

وَبِقَوْلِ رَبِّيَ عَلِيمًا



RESPIRATORY SYSTEM

HAYAT BATCH



SUBJECT : Anatomy

LEC NO. : 6

DONE BY : Ruba Almshaqba



Respiratory system

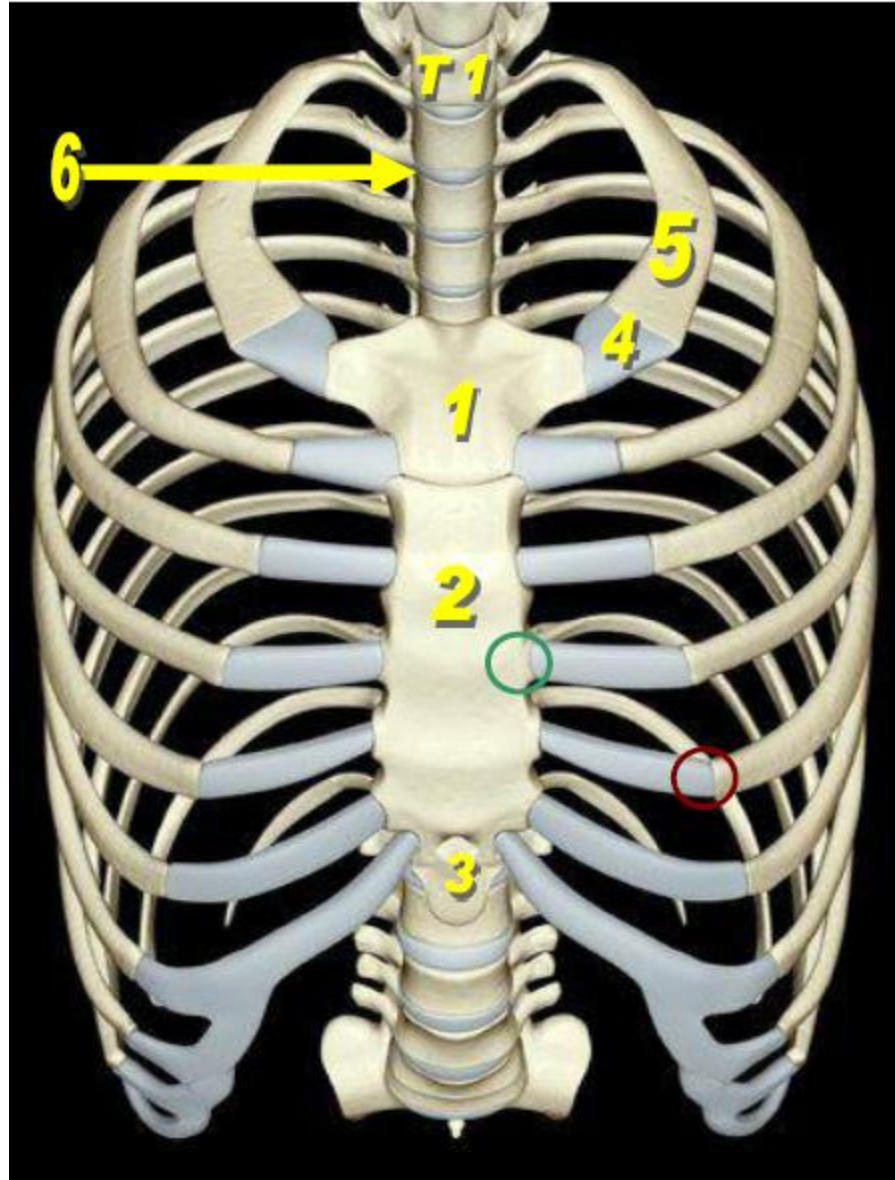
Thoracic cage & intercostal muscles

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Bones of the thorax

Lateral border of sternum attached with (1-7) costal cartilage by sternochondral



- 1- Manubrium
 - 2- Body of sternum
 - 3- Xiphoid process
 - 4- 1st costal cartilage
 - 5- 1st Rib
 - 6- Intervertebral disc
- } Sternum
○ Sternocostal joint between the sternum and the costal cartilage
○ Costochondral joint between the costal cartilage and the rib.

Boundries	Thoracic inlet	Thoracic outlet
posterior	T1 vertebra	T12 vertebra
lateral	1 st rib	11 th and 12 th rib
Anterior	Manbrium sterni	Costal margin and xiphoid process

Handwritten scribble

STERNUM

***Type:** flat bone.

***Site:** Anterior chest wall

1. Jugular notch.

2. Clavicular notch.

***Parts:** Manubrium sterni, body and Xiphoid process

***Joints formed by:**

1. Sternoclavicular joint .

(saddle synovial J).

2. 1st sternocostal joint.

3. Manubrio-sternal joint (sternal angle)

(2ry cartilagenous J).

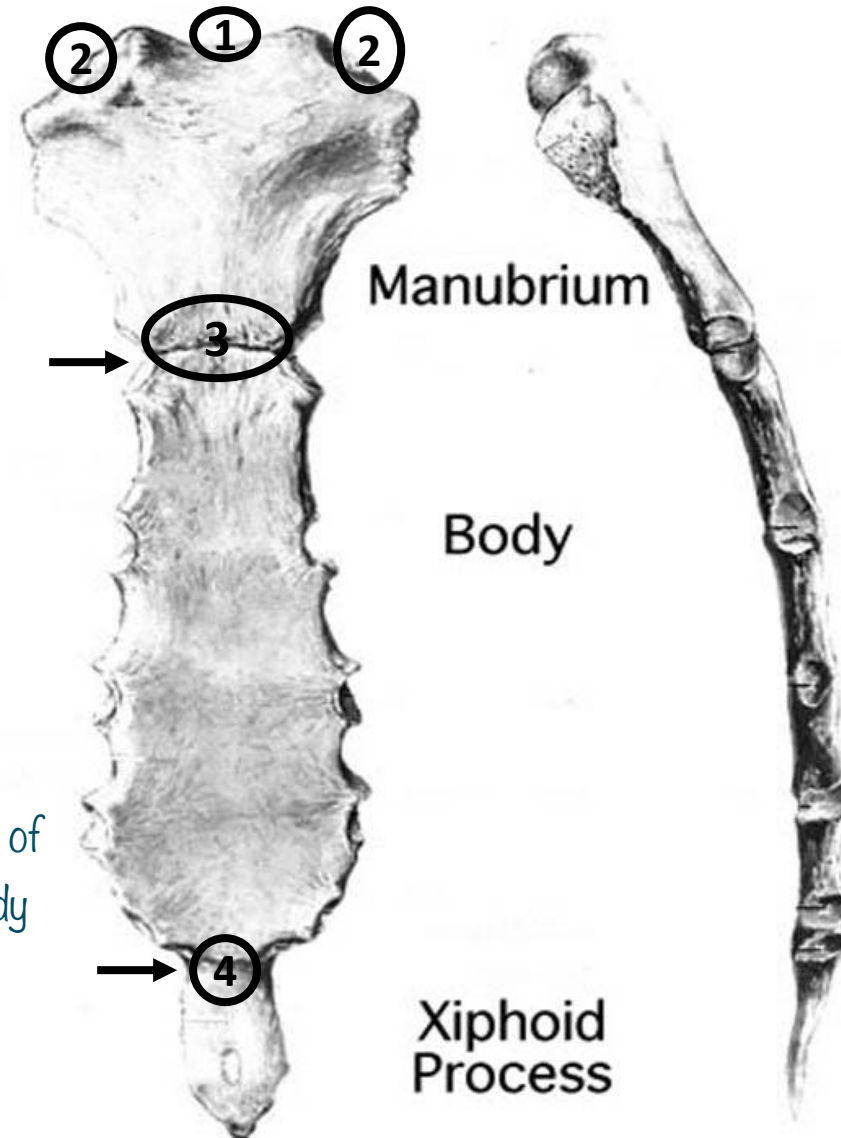
4. Xiphi-sternal joint

(2ry cartilagenous J)

Pass Interval Jugular
vein

between the
xiphoid process
and the body of
the sternum.

