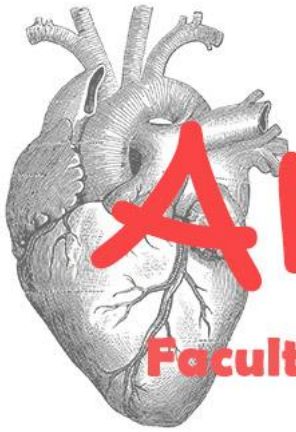


Anatomy

Faculty of Medicine - JU2017

◉ Sheet ○ Slides

Number

1

Done by:

Yara saddam & Dana Qatawneh

Corrected by:

Razi kittaneh

Doctor

Maher hadidi

THORAX

LECTURE 10

The thorax extends from the root of the neck to the abdomen.
The thorax has a

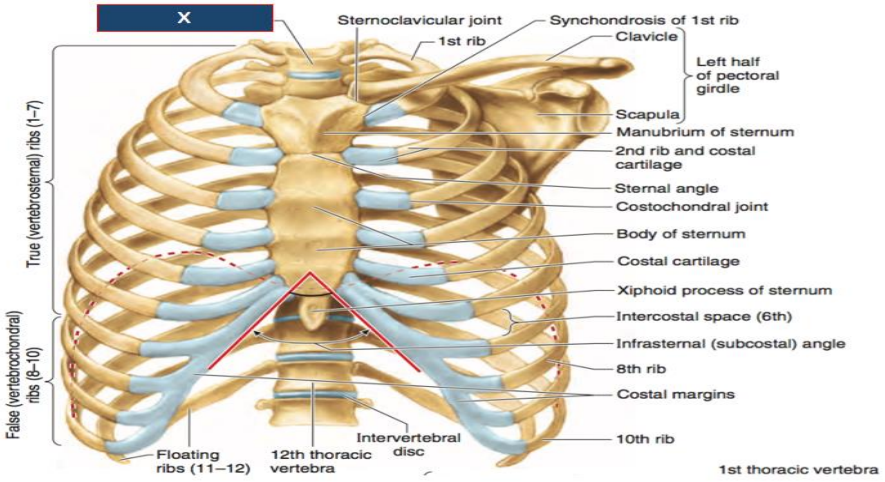
- Thoracic wall
- Thoracic cavity and it is divided into 3 parts:
- A) right and left pleural cavities each surrounding a particular lung
- B) the Mediastinum which separates the pleural cavities

If we take a cross section of the thorax we see that it is composed of 8 layers and it has a hard part called the thoracic cage. It extends from the thoracic inlet to the thoracic outlet which is (covered by diaphragm).
The Diaphragm is a partition between thoracic and abdominal cavity.

The thoracic cage has boundaries

- sternum⇒anterior
- 12 thoracic vertebrae⇒posterior
- on both sides⇒12 pairs of ribs and

Each rib has costal hyaline cartilage on its anterior distal end



STERNUM

It has 3 parts

- manubrium
- body
- xiphoid process

The sternum is a flat bone, and it is called breast bone in slang language. It has the shape of a dagger; it has a handle, body and tip. The handle is the manubrium, and the tip is the xiphoid process (pronounced ziphoid) which is a thin plate of cartilage that becomes ossified at its proximal end during adult life (approximately at age of 40)

The sternum is: -→ short and broad in (females); for wider breast

-→ long and narrow in (males)

*the manubrium articulates with the body of the sternum at the manubriosternal joint, it also articulates with the clavicles at the sternoclavicular joint and articulates with the 1st costal cartilage and the upper part of the 2nd costal cartilages on each side, the trachea is located behind the suprasternal notch which is why you can choke someone by applying pressure over the suprasternal notch.

