

Reading Hospital School of Health Sciences  
Medical Imaging Program  
MI 243  
2021

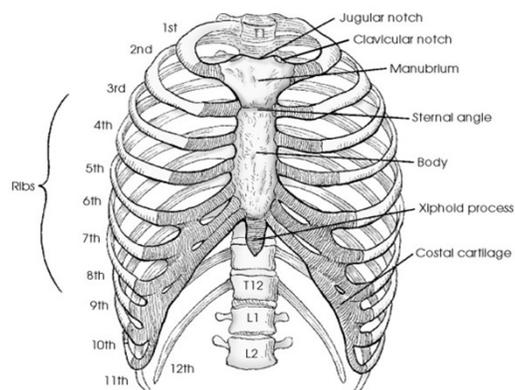
RIBS AND STERNUM RADIOGRAPHY

MERRILL'S VOLUME 1, CHAPTER 10

1

## Bony Thorax

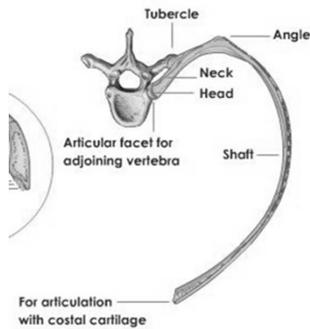
- ▶ Formed by the sternum, 12 pairs of ribs, and 12 thoracic vertebrae
- ▶ Supports walls of pleural cavity and diaphragm that are used during respiration
- ▶ Allows volume of cavity to be varied during respiration
- ▶ Protects heart and lungs
- ▶ Conical shaped



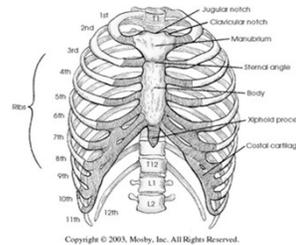
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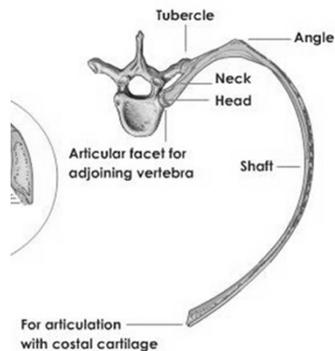
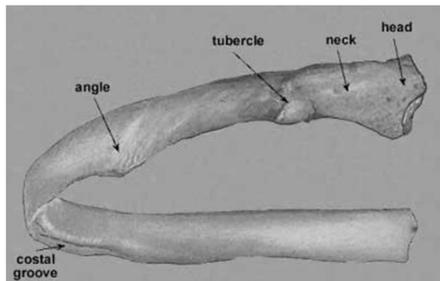
# Ribs



- ▶ Ribs are a flat bone
- ▶ 12 pairs of ribs - each corresponds to the thoracic vertebrae that it attaches to.
- ▶ Each is long, narrow & curved with an anteriorly attached piece of cartilage called the costal cartilage
- ▶ They are situated in an oblique plane slanting anterior and inferior
  - ▶ Anterior lies 3-5 inches lower than the vertebral end



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Head of Rib - articulates with body of vertebra

Neck of Rib- flattened area between the neck and tubercle

Tubercle of Rib- has a facet that articulates with transverse process of vertebra

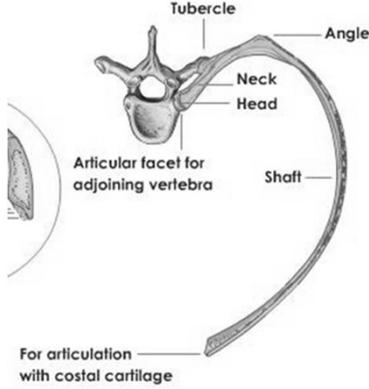
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Vertebral End - end of rib which attaches to the thoracic vertebra

Angle of Rib - posteriorly, before connection to vertebra

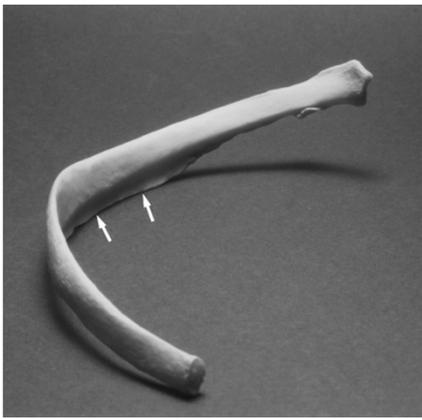
Body or Shaft - main part of rib

Sternal End - end of rib which attaches anteriorly



The diagram illustrates the anatomy of a rib. It shows the rib's connection to a thoracic vertebra at the vertebral end, which includes the head, neck, and tubercle. The articular facet for adjoining vertebra is also shown. The shaft is the main part of the rib, and the angle is the bend between the neck and the shaft. The sternal end is shown for articulation with costal cartilage.