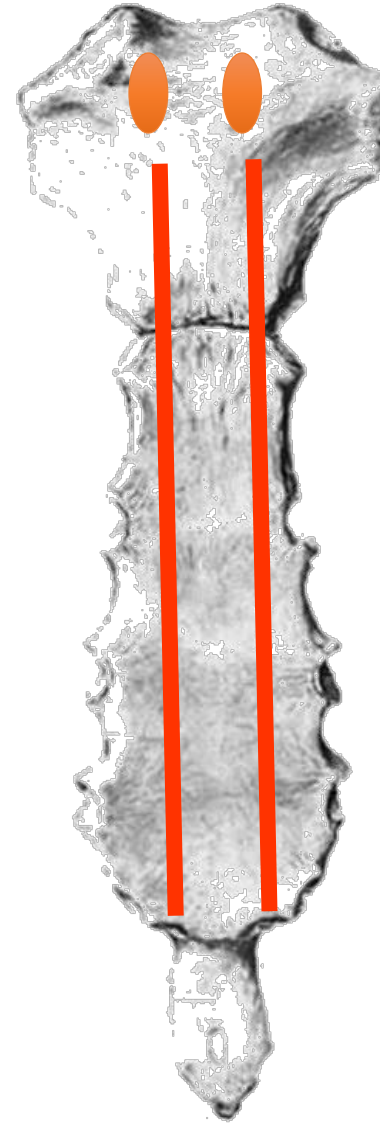
between the manubrium of
the sternum and the body
of the sternum



Anterior surface

**the structure attached
to the marked area:**

Pectoralis major muscle It originates from the sternum,





**the structure related to
the back of sternum** posterior surface
(the marked area)

Upper half of Manubrium related to

1. Lt. brachio-cephalic V.

Lower half of Manubrium related to

2. Arch of aorta.

Right side of body related to

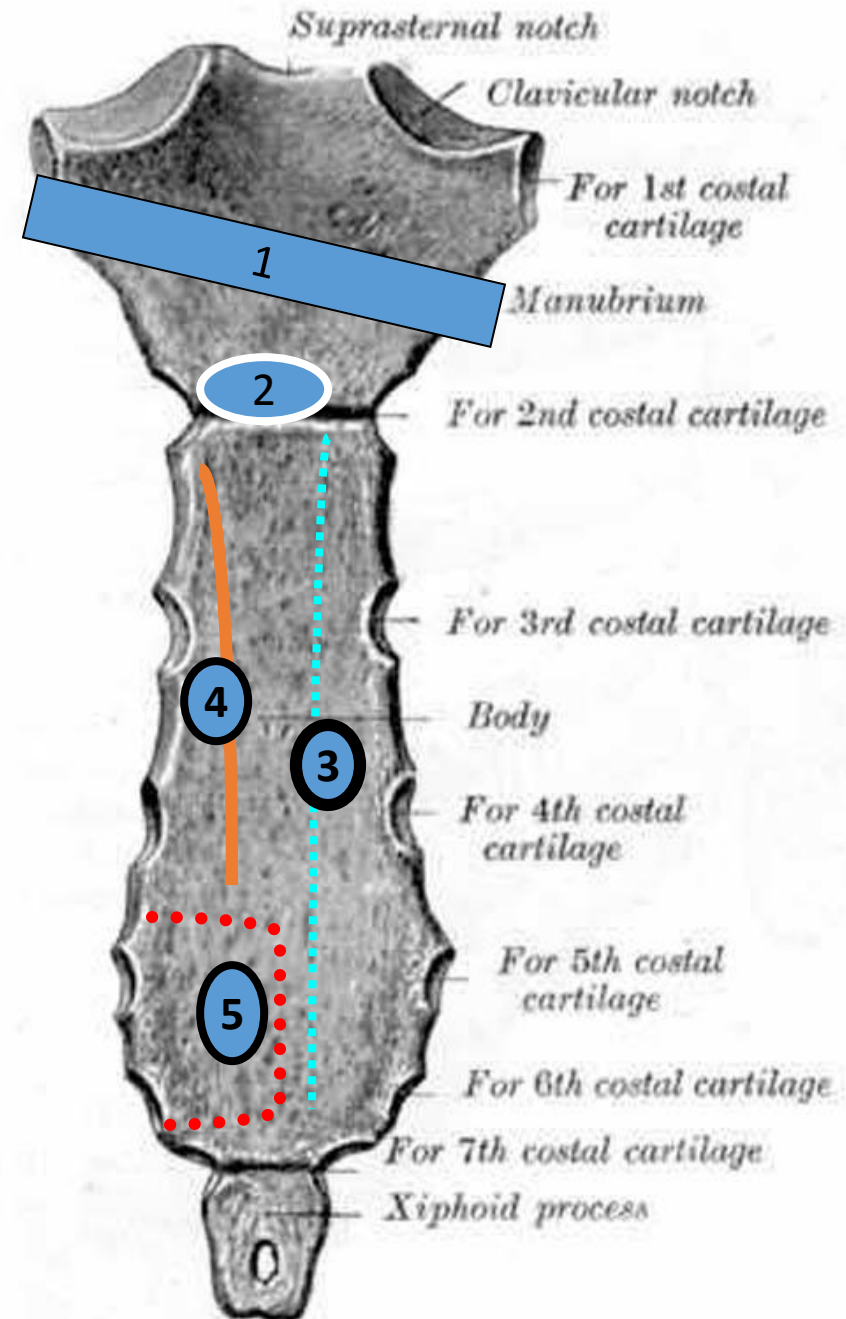
3. Right lung & Rt. Pleura.

upper ($\frac{2}{3}$) of left side of body

4. Left lung & Lt. pleura.

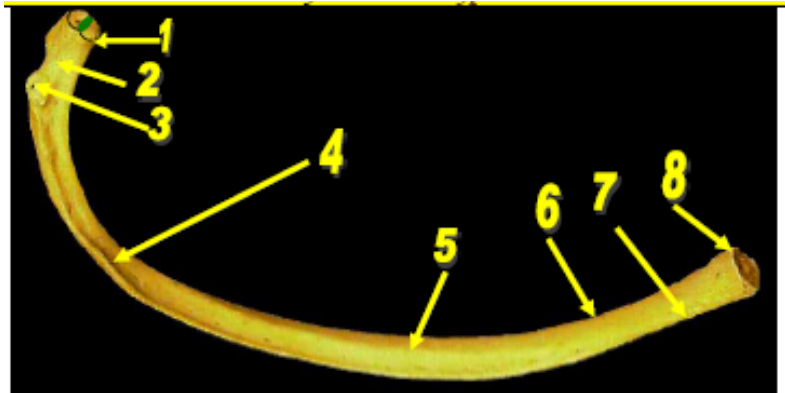
Lower ($\frac{1}{3}$) of left side of body

