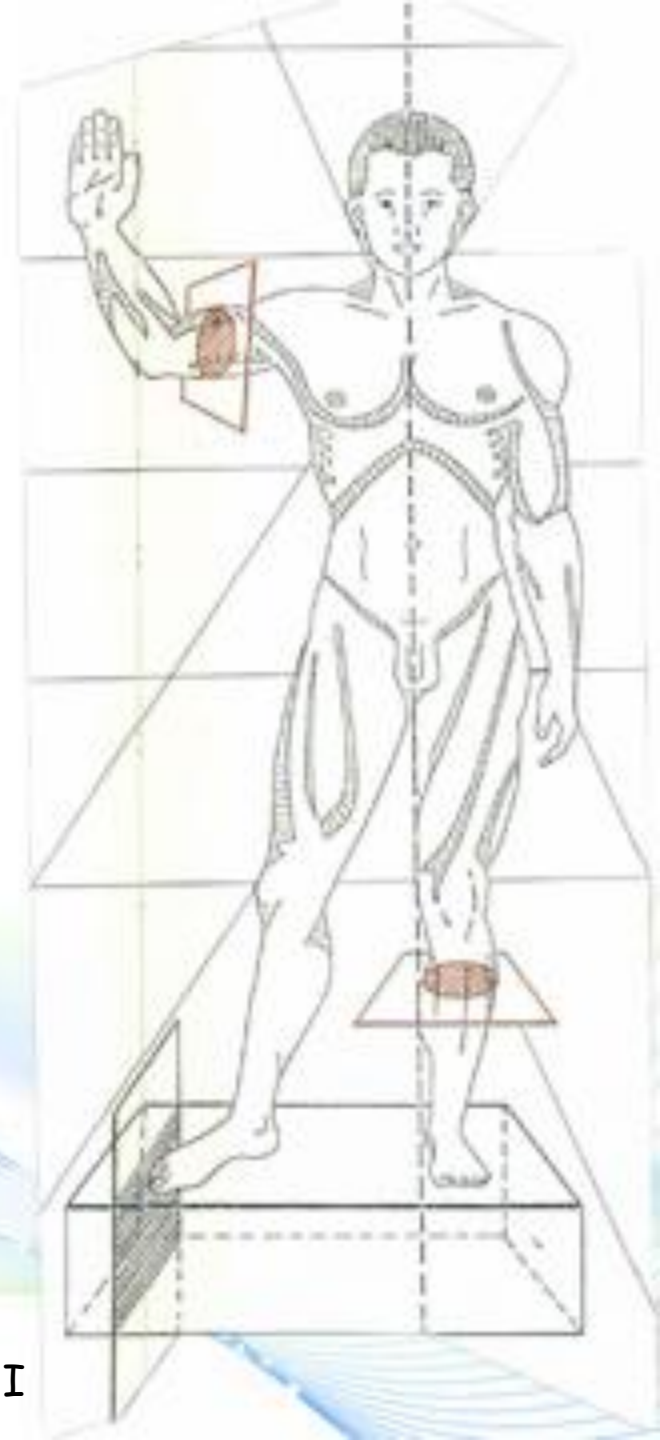
MARRAKECH
جامعة القاضي عياض
UNIVERSITÉ CADI AYYAD
كلية الطب
والصيدلة - مراكش
FACULTÉ DE MÉDECINE
ET DE PHARMACIE - MARRAKECH
ANATOMIE
FMPM

THE THORACIC WALL



PR.M.D EL AMRANI PR. H.FENANE DR.CHAIMA KASSI

Plan :