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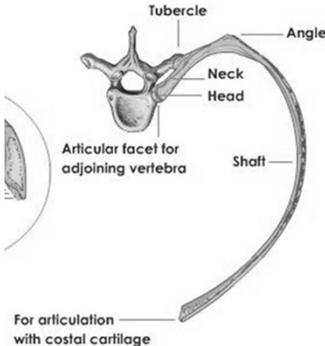
Costal Groove - located on the inferior and internal border. It contains costal arteries, veins, and nerves. Trauma to the ribs can damage this area and cause pain and hemorrhaging.

The photograph shows a rib with two white arrows pointing to the costal groove, which is a shallow depression on the inferior and internal border of the rib shaft.

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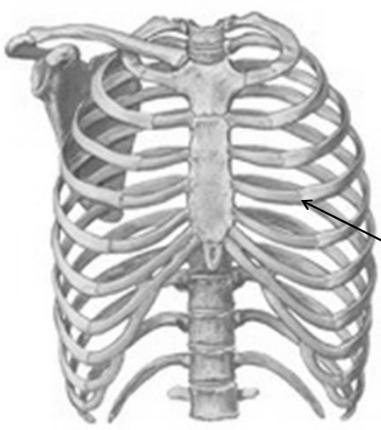
Costovertebral Joint-  
the head connects to  
vertebral body-  
synovial gliding

Costotransverse Joint  
the tubercle  
connects to  
transverse process-  
synovial gliding



The diagram illustrates the anatomical features of a rib head and neck. The head is shown articulating with the vertebral body, labeled as the 'Articular facet for adjoining vertebra'. The neck of the rib is shown articulating with the transverse process, labeled as the 'Tubercle'. The angle of the rib is also indicated. The shaft of the rib is shown, with a note indicating it is 'For articulation with costal cartilage'.

7



Costochondral Joint-  
anterior connection  
of sternal end of rib  
with the costal  
cartilage-  
cartilaginous  
synchondroses and  
allow no movement

The illustration shows the human rib cage from a posterior view. An arrow points to the anterior connection of the sternal end of a rib with the costal cartilage, which is labeled as the Costochondral Joint.

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- ▶ **True ribs** = 1 through 7
  - ▶ attach directly to sternum
- ▶ **False ribs** = 8 through 12
  - ▶ do not attach directly to sternum
- ▶ **Floating ribs** = 11 and 12
  - ▶ attached only to vertebrae

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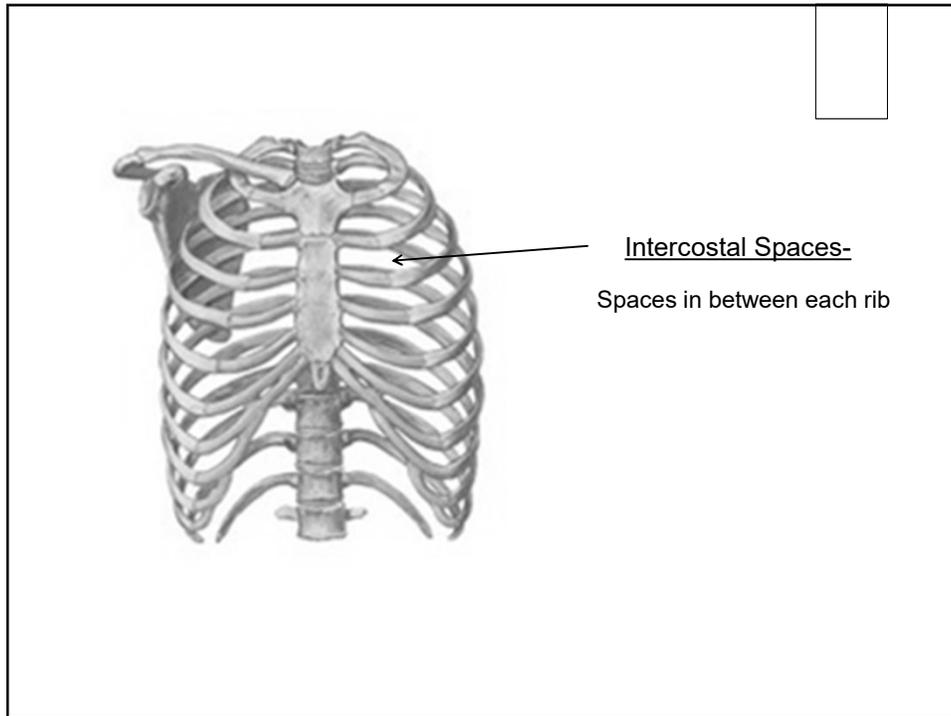
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**c**

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**Intercostal Joints-**  
 between costal  
 cartilages of 6-7, 7-8,  
 and 8-9- synovial  
 gliding

