

Reading Hospital
School of Health
Sciences
Medical Imaging
Program

MI 243
2022

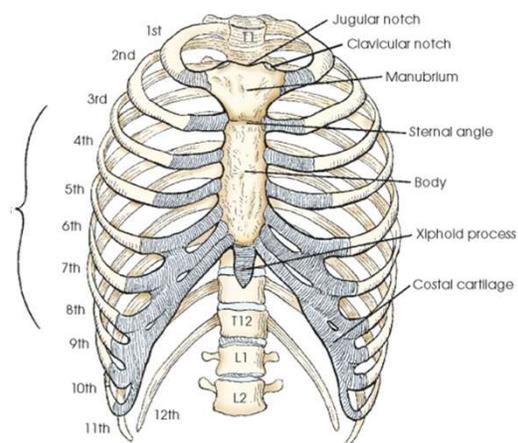
Ribs and Sternum Radiography

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

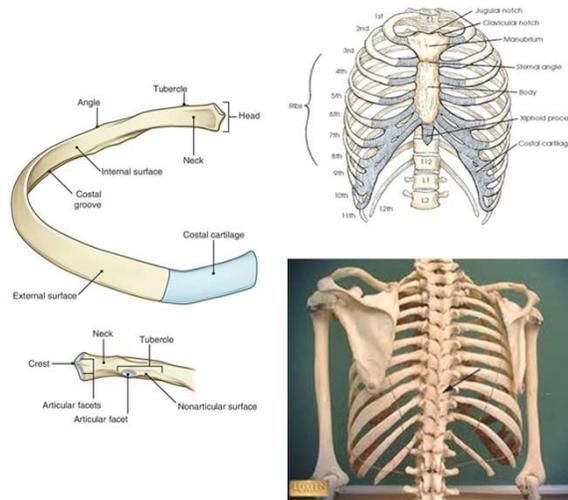


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Ribs

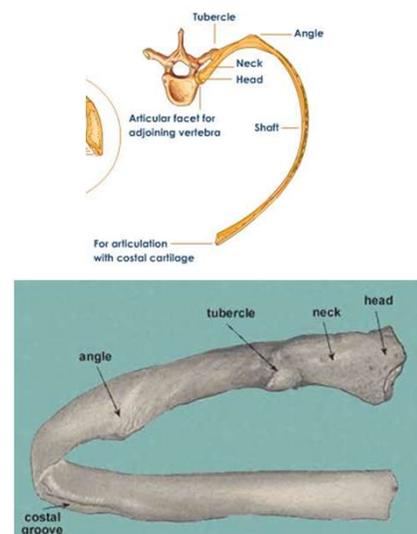
- Ribs are a flat bone
- 12 pairs of ribs - corresponds to the thoracic vertebrae that it attaches to.
- Each is long, narrow & curved with an anteriorly attached piece of cartilage called the costal cartilage
- They are situated in an oblique plane slanting anterior and inferior
 - Anterior lies 3-5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



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Ribs

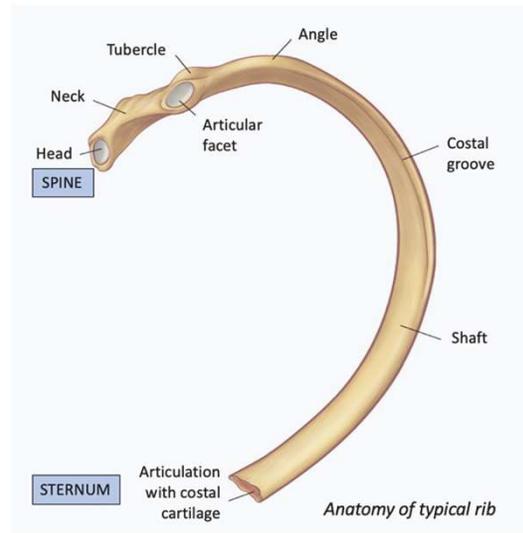
- Head of Rib - articulates with body of vertebra
- Neck of Rib- flattened area between the neck and tubercle
- Tubercle of Rib- has a facet that articulates with transverse process of vertebra