I. INTRODUCTION

I. THORACIC CAGE
- A- General overview
- B- Sternum
- C- Ribs
- D- Thoracic spine
- E- Thoracic joints

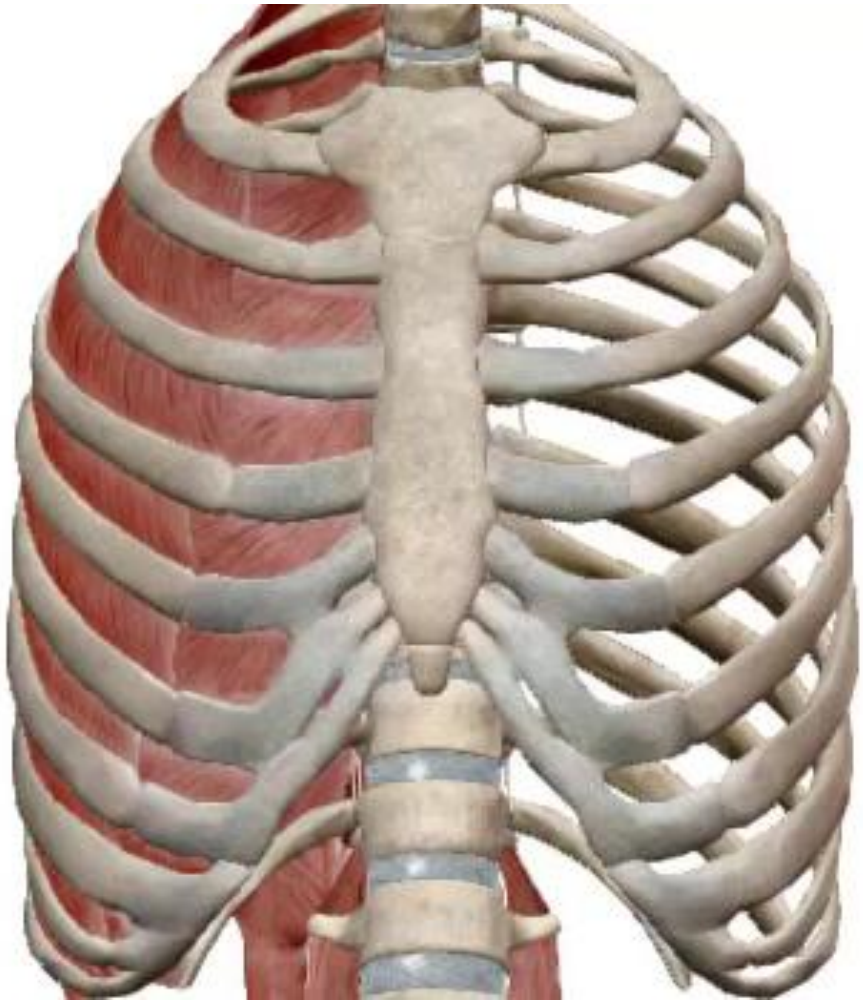
II. INTRINSIC MUSCLES OF THE THORAX

I. OSTEO-MUSCULAR COVERING LAYERS

II. VASCULARIZATION - INNERVATION

VI. CLINICAL APPLICATIONS

VII. CONCLUSION



I. INTRODUCTION :

The thoracic wall is made up of an osteocartilaginous framework.

II. THORACIC CAGE:

A- General overview :

The thoracic cage has the shape of a cone, made up of :

- **Muscular elements**
- **Skeletal elements,**

With a superior opening and a larger inferior opening.

I. INTRODUCTION :

The thoracic wall is made up of an osteocartilaginous framework.

II. THORACIC CAGE:

A- General overview :

The thoracic cage has the shape of a cone, made up of :

- **Muscular elements**
- **Skeletal elements,**

With a superior opening and a larger inferior opening.

a- External configuration:

- Anterior surface,
- Posterior surface,
- Lateral surfaces.

I. INTRODUCTION :

The thoracic wall is made up of an osteocartilaginous framework.

II. THORACIC CAGE:

A- General overview :

The thoracic cage has the shape of a cone, made up of :

- **Muscular elements**
- **Skeletal elements,**

With a superior opening and a larger inferior opening.

a- External configuration:

- Anterior surface,
- Posterior surface,
- Lateral surfaces.

b-Superior opening:

- It is limited by :
  - Anteriorly : **the jugular notch,**
  - Laterally : **the first ribs.**
  - Posteriorly : **T1.**

- Its diameter is :
  - **5 cm sagittally**
  - **10 cm transversally**

c- Inferior opening:

- It is limited by:
  - Anteriorly : **the infrasternal angle.**
  - Posteriorly : **T12 and the 12th thoracic ribs.**
  - Laterally: **the lower border of last costal cartilage.**

