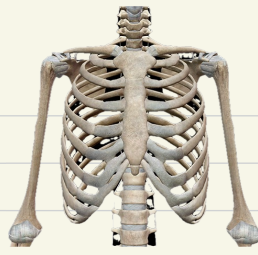


Thoracic Cage



Osseo cartilaginous

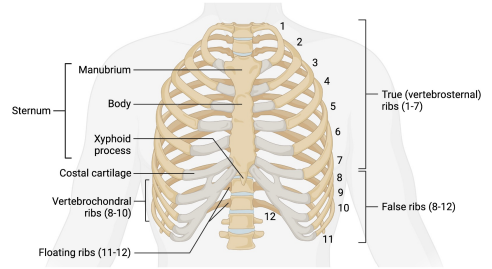
Composed of:

* anteriorly: Sternum and Costal cartilages

* posteriorly: vertebral column

* on either side: ribs

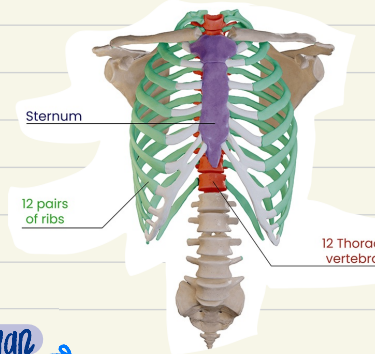
Thoracic Cage Anatomy



Functions of Thorax Cage

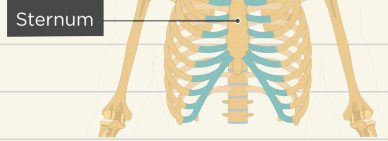
- ① Protection of Thoracic organ and abdominal organ
- ② Respiration

Heart, lungs, vessels
liver, spleen



Sternum → one of the sites to take bone marrow biopsy
it has three parts:

- * Manubrium
- * Body
- * Xiphoid Process

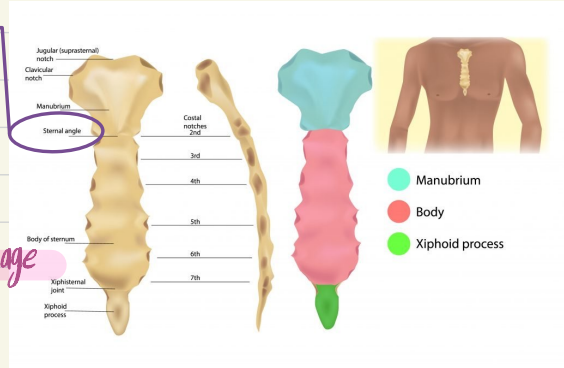


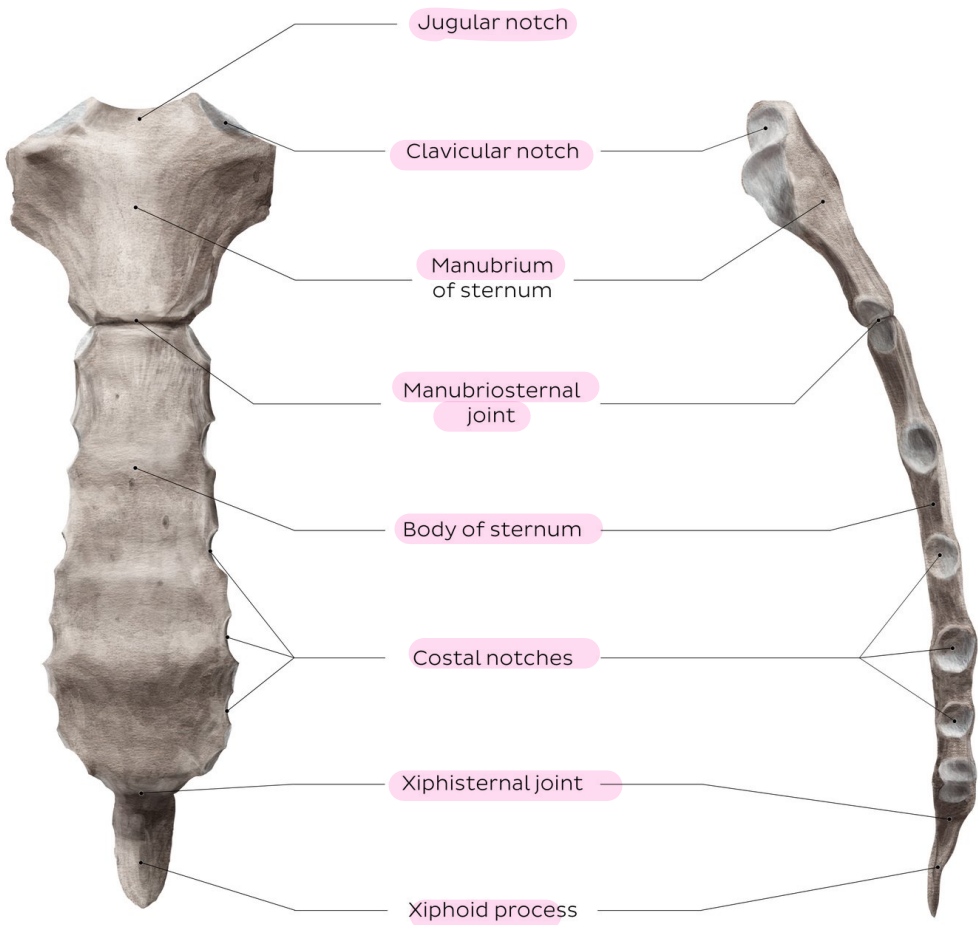
The Sternal angle (angle of Louis)