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11

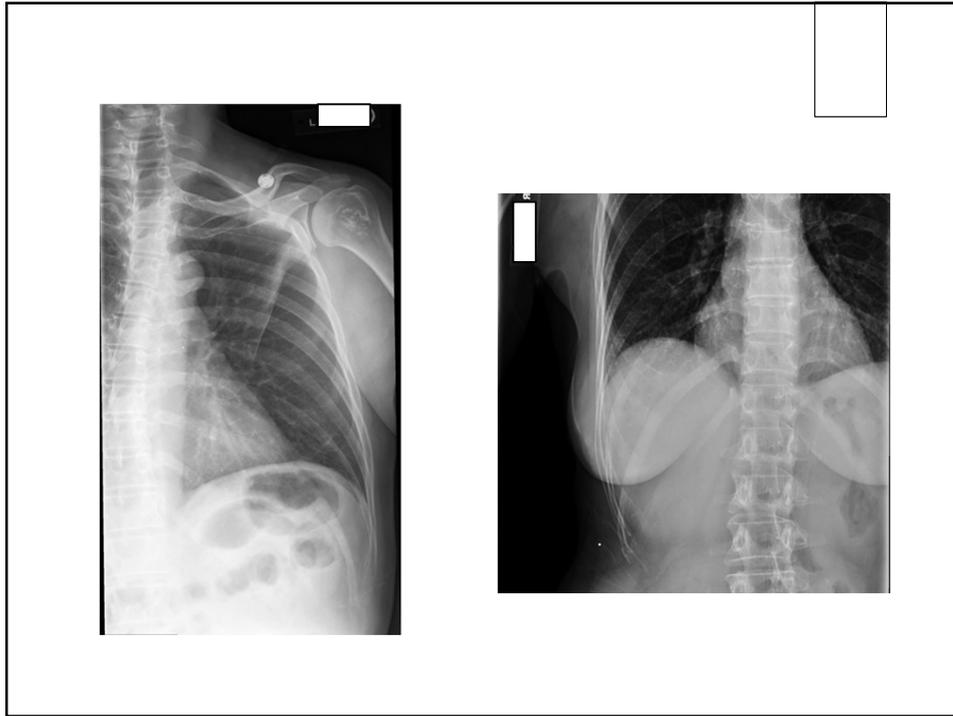
**Inspiration**

## Diaphragm position

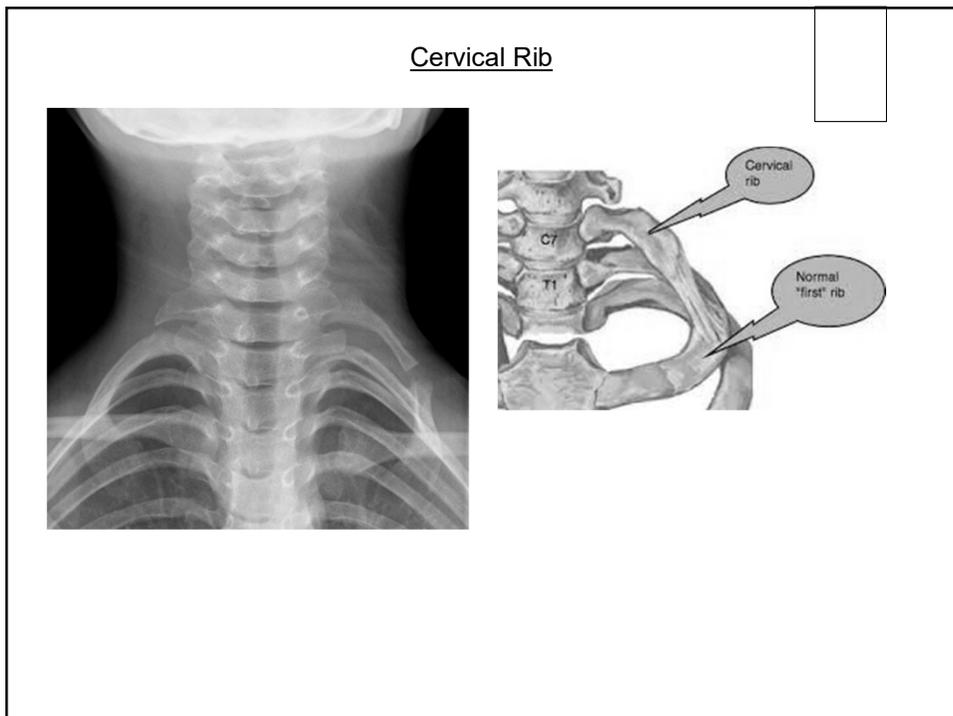
**Expiration**

- The diaphragm moves approximately **1 1/2"** between deep inspiration and deep expiration.
- Ribs located **above** the diaphragm (1-9) best examined on inspiration
- Ribs **below** the diaphragm (8-12) best examined on expiration
- Note: the rib cage is **widest** at 8<sup>th</sup> and 9<sup>th</sup> ribs

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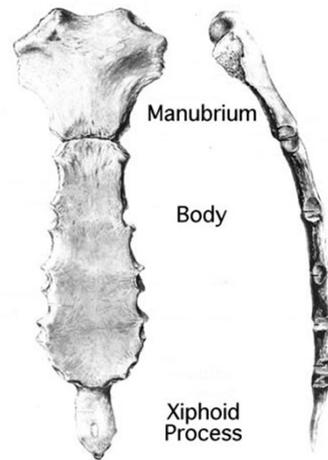
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# Sternum

The sternum is a flat bone  
Consists of 3 parts:

- **Manubrium**
- **Body**
- **Xiphoid process**

Supports clavicles and provides attachments to costal cartilages of first 7 ribs.