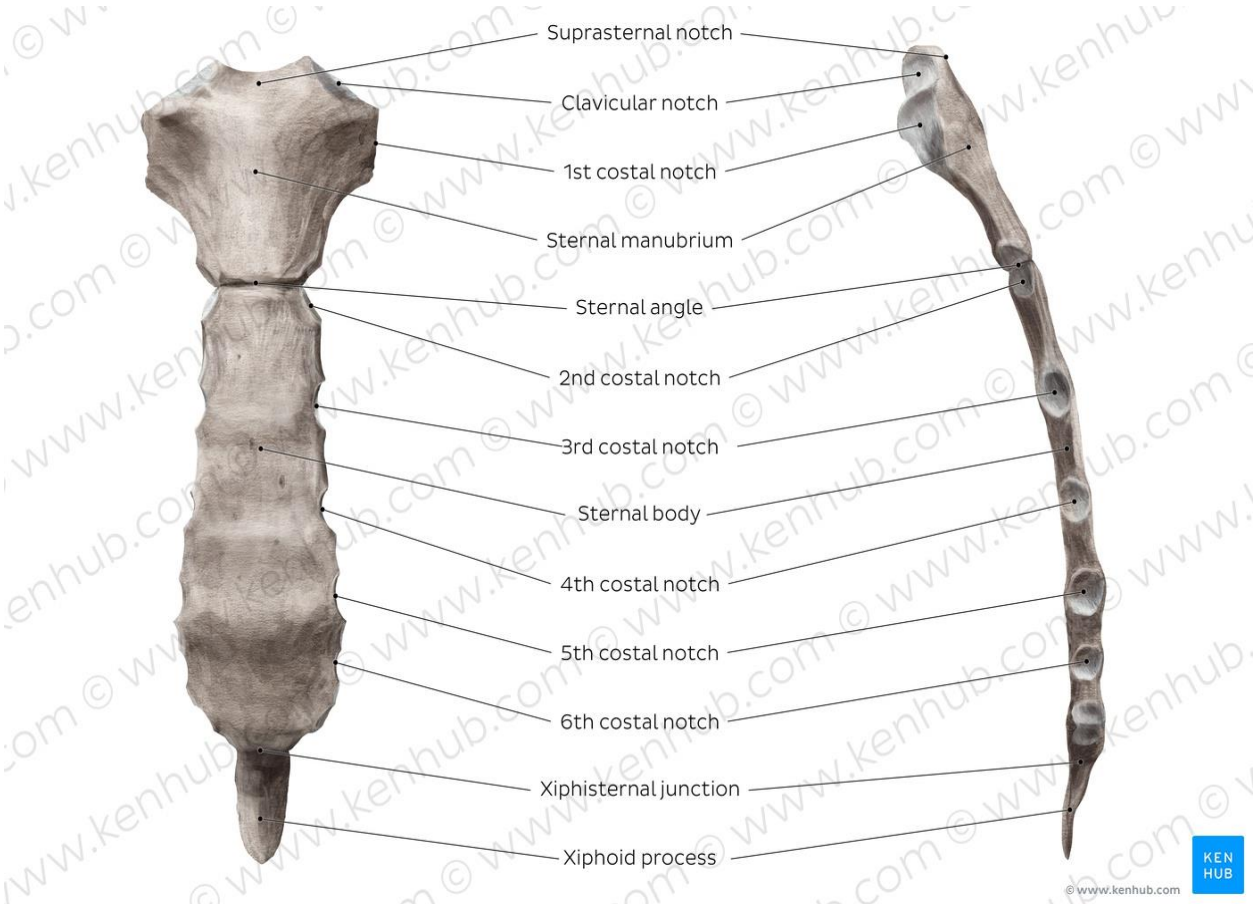
*The body is anterior to the aortic arch (reason for compressing chest in CPR (Cardio Pulmonary Resuscitation), to compress heart into posterior abdominal wall). It stores bone marrow, so this is the first choice to take a sample of bone marrow in case of anemia or cancer to do a biopsy.

*The sternal angle is the joint between the manubrium and the body.

It is a clinical landmark for:

1. counting ribs, to find the second rib because the first rib is hidden below the clavicle.
2. The sternal angle lies opposite the intervertebral disc between T4/T5 vertebrae.
3. the site of division (Bifurcation) of trachea into the right and left primary bronchi.
4. It marks the level of beginning and end of arch of aorta.

A further look to the parts of the sternum:



VERTEBRAE

The vertebral column is composed of 33 vertebrae. Their shape is irregular. The 33 vertebrae are named according to their region, (each region vertebrae have special features)

- 7 cervical
- 12 thoracic
- 5 lumbar
- 5 sacral (fused vertebrae)
- 4 coccygeal or coccyx.

Typical vertebrae have 3 parts:

1) body: heart shaped and designed for weight bearing. This is why the bodies of vertebrae increase in size in sequence from superior to inferior.
2) Vertebral arch: designed for protection of spinal cord
3) Vertebral foramen: is between anterior and posterior. Sequential vertebral foramen form vertebral canal. Its contents are spinal cord and 3 meninges.