formed by articulation of manubrium with body of sternum

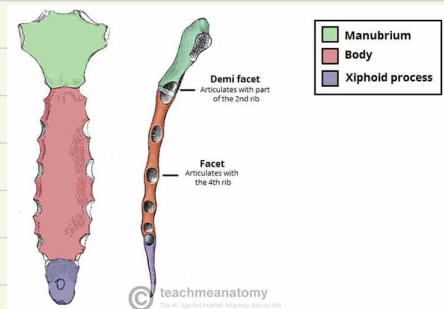
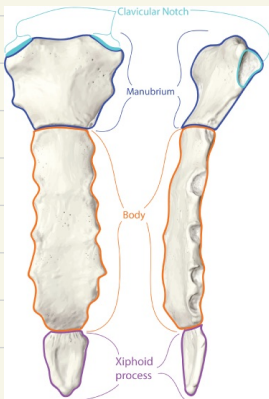
* at the level of second costal cartilage

Counting of the ribs





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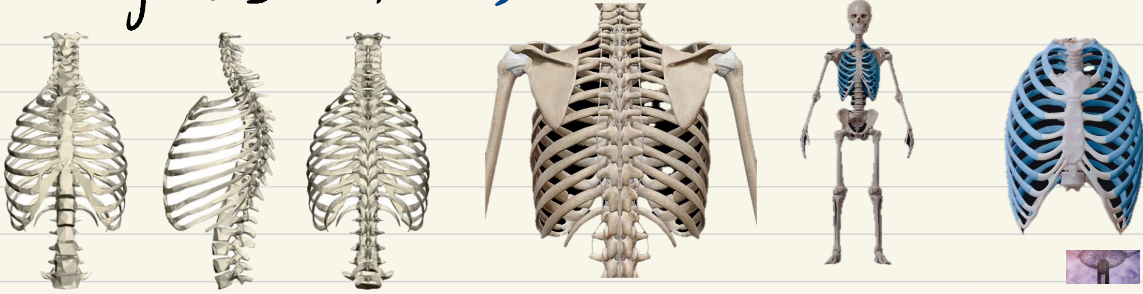


Ribs → 12 pairs

True ribs → 1st to 7th ribs → attach to thoracic vertebrae and Sternum

False ribs → 8th, 9th, 10th ribs → are attached anteriorly to each other and 7th rib

