

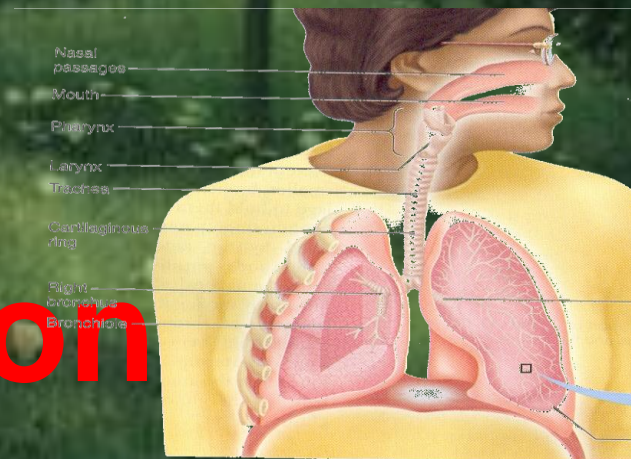
A 25 years old young boy presented to ER with hx of having sore throat , then he developed weakness of his lower limbs, he also developed difficulty in breathing, The ER doctor noticed that he is having lower motor neurone type ascending paralysis, He was shifted to ICU for further management.....



A 40 years old man having painful and weak proximal muscles, He is undertreatment of Rheumatologist, He skipped his medicine and was brought to ER with severe weakness and difficulty in breathing , he was shifted to ICU having abnormal ABGs and put on ventilator...

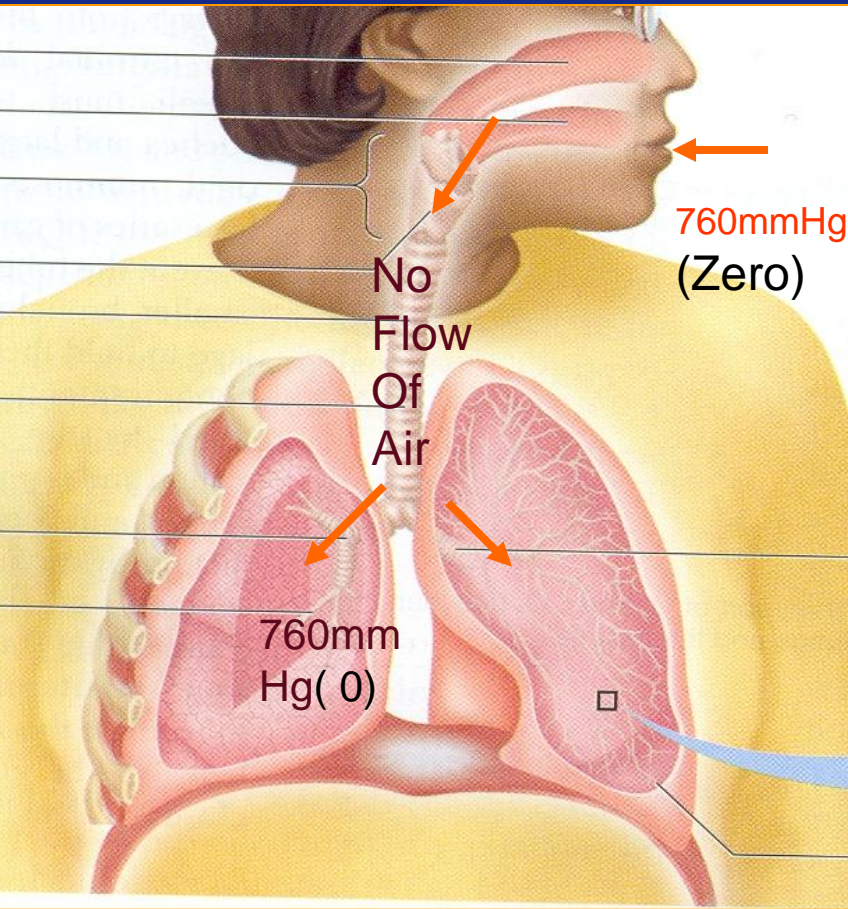






Respiration

Pulmonary Ventilation



- Inflow & outflow of air between atmosphere and lungs alveoli.
- Flow of air is only Possible when-----?
- **How** that can be achieved-----?
- **Mechanical Process**

Mechanics of Respiration (Inspiration)

