

# Mechanics of respiration

By Dr.Pankaj Panchal

Assistant professor

10/08/2021

# Mechanism of breathing

- **Eupnoea** – *rhythmic breathing at rest* it consists of
  1. INSPIRATION: active process in which lungs and thoracic cage expands & air sucks in lungs
  2. EXPIRATION : passive process in which muscles of inspiration relaxes  
Elastic recoil of the thoracic wall & lungs occurs

# Definitions

- **Respiratory rate** at rest in an adult: 12-14 breaths /min
- **Tidal volume**: amount of air inspired or expired per breath ( normal value: 500 ml)
- **Pulmonary ventilation** : amount of air breathed in or out of the lungs per minute ( 6-7 litres)

# Definitions

- **Alveolar ventilation:** How much air per minute enters the parts of the respiratory system in which gas exchange takes place

$$AV = (TV - \text{dead space}) \times RR$$

Normal value: 4.2 L/min

- **Dead space:** conducting zone of tracheobronchial tree doesn't take part in exchange of gases ( 150 ml)

➤ Anatomical

➤ Physiological

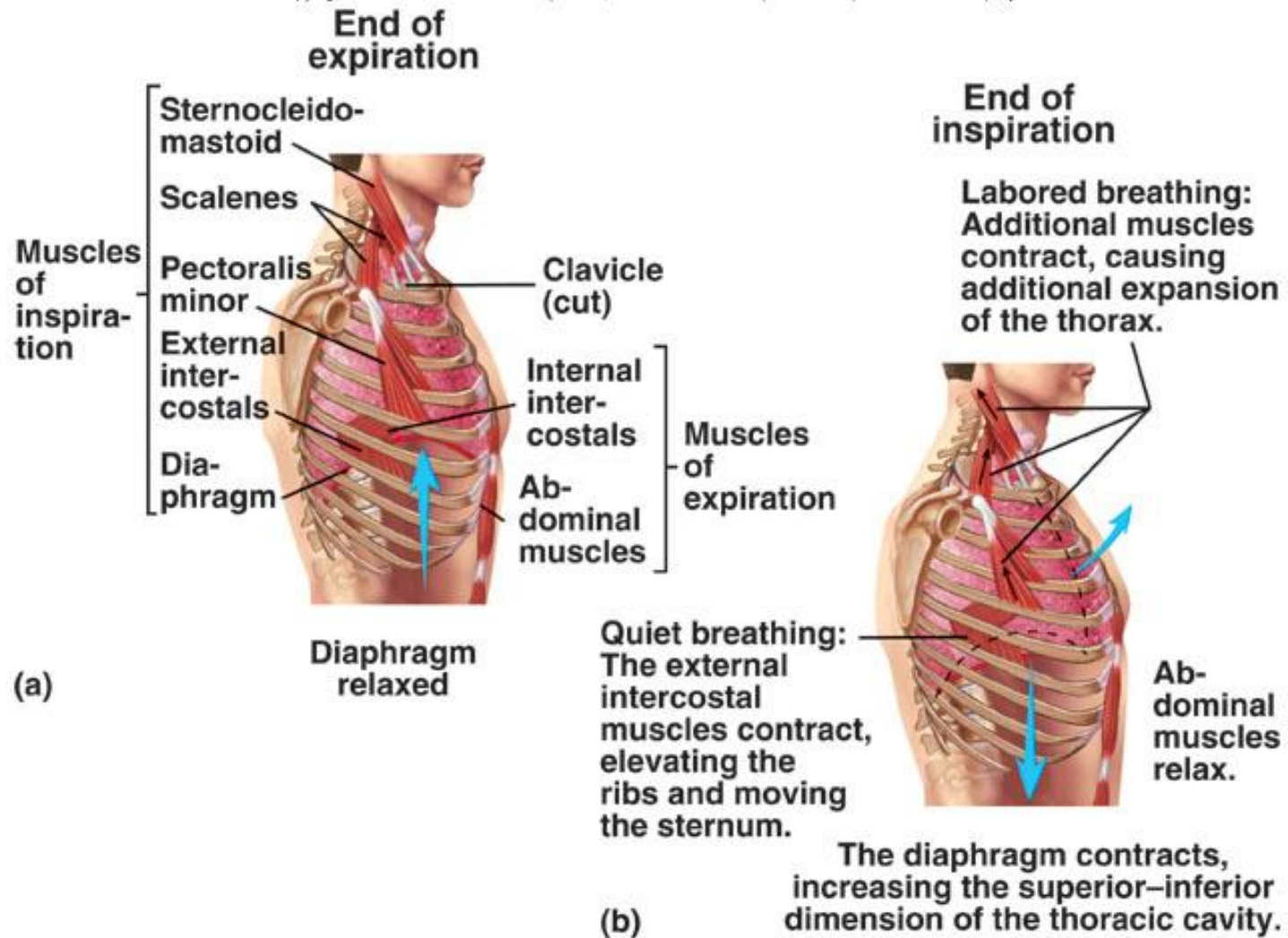
# Mechanism of inspiration

Thorax enlarged by

- ❖ **Rib movements( outwards & upwards)-**
  - Pump handle movements (2<sup>nd</sup> to 6<sup>th</sup> ribs)
  - Bucket handle movements (7<sup>th</sup> to 10<sup>th</sup> ribs)
- ❖ **Descent of diaphragm –**
  - 1.5 cm in eupnoea
  - 7 cm in deep inspiration

