



Lecture title: Lung Volume

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Summary: Lung volume + Lung capacity

- Lung volumes: -

- **Lung volumes:** are the amount of air inhaled, exhaled and stored within the lungs at any given time.
- **Tidal volume (TV):** the amount of air inspired or expired during normal respiration.
- **Inspiratory reserve volume (IRV):** it is the maximal volume of air that can be inspired from the end tidal inspiration.
- **Expiratory reserve volume (ERV):** It is the maximal volume of air which can be expired from the resting end expiratory level.
- **Residual volume (RV):** is the volume of air that remains in the lungs after a maximum forced expiration.

- Lung capacities: -

- **Vital Capacity (VC):** it is the maximal volume of air that can be expired after maximal forced inspiration.

$$VC = TV + IRV + ERV$$

- **Total Lung Capacity (TLC):** it is the maximal volume of air that in the lungs after maximal forced inspiration.

$$TLC = RV + (ERV + TV + IRV) = RV + VC$$

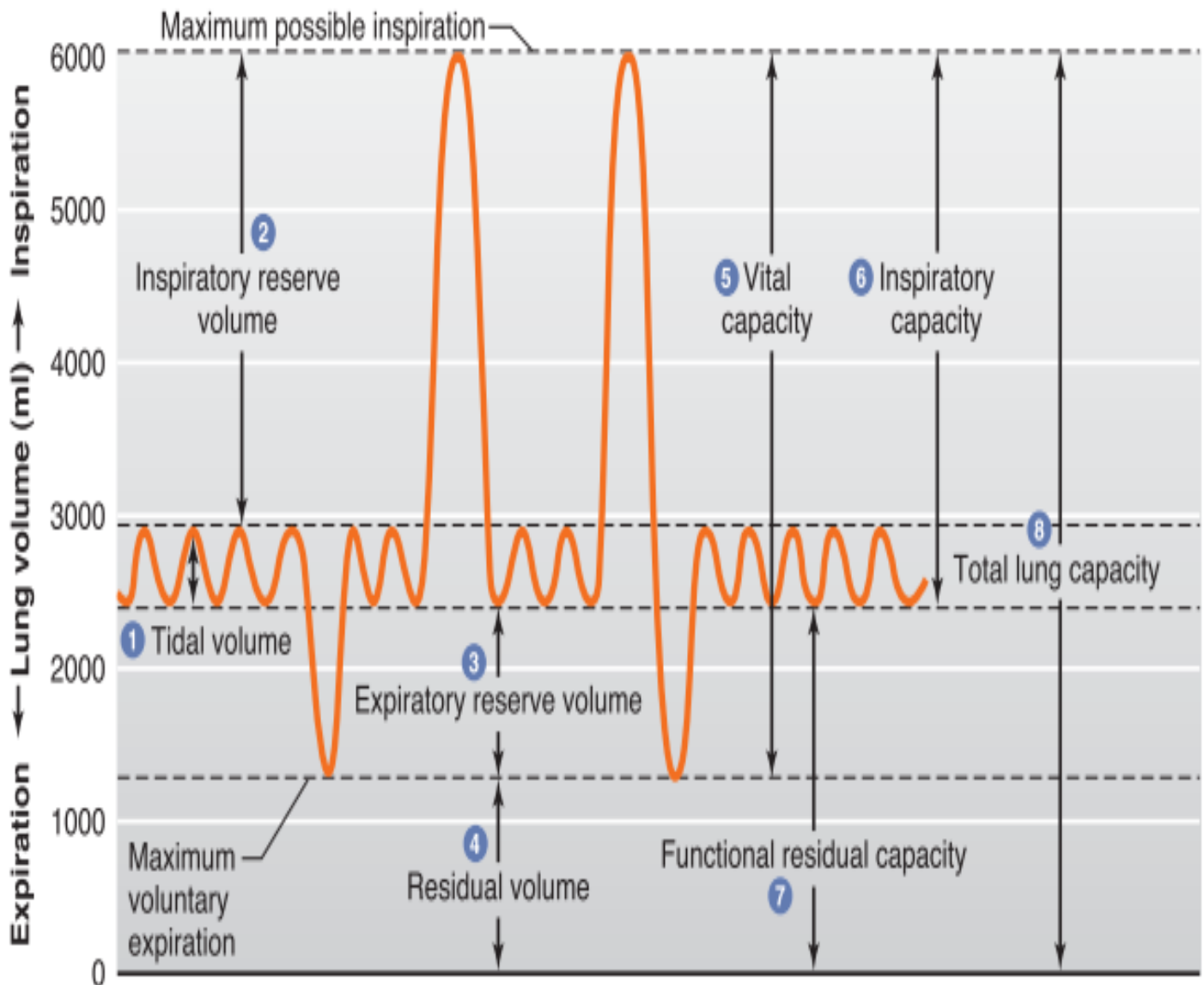
- **Functional residual capacity (FRC):** - amount of air remaining in the lungs at the resting end expiratory level.

$$FRC = ERV + RV$$



- Inspiratory capacity (IC): it is the maximal amount of air can be inspired from the resting end expiratory level.

$$IC = IRV + TV$$



- Dead space: - is the volume of air that is inhaled and does not take part in the gas exchange, because it either remains in the conducting airways or reaches alveoli that are not perfused or poorly perfused. **In other**



words, not all the air in each [breath](#) is available for the exchange of [oxygen](#) and carbon [dioxide](#).

- **[Anatomical](#) dead space:** - is that portion of the airways (such as the [mouth](#) and [trachea](#) to the bronchioles) which conducts air to the [alveoli](#), but do not take part in the process of gas exchange itself.

Alveolar dead space: - refers to the volume of air in alveoli that are ventilated but not perfused, and thus gas exchange does not take place.

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