- Increase in Vertical Diameter

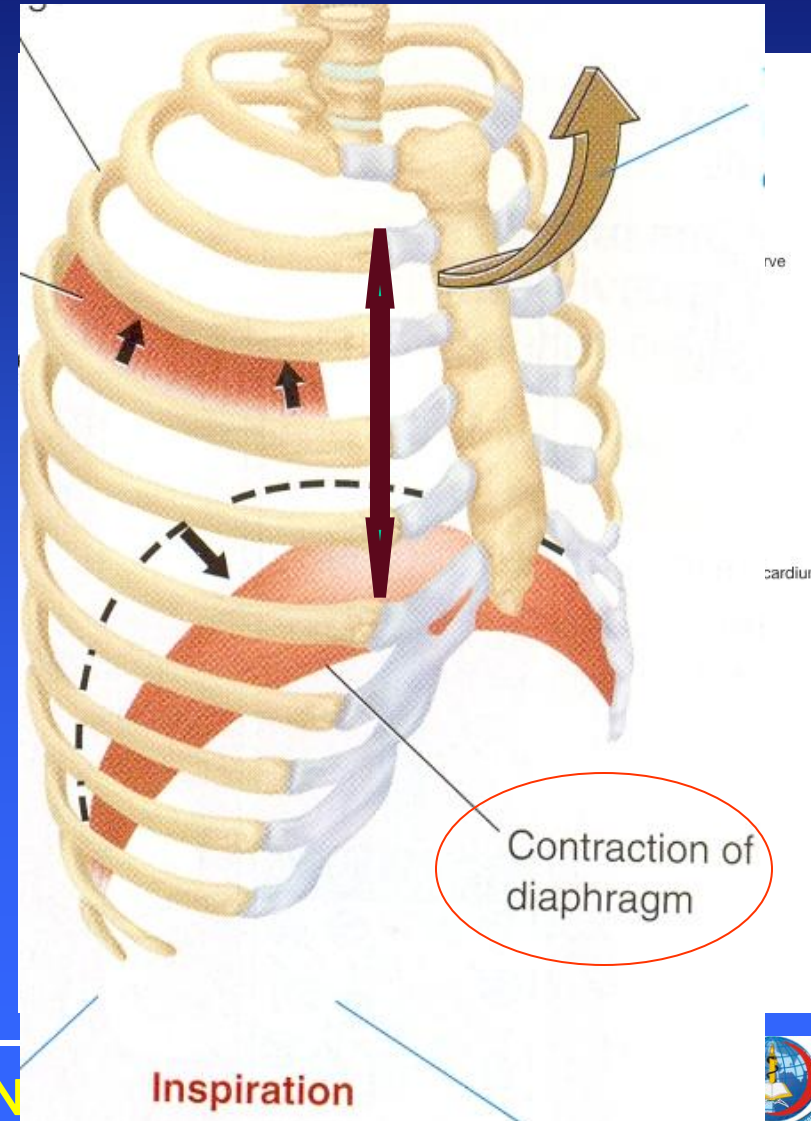
(Role of Diaphragm)

Muscle Fibers originate from:

