

(XVII.) PNEUMOGRAPHY

Anatomy of respiratory system

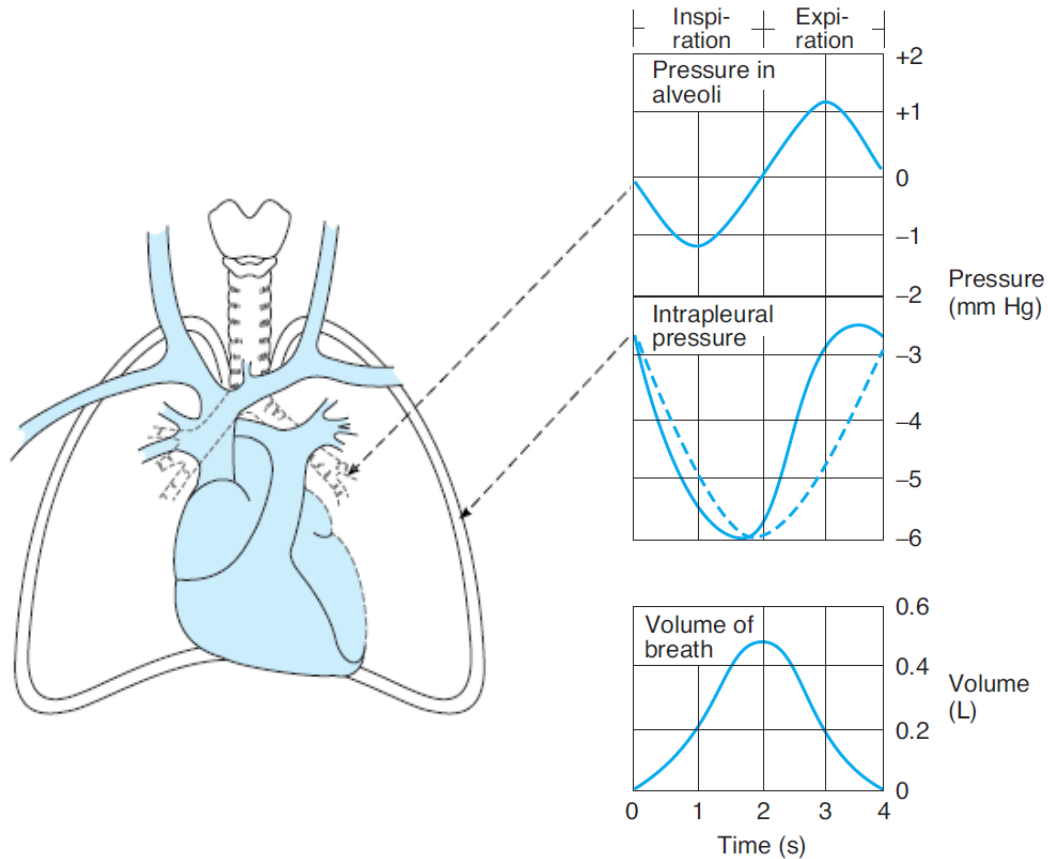
Respiratory system

- ***Airways***
 - Upper airways
 - Lower airways
- ***Lungs***

Respiratory muscles

- ***Inspiratory muscles***
 - Diaphragm
 - External intercostal muscles
- ***Accessory inspiratory muscles***
 - Scalene and sternocleidomastoid muscles
- ***Expiratory muscles***
 - Internal intercostal muscles; abdominal muscles

Changes of intrapleural and intraalveolar pressure (related to atmospheric pressure) during inspiration and expiration