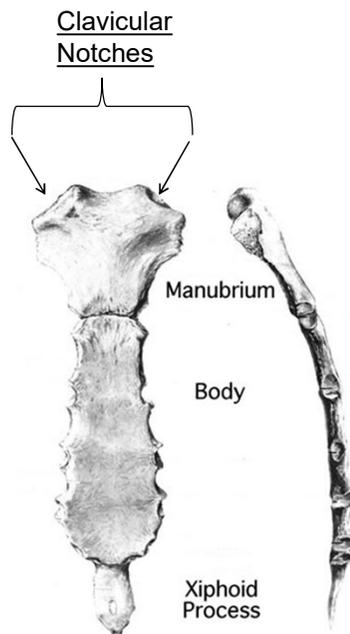


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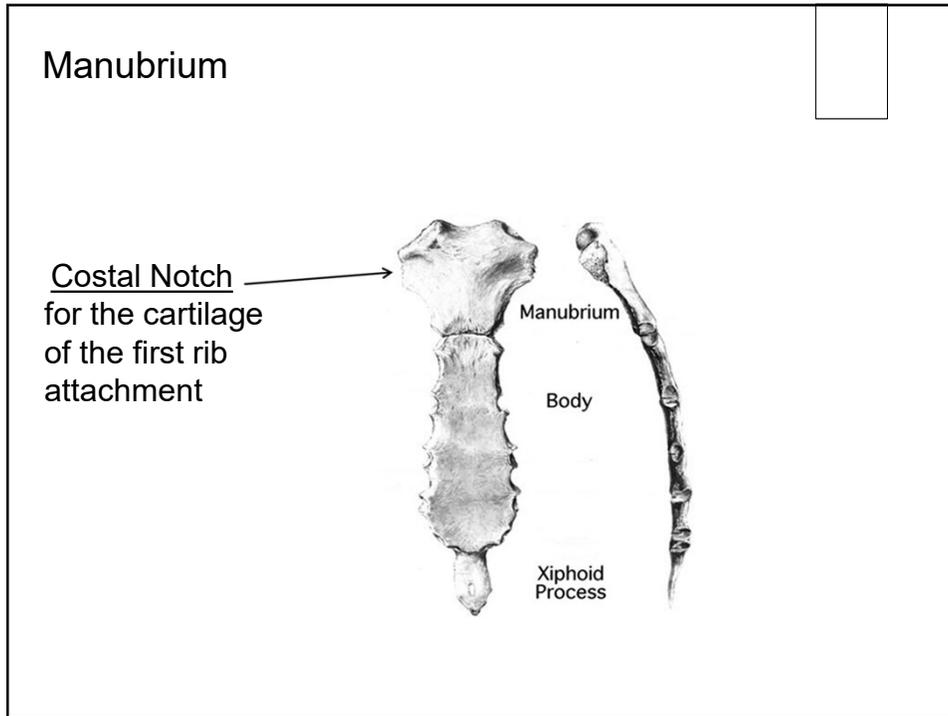
# Manubrium

Clavicular notches- on the superior lateral sides where the sternal end of the clavicles articulate

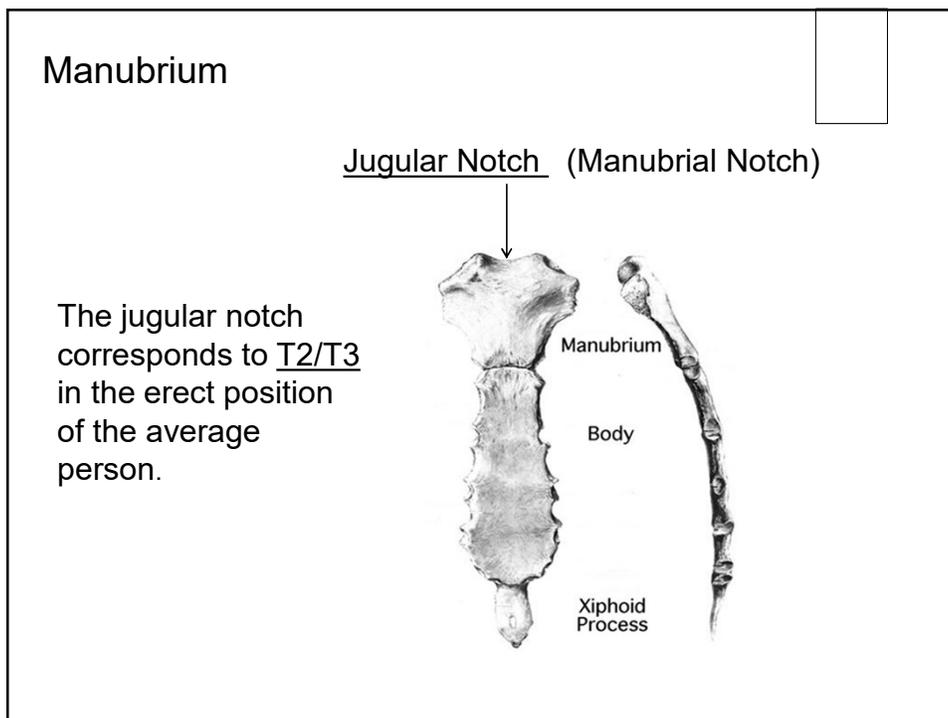
Attachment of the clavicles to this area termed the Sternoclavicular joints (SC Joints)- synovial gliding