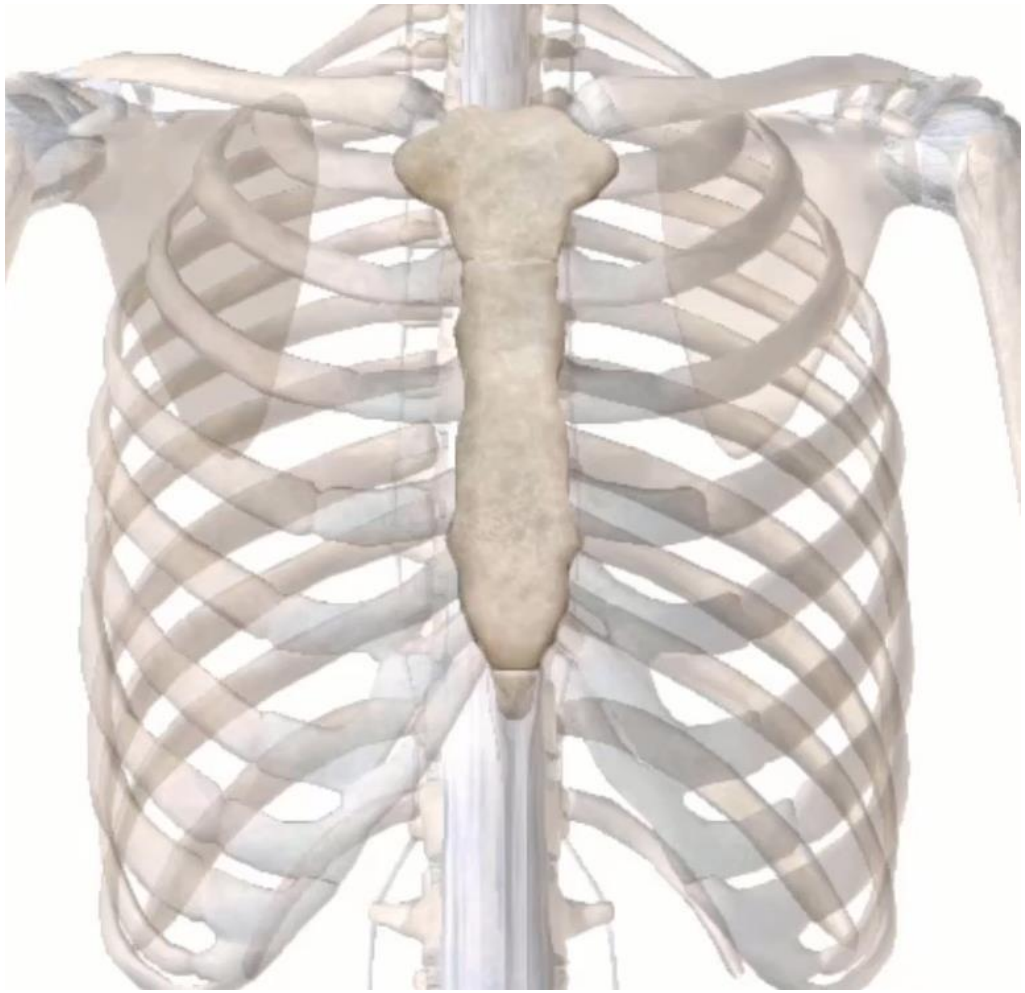
B- Sternum

- The sternum is an impair and median bone.
- It is composed of :
  - **the manubrium sterni,**
  - **the body,**
  - **the xyphoid process.**

- These parts are united by:

- The manubriosternal symphysis,
- The xiphosternal synchondrosis.

- It measures **15 to 20 cm** in length and **5 to 6 cm** in width.



B-Sternum :

- **2 surfaces :**

  - Anterior surface,
  - Posterior surface.

- **3 borders :**

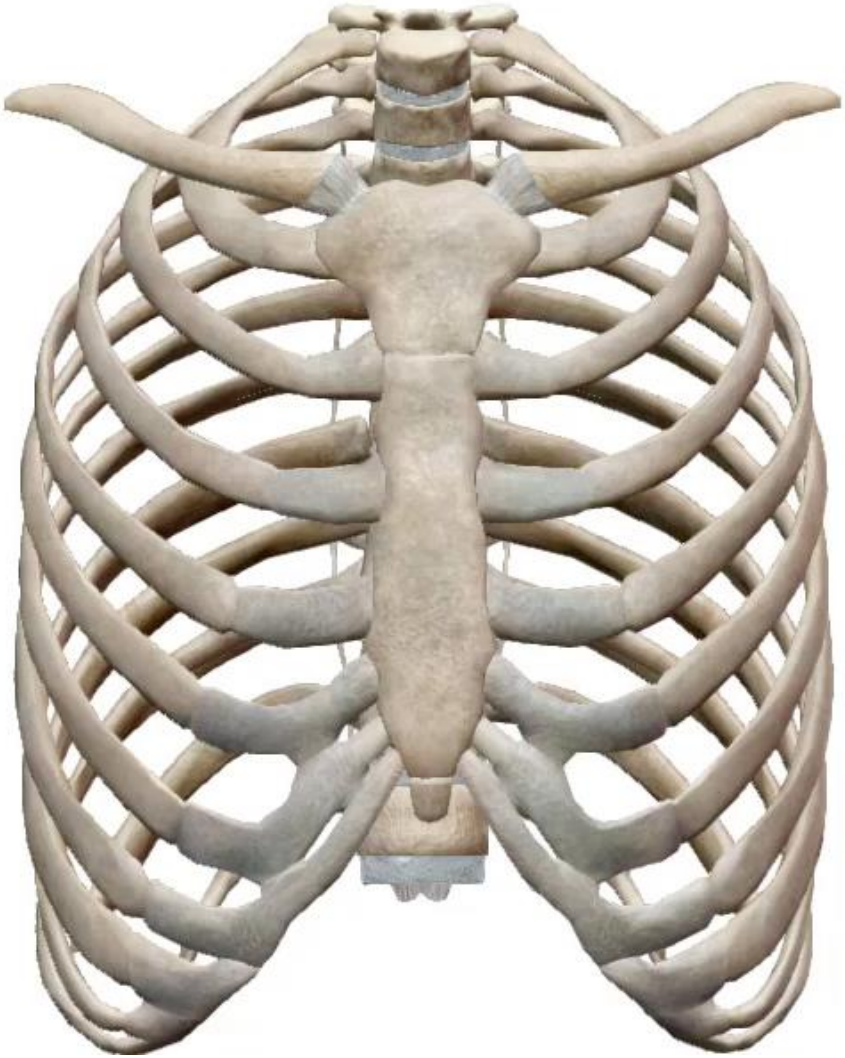
  - 2 lateral borders,
  - 1 superior border.

C-Ribs :

- The ribs are flat, long and curved bones.

- The are 12 ribs on each side, numbered from 1 to 12:

- **True ribs** : from the 1st to the 7th.
- **False ribs** : from the 8th to the 10th.
- **Floating ribs** : the 11th and the 12th.
- The ribs from 1 to 7 are called **sternal ribs.**
- Those from 8 to 12 are called **asternal ribs**.



a-General characteristics of ribs 3 to 9 (typical rib) :

- The typical rib is medially concave, tilted downward and forward, with a slight medial twist of its anterior part.