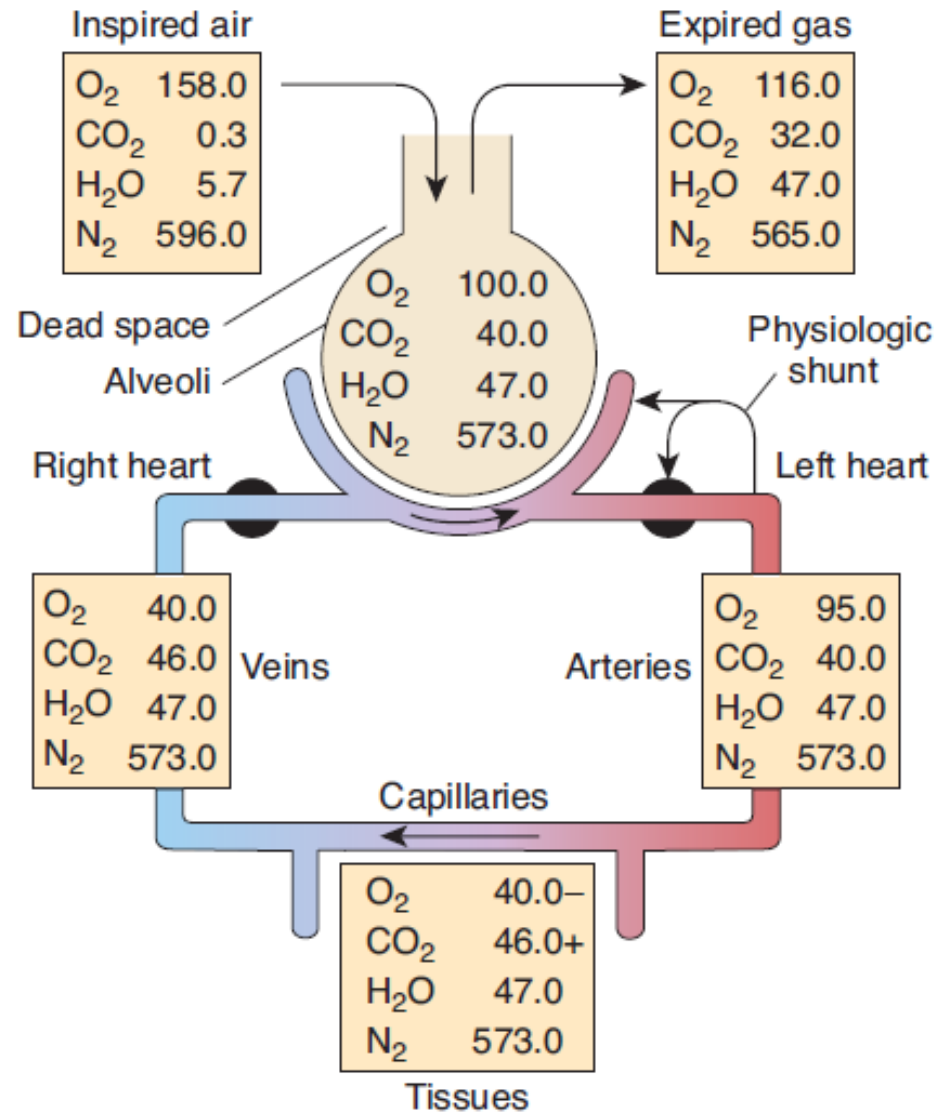
Inspiration

- Active process – contraction of respiratory muscles
- Decrease of intrapleural pressure
- Decrease of intraalveolar pressure
- Due to pressure gradient, air flows into lungs

Expiration

- Passive process (quiet expiration) – elasticity of thoracic wall and lungs
- Increase of intrapleural and intraalveolar pressure
- Air flows out of lungs

Partial pressures of gases (mm Hg) in various parts of the respiratory system and in the circulatory system