Floating ribs → 11th, 12th → no attachment in front



Classification of ribs

according to attachment to sternum

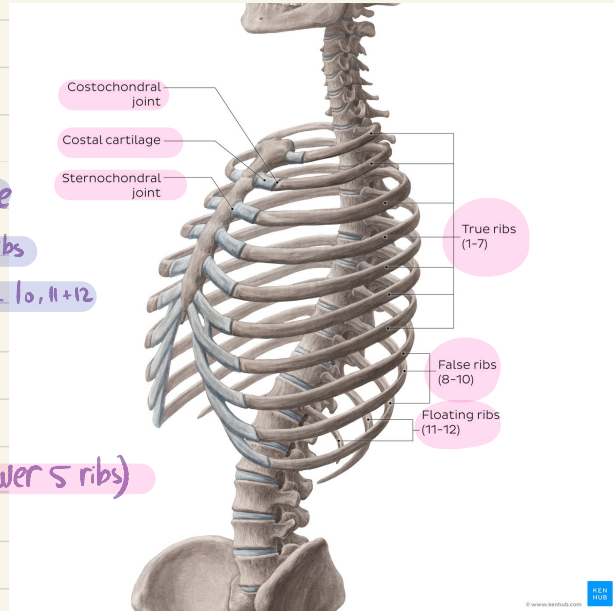
according to shape

Typical: 3rd - 9th ribs

non-typical: 1, 2 ... 10, 11 + 12

True: attached to sternum (upper 7 ribs)

False: Not attached to sternum (lower 5 ribs)



Each typical rib consist of 3 parts:

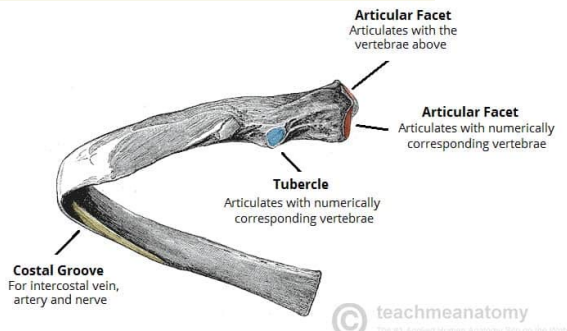
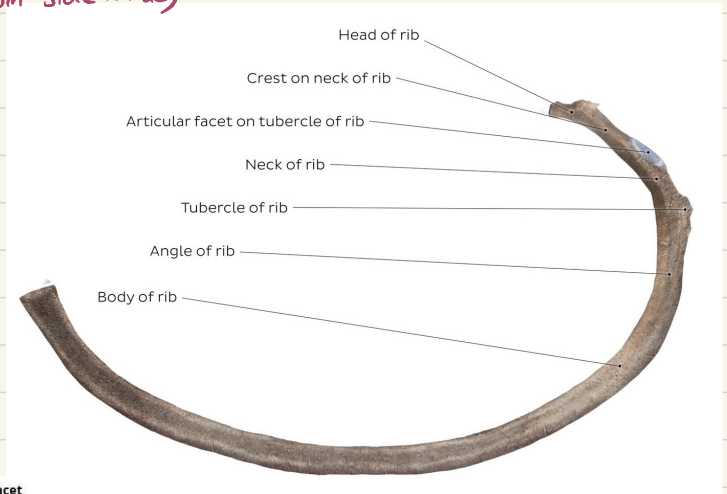
I) Anterior or sternal ends cup-shaped and articulates with costal cartilage

II) Shaft → Two borders: upper rounded and lower sharp

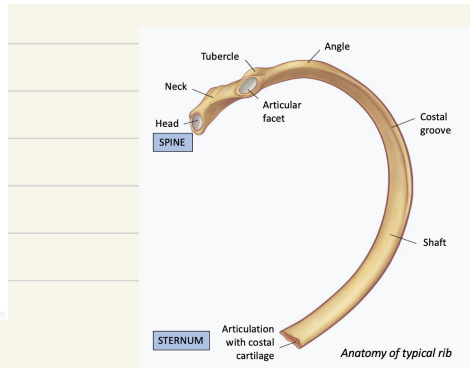
Two surfaces: outer convex and inner concave

Costal groove: present in lower part in inner surface, contain intercostal vein, artery and nerve

angle: divides the shaft into anterior 3/4 (flat from side to side) and posterior 1/4



