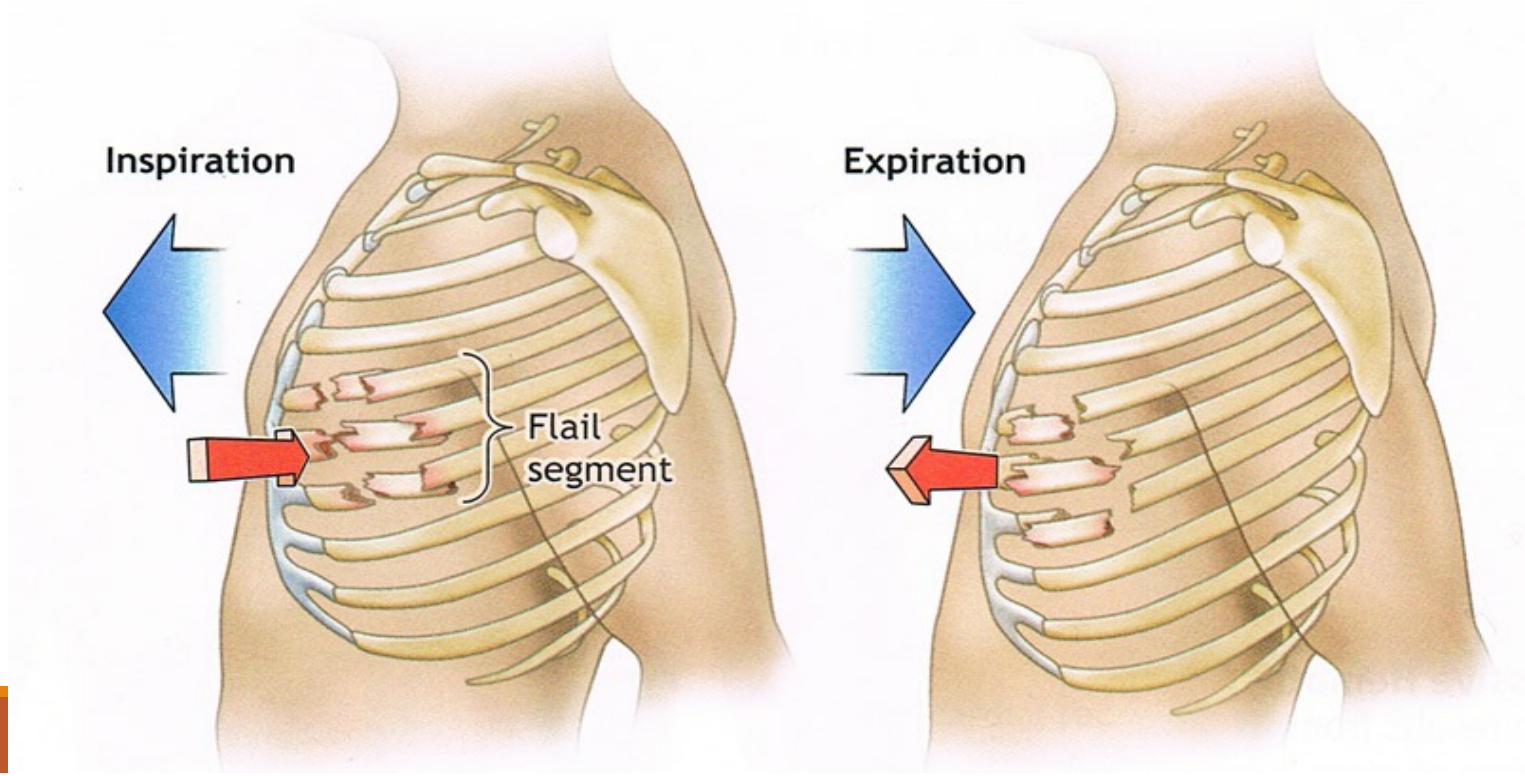
## 2- Rectus carinatum (pigeon chest)