- Each rib, from back to front, presents :

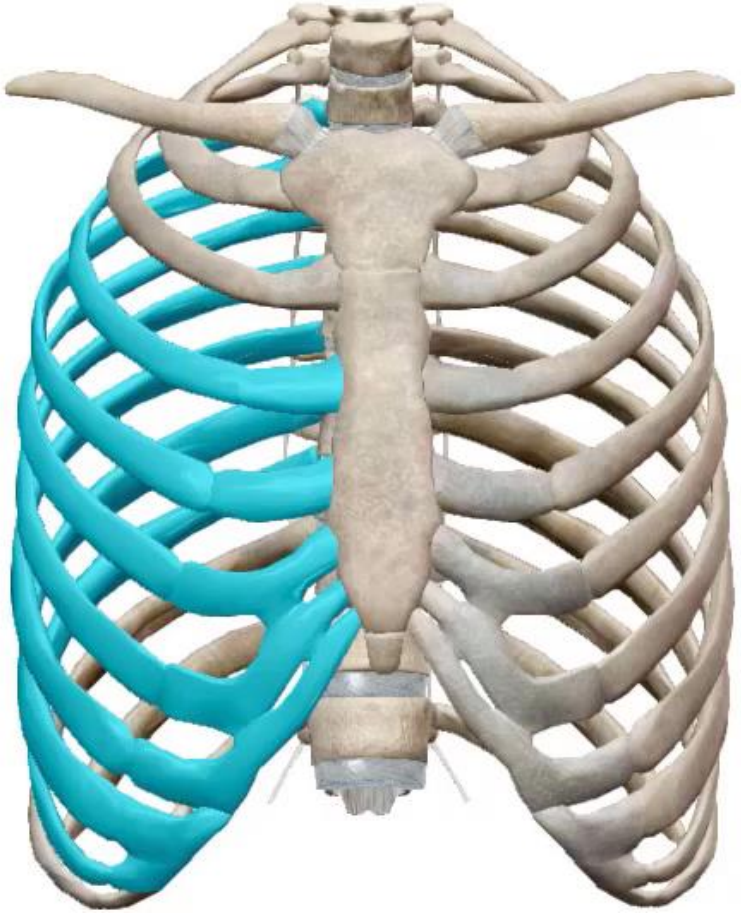
  -A head,

  -A neck,

  -A tubercle,

  -A body.

- The anterior end continues with **costal cartilage.**

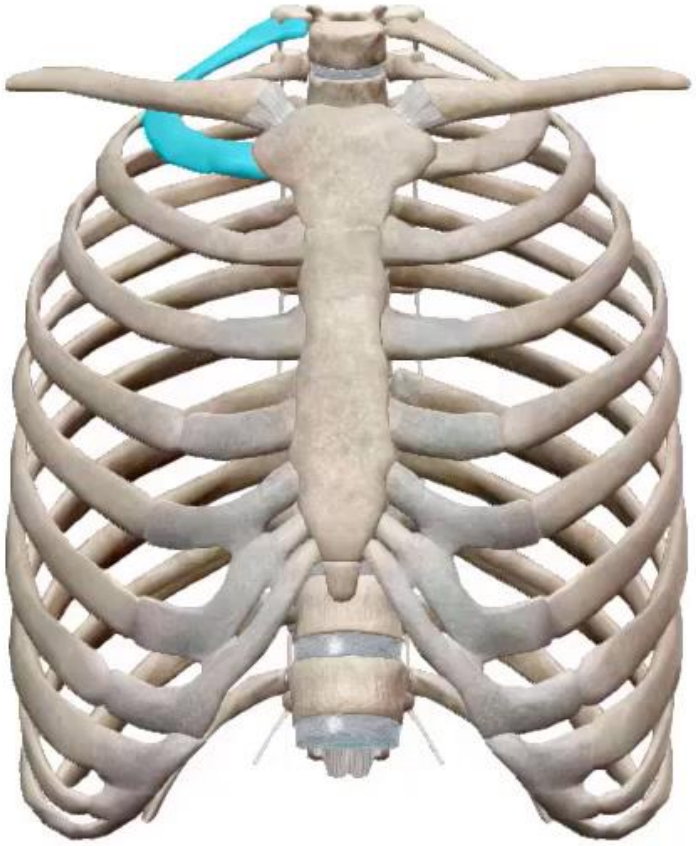


b- Characteristics of the first rib :

- It is shorter and smaller than the other ribs.
- Its head has only one articular surface for T1.
- Its neck is thin and rounded.
- Its body has :

- 2 surfaces : superior and inferior.

- 2 edges : medial and lateral.