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Anatomy of typical rib

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

① Head : 2 facet separated by a crest

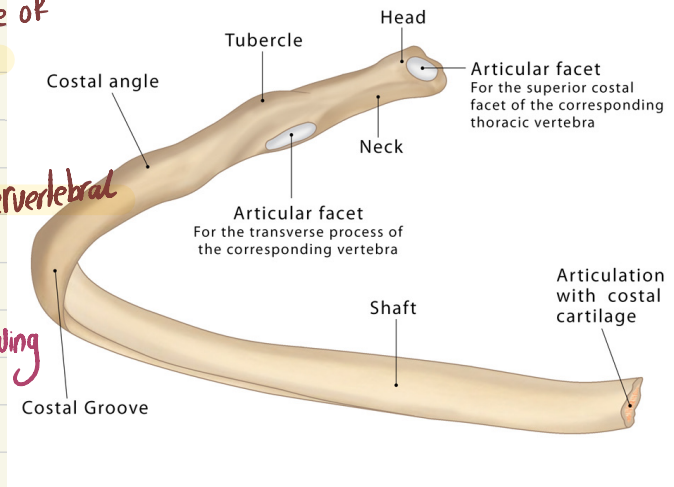
* Superior facet → articulated with inferior demifacet on the side of the body the vertebra above it

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

* Crest → articulates with intervertebral disc

② Neck : constricted part following the head

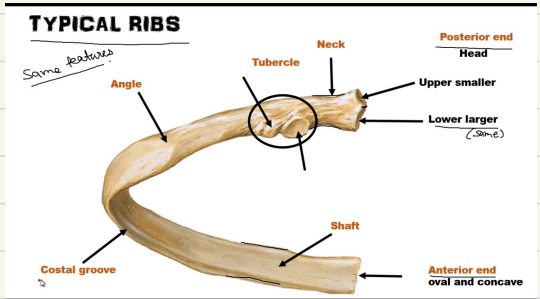
Anatomy of a Typical Rib



③ Tubercle : formed of 2 parts

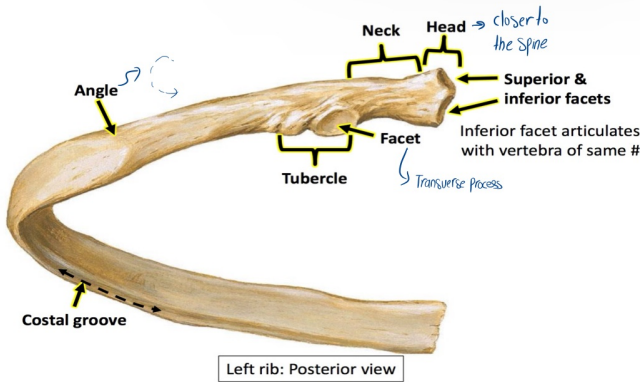
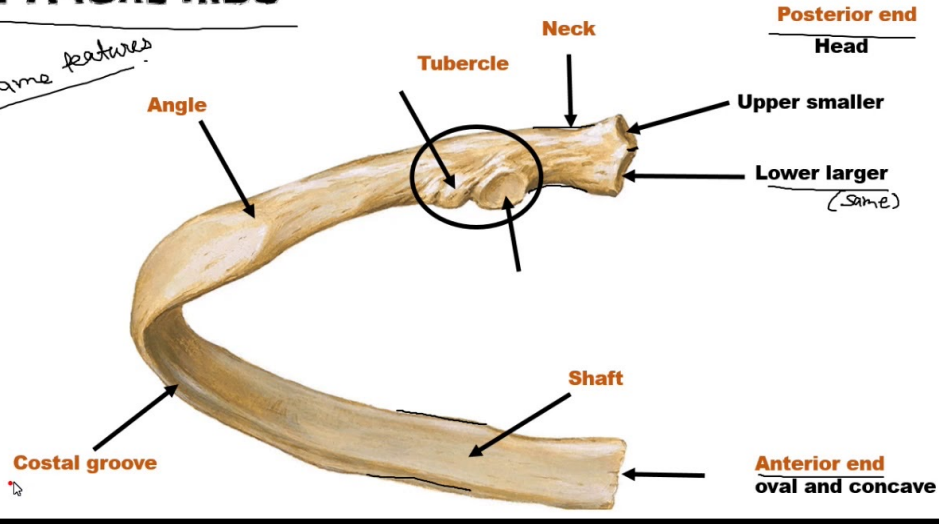
* a rough lateral non articular part