5. Heart & pericardium.



Typical rib

RIBS



1- Head
2- Neck
3- Tubercle
4- Costal groove
5- Inner surface
6- Upper border <i>round border</i>
7- Lower border <i>Sharp border</i>
8- Anterior end (concave)
9- Rib angle
○ ○ Two articular demifacets separated by a crest

connects the head of ribs to the vertebrae

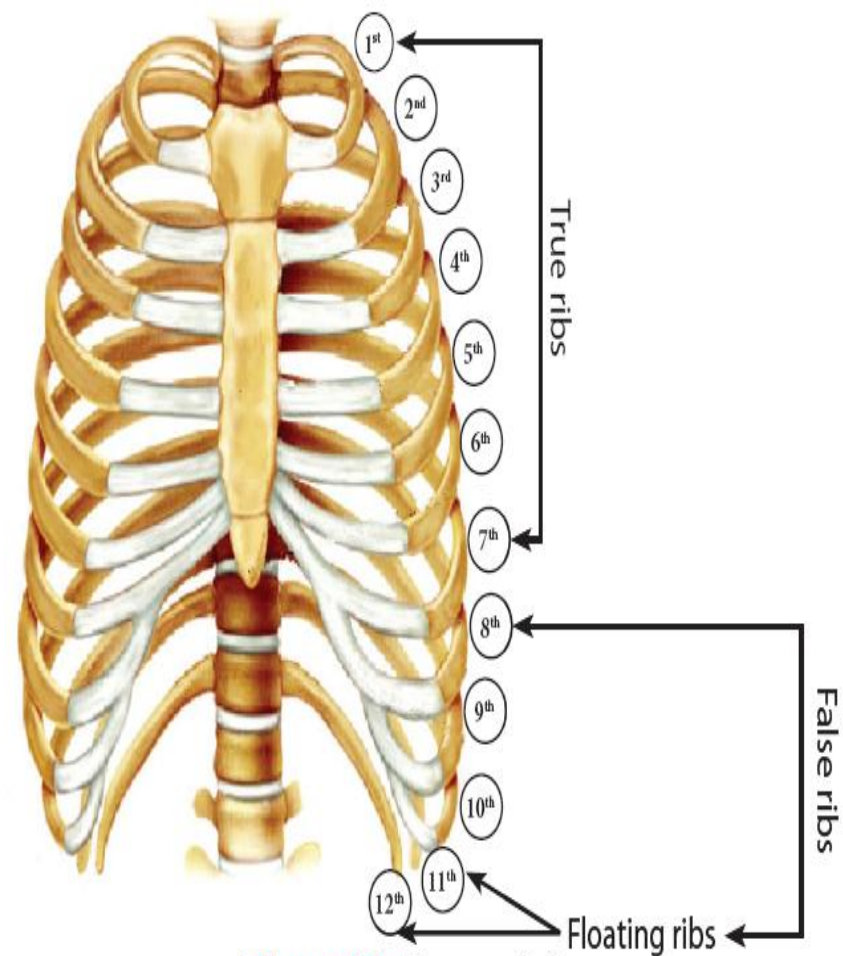


Figure (8): Types of ribs.

Joints formed by the rib:

1-costovertebral joint: plane synovial joint.

2-costotransverse joint: plane synovial joint.

between the tubercle of a rib and the transverse process of the corresponding thoracic vertebra

How to identify a rib?

Look to the head of the rib

Has 2 facets

Look to the shaft

Has outer surface & inner surface

Typical rib

Has supero-lateral & infero-medial surfaces
(rests on table)

Second rib

Has 1 facet

Look to the shaft

Has superior & inferior surfaces
(flat & short)

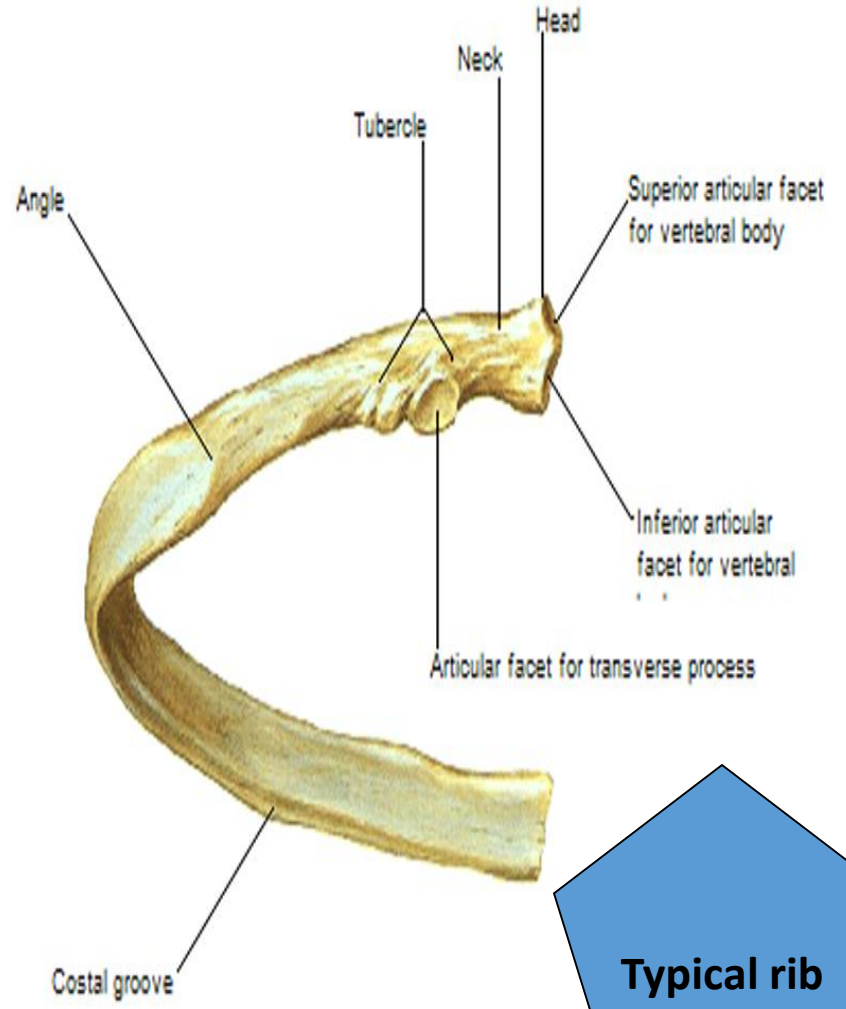
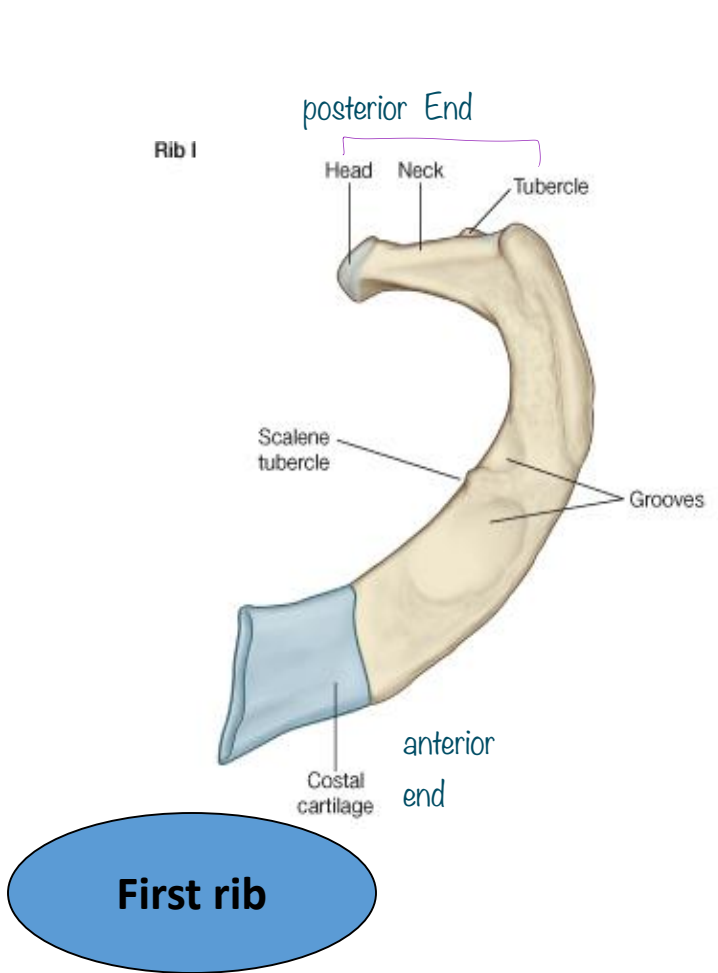
First rib

Has no neck, no tubercle

Floating ribs, 11 & 12

For example, the head of the 5th rib has two facets, one for articulation with the body of the 5th thoracic vertebra and one for articulation with the body of the 4th thoracic vertebra.