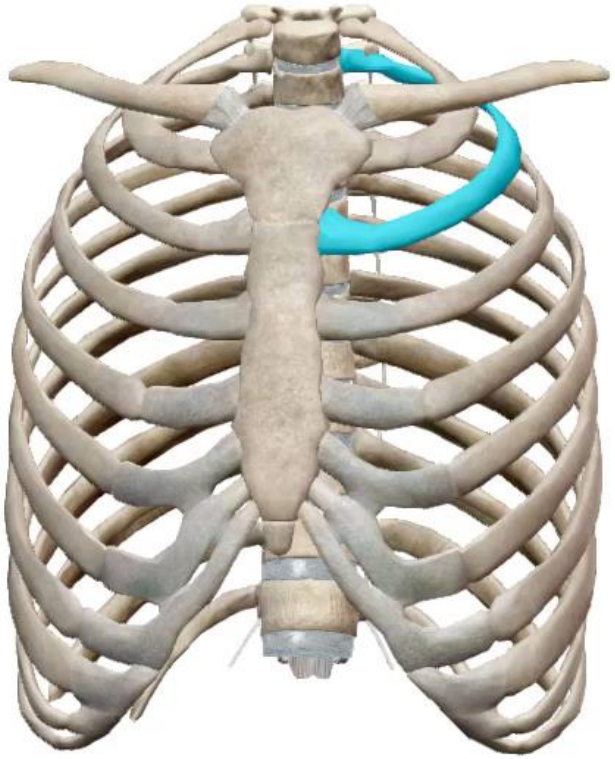


c- Characteristics of the second rib :

- It is as twice as long as the first rib.

d- Characteristics of the 11th and 12th rib :

- They do not have a tubercle and only present one articular surface for the T11 and T12 vertebrae.

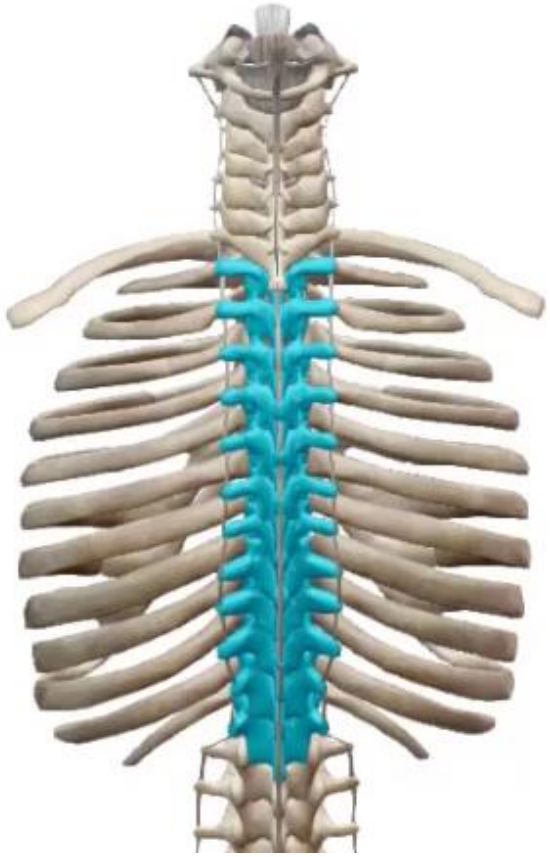


D-Thoracic vertebrae:

- The are 12 thoracic vertebrae.

a-General characteristics of the thoracic vertebrae:

- The thoracic vertebra has :
  - A vertebral body,
  - Two pedicles,
  - Two vertebral laminae,
  - A spinous process,
  - Two transverse processes,
  - Articular processes,
  - A vertebral foramen.



E-Thoracic joints:

a- The sternocostal joints,

b- The interchondral joints,

c- The costochondral joints,

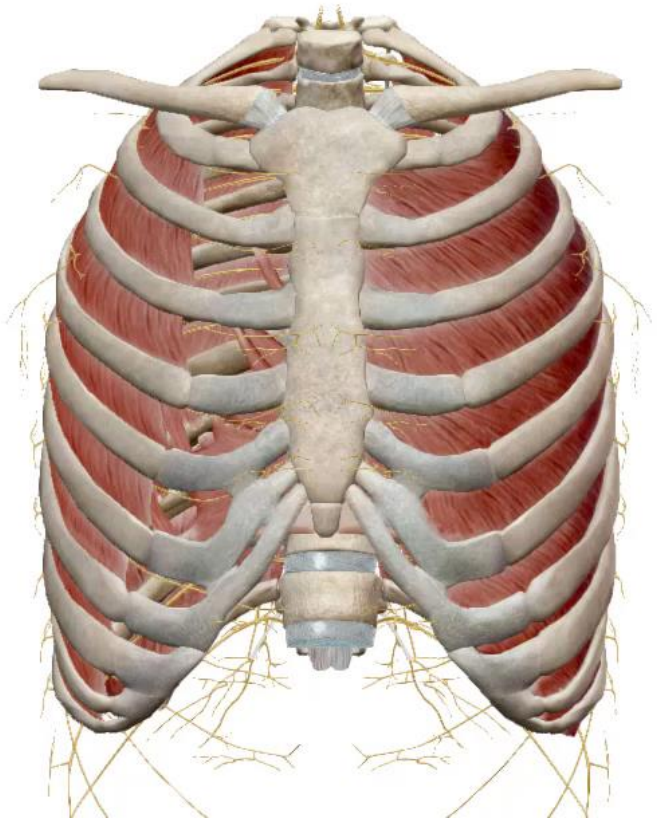
d- The costovertebral joints :

That are composed of :

- ✓ The costocorporeal articlation,
- ✓ The costotransverse articulation.