* a medial part → articulates with the facet on transverse process of corresponding vertebra



TYPICAL RIBS

Same features

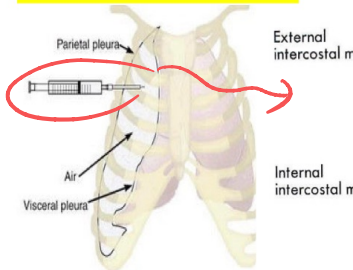


Typical Rib

- * head
- * Neck
- * Tubercle
- * Angle
- * Shaft + or body

Subcostal Groove : contains; Inter

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



above the superior border of the rib

* Subcostal groove
 intercostal vein ← var → intercostal artery
 = = = intercostal nerve

Joints of Thoracic wall

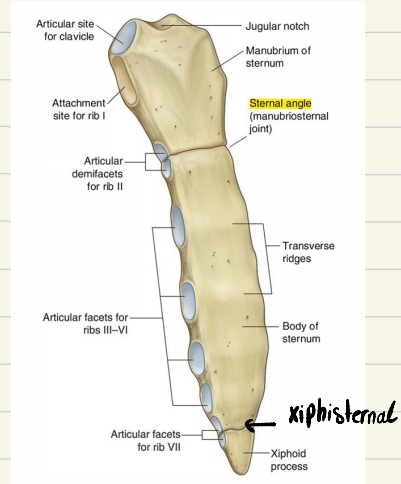
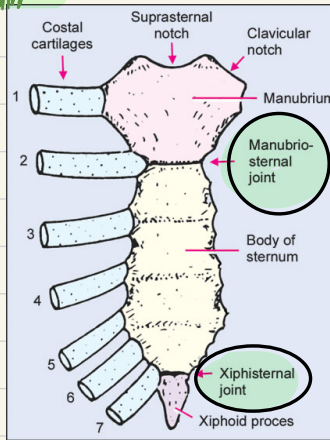
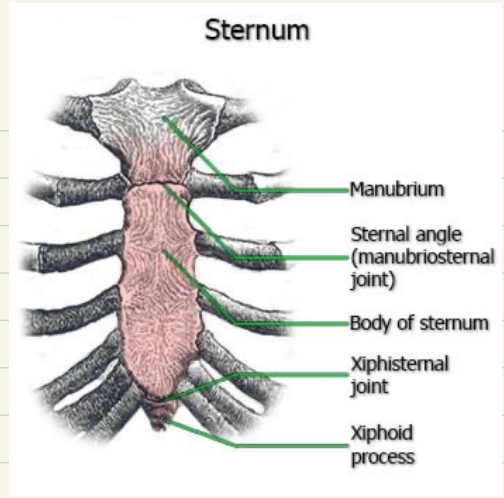
Joints of Sternum :

(A) manubriosternal

Secondary Cartilaginous joint

between the manubrium and body of sternum

a small amount of angular movement is possible during respiration



(B) xiphisternal joint

Secondary Cartilaginous joint

xiphoid processes and body of sternum

Joints related to the rib: [Plane Synovial]

① Costo-vertebral joint

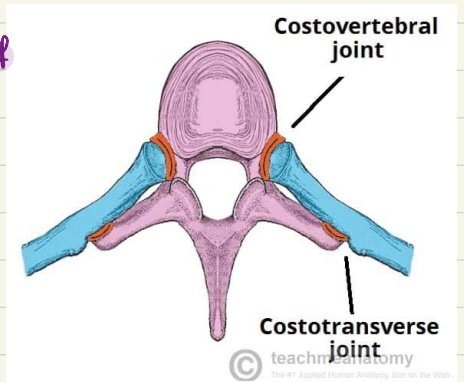
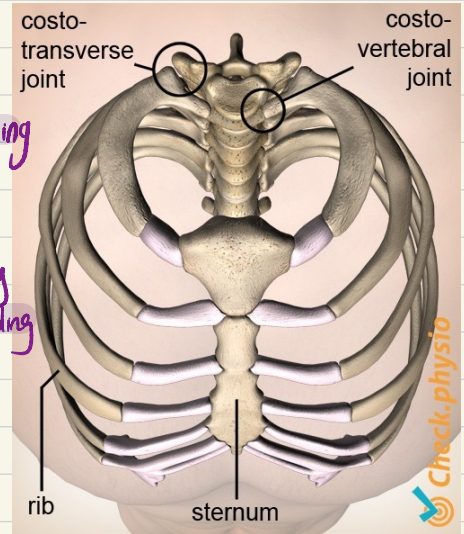
between head of typical rib and corresponding vertebra above and intervertebral disc