For example, the 1st rib has one facet on its shaft, which articulates with the body of the 1st thoracic vertebra.



The structure attached to:

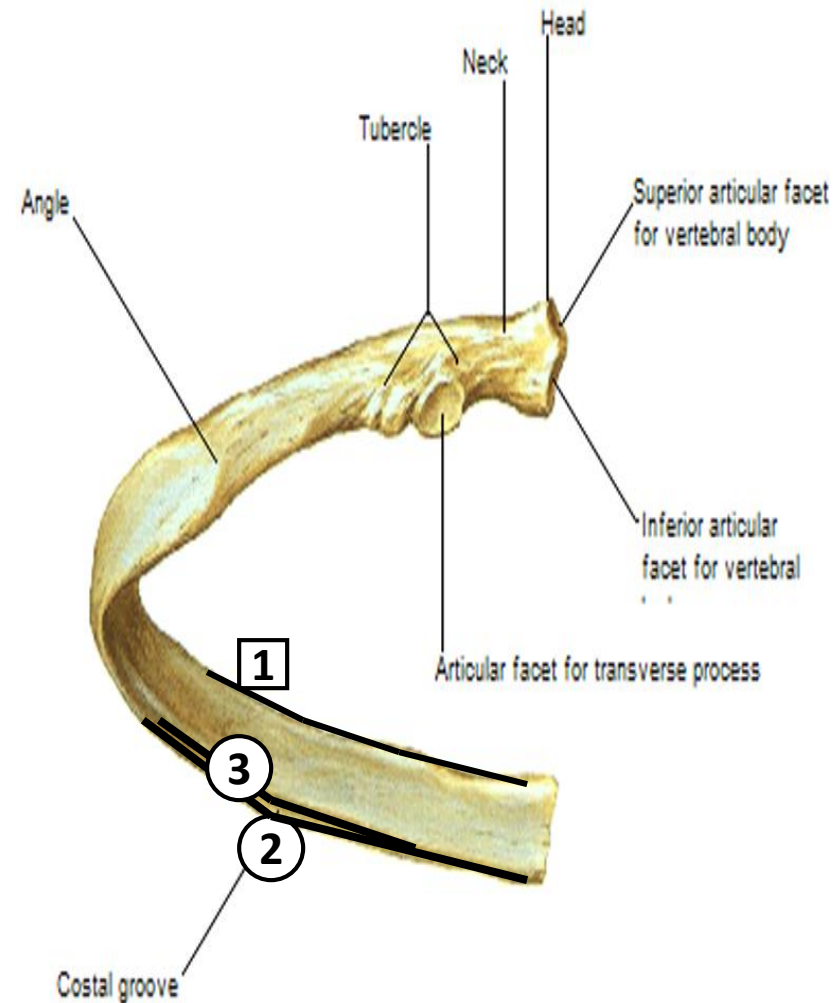
1. External, internal & inner most intercostal muscles.

2. External intercostal muscle.

The structure related :

Costal groove:

3. Posterior intercostal vein & artery and intercostal nerve.



تطبيق هاي المعلومة من ناحية clinical عند مريض ال pneumothorax لا بدى اعمل inter costal chest tube رح اركبه من جهة ال upper border

This location is chosen because it avoids damaging major neurovascular structures while still allowing effective drainage

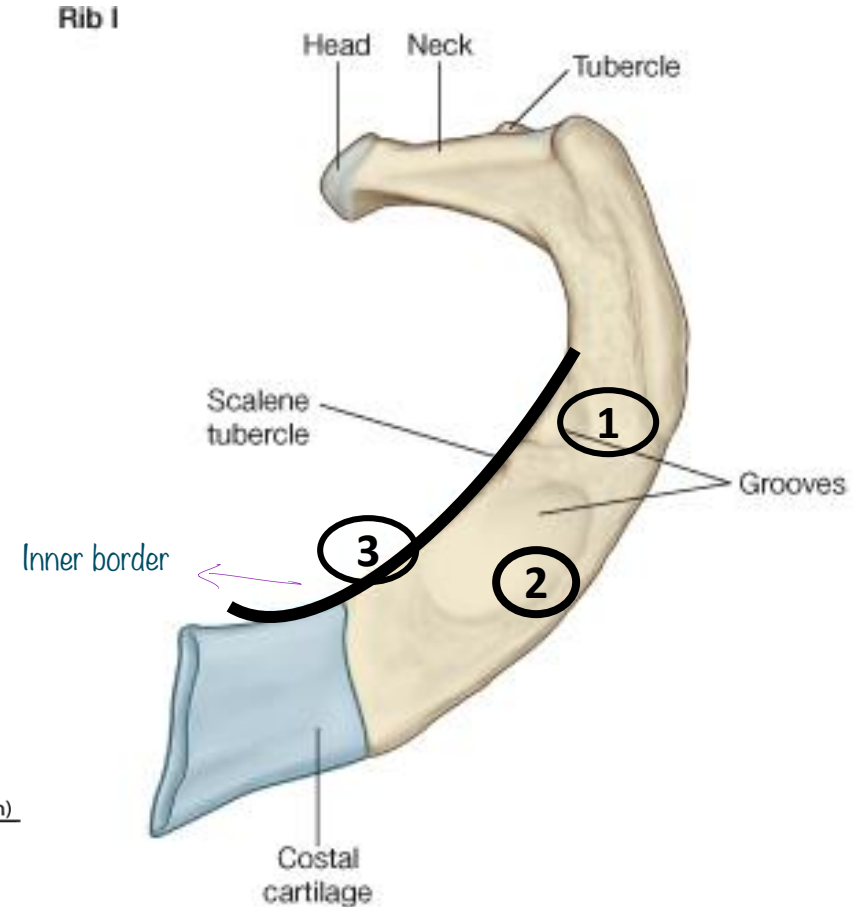
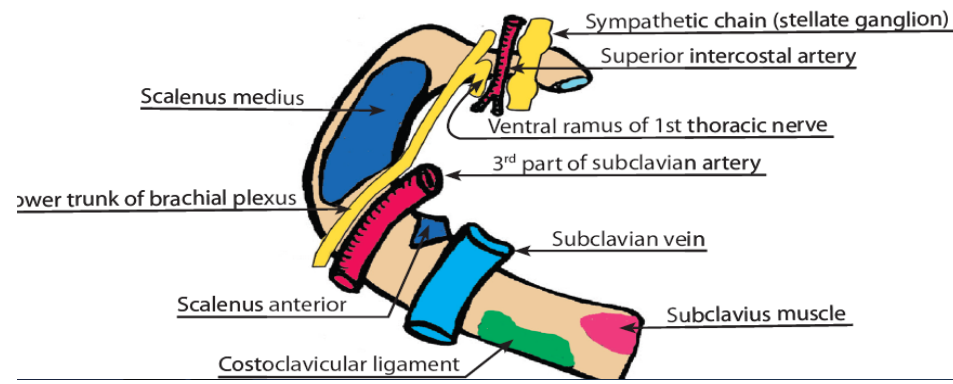
First Rib:

The structure related to the marked area.

