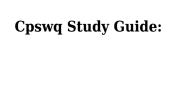
#### Chapter 18- Thorax and Lungs

- Thoracic cage: bony structure with a conical shape, which is narrower at the top.
  - Defined by sternum, 12 pairs of ribs, and 12 thoracic vertebrae
- Sternum: 3 parts
  - Manubrium, the body, the xiphoid process
- Sternal angle:
  - Angle of Louis: this is the articulation of the manubrium and body of the sternum, and its continuous with the second rib
    - Find it by palpating to the 2" rib, and slide down into the second intercostal space
    - Marks the site of tracheal bifurcation into the right and left main bronchi
- Costal angle: usually 90 degrees or less, this angle increases when the rib cage is chronically overinflated, as in emphysema.
- Wertebra prominins: flex your head and feel the most prominent bony spur protruding at the base of your neck.
- Reference lines: Anterior- midsternal line and mid clavicular line. Posterior: vertebral and scapular line.
  - Lift the persons arm 90 degrees:
    - Anterior axillary line: extends down from the anterior axillary fold where the pectoralis major muscle.
    - Posterior axillary line: continues down from the posterior axillary fold where the latissimus dorsi muscle inserts
    - Midaxillary line; runs down from the apex of the axilla
- Apex of the lungs: 3-4 cm above the inner third of the clavicles
- Base of lungs: rests on the diaphragm at about the 6" nb in the middlevicular line
- Right lung: 3 lobes
- Left lung: 2 lobes
- Visceral pleura: lines the outside of the lungs, dipping down into the fissures.
- Parietal pleura: lines the inside of the chest wall and diaphragm
- Pleura cavity: potential space filled only with a few mm of lubricating fluid. Normally has a vacuum, negative pressure, which holds the lungs tightly against the chest wall.
  - Like two glass slides with a drop of water between them
  - Extends approx. 3 cm below the level of the lungs, forming the cost diaphragmatic recess (helps lungs expand).
    - This is a potential space; when it abnormally fills with air or fluid, it compromises the lung expansion.
- Trachea: lines the anterior to the esophagus, 10-11cm long in the adult
  - Bifurcates just below the sternal angle into the right and left main bronchi
- Trachea and bronchi: transport gases between the environment and lung parenchyma. They constitute the dead space
  - Bronchi: lined with goblet cells which secrete mucus that entraps the particles
    - Cilia- sweep particles upward where they can be swelled or expelled
- Acinus: functional respiratory unit that consists of the bronchioles, alveolar ducts, alveolar sacs, and the alveoli. Gas
  exchange occurs across the respiratory membrane in the alveolar duct in the millions of alveoli
- 4 main functions of the respiratory system.
  - Supplying oxygen to the body for energy production
  - Removing CD, as a waste product of energy reactions.
  - Maintaining homeostatic of arterial blood
  - Maintain heat exchange (like how dogs pant, occurs less in humans)
- Control of respirations:
  - Involuntary control
  - Brainstem (pons and medulla)
  - Major feedback loop is humoral regulation, or the change in CO2 and O2 levels and H ion levels
    - Hypercapnia: increase of CO2 in blood. Predominantly the stimulus for us to breath
    - Hypoxemia: decrease of oxygen in the blood, less effective than hypercapnia
- In a COPD patient: be careful when giving them O2
- Changing in chest size:
  - Inspiration increasing the size of the thoracic container creates a slightly negative pressure in relation to the atmosphere; therefore air rushes into fill the partial vacuum
  - Expiration: primarily passive, as the diagram relaxes, elastic forces within the lung, chest cage, and abd cause it to dome up, this squeezing creates a relatively positive pressure within the alveoli, which flows air out
- The aging adult:
  - Costal cartilages become calcified, thus the thorax is less mobile

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**Michael Hoelscher** 



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