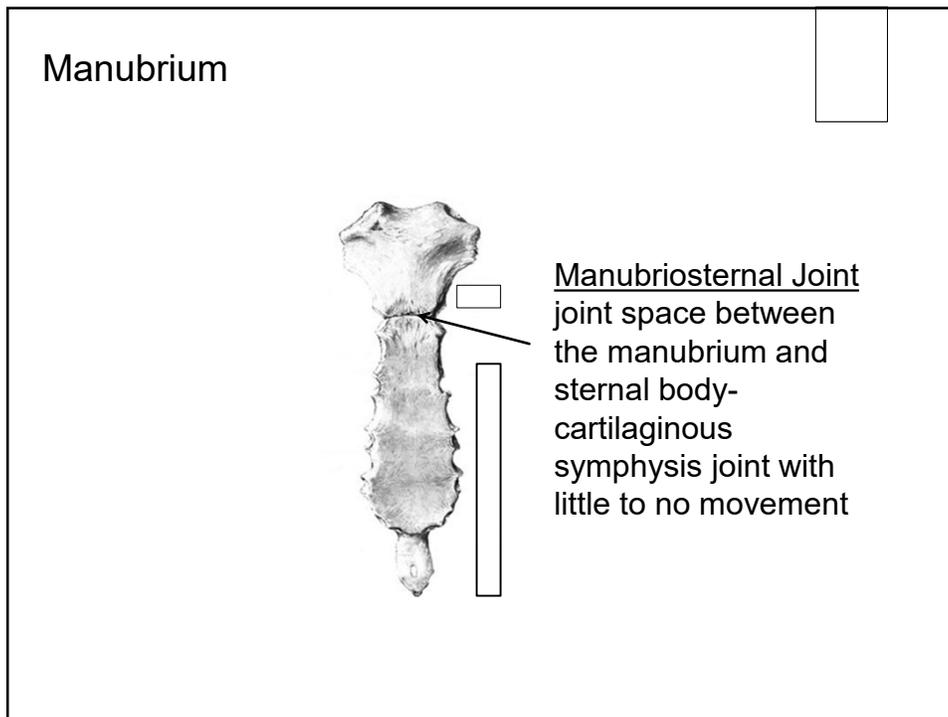
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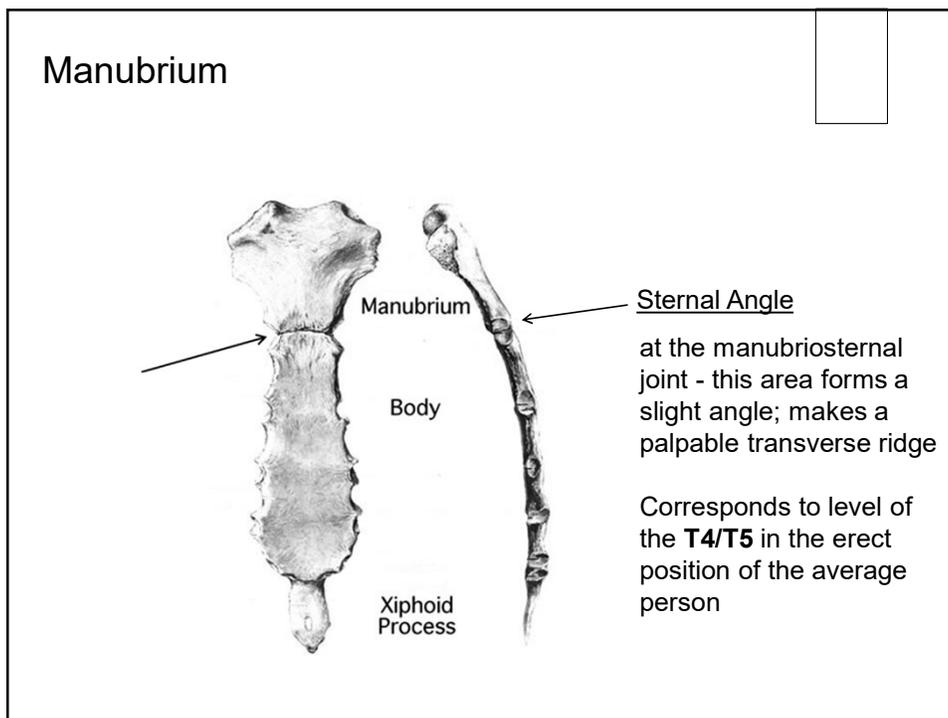
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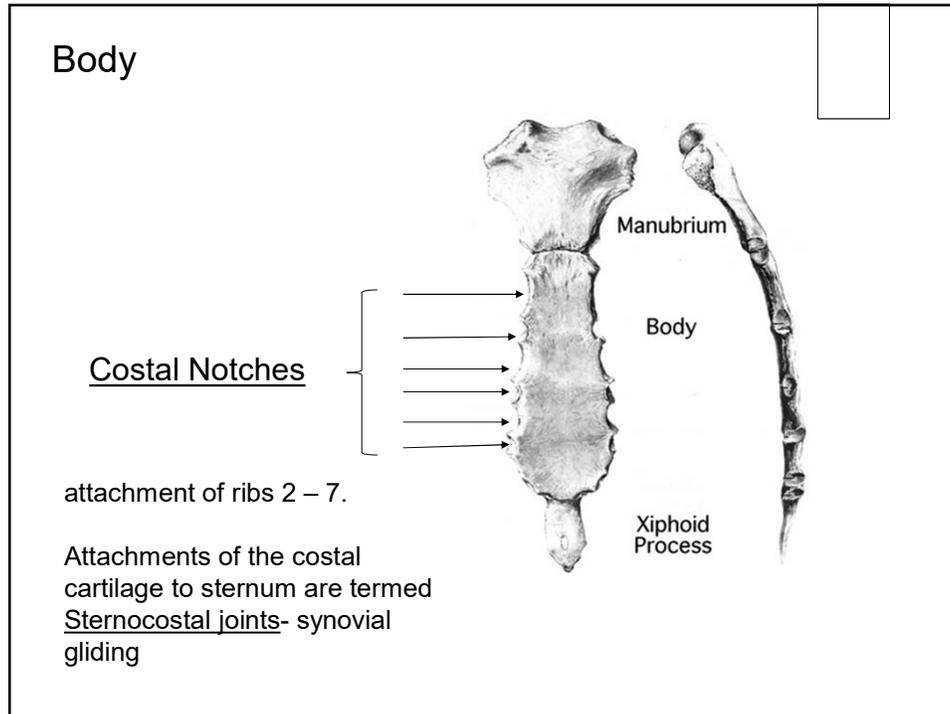
