Ventilation-perfusion

Health & Medicine

During rest, the alveolar change is minimal. However, during the active or highly active periods such as exercise and other conditions, alveolar pressure changes are high. Such a person is said to be on positive pressure ventilation. This may lead to a situation where alveolar pressure exceeds vascular pressure, and this may be detrimental to the flow of blood (Osborne 2). Usually, pulmonary pressure is high during exercise to avoid any hindrance that may occur to the blood flow (Osborne 3). The alveolar partial pressure of oxygen is a function of the ratio of ventilation to perfusion (Osborne 3). In a normal situation, the blood in the pulmonary capillaries equilibrates with alveolar oxygen pressure and carbon dioxide pressure (Osborne 4). The great ventilation and perfusion at the base of the lung allow greater gas exchange at the base of the lungs (Osborne 4). Therefore, such an arrangement allows adequate gas exchange, unless a disease occurs to disrupt it (Osborne 4). On the other hand, if regional hypoxia occurs that leads to reduced oxygenation of the alveolus, local pulmonary vasoconstriction takes precedence (Osborne 4). The supply of blood to less oxygenated alveolus is reduced and directed to areas with an adequate supply of oxygen.

These rates are able to maintain sufficient saturation of the blood in the pulmonary capillaries. This is because if the pressure of oxygen increases, the saturation goes up and hemoglobin stores excess oxygen (“ The Respiratory System Part 2” Web). Hemoglobin is able to compensate for the low pressure of oxygen (“ The Respiratory System Part 2” Web). For example, active tissues consume a large amount of oxygen. This causes saturation of hemoglobin going through such sites to drop significantly (“ The Respiratory System Part 2” Web).

A decrease in Dead Space means that the alveolar pressure will be low as compared to arterial pressure (Leach and Treacher 3). This will cause oxygen delivery to tissues to increase significantly. Several factors can affect oxygen delivery to tissues and include the rate of oxygen delivery to the capillary, oxygen-hemoglobin breakdown, capillary size, diffusion rate, and rate of oxygen use by the cells (Leach and Treacher 3).