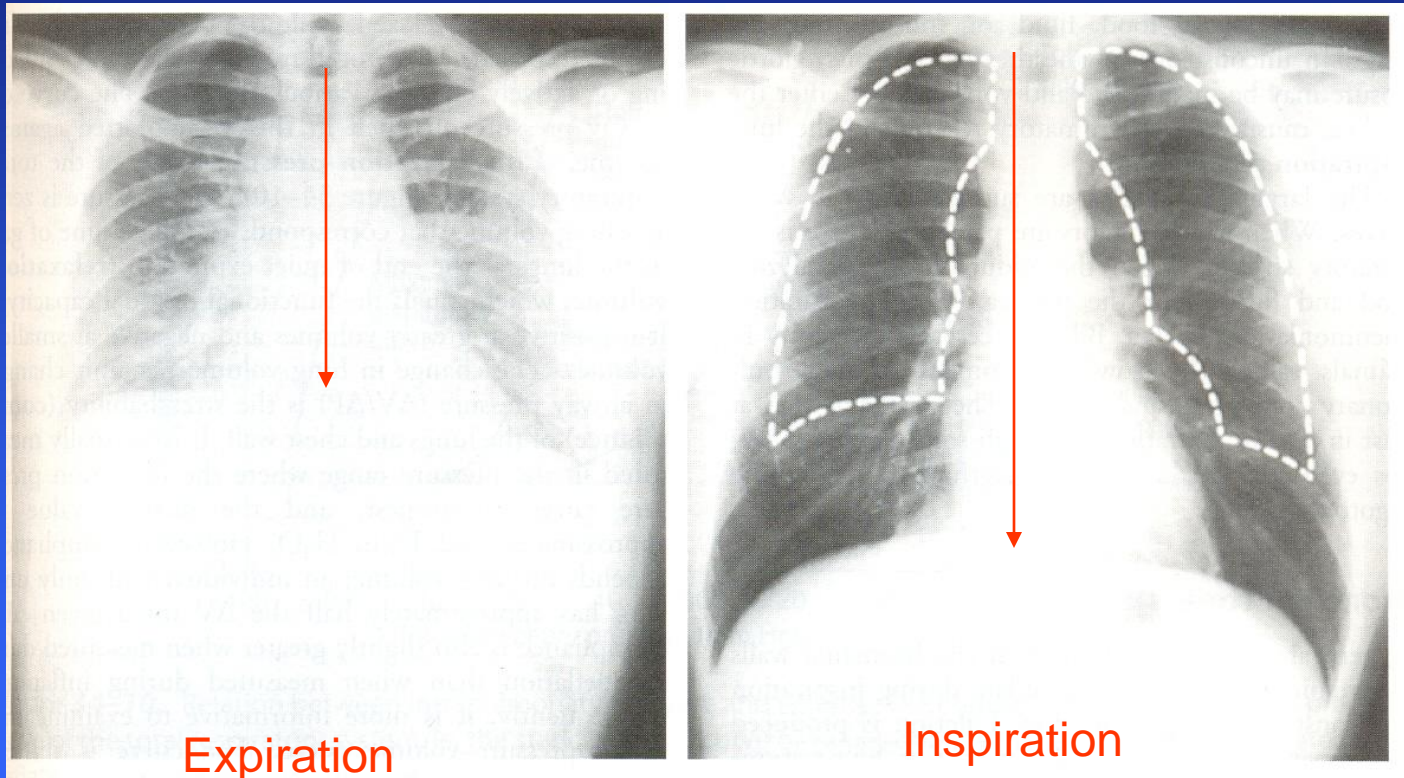
- Inner surfaces of lower six ribs;
- Arcuate ligaments;
- Xiphisternum.

Attached to:

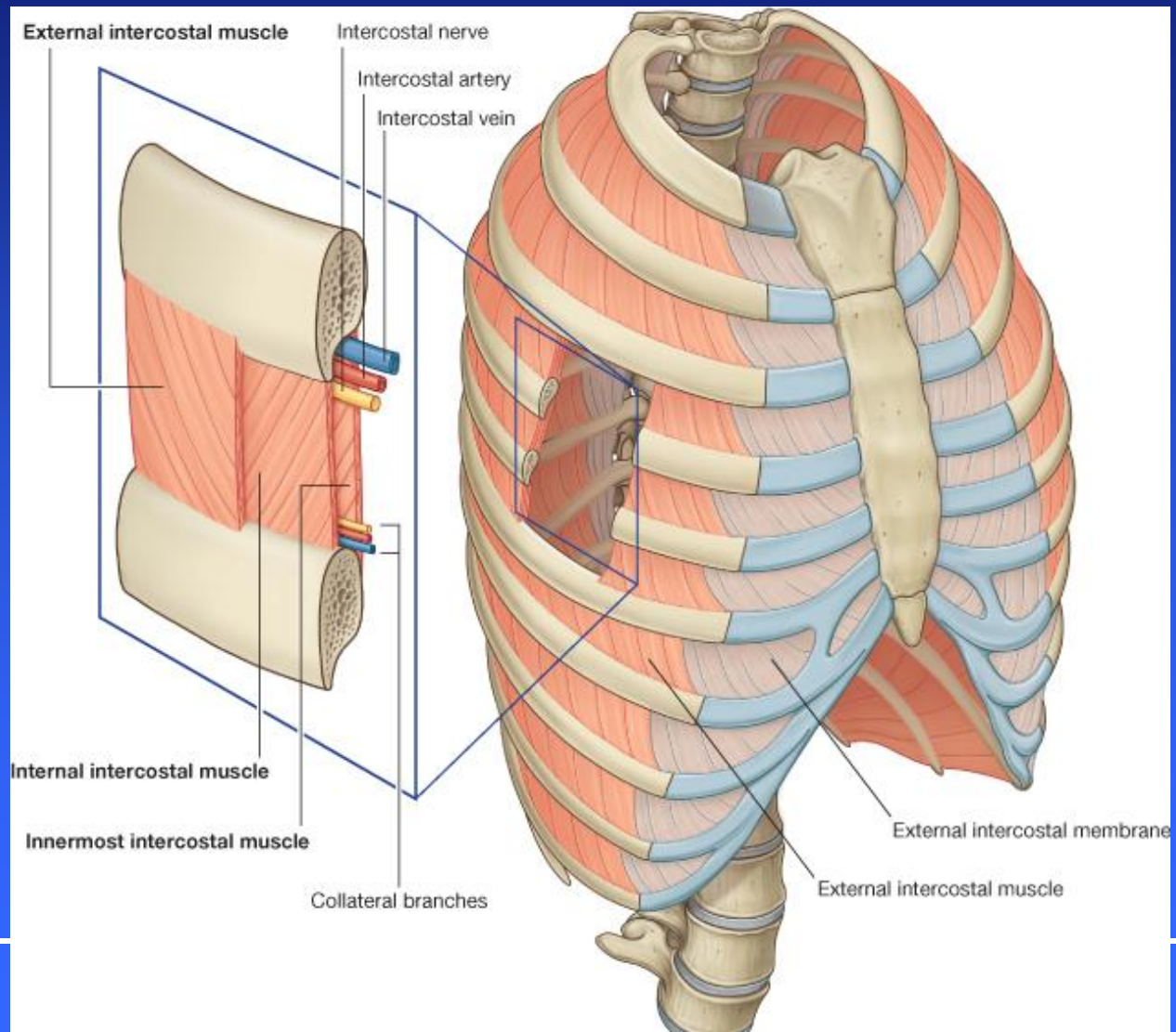
Club shape central Tendon



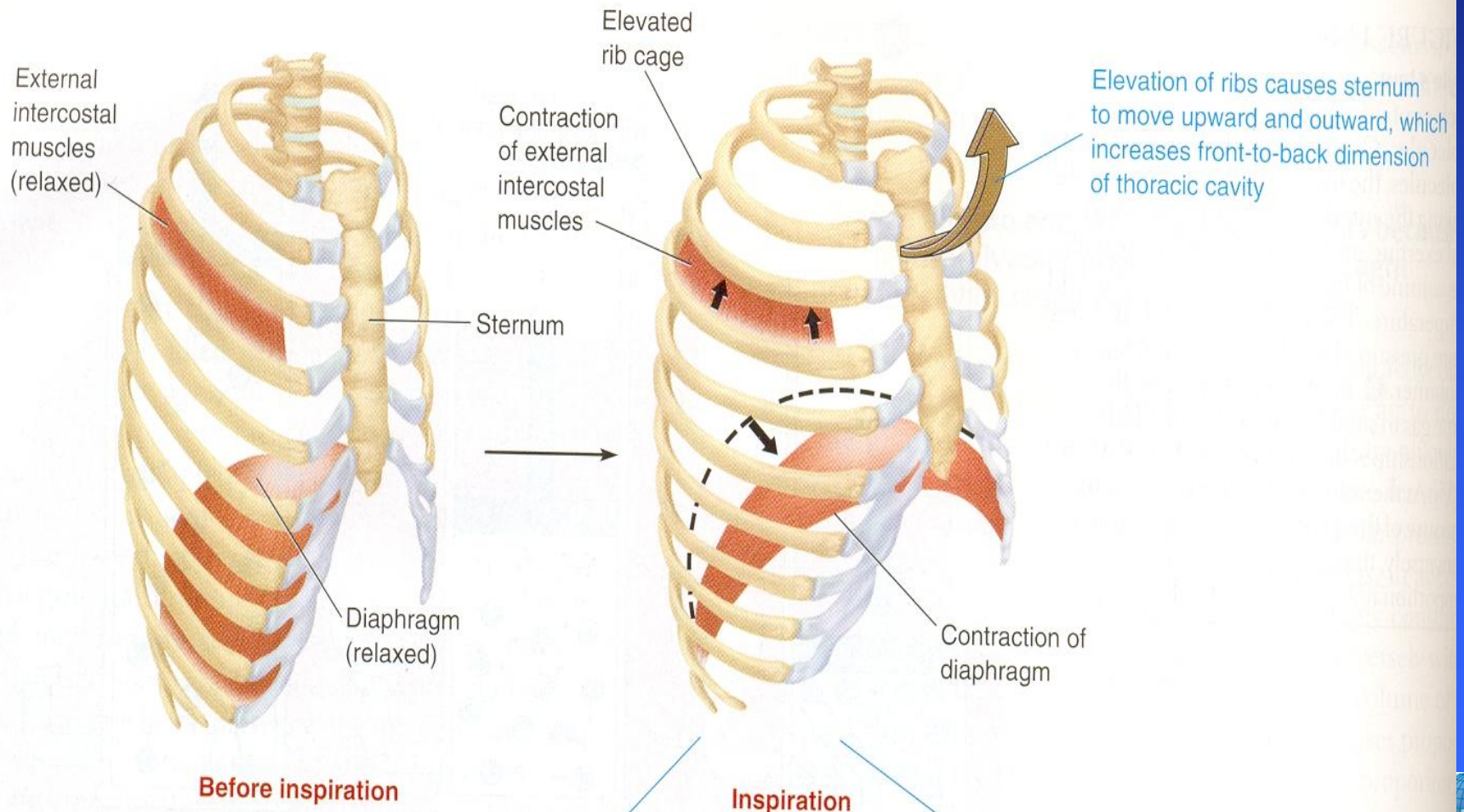
X-Ray Chest showing movement of Diaphragm during Respiration