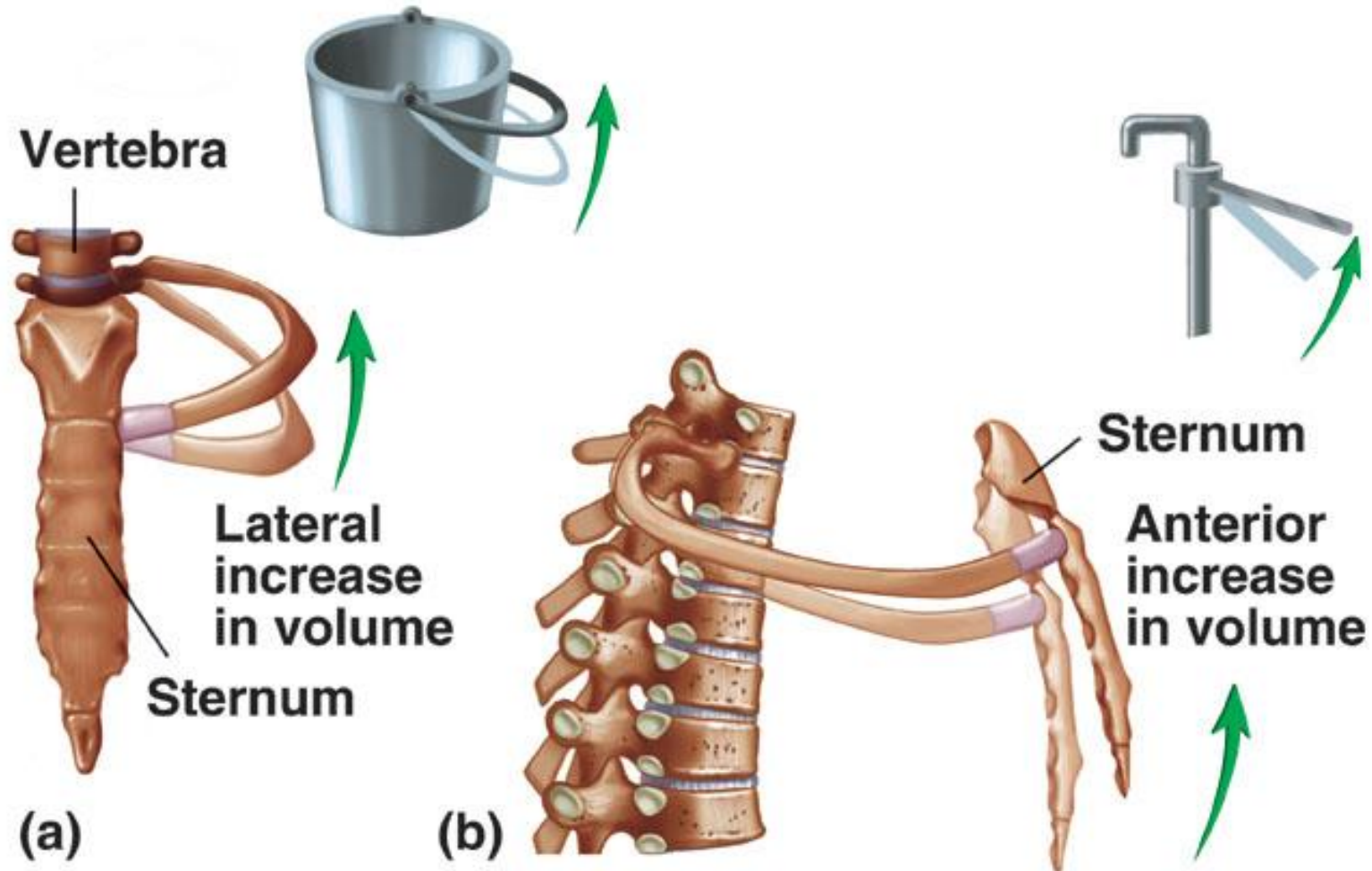
# Muscles of Respiration

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



# Thoracic Volume

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



# Mechanism of expiration

❖ In quiet breathing,

Expiration is passive process but

❖ During forced expiration

**Muscles of expiration** contracts

- Anterior abdominal muscles
- Internal intercostal muscles
- Accessory muscles: adductors of vocal cords

# Muscles of Respiration

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

