

Short and Long Term Effects of Exercise on the Respiratory System

Cardiovascular and respiratory System

Responses by the respiratory and cardiovascular system do not work in isolation. The demands of exercise cause changes in both systems and one cannot work without the other.



i.e. An increase in breathing rate means more oxygen is inhaled and can only benefit the body if heart rate increases too to pump to working muscles.

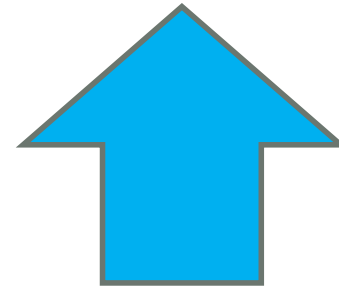
Short Term Effects of Exercise on the Respiratory System

1) Tidal Volume

The volume of air inspired or expired per breath. This increases during exercise.

2) Breathing Rate

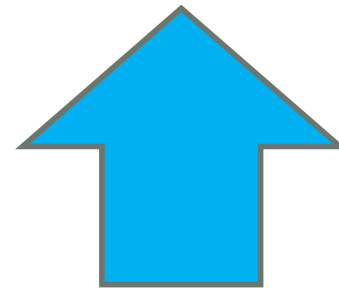
The number of breaths per minute. The typical respiratory rate for a healthy adult at rest is 12–20 breaths per minute.



3) Minute Ventilation

The minute ventilation is the amount of air a person breaths in a minute. This is calculated through the following equation:

$$\text{Minute Ventilation} = \text{Tidal Volume} \times \text{Respiratory Rate.}$$



Breathing volumes



Tidal volume:

This is the amount you breathe in and out in one normal breath.

Name	Tidal volume at rest (ml)	Tidal volume during exercise (ml)
James	500	3500

Think. Pair. Share - Look at the two tidal volume readings below. What changes have taken place and why?

Breathing volumes and exercise

Name	Tidal volume at rest (ml)	Tidal volume during exercise (ml)
James	500	3500

Exercise causes an increase in breathing rate and depth of breathing. This is due to a greater need for oxygen in the body and removal of carbon dioxide.



Tidal volume can increase up to 5-9 times higher than at rest to cope with exercise demands.

Long Term Effects of Exercise on the Respiratory System

1) Gaseous Exchange becomes more efficient

Exchange of gases at the alveoli becomes more efficient and therefore the body can work harder and for longer due to the increased surface area of the alveoli.



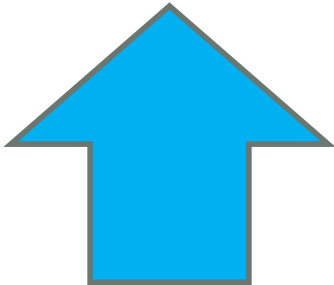
2) Increased Intercostal strength

Allows for more air to be breathed in and out, and a reduction in resting respiratory rate, which makes the body more efficient

Long Term Effects of Exercise on the Respiratory System

3) Vital Capacity

Maximum amount of air that an individual can expel from lungs after a maximum inhalation.



4) Tidal Volume

More oxygen can enter the lungs during inhalation