1. Subclavian artery.
2. Subclavian vein.

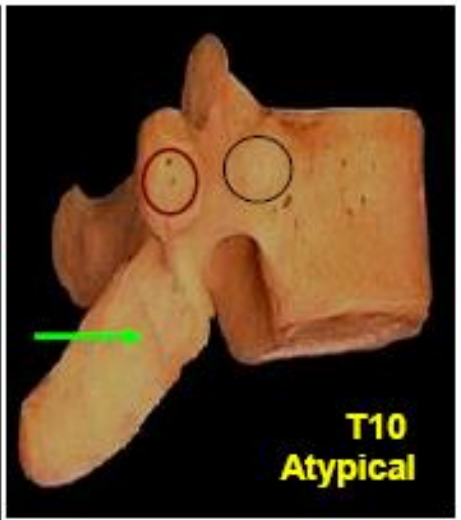
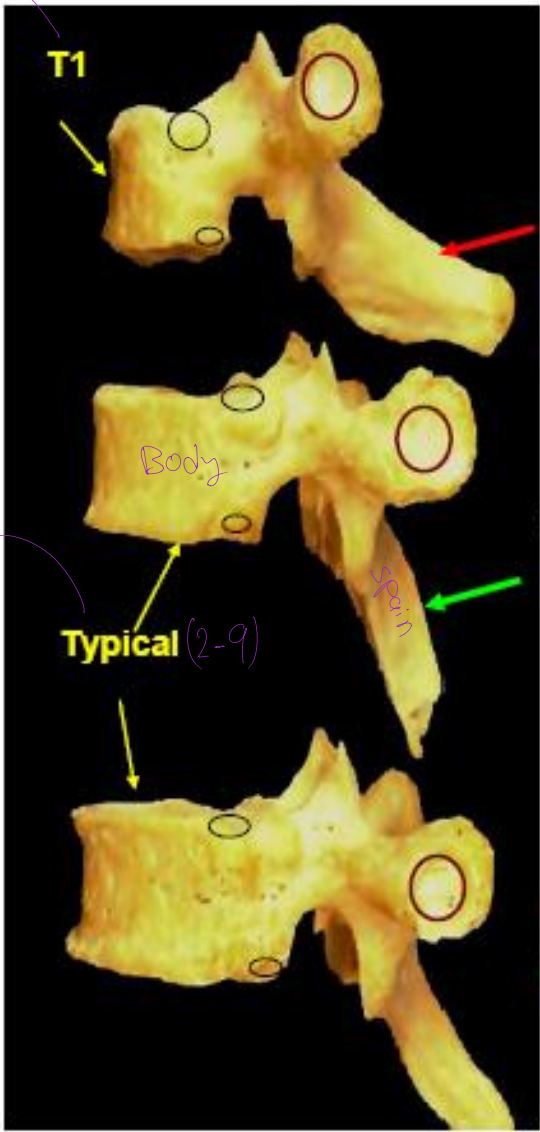
*The structure attached to the marked area.

3. Suprapleural membrane



THORACIC VERTEBRAE

*Long horizonhl spine
 *Smaller-body then Typical
 *Complete Facet in transverse process






12 thoracic vertebra
 2-9 typical
 1,10,11,12 Atypical

** Long // down wade
 Sharp//oblique Spine

*body has complete facet (no Demi facet)

** Long // down wade
 Sharp//oblique Spine
 ***body has Demi or half facet
 ***Complete facet in transverse process

<i>Typical Thoracic vertebrae-</i>	Upper and lower demifacet ◯
<i>Atypical Thoracic vertebrae-</i>	one complete facet ○
<i>T1-</i>	Upper complete facet and lower demifacet ◯
 <i>T1-</i>	Horizontal spine
	Oblique spine
	Articular facet on transverse process

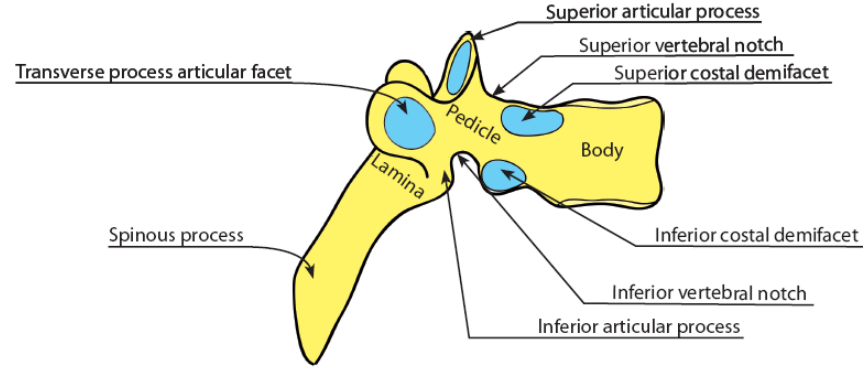


Figure (3): Typical thoracic vertebra, lateral view.

Complete circular costal facet for head of 1st rib

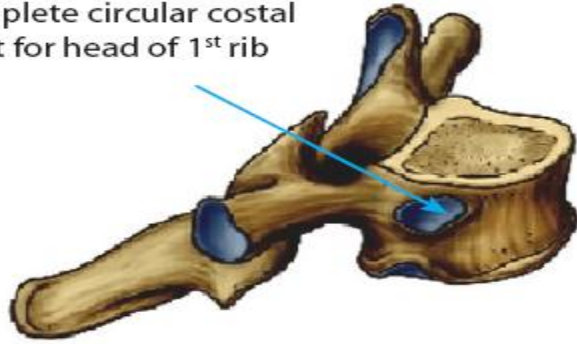


Figure (4): First thoracic vertebra.

Single complete costal facet for head of 10th rib

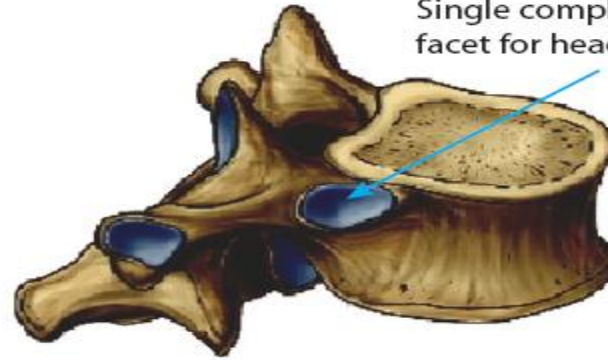
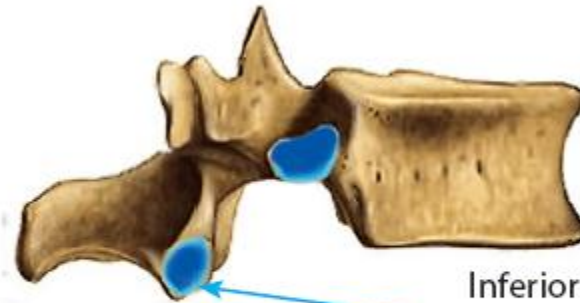
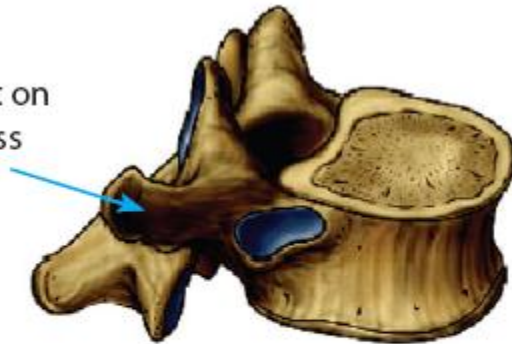


Figure (5): Tenth thoracic vertebra.

No articular facet on transverse process



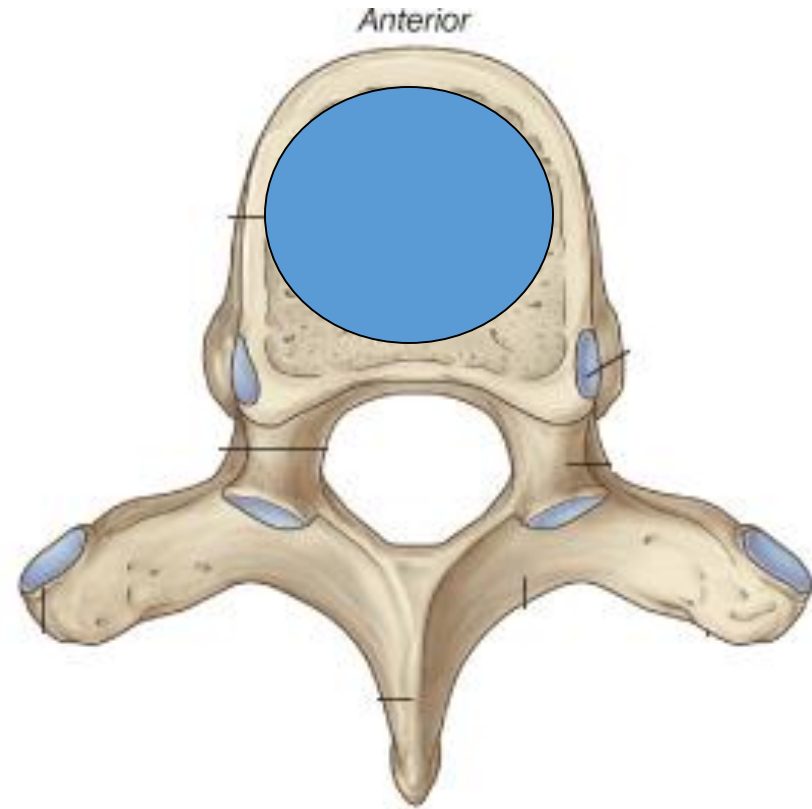
Inferior articular process is directed forward and laterally