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Ribs

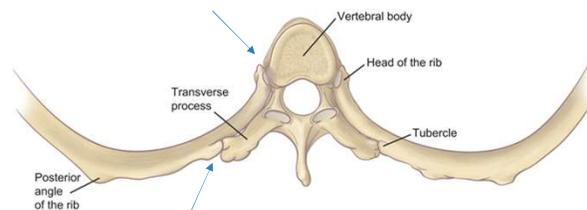
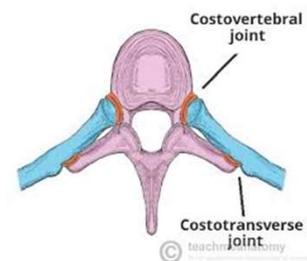
- Vertebral End - end of rib which attaches to the thoracic vertebra
- Angle of Rib - posteriorly, before connection to vertebra
- Body or Shaft - main part of rib
- Sternal End - end of rib which attaches anteriorly
- Costal Groove - located on the inferior/internal border. It contains costal arteries, veins, and nerves. Trauma to the ribs can damage this area and cause pain and hemorrhaging.



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Ribs

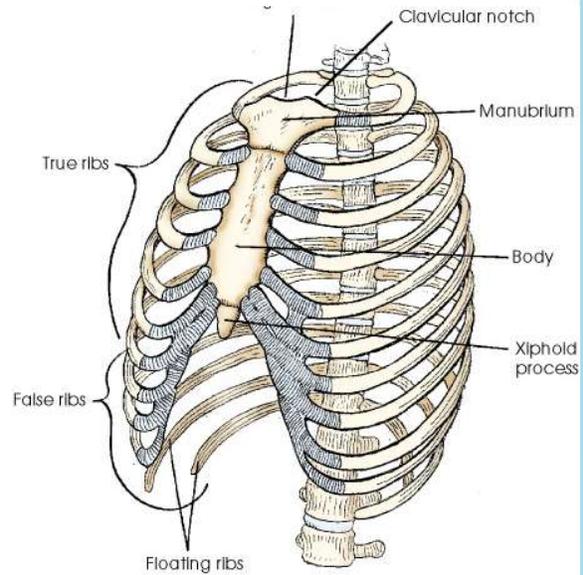
- Costovertebral Joint - the head connects to vertebral body
 - synovial gliding joints
- Costotransverse Joint - the tubercle connects to transverse process
 - synovial gliding joints



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Ribs

- **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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Ribs

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

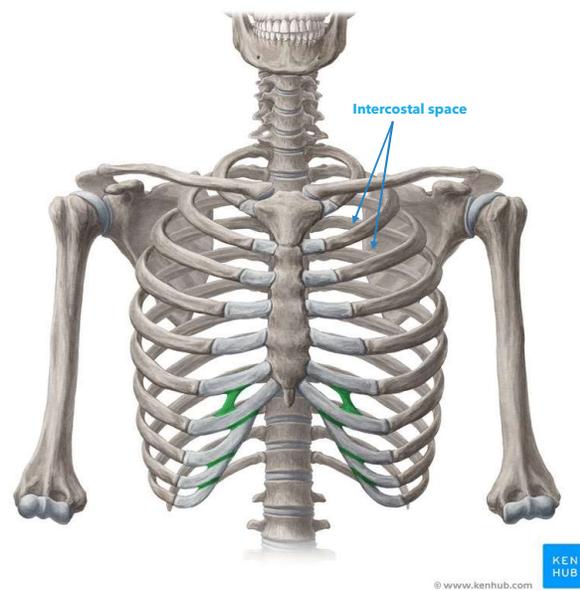


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Ribs

- Interchondral Joints - between costal cartilages of 6 - 7, 7 - 8, 8 - 9, and 9 - 10
 - synovial gliding joint
- Intercostal Space - space between each rib