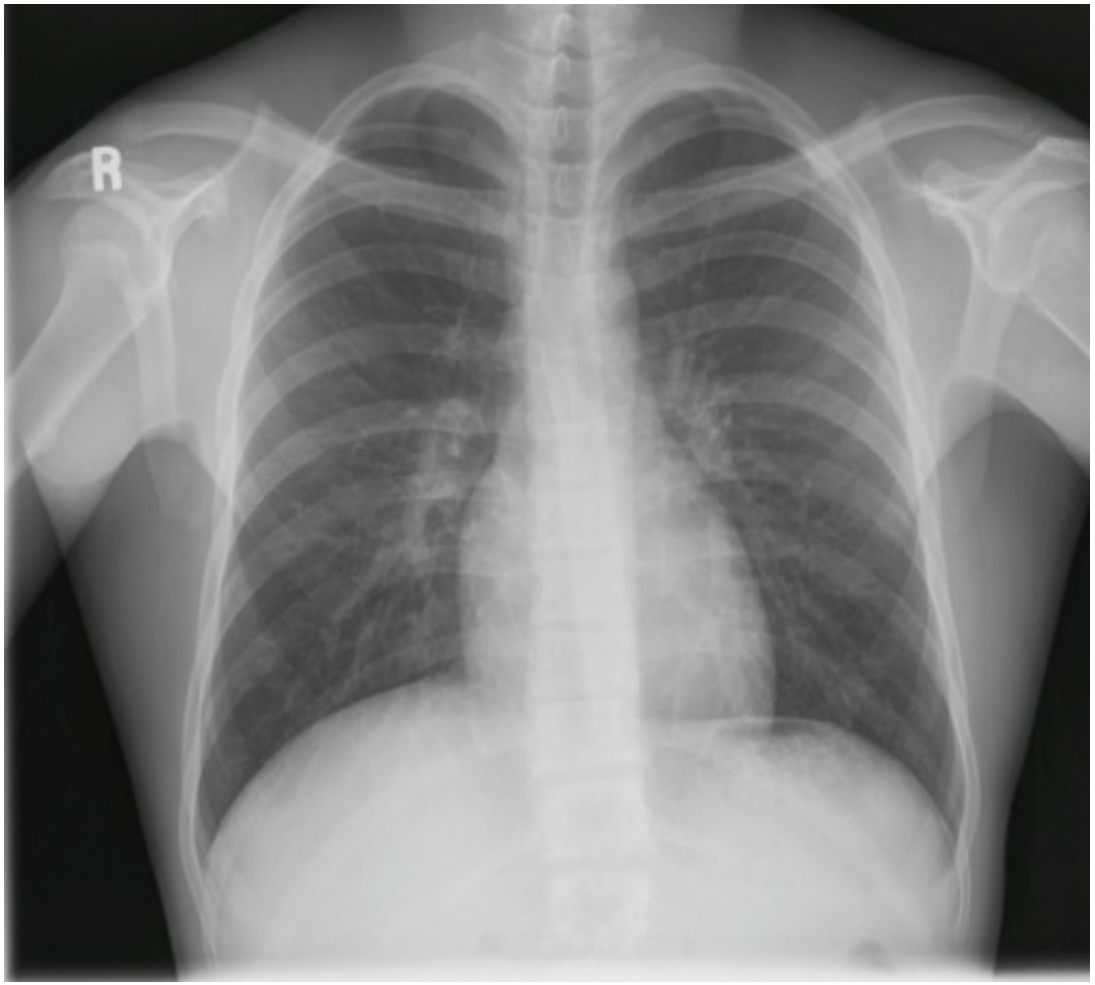
is a deformity of the chest characterized by a protrusion of the sternum



## Flail Chest

- ✓ It is s a life-threatening medical condition that occurs when a segment of the rib cage breaks due to trauma .
- ✓ In this case ; multiple adjacent ribs are broken in multiple places, separating a segment, so a part of the chest wall moves independently
- ✓ Two of the symptoms of flail chest are chest pain and shortness of breath.






**Chest X ray Posterior anterior view**


THANK
YOU!