

## INTRODUCTION TO THORAX

### STERNAL ANGLE (SE)(SA)

Sternal angle is the junction between the manubrium sterni and the body of the sternum.

It is also known as angle of Louis.

Location-

It is at the level of lower border of 4<sup>th</sup> thoracic vertebra.

### Events at sternal angle

Tracheal Bifurcation

Aortic arch starts and ends

Anterior ends of second rib

Boundary between the superior and inferior portion of the [mediastinum](#)

Passage of the thoracic duct from right to left behind esophagus

End of the azygos system into superior vena cava

Ligamentum arteriosum

### Clinical importance

It is a palpable surface marking which can be made use for counting ribs and intercostals spaces, as the anterior end of second rib is at the sternal angle.

### BOUNDARIES OF INLET OF THORAX(SA)

#### Boundaries of thoracic inlet

Posteriolly

Anterior border of the superior surface of body of first thoracic vertebra

Anteriorly

Upper border of manubrium sterni

Each side

Inner border of right and left first ribs and its costal cartilage.

## **STRUCTURES PASSING THROUGH THE THORACIC INLET(SA)**

### **Viscera**

Trachea, oesophagus, apices of lungs with suprapleural membrane.

### **Vessels**

brachiocephalic artery on the right side

Left common carotid and left subclavian artery on left side

Brachiocephalic veins

### **Nerves**

The following nerves pass through the thoracic inlet on the right and left side.

Phrenic nerves

Vagus nerves

Sympathetic trunks

First thoracic nerves

### **Muscles**

Sternohyoid, sternothyroid and longus colli.

## **BONES & JOINTS OF THORAX**

### **FIRST RIB (SA) (SE)**

#### **Distinguishing features**

It is shortest, broadest and most acutely curved.

Its shaft is flattened above downwards therefore it has superior and inferior surfaces and outer and inner borders.

Head of the rib has single articular facet.

Angle and tubercle of the rib coincide

It has no costal groove

Its anterior end is thicker and larger.

#### **Structures related and attached**

##### **Muscle Attachments**

scalenus anterior

Scalenus medius

Serratus anterior

subclavius

##### **Relations**

Superior surface anterior to scalene tubercle- subclavian vein

Superior surface posterior to scalene tubercle- subclavian artery and lower trunk of brachial plexus.

Inferior surface -costal pleura

### **TYPICAL THORACIC VERTEBRA(SE) (SA)**

The 2<sup>nd</sup> to 8<sup>th</sup> thoracic vertebrae are typical thoracic vertebrae.

Features of typical thoracic vertebra

Body- heart shaped, has demifacets on the the sides. The upper facet articulates with numerically corresponding rib. The lower facet articulates with rib below.

Pedicles - are directed straight backwards

Superior articular process- larger & present at junction of pedicle and lamina

Inferior articular process-smaller & fused to lamina

Transverse process- bear articular facet near its tip for the tubercle of the corresponding rib.

Lamina - overlap each other from above.

Spinous process- directed backwards and downwards.

Vertebral canal- comparatively small and circular.

### **FLOATING RIBS (SA)**

Ribs may be classified according to articulation

Vertebro- sterna - True ribs- 1<sup>st</sup> to 7<sup>th</sup> articulate with sternum.

Vertebro- chondral - 8<sup>th</sup> and 9<sup>th</sup> ribs articulate with costal cartilage of rib above.

Vertebral or floating ribs - 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> ribs articulate posteriorly with vertebrae but their anterior ends are free.

Distinguishing features of floating ribs

They have a single articular facet on the head.

11<sup>th</sup> and 12<sup>th</sup> ribs have no neck and no tubercle.

Their ends are pointed with tips covered by hyaline cartilage

12<sup>th</sup> rib provides attachment to quadratus lumborum , diaphragm and erectot ---- spinae group of muscles

### **CERVICAL RIB (SA)**

A cervical rib is a supernumerary (or extra) rib which arises from the seventh cervical vertebra

It may be a complete or partial rib.

Cervical rib is usually asymptomatic and is detected when a chest or neck X-ray is taken for some other purpose.

### Cervical rib syndrome

Symptoms occur due to the rib pressing on the nerves or blood vessels, as they go from the spinal column to the arm.

Sensory symptoms like pain and tingling numbness are complained of in the forearm and hand,

Motor symptoms include weakness of the arm and hand

Vascular symptoms - If the blood vessels like the subclavian artery are compressed, there may be bluish discolouration of the skin of that limb due to diminished blood supply or in rare cases frank gangrene of the fingers

### ATTACHMENTS OF STERNUM(SA)

The sternum has a body, manubrium (above the body), and xiphoid process (below the body).

#### Attachments

##### Manubrium

Anterior surface- pectoralis major, sternomastoid

Posterior surface sternohyoid, sternothyroid

##### Body of sternum

Anterior surface- pectoralis major,

Posterior surface- sternocostalis muscle

##### Xiphoid process

Anterior surface- rectus abdominus, external and internal oblique muscles

Posterior surface- diaphragm

Lateral borders- internal oblique and transverses abdominus.