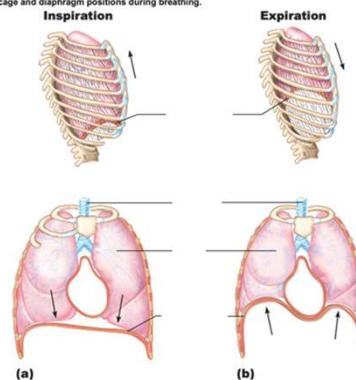
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Diaphragm Position

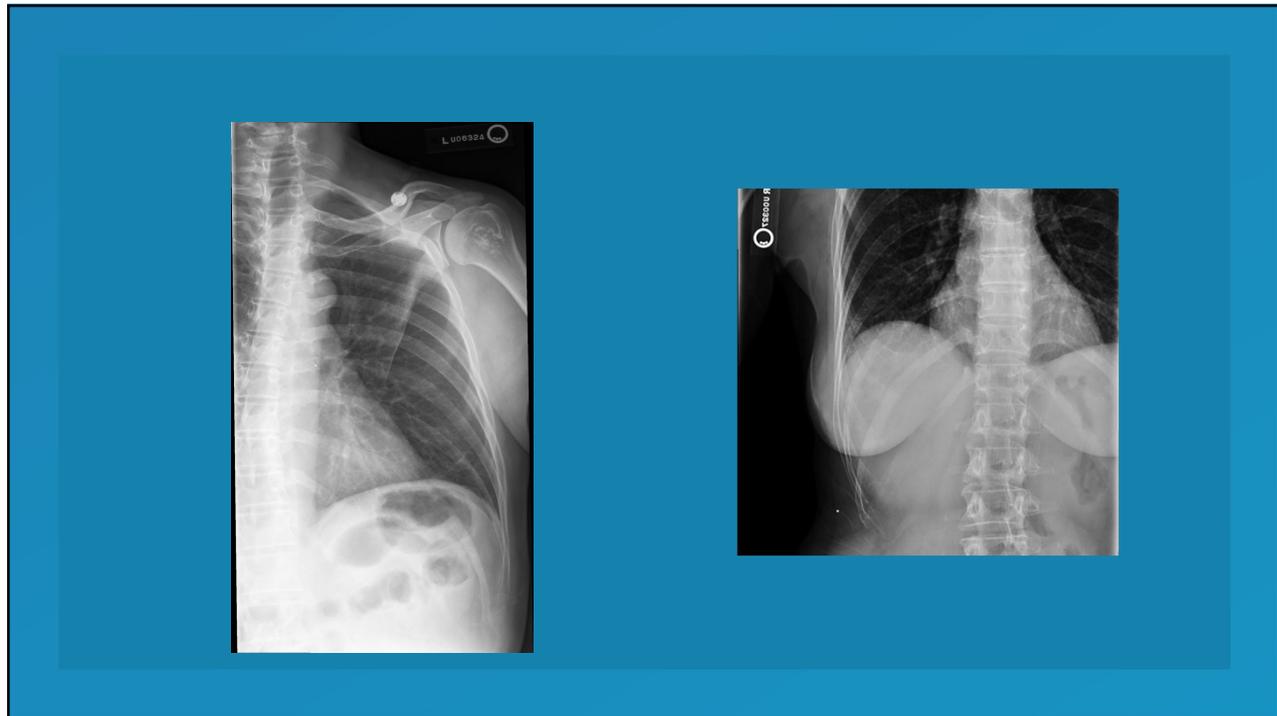
- The diaphragm moves approximately **1 ½"** between deep inspiration and deep expiration.
- Ribs located **above** the diaphragm (1-9) best examined on inspiration
- Ribs **below** the diaphragm (8-12) best examined on expiration

* Note: the rib cage is **widest** at 8th and 9th ribs *

Figure 37.1 Rib cage and diaphragm positions during breathing.