Internal & External Intercostal muscles



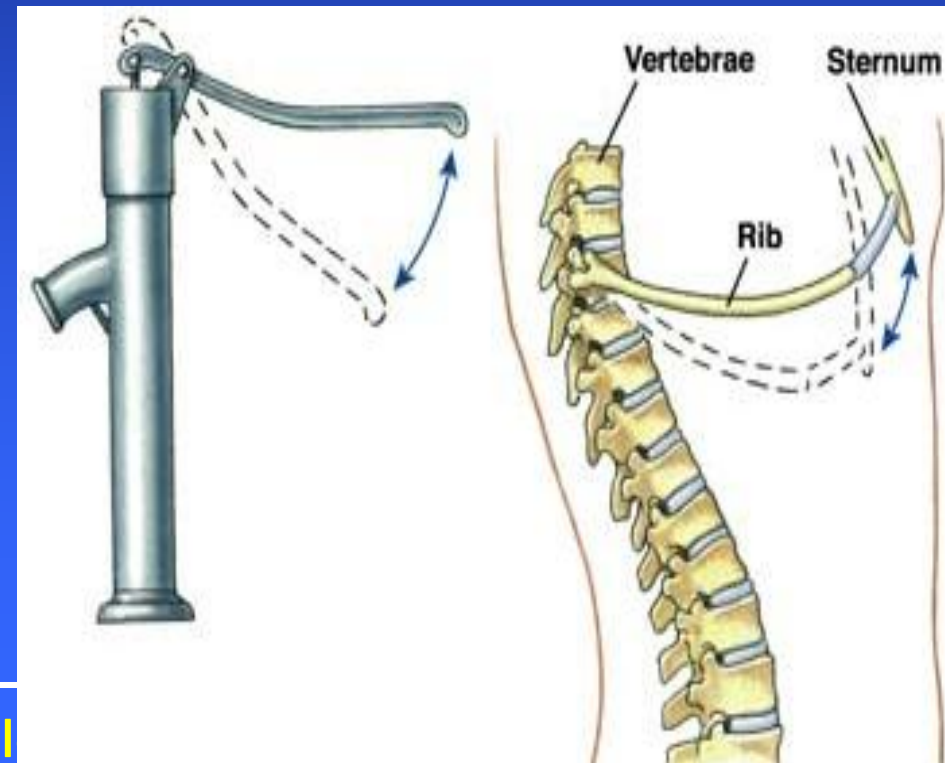
Mechanics of Respiration



Mechanics of Respiration (Inspiration)

- Increase in Antero-posterior Diameter.
(Role of External Intercostals Muscle)