III. INTRINSIC MUSCLES

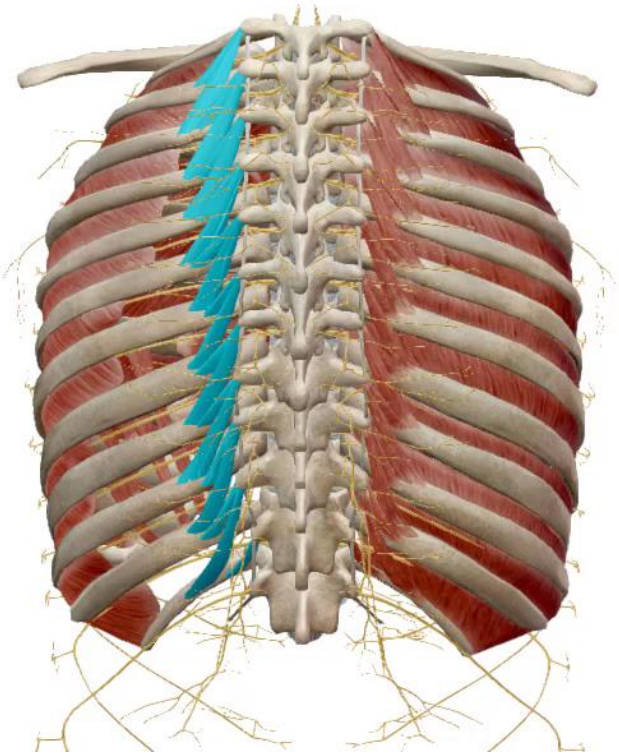
- The are fully inserted on the thoracic cage.
- They include :
  - ✓ External thoracic muscles,
  - ✓ Intercostal muscles,
  - ✓ Internal thoracic muscles.
- The innervation is provided by the intercostal nerves.



III. INTRINSIC MUSCLES

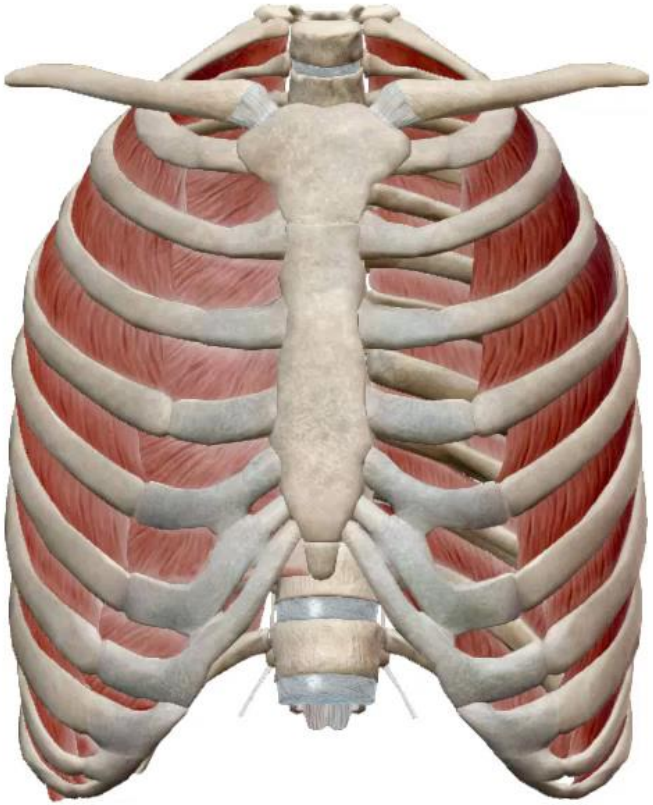
A- The external thoracic muscles :

- They originate from **the apex of the transverse processes of the ribs from C7 to T11.**
- They insert on the **first 12 ribs.**
- They elevate the ribs, making them **inspiratory muscles.**



B- The intercostal muscles :

- They are located in each intercostal space and include, from outside to inside :
  - The external intercostal muscle,
  - The internal intercostal muscle,
  - The innermost intercostal muscle.

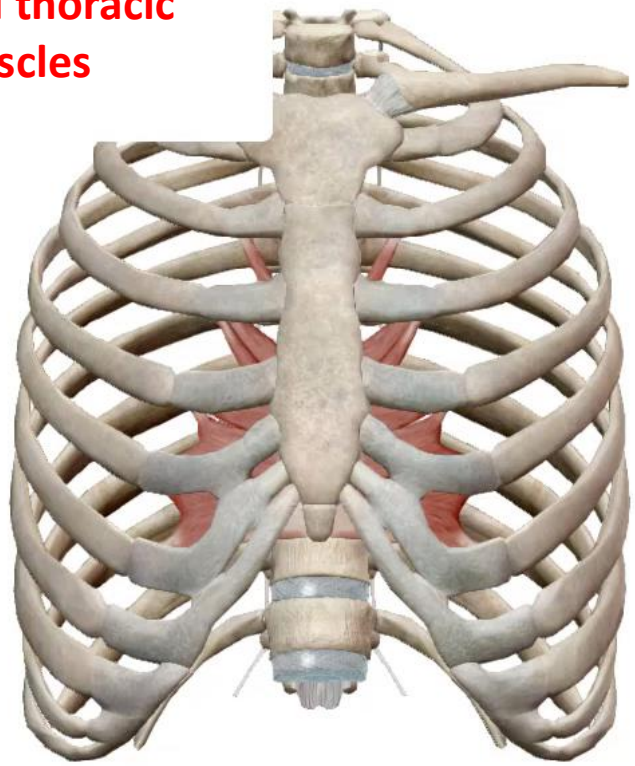


C- The internal thoracic muscle :

- The transverse thoracic muscles :

- They originate from the posterior surface of the xypoid process and extend toward the 3rd and 4th rib, as well as the 3rd and 6th costal cartilages.