Figure (6): Eleventh and twelfth thoracic vertebrae.

between two
vertebrae

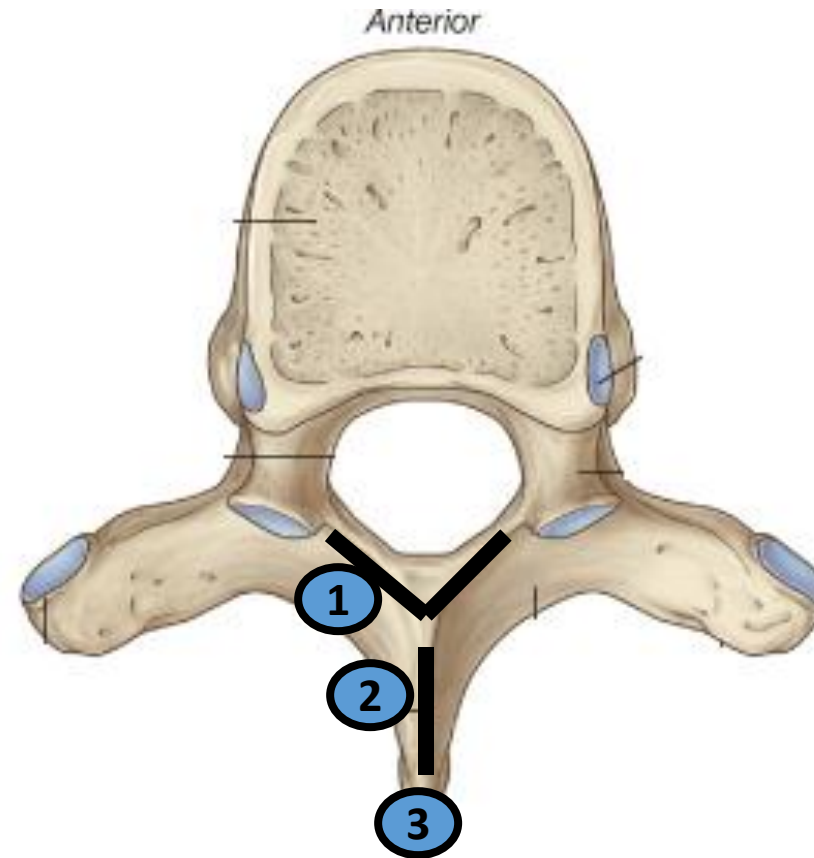
***The structure related to
the marked area:***

***Inter - vertebral disc.
(Secondary cartilaginous J).***

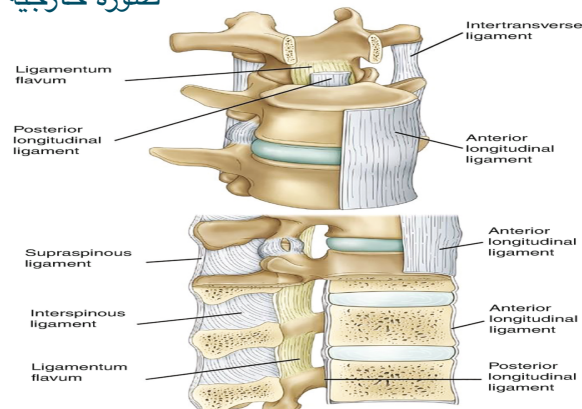


The structure attached to the marked area.

- 1) Ligamentum flavum.
- 2) Inter - spinous ligament.
- 3) Supra-spinous ligament.



صورة خارجية

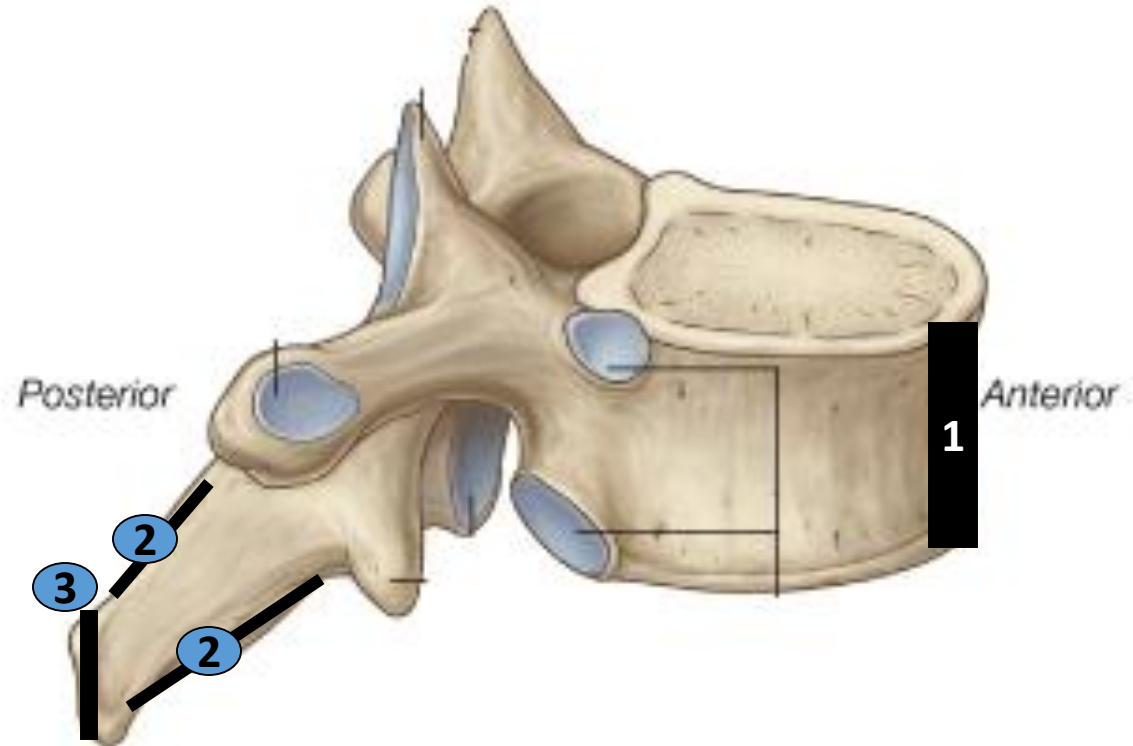


the structure attached to the marked area:

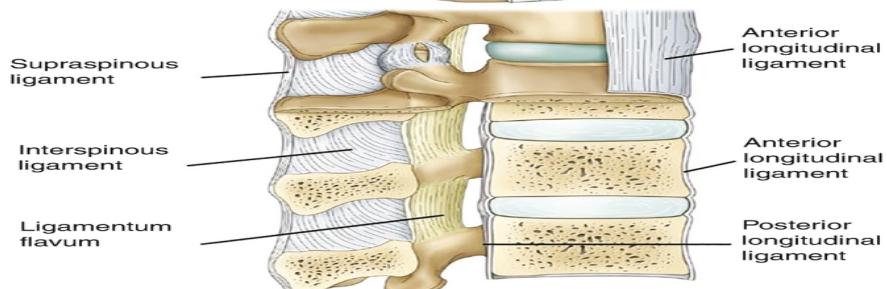
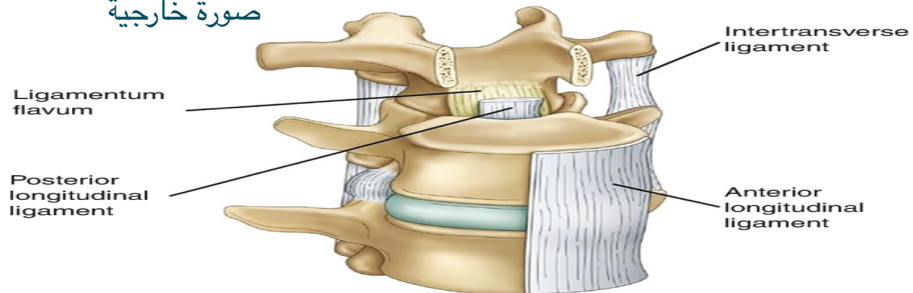
1) Anterior longitudinal ligament.

