

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 2nd 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
- **Vertebra prominens:** flex your head and feel the most prominent bony spur protruding at the base of your neck.
C6
- **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** inserts
 - **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 6th rib in the midclavicular 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 CO₂** 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 breathe
 - **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 diaphragm 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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Marco Casella



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