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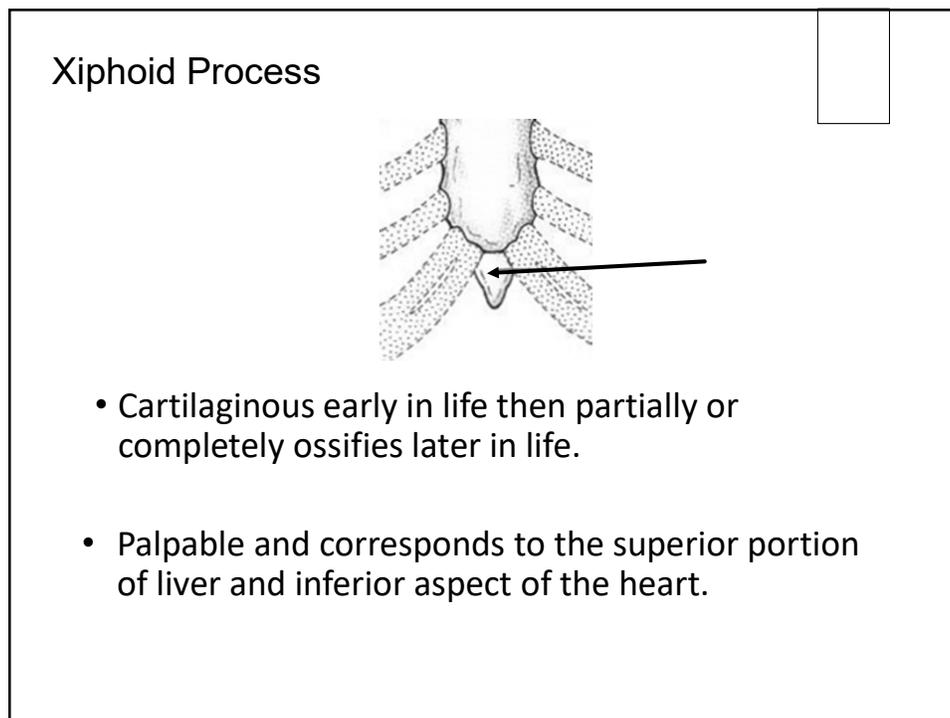
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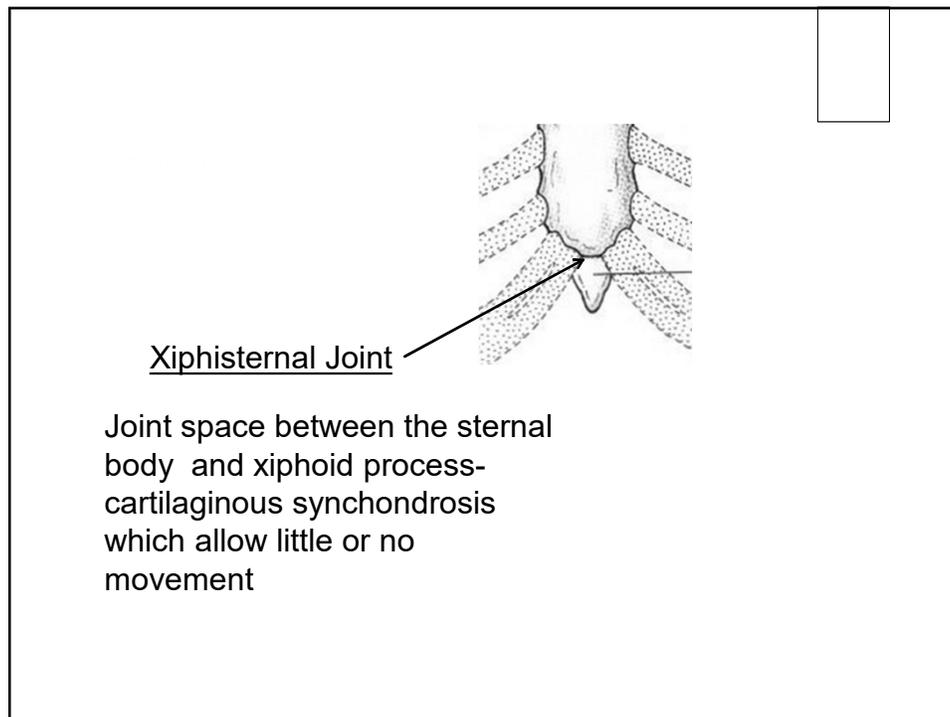
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