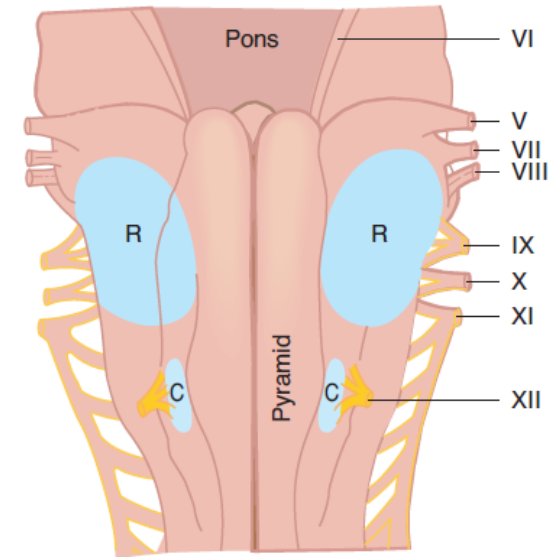
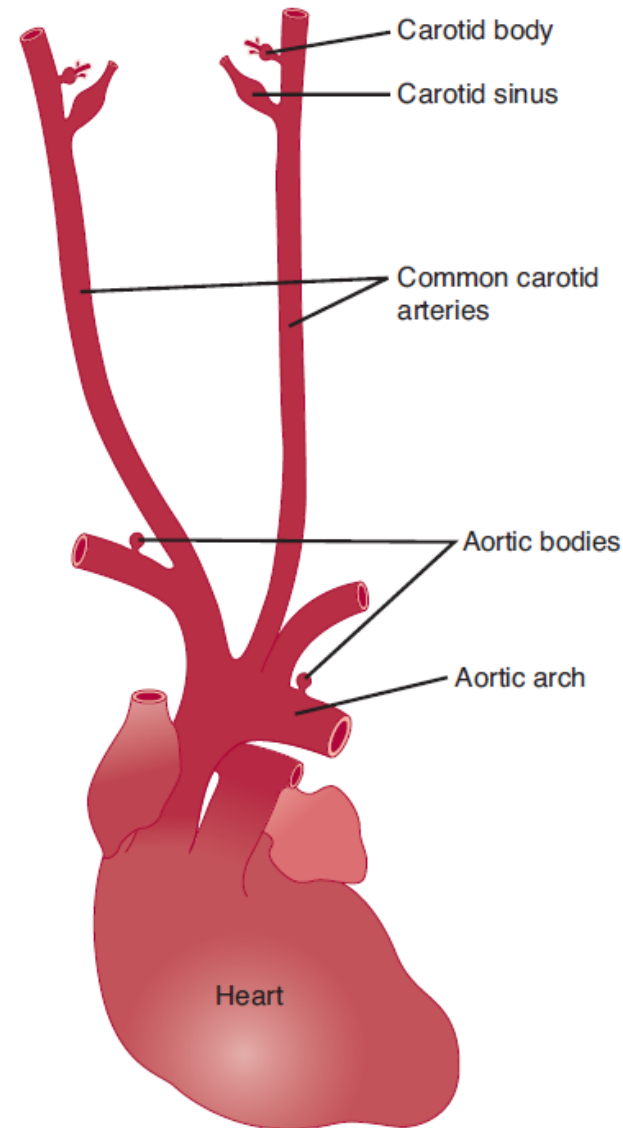


Chemical control of breathing

Chemoreceptors

- Peripheral
- Central

- Changes of $p\text{CO}_2$ (pH) or $p\text{O}_2$
- Changes of activity of respiratory neurons



Equipment

- two respiratory belts for registration of respiratory movements
- nose clip
- sterile mouthpiece
- Krogh respirometer
- PowerLab system

Procedure

Record:

- Resting respiration (1 min)
- Respiration after a mild exertion (5 squats – 10 breathing cycles)
- Respiration after an intensive exertion (30 squats – 10 BC)
- Respiration after re-breathing of the expired air from Krogh respirometer (2-3 min + recovery)

Evaluation

Following parameters in 6 chosen breathing cycles in each recorded situation

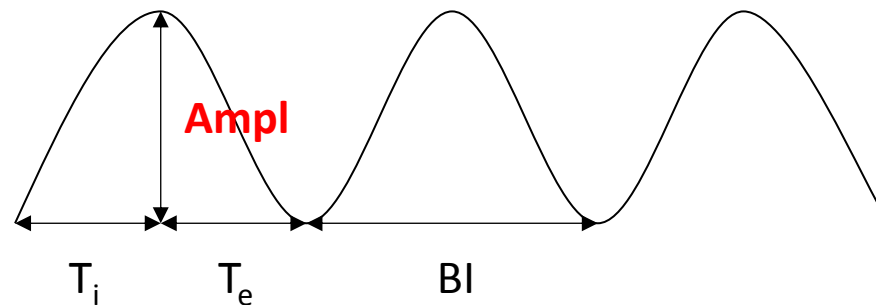
T_i - duration of inspiration

T_e - duration of expiration

BI - duration of whole breathing cycle (breathing interval)

Ampl - amplitude of breathing movements

Create a table, calculate arithmetic means and standard deviations



Statistical analysis of obtained data

Choose two sets of data which will be analyzed

Follow the procedure in textbook