MEDICAL EDUCATION RESOURCE

Formation and Shape of Thorax

Skeleton of Thorax

- The **skeleton of the thorax**, or **thoracic cage**, is an **osseocartilaginous elastic cage** designed to **alter intrathoracic pressure** during respiration.
- **Function:**
    - During **inspiration**, it expands to allow air entry into the lungs.
    - During **expiration**, it contracts to expel air.
- It provides protection to the **heart, lungs, and great vessels** and supports the **pectoral girdle** and upper limbs.

Formation of the Thoracic Cage

- **Anteriorly:** Sternum (composed of manubrium, body, and xiphoid process).
- **Posteriorly:** 12 thoracic vertebrae with their **intervertebral discs**.
- **Laterally:** 12 pairs of ribs with costal cartilages.
    - **True (vertebrosternal) ribs:** 1st–7th ribs—each directly articulates with the sternum.
    - **False (vertebrochondral) ribs:** 8th–10th ribs—join the cartilage of the rib above, forming the **costal margin**.

- **Floating (vertebral) ribs:** 11th and 12th—anterior ends free, not attached to sternum.

- **Joints involved:**
  - Costovertebral, costotransverse, manubriosternal, and chondrosternal joints enable **respiratory movements**.

Shape of the Thorax

- The thorax resembles a **truncated cone** — **narrow above**, **broad below**.
  - **Upper end:** Continuous with the neck, partly separated by the **suprapleural membrane (Sibson's fascia)**.
  - **Lower end:** Separated from the abdomen by the **diaphragm**, concave downward.
- The **thoracic cavity** is smaller than it appears because:
  - The upper part appears wider due to the shoulders.
  - The lower part is encroached upon by the abdomen (due to the diaphragm's dome).
- **Transverse Section:**
  - **Adults:** Oval/reniform (kidney-shaped); transverse diameter > anteroposterior.
  - **Infants:** Circular—ribs horizontal, leading to **abdominal respiration**.
  - **Quadrupeds:** Anteroposterior diameter > transverse.

Clinical Anatomy

- **Respiration:**
  - The diaphragm descends during inspiration, increasing the vertical diameter.
  - In adults, both **thoracic and abdominal respiration** occur; in infants, mainly abdominal.
- **Rib Fractures:**
  - The ribs are weakest at their **angles**, where fractures commonly occur due to indirect trauma.
  - The **upper two ribs** (protected by the clavicle) and **lower two ribs** (floating) are least likely to fracture.
  - In children, rib fractures are rare due to high elasticity of the chest wall.
- **Hiccups:**
  - Caused by **spasmodic contraction of the diaphragm** with sudden closure of the glottis.
  - May result from **gastric irritation**, **phrenic nerve irritation**, **uraemia**, or **hysteria**.

Summary Table

FEATURE	DESCRIPTION
Thoracic skeleton	Elastic cage for respiration and protection
True ribs	1st–7th (attach to sternum)
False ribs	8th–10th (join cartilage above)

FEATURE	DESCRIPTION
Floating ribs	11th–12th (free anteriorly)
Shape	Truncated cone; narrow above, broad below
Infant thorax	Circular, abdominal breathing
Adult thorax	Oval, thoracic + abdominal breathing
Common fracture site	Rib angle
Diaphragm function	Expands thorax vertically during inspiration