Internal thoracic muscles



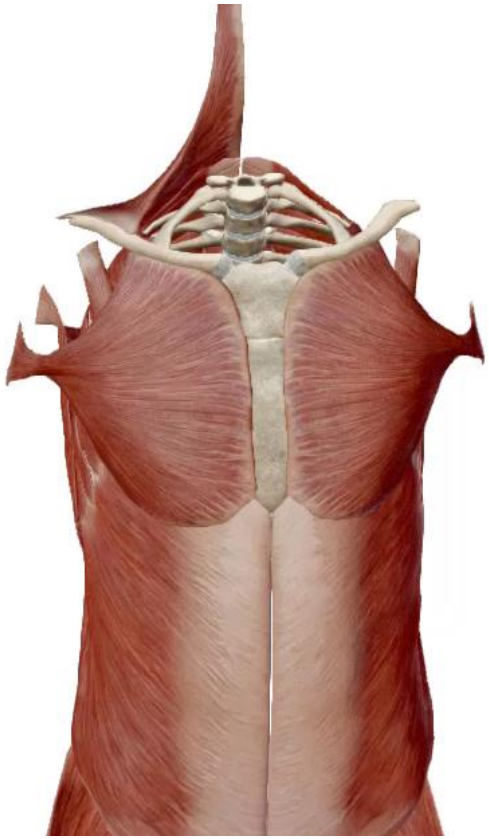
IV. Cutaneous and muscular coverage layers:

- They are arranged from superficial to deep and include:

- The skin,
- The subcutaneous tissue,
- The fascia,
- The muscular layers.

The muscular layers :

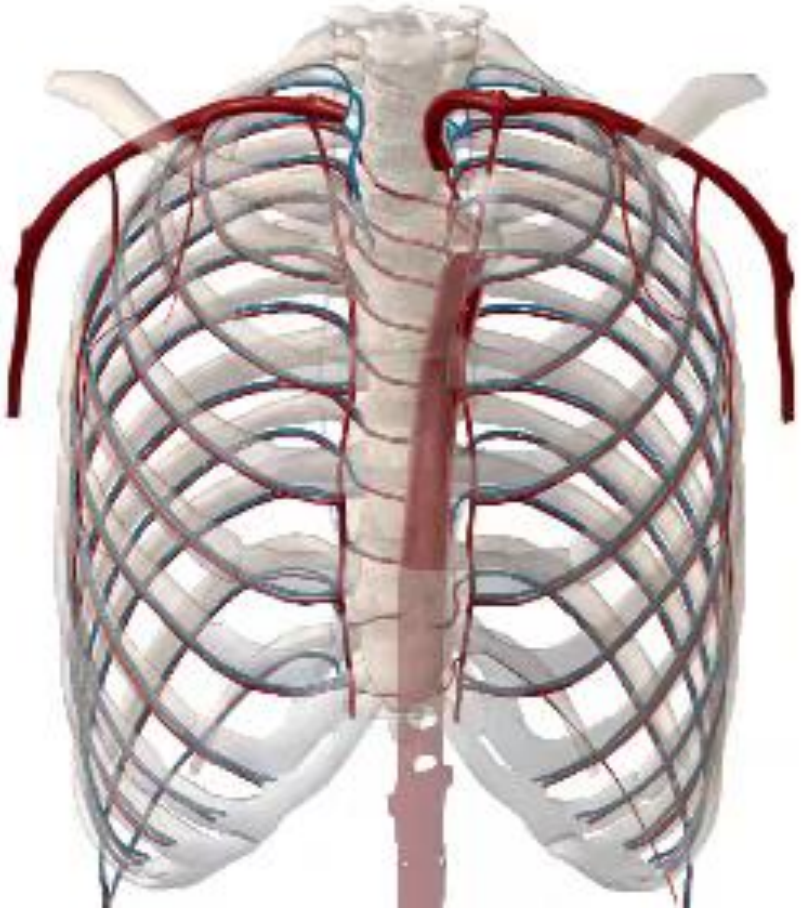
- They are organised into two layers :
- Posteriorly :
  - ✓ The trapezius and latissimus dorsi,
  - ✓ The rhomboid and serratus anterior muscles
- Anteriorly :
  - ✓ The pectoralis major.
- Laterally :
  - ✓ The serratus anterior and the external oblique muscles.



