

Human physiology and anatomy write up



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In the practical the systolic and diastolic blood pressure was measured, heart and respiration rate, tidal volume, minute volume and % gas analysis at rest and immediately after a short period of exercise will also be measured. The respiratory volumes will be measured by collecting expired air in a Douglas bag via a mouthpiece and a valve.

Definitions Of Key Terms

Heart rate is the number of heartbeats per unit of time – typically expressed as beats per minute (bpm) – which can vary as the body's need for oxygen changes, such as during exercise or sleep.- Web definition Wikipedia

Systole – the contraction of the chambers of the heart (especially the ventricles) to drive blood into the aorta and pulmonary artery.

Diastole – the widening of the chambers of the heart between two contractions when the chambers fill with blood.- Web definition Wikipedia

Blood pressure (BP) is a force exerted by circulating blood on the walls of blood vessels, and is one of the principal vital signs. During each heartbeat, BP varies between a maximum (systolic) and a minimum (diastolic) pressure.- Web definition Wikipedia

Respiratory rate (RR) is the number of breaths a living being, such as a human, takes within a certain amount of time.- Web definition Word Net Web

Tidal volume is the lung volume representing the normal volume of air displaced between normal inspiration and expiration when extra effort is not

applied. Typical values are around 500ml or 7ml/kg bodyweight.- Web definition Wikipedia

Respiratory minute volume is the volume of air which can be inhaled (inhaled minute volume) or exhaled (exhaled minute volume) from a person's lungs in one minute.- Web definition Word Net Web

Factors that were taken into consideration when working with a human subject, is health factors, is the person physically fit to stand the exercise. Mental stamina if the subject can withstand the pressures of lengthily exercises.

Method:

Ask a demonstrator to check that the Douglas bag is correctly connected to a mouthpiece, valve and three-way tap.

Once seated comfortably on a bike, the subject should put on a nose clip, then breathe through the mouthpiece with the three-way tap open to the atmosphere for a short period for acclimatisation (Question – why is this?).

The tap should then be opened to the Douglas bag for five minutes during which time one observer measures the respiration rate using a stop watch and another observer obtains values for resting systolic and diastolic blood pressures as directed by the demonstrator. At the same time, another group member estimates the heart rate every 60 seconds.

At the end of the 5 minute period the three-way tap is closed.

The subject is now connected to a second Douglas Bag and using the bicycle ergometer provided, the subject should exercise for five minutes. NB, this should be light exercise only. As the subject exercises recorded the heart rate every 60 seconds as before.

As soon as possible after the subject has stopped exercising the expired air should be collected in a Douglas bag (as above) but for only one minute, and measures of respiration rate and heart rate should be made for 5 minutes. Record blood pressures.

Take a gas sample from each bag used and measure the volume of expired gases in each bag (a demonstrator will assist you). Gas samples should be analysed for % oxygen and carbon dioxide.

You will be provided with % oxygen and carbon dioxide values for inspired room air.

Using the method above, none of the format was changed.

Dissuasion:

In upright exercise with all factors remaining equal, systolic blood pressure slowly amplifies while diastolic blood pressure remains the same. Diastolic pressure may even decrease due to vasodilation, or the slight variation of blood vessels caused by the heart pumping harder to spread more oxygen throughout the body.

Diastolic blood pressure is the extended at base blood pressure, when pressure is weakest, and systolic shows pressure at peak times, when

heartbeats force blood through the veins. Since systolic pressure is unswervingly associated to how the heart functions, it is affected the most by exercise. However, since the type of exercise and the amount will force a change on the body's blood pressure. Dynamic, or aerobic, exercise, will affect blood pressure another way from static exercises.

Characteristically during exercise heart rate will increase, this is in direct to increase blood flow to the functioning muscles to allow for amplified respiration – in order for the muscles to work well. Therefore the more exhausting the exercise, the more your heart rate will increase.

Blood pressure will also increase during exercise and again depends on strength levels. During exercise such as running/cycling/swimming systolic pressure will raise steadily whereas diastolic pressure will increase only somewhat.

Exercise in healthy people can lead to, arterial CO₂ levels rise slightly with light, moderate, medium and sub-maximum exercise strength levels regardless of the route of breathing during exercise. Since CO₂ is the influential vasodilation agent, total arteries and arterioles improve blood and O₂ delivery to all vital organs of the human body, including the heart and brain. Vasodilation guarantees aerobic respiration in body cells making it likely for healthy people to benefit from aerobic exercise without any key problems associated to tissue hypoxia causing too elevated blood lactate, muscle spasms, injuries, low recovery rates, volatility, stress, poor sleep.

Looking at the Graphs on the separate page, there seems to be no large variations in the data. As graph one show shows a nice trend, that when the
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subject is resting their heart rate is a normal pace, as they started exercising the rate slowly goes up, and as the subject begins to get into the recovery period, the subject's heart rate starts to settle down. Graph two and three show that O₂ and CO₂ levels in a subject that has been exercising.

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