

5.2

RESPIRATORY PRESSURES

Ventilation or breathing is the movement of air into and out of the lungs. In order for air to move there must be differences in air pressure. An area of high pressure and an area of low pressure is often referred to as a pressure gradient. Air will always flow from a region of high pressure to a region of low pressure (P_1 and P_2 in the equation below represent the two different pressures). Additionally, the rate of airflow through the respiratory passages is affected by the amount of resistance of the passageway.

Recall when we studied the mean arterial pressure (MAP) of blood that total peripheral resistance was dependent on the diameter of the blood vessels and that if you constricted a blood vessel it would increase MAP. The same principles apply to air flow in our respiratory passages. According to Poiseuille's law (see formula below) the diameter of the tube has the greatest influence on resistance: they are inversely proportional - as diameter goes up, resistance goes down.

$$\text{Flow} = (P_1 - P_2)/R$$

The greater the difference between the two pressures and the lower the resistance in the tube, the faster air will flow. Upon inhalation of air the atmospheric pressure is greater than the pressure inside the lungs so air enters the lungs.

Ventilation: Inspiration and Expiration
Pressure Differences in the Thoracic Cavity
Pneumothorax and Pleuritis
Respiratory Volumes and Capacity



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