

Physiologic Dead Space (VD)

The physiologic dead space represents the amount of air that is inspired but does not take part in gas exchange. Two areas of the lung contribute to the physiologic dead space: one is the space in the conductive airway also called anatomic dead space and the other is the alveoli that are not well perfused such as the apex of the lung, also called functional dead space. Physiologic dead space can quickly provide insight into how patients' gas exchange in the lungs are functioning. Causes on increase in physiologic dead space include shunt or diseases that damage the alveoli. Physiologic dead space can be calculated by multiplying the tidal volume (TV) with the difference between the arterial partial pressure of CO₂ (PaCO₂) and the partial pressure of CO₂ in the expired air (PECO₂) and divided by the arterial partial pressure of CO₂ (PaCO₂). In other words, it is the volume of air that is proportional to the percentage of CO₂ that entered the lungs but did not get exchanged.



PLAY PICMONIC

Tidal Volume (VT)

Volume-Cup Tidal-wave

The volume of air displaced between normal inspiration and expiration when extra effort is not applied. It is normally around 500 ml in a young healthy adult.

Partial pressure of arterial CO₂ (PaCO₂)

Partial Pressure-Gauge Artery-Archer with CO₂

This is the partial pressure of CO₂ in the arteries. It can be obtained and measured with an arterial blood gas (ABG).

Partial pressure of CO₂ in expired air (PECO₂)

Partial Pressure-gauge Exhaust with CO₂

The partial pressure of CO₂ in the expired air is an important piece of information for calculating the physiologic dead space. This can be obtained from capnometry clinically.

VD = TV x (PaCO₂ - PECO₂) / PaCO₂

Volume-cup and Dead-space-man EQUALS Artery-Archer with CO₂ SUB-Tract Exhaust CO₂ OVER Artery-Archer with CO₂

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