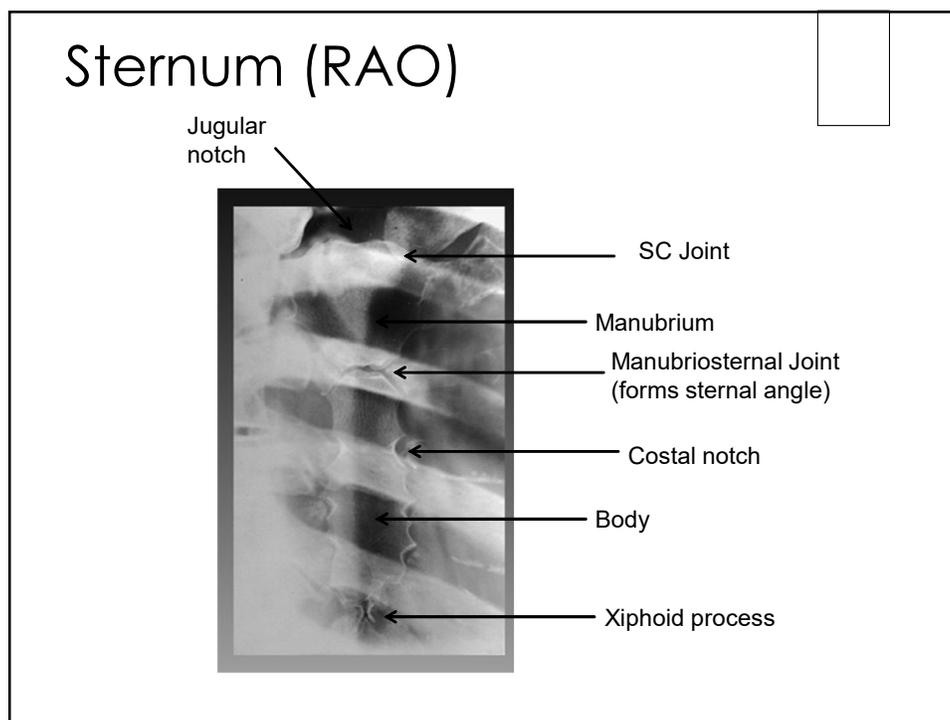
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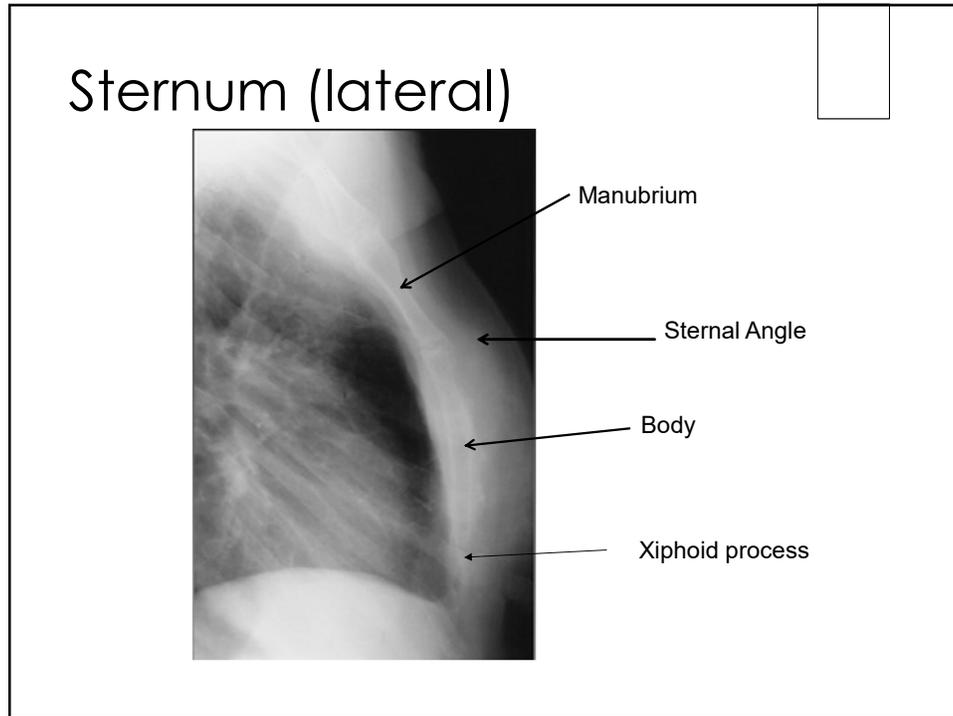
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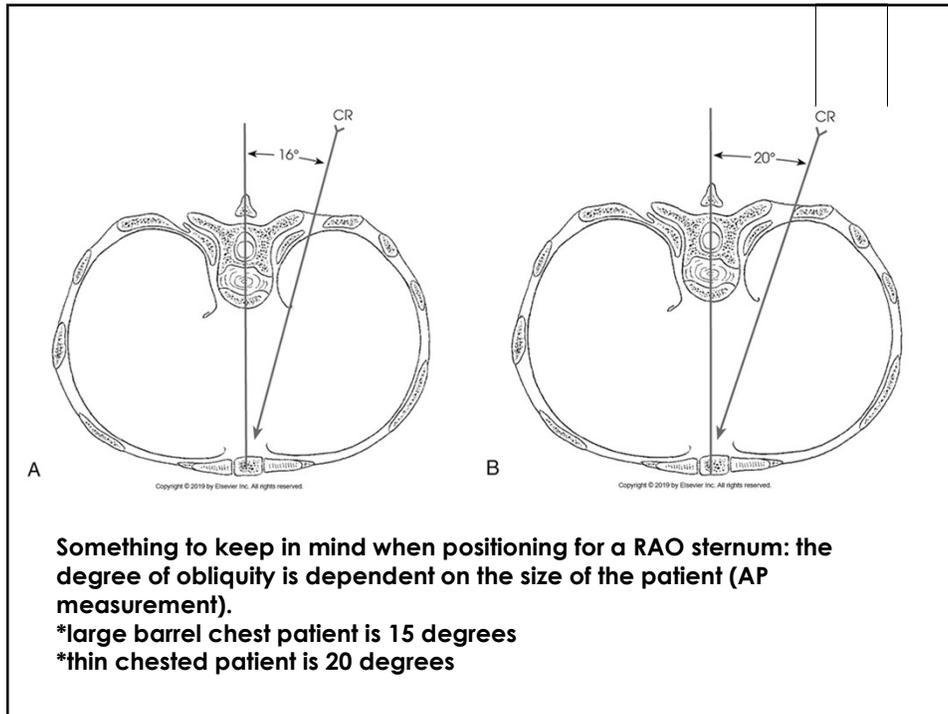