head of 1st, 10th, 11th and 12th carries only one facet to articulate with the corresponding vertebra

② Costo-transverse joint

Smooth articular part of tubercle of the rib articulates with articular facet of transverse process of corresponding vertebra

11th and 12th carries no tubercle and therefore have no Costo-transverse joints



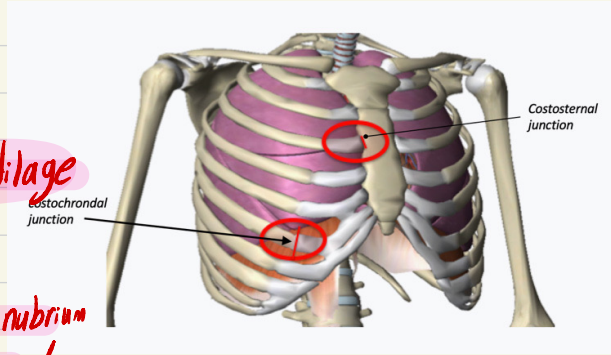
Joints of Costal Cartilages

(A) Sternocostal joint

↳ plane synovial

between sternum and costal cartilage of true ribs

* 1st costal cartilage articulate with manubrium by primary cartilaginous joints with no movement

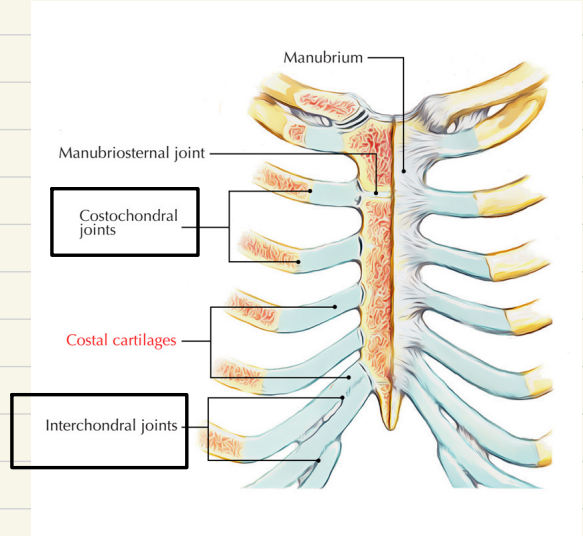


(B) Chostochondral

↳ Primary cartilaginous joints

↳ between ribs and costal cartilage

No movement is possible



(C) Interchondral joints

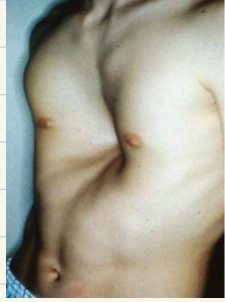
* between 6-9 cartilages

* Plane synovial

Chest wall abnormalities

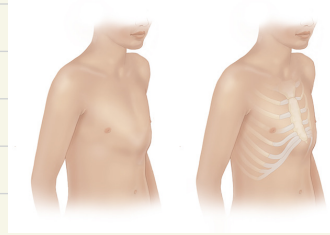
① Pectus excavatum (Sunken or funnel chest)

ضيق
Congenital deformity in which several ribs and sternum grow abnormally producing a concave or caved-in appearance in chest wall



② Pectus carinatum (Pigeon chest)

deformity of the chest → protrusion of sternum



Flail chest

↳ life threatening medical condition → segment of rib cage breaks due to trauma

multiple adjacent ribs broken in multiple places, separating a segment so a part of chest moves independently

chest pain

shortness of breath