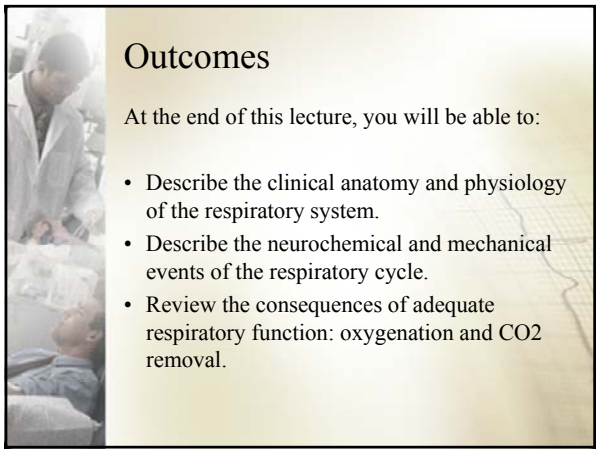
EMC 340 Intro to Clinical Medicine

Respiratory System

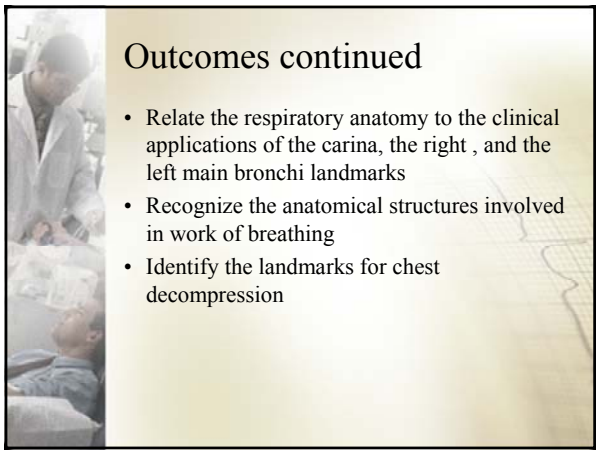
David Trigg, MD



Outcomes

At the end of this lecture, you will be able to:

- Describe the clinical anatomy and physiology of the respiratory system.
- Describe the neurochemical and mechanical events of the respiratory cycle.
- Review the consequences of adequate respiratory function: oxygenation and CO2 removal.



Outcomes continued

- Relate the respiratory anatomy to the clinical applications of the carina, the right , and the left main bronchi landmarks
- Recognize the anatomical structures involved in work of breathing
- Identify the landmarks for chest decompression

Trachea

Carina

- Junction of right and left bronchi
- 21-22 cm from the central incisors (avg. adult)

Right main bronchus

- Clinical application: “Vertical continuation of the trachea”

Left main bronchus

- Clinically: “A 90^0 turn off of the trachea”

Chest Wall

- Sternum
  - Sternal notch
  - Manubrium
  - Angle of Louis
  - Xiphoid process
- Cartilaginous structures
- 12 ribs

Chest Wall, continued

- Intercostal muscles
- Three cavities:
  - Mediastinum
  - Right pleural cavity
  - Left pleural cavity

Anterior Chest Wall

- Sternum
  - Angle of Louis
    - Sternal angle
    - Knuckle at edge of inferior manubrium
    - Landmark for 2nd rib
- Intercostal Muscles and Spaces
  - Spaces named for the rib above it
    - 2nd ICS is below the 2nd rib
- Intercostal Veins, Arteries, and Nerves
  - Inferior to each rib

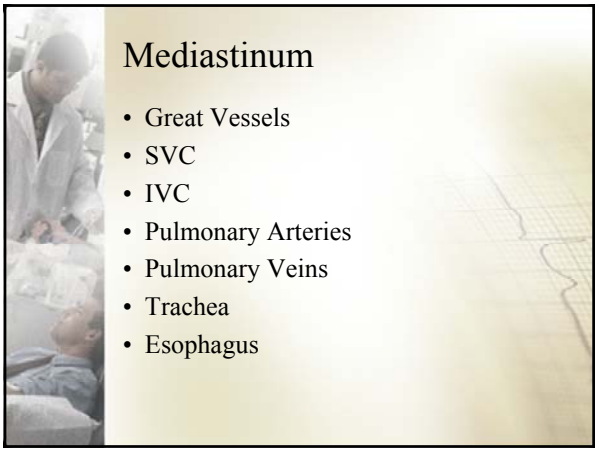
Directional Terms

- Midclavicular Line
- Midaxillary Line

Landmark for pleural decompression
2nd ICS – Midclavicular Line (MCL)

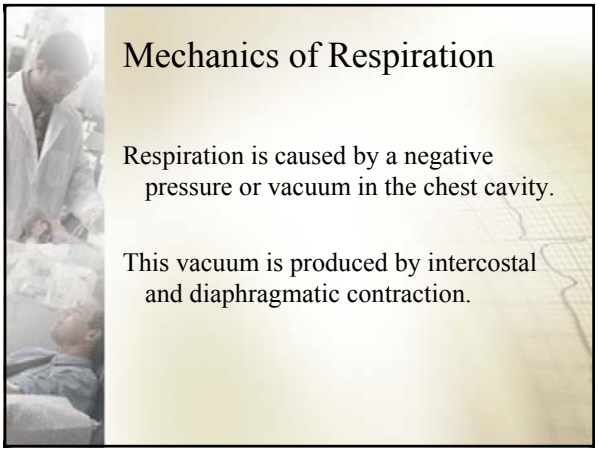
Lungs

- Right Lung
  - 3 Lobes
    - Upper
    - Middle
    - Lower
- Left Lung
  - 2 Lobes
    - Upper
    - Lower