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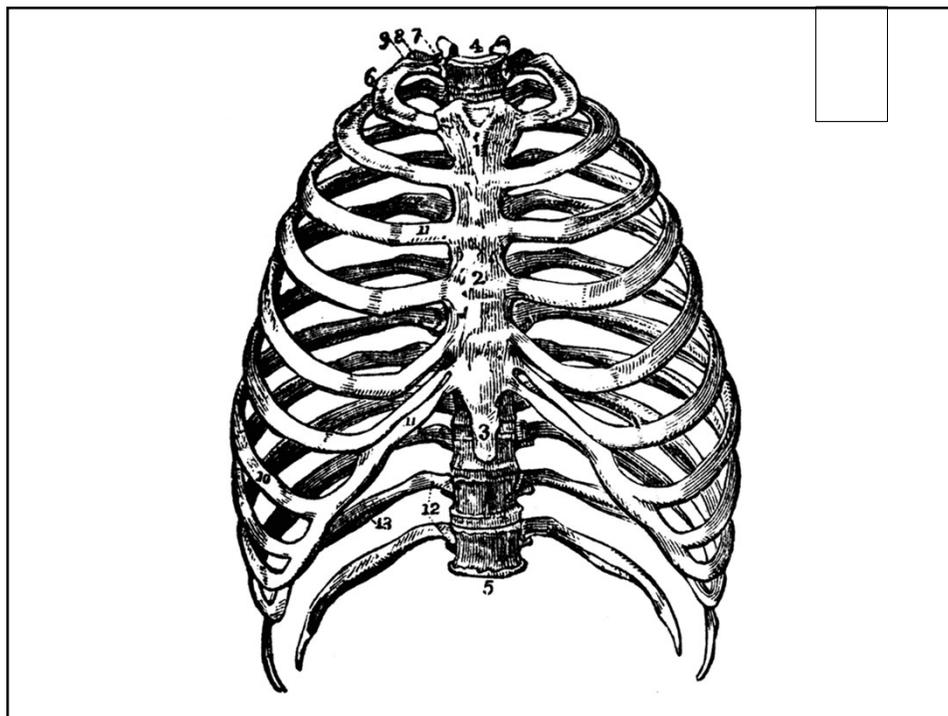
## Landmarks Ribs/Sternum

- Jugular Notch - T2/T3
- Sternal Angle (Manubriosternal Joint) – T4/T5
- Xiphoid Process - T10
  - superior portion of liver
  - inferior portion of heart

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