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Sternum

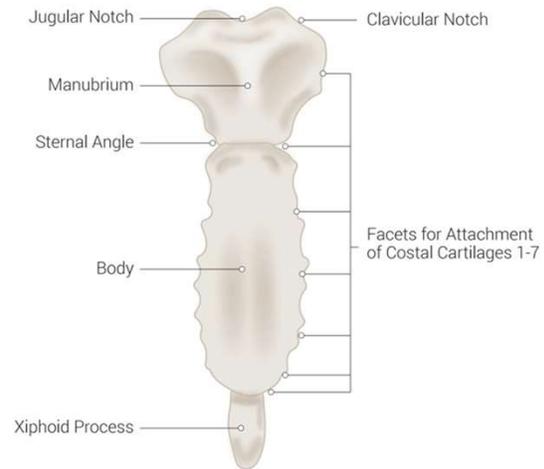
- The sternum is a flat bone
- Consists of 3 parts:
 - **Manubrium**
 - **Body**
 - **Xiphoid process**
- Supports clavicles and provides attachments to costal cartilages of first 7 ribs.

The illustration shows the sternum from a lateral perspective. It is divided into three distinct parts: the Manubrium at the top, the Body in the middle, and the Xiphoid Process at the bottom. The Manubrium is the uppermost, broadest part. The Body is the middle, elongated part with a serrated edge. The Xiphoid Process is the smallest, cartilaginous tip at the bottom.

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Manubrium

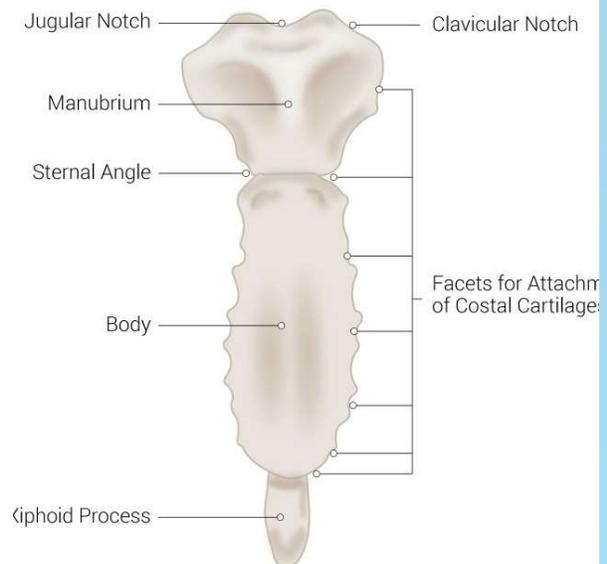
- Clavicular notches - on the superior lateral sides where the sternal end of the clavicles articulate
- Attachment of the clavicles to this area termed the Sternoclavicular joints (SC Joints)
 - synovial gliding joints



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Manubrium

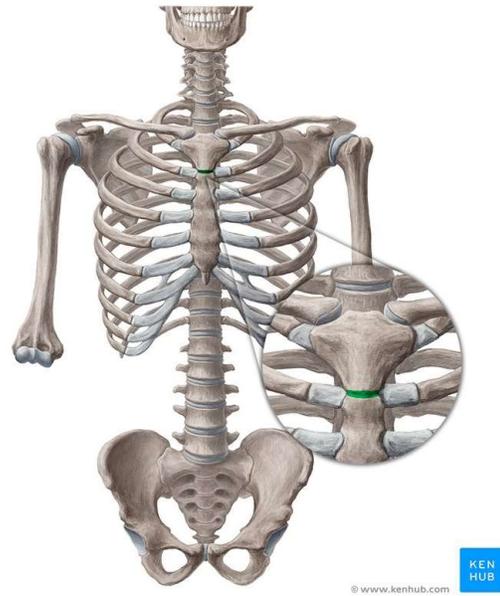
- Costal Notch - for the cartilage of the first rib attachment
- The jugular notch corresponds to **T2/T3** in the erect position of the average person.