Each vertebra also has:

- 2 pedicles between body of the vertebra and the transverse process
- 2 transverse processes for articulation with the tubercle of the ribs
- 2 laminae between each transverse process and the spine

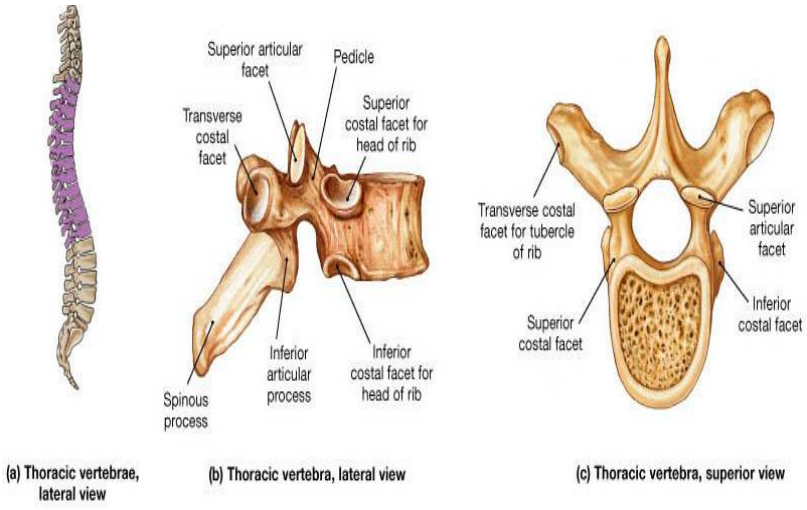
- 1 spine

Thoracic vertebrae features:

- body⇒ heart-shaped (because next to heart). The body articulates with head of the ribs. It has 2 superior facets and 2 inferior facets (for articulation with ribs). Superior facet⇒same rib number. Inferior facet⇒for the rib below.
- foramen⇒circular(ring)

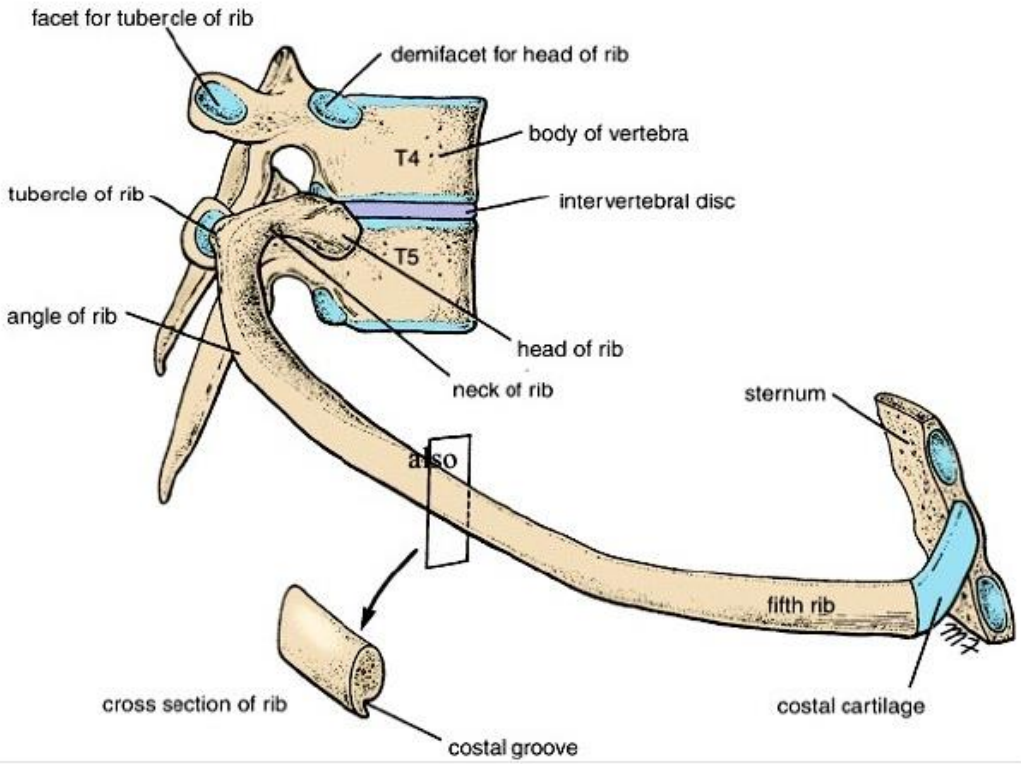
- Transverse process

It is attached by muscles, and they are for balance. Transverse process has cartilage because it articulates with the rib of the same number



- Spine Process

It is oblique and long. If we have to take a sample of CSF (cerebrospinal fluid), the patient must flex to open spine for the sample to be taken.



Fifth right rib as it articulates with the vertebral column posteriorly and the sternum anteriorly. Note that the rib head articulates with the vertebral body of its own number and that of the vertebra immediately above. Note also the presence of the costal groove along the inferior border of the rib.

RIBS

There are 12 pairs of ribs. They are curved and flat bones. They extend from the thoracic vertebrae posteriorly, and the sternum anteriorly. Not all ribs attach to sternum, ribs 11 and 12 attach to the muscles of the abdominal wall. The head of the typical ribs articulates with 2 sequential vertebrae.