- Pump
Handle
Movement



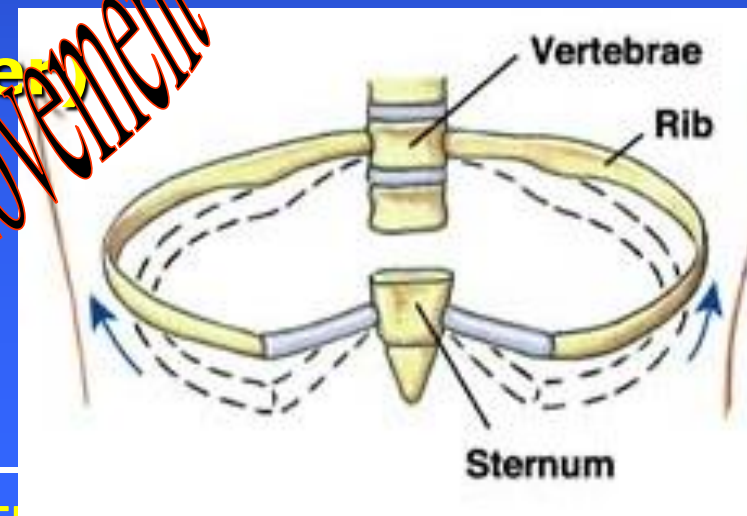
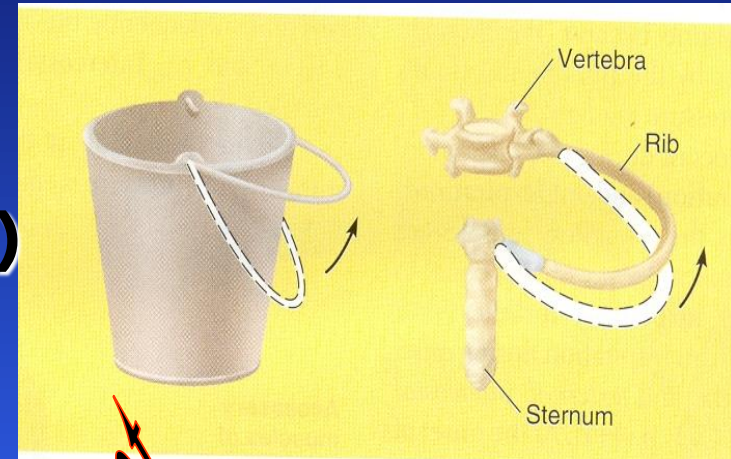
Mechanics of Respiration

Increase in Transverse Diameter.

-Active--(Role of Diaphragm)

-Passive-
(Automatic with A-P Diameter)

Bucket Handle movement



Accessory Muscles of Inspiration

- Sternocleidomastoid

Anterior

- Scaleni { Middle
Inferior

Anterior serrati.

External intercostal.



- Accessory muscle of expiration
- Abdominal recti.
- Internal intercostal.



Accessory Muscles of Respiration

<p>Accessory</p> <p>Sternocleidomastoid (elevates sternum)</p> <p>Scalenes Group (elevate upper ribs)</p> <p>Not shown: Pectoralis minor</p>		<p>Quiet breathing</p> <p>Expiration results from passive, elastic recoil of the lungs, rib cage and diaphragm</p>
<p>Principal</p> <p>External intercostals Interchondral part of internal intercostals (also elevates ribs)</p> <p>Diaphragm (dome descends, thus increasing vertical dimension of thoracic cavity; also elevates lower ribs)</p>	<p>Active breathing</p> <p>Internal intercostals, except interchondral part (pull ribs down)</p> <p>Abdominals (pull ribs down, compress abdominal contents thus pushing diaphragm up)</p> <p>Note shown: Quadratus lumborum (pulls ribs down)</p>	

Expiration

- **Quiet Expiration:-Passive** Phenomenon

Depends upon:

1. Elastic Recoil of the lungs-----1/3rd
2. Surface tension due to water molecules--2/3rd

- **Forceful Expiration:- Active Phenomenon**

Muscles:

1. Internal Intercostals Muscles
2. Abdominal muscles



Dead Space

- space in the respiratory passages where there is no exchange of gases

- Anatomical Dead Space

+ Physiological D.S

Alveolar Dead Space



Physiological Dead Space

- Bohr's Equation:

$$D.S._{physio} = \frac{P_a CO_2 - P_{ECO_2}}{P_a CO_2} \times V_T$$

Where $P_a CO_2$ = Partial Pressure of CO_2 in Alveolar Air = 40 mmHg
 P_{ECO_2} = P.P of CO_2 in Mixed Expired Air = 28 mmHg



Measurement of Anatomical Dead Space

- Single Breath N_2 Washout Method.
(Fowler's Method)

Nitrogen Meter