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Manubriosternal Joint

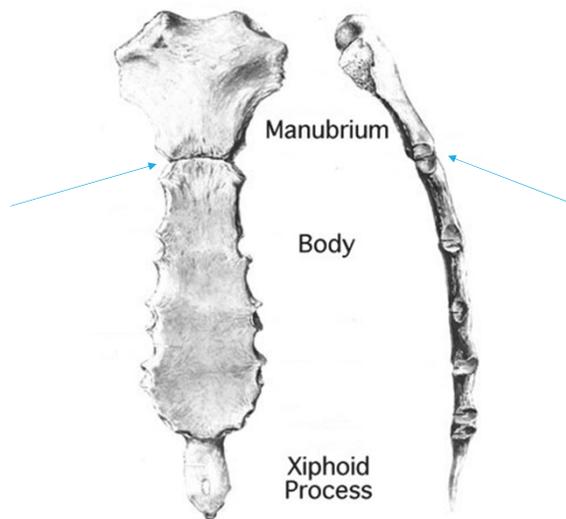
- Joint space between the manubrium and sternal body
 - cartilaginous symphysis joint with little to no movement



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Sternal Angle

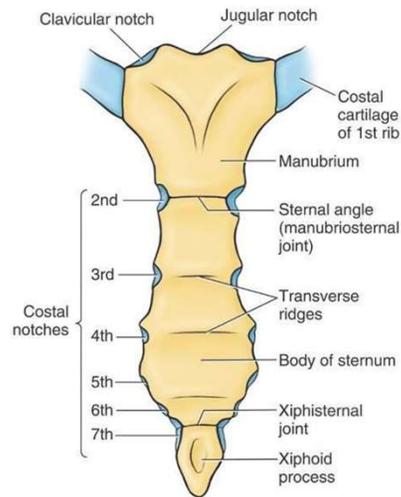
- At the manubriosternal joint - this area forms a slight angle; makes a palpable transverse ridge
- Corresponds to level of the **T4/T5** in the erect position of the average person



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Body of Sternum

- Costal Notches
 - Attachments of Ribs 2-7
 - Attachments of the costal cartilage to sternum are termed Sternocostal Joints
 - synovial gliding joints

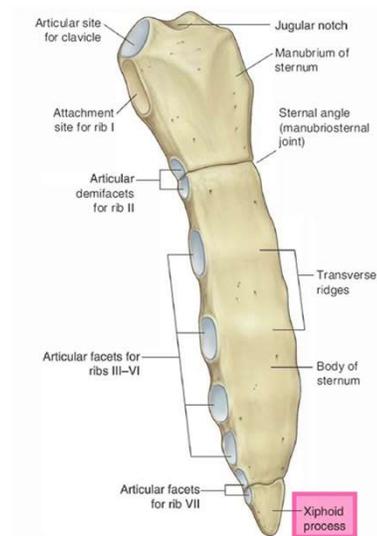


A Anterior view

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Xiphoid Process

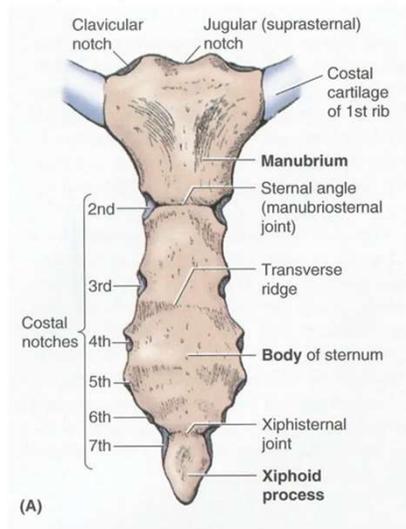
- Cartilaginous early in life then partially or completely ossifies later in life.
- Palpable and corresponds to the superior portion of liver and inferior aspect of the heart