3) Supra spinous ligament.

2) Interspinous ligament.



صورة خارجية



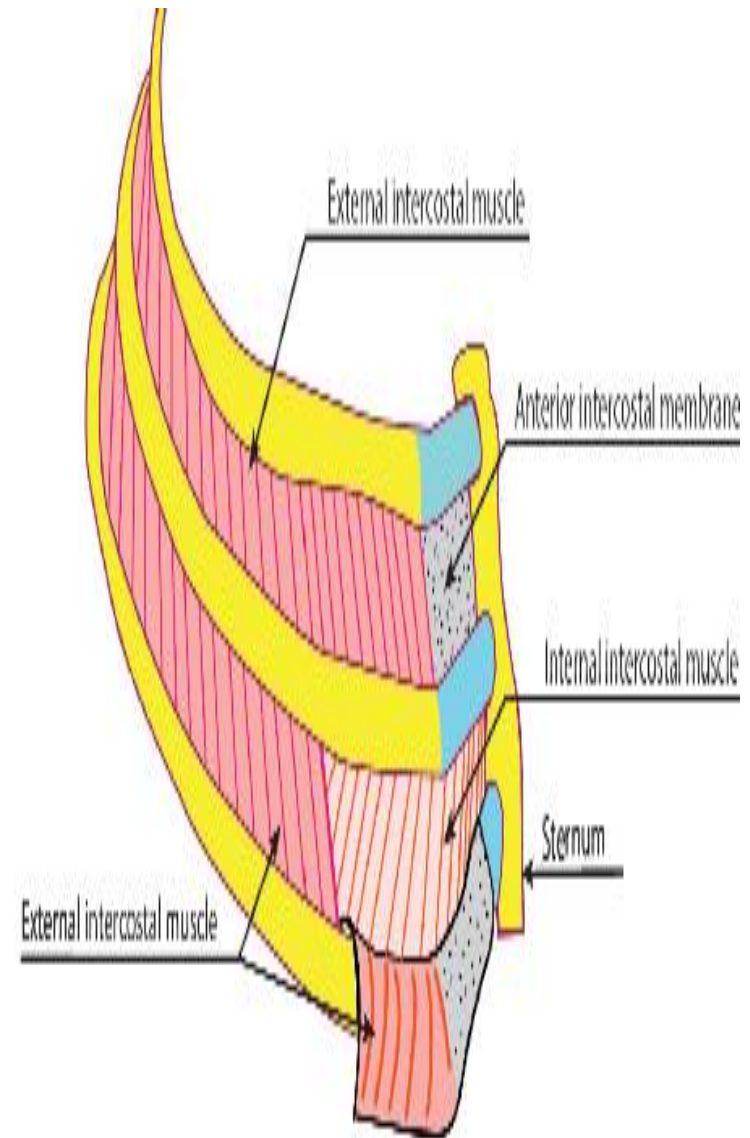
The intercostal muscles

1-External intercostal muscles:,,

Extent: from the tubercle of the ribs posteriorly to the costochondral junction anteriorly where it is replaced by an aponeurosis, the anterior (external) intercostal membrane.

Attachments: Each muscle passes from the lower border of one rib to the upper border of the rib below.

Direction of fibers: downwards & forwards (as one putting his hand in his pocket).



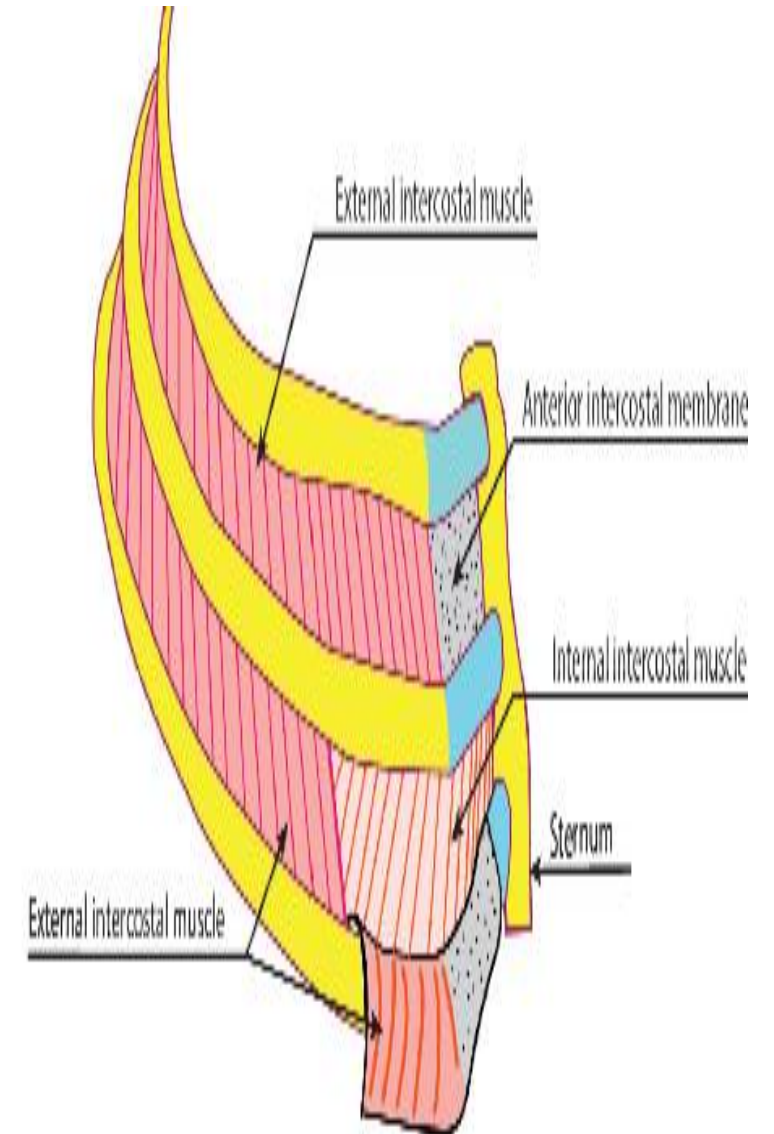
2-Internal intercostal muscles

Forms the intermediate layer.

Extent: from the sternum in front to the angle of the rib behind where each is replaced by internal (posterior) intercostal membrane.

Attachments: Each muscle descends from the floor of the costal groove of one rib to the upper border of the rib below.

Direction of fibers: downwards, backwards i.e. at right angles to those of the external intercostal muscle.