Mediastinum

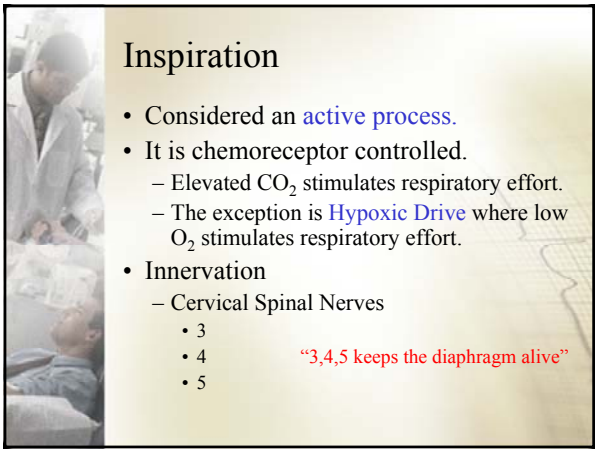
- Great Vessels
- SVC
- IVC
- Pulmonary Arteries
- Pulmonary Veins
- Trachea
- Esophagus



Mechanics of Respiration

Respiration is caused by a negative pressure or vacuum in the chest cavity.

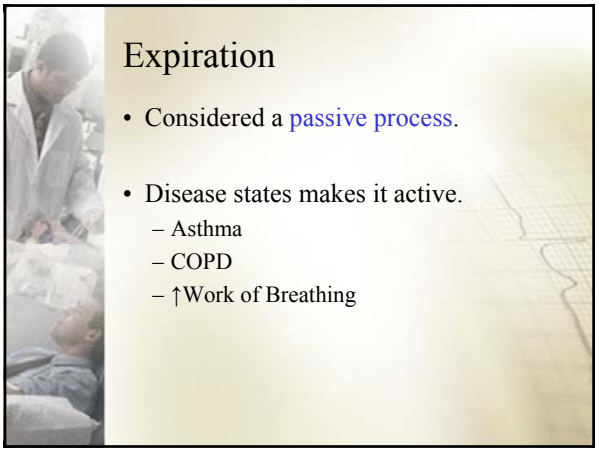
This vacuum is produced by intercostal and diaphragmatic contraction.



Inspiration

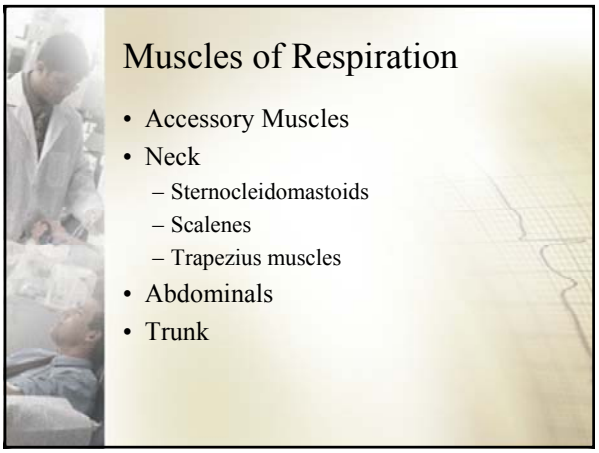
- Considered an active process.
- It is chemoreceptor controlled.
  - Elevated CO_2 stimulates respiratory effort.
  - The exception is Hypoxic Drive where low O_2 stimulates respiratory effort.
- Innervation
  - Cervical Spinal Nerves
    - 3
    - 4
    - 5

"3,4,5 keeps the diaphragm alive"



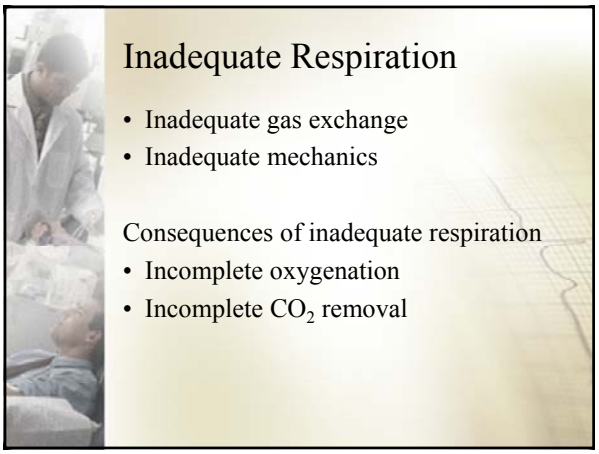
Expiration

- Considered a passive process.
- Disease states makes it active.
  - Asthma
  - COPD
  - ↑Work of Breathing



Muscles of Respiration

- Accessory Muscles
- Neck
  - Sternocleidomastoids
  - Scalenes
  - Trapezius muscles
- Abdominals
- Trunk



Inadequate Respiration

- Inadequate gas exchange
- Inadequate mechanics

Consequences of inadequate respiration

- Incomplete oxygenation
- Incomplete CO_2 removal

Summary

We have discussed:

- Some clinical applications of the anatomy and physiology of the respiratory system.
- Consequences of inadequate respiratory function.
- Anatomical structures.
- Anatomical landmarks for pleural decompression.