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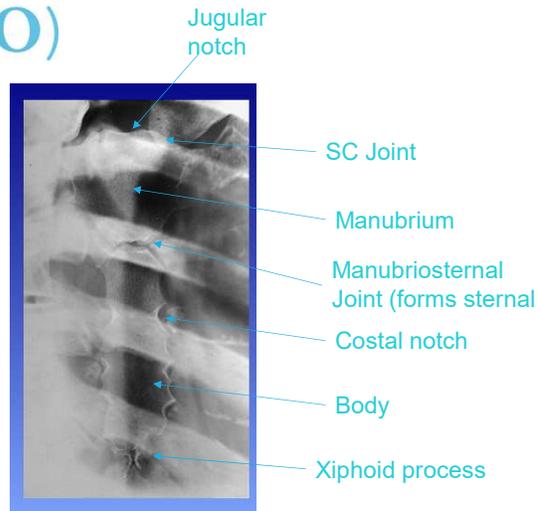
Xiphisternal Joint

- Joint space between the sternal body and xiphoid process
 - cartilaginous synchondrosis joint which allow little or no movement



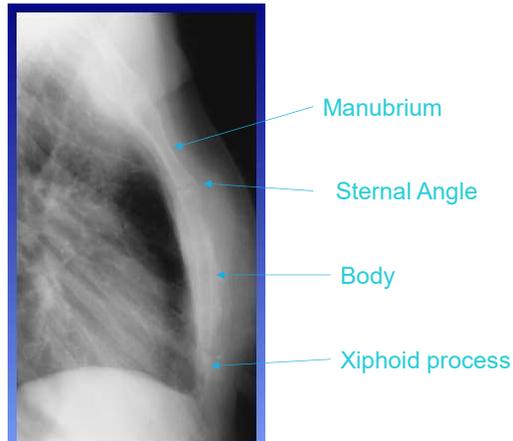
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Sternum (RAO)



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Sternum (Lateral)