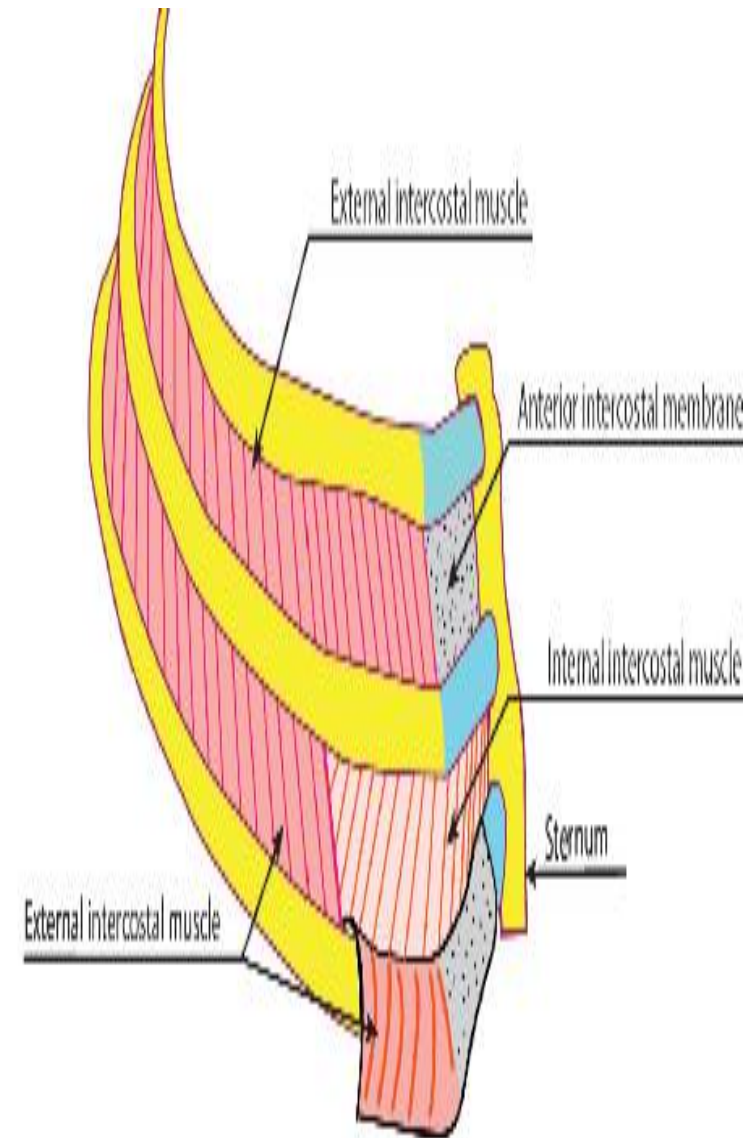


3. Innermost intercostal muscles

forms the deepest layer.

Extent: occupy the middle 2/4 of the intercostal spaces.

- **Attachments:** Each muscle is attached to internal aspects of two adjoining ribs (from the upper border of the costal groove of one rib to the upper border of the rib below).
- **Direction of fibers:** As internal intercostal; actually it is considered to be a part of the internal intercostal which is split off by the intercostal nerves and vessels.



Subcostal Muscles (Subcostalis)

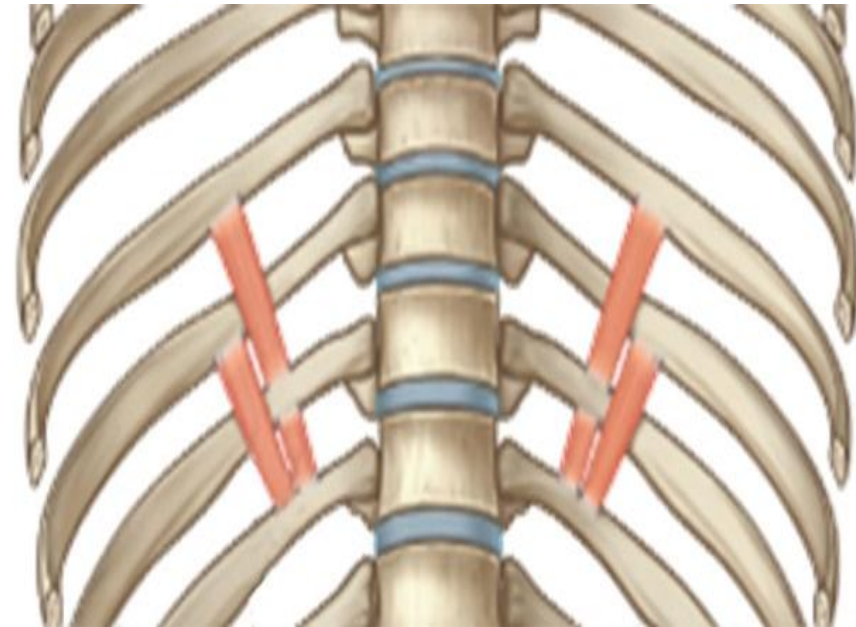
مش مطالبين بالتفاصيل

These muscles cross 2-3 ribs between their attachments.

Extent: They are well developed only in the lower and posterior part of the thorax lying near the angles of the ribs.

Attachments: Each muscle descends from the internal surface of one rib to the internal surface of the 2nd or 3rd rib below.

Direction of fibers: like those of the internal intercostal muscles.



Transversus Thoracis (Sternocostalis)

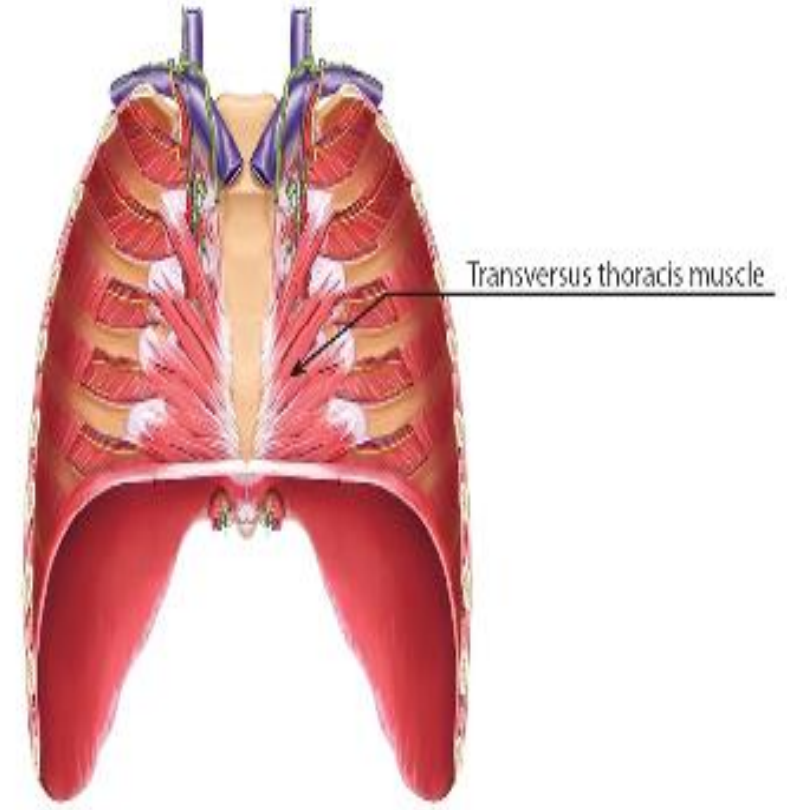
مش مطالبين بالتفاصيل

”

Extent: The muscle is present on the internal surface of the anterior part of the thoracic wall in line with the innermost intercostal.

Attachments: it arises from the lower half of the posterior surface of the body of sternum to be inserted by 5 slips into the lower border of the costal cartilages from the 2nd to the 6th.

Direction of fibres: upwards and laterally.



Nerve supply of muscles of the thorax:

All the above mentioned muscles are supplied by the adjacent intercostal nerves.

Action of muscles of the thorax:

1-The external intercostal muscles are most active in inspiration (elevators of the ribs).

2-The internal and innermost intercostal muscles are most active in expiration (depressors of the ribs).

3-Subcostales muscle: depresses the ribs.

4-Transversus thoracis: draws down the costal cartilages to which it is attached.

ال 3 / 2 / 4 رح يعملو depresses of

ribs

في ال الزفير