The ribs could be classified according to their connection to the sternum:

- true ribs: reach the sternum directly (ribs 1 to 7)
- false ribs: reach sternum indirectly (ribs 8 to 10)

- floating ribs: attach to the anterior abdominal muscles (ribs 11 and 12)

They could be classified according to parts:

- Typical ribs: contains all parts (ribs 3 to 9, some books consider rib 10 to be typical too)

    1. Head, has 2 facets for articulation with vertebra
    2. Neck (narrow part of the rib) has 2 tubercles
    3. Angle
    4. Body, has 2 borders, 2 surfaces and a costal groove

- Atypicals ribs: has missing parts (ribs 1,2,11,12)

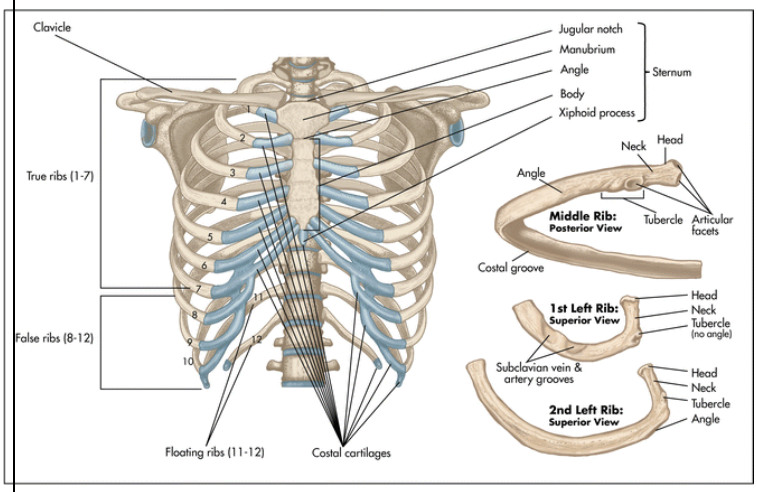
The 2 tubercles: one is articular which means it articulates with the transverse process of the same number, the other is non-articular, it attaches to the ligament.

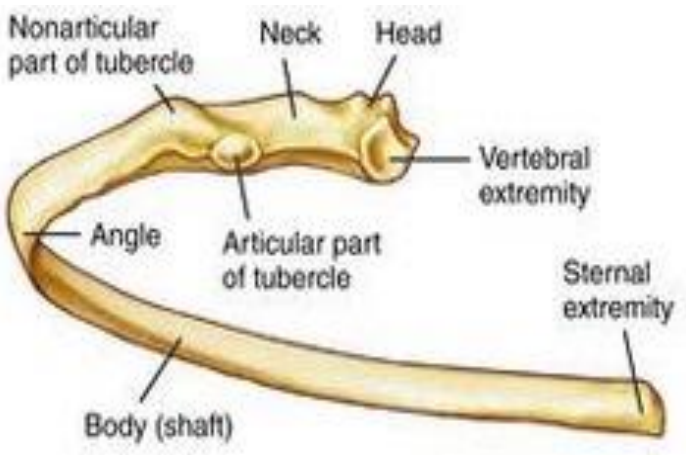
Angle: the site where the rib changes direction. It starts posterior then converted lateral then anterior. The serratus anterior originates from angles of the upper 8 ribs.

Body: it is flat, it has a superior border, which is smooth and rounded, and an inferior border which is sharp. (this is used to know the posterior, anterior, inferior, and lateral. It is convex externally, and concave internally. It has a costal groove which intercostal vessels and nerves pass through.

INTERCOSTAL NEURALIGIA: this disease is due to intercostal nerve)

- the inferior border of the rib articulates with the superior vertebral body of the same number.
- The tubercle articulates with the transverse process of the same number





- 1st RIB (false rib)

It has an anterior and posterior border, a superior and inferior surface. The rib is designed to articulate between thoracic vertebrae ONLY. So, the first rib can't articulate between C7 and T1; therefore, it has ONE facet. This rib is the shortest, widest, and most curved of all. It relates superiorly with subclavian artery and vein and lower trunk of brachial plexus, so if an injury occurred to the first rib these are the structures involved and might be impaired.

- 2nd rib, has the same characteristics to the rib 1 but it is twice in long

- 11th and 12th RIBS

The same as 1st rib, it can't articulate with L1 and T12(each rib articulate only with the vertebra of the same number) and their tubercle doesn't articulate with the transverse process of the vertebra, also it doesn't have a costal groove. While all ribs have intercostal VAN, the 12TH rib has subcostal VAN passing under it.

Atypical Ribs