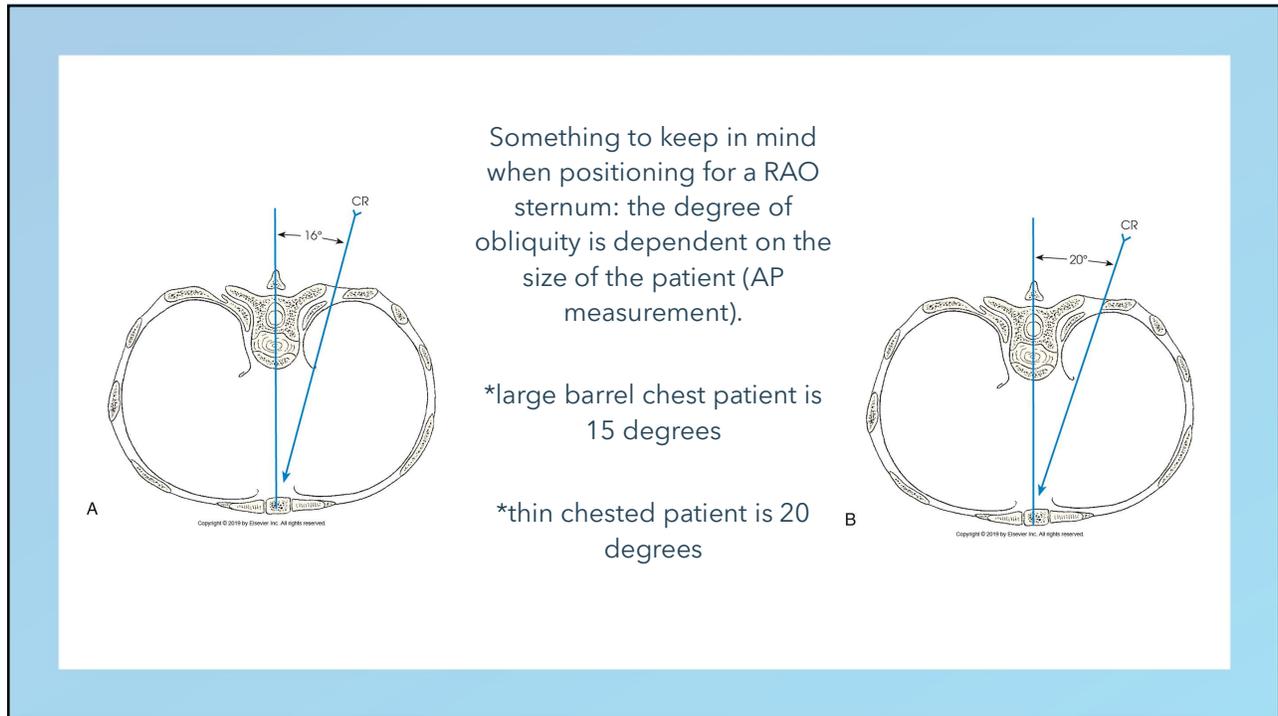


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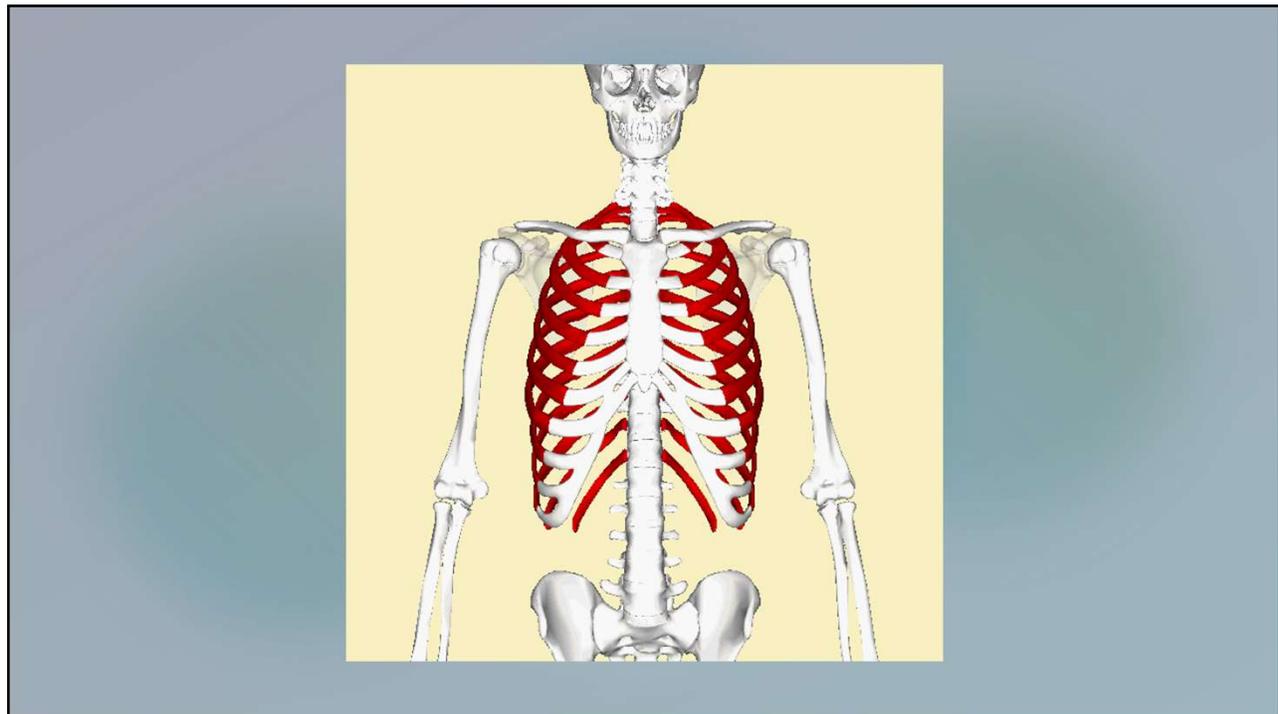
Landmarks Ribs/ Sternum

- 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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