V. VASCULARIZATION – INNERVATION:

A-Arterial blood supply :

- The thoracic aorta :
  - ✓ Posterior intercostal arteries,
  - ✓ Subcostal arteries.
- The subclavian artery :
  - ✓ Internal thoracic artery,
  - ✓ Superior intercostal artery.
- The axillary artery :
  - ✓ Superior thoracic artery,
  - ✓ Lateral thoracic artery.



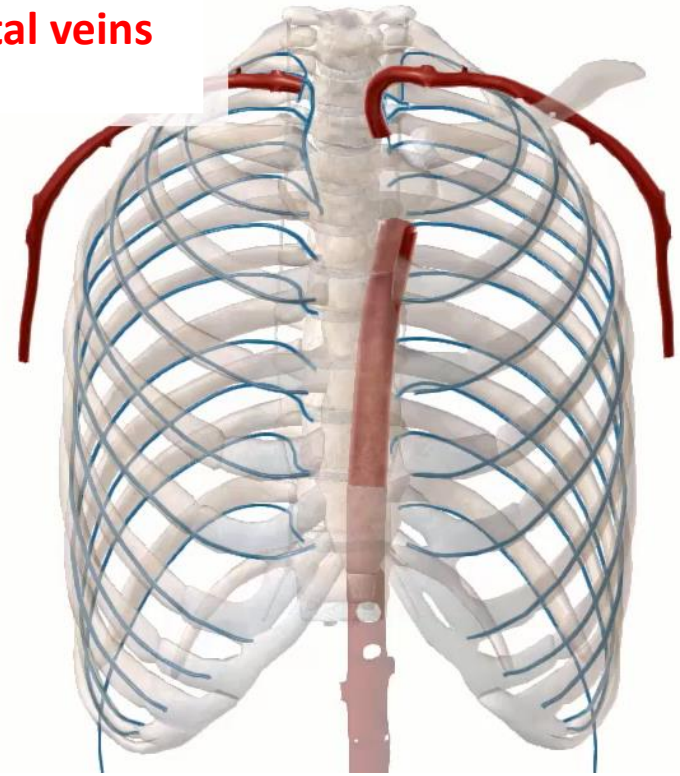
B-Venous blood supply :

- Intercostal veins.

C-Innervation :

- Intercostal nerves.

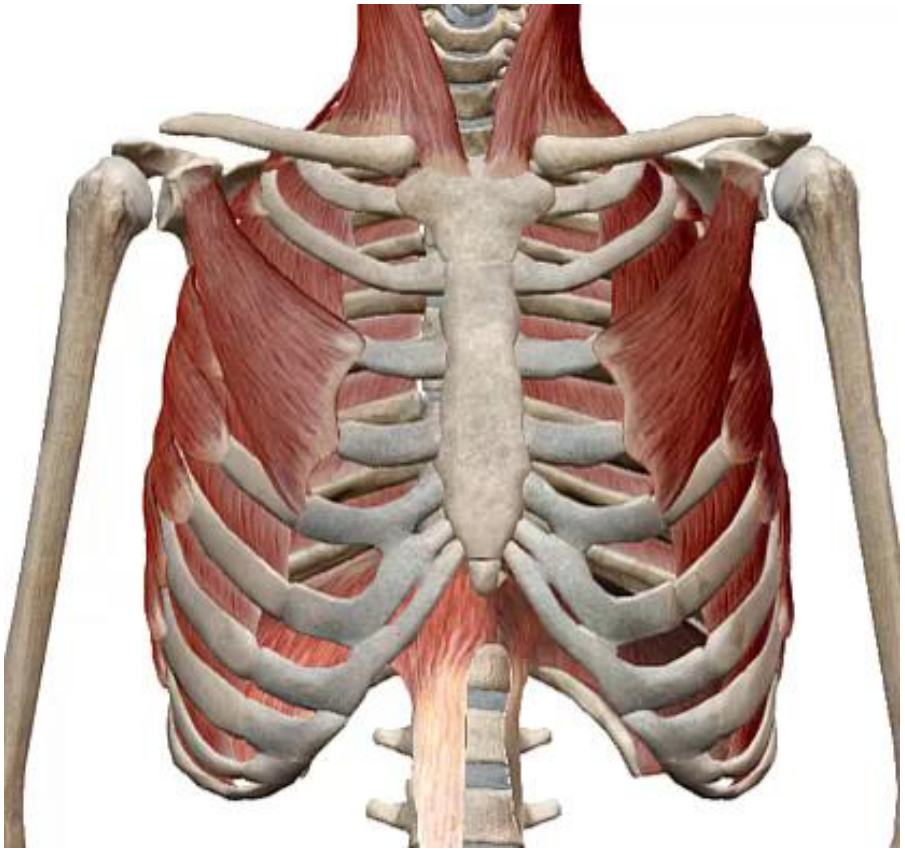
Intercostal veins



VI. CLINICAL APPLICATIONS:

Movements of the thoracic cage :

- The thoracic cage is elastic.
- It moves with each respiratory cycle, between a position of maximal expiration and a maximal inspiration.



VII.CONCLUSION :

- The thoracic wall is an osteocartilaginous and muscular structure articulated with the thoracic spine, whose integrity is essential for proper respiratory mechanics.
- Its anatomical study is crucial for a throughout understanding of the pathology of its various components.