Anatomy and Physiology

Writer

Instructor

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1. **Explain the change in ERV with exercise.**

During exercise, the change in endovascular revascularization (EVR) occurs as breathing rate gets faster by exhaling air out of the lungs.

1. **Explain the change in IRV with exercise.**

Iterative-virtual reality (IRV) changes with exercise as breathing gets faster and vigorous exercise demands increase inhale of air for supplying required amount of oxygen.

1. **Explain the change in IC with exercise.**

The change in the interstitial cystitis (IC) during exercise is due to increase in the tidal volume (TV). As TV increases, it will reimburse the breathing by decreasing the IRV.

1. **Explain the change in FRC with exercise.**

Functional Residual Capacity (FRC) changes with exercise because when the respiratory rate increases, the exhalation time of the air from the body decreases. This causes an increase in the FRC in to meet the body demand of increased oxygen supply enough for all muscles.

1. **Explain why RV does not change with exercise.**

When the residual volume (RV) does not change with the exercise it means that the lungs are not stressed out enough to cause a change in the amount of air within the lungs after maximal exhalation.

1. **Explain why VC does not change with exercise.**

The vital capacity (VC) is the maximum amount of air that can be exhaled out. In the course of exercise, there’s a significant increase in respiratory rate and inhaling of the air. Hence, the amount of air being exhaled out would not increase during exercise.

1. **Explain why TLC does not change with exercise.**

The total lung capacity (TLC) does not change during exercise because it already is at its maximum rate and further increase in it during exercise may cause damage to the lungs.

1. **During exercise, the depth of respiration increases. Name the muscles involved in increasing the depth of respiration and explain how muscle contraction causes this increase.**

The intercostal muscles are involved in increasing the depth of the respiration. When these muscles contract, the chest lining is stressed out allowing the exchange of air during normal breathing.

1. **Explain the importance of the change in minute ventilation with exercise.**

Minute ventilation is the measure of the volume of the oxygen inhaled in the body within a minute. During exercise, the body’s need for oxygen increases, therefore, the TV increases the rate of respiration to meet the need of oxygen supply (Caravita et al., 2017).

1. **Restate your predictions that were correct and give data from your experiment that support them. Restate your predictions that were not correct and correct them with supporting data from your experiment.**

The predictions about the decrease in the TV is incorrect as during exercise, TV increases by 0.4-1.6 folds. The prediction that IRV decreases is correct, as it reduces from 1.3 to 0.6. The prediction about VC not changing during exercise is correct, the initial reading 4.1 remains the same. While a slight increase in TLC is observed, it rose from 5.5 to 5.6.

**Application**

1. **During strenuous exercise, TV plateaus at about 60% of VC but minute ventilation continues to increase. Explain how that would occur.**

During exercise, the minute ventilation continues to increase as there is significant amount of gaseous exchange between oxygen and carbon dioxide as compared to the rest situation. The increase in rate of respiration increases the overall minute ventilation.

1. **Emphysema causes alveolar dilation and destruction of alveolar walls which cause an increase in residual volume with air that cannot be exhaled. Assuming that an individual’s TLC does not change, explain why a person with developing emphysema is not short of breath while resting, but becomes short of breath after climbing a flight of stairs.**

In the case of emphysema, there is an alveolar dilation and destruction which causes decrease in the oxygen supply that enters the blood stream during exhalation. When the alveoli are malfunctioned, the previously inhaled air remains in the lungs and new air cannot enter due to no space in the lungs. Hence during exercise, the increased need of oxygen supply cannot be fulfilled as damaged lungs cannot accommodate more air with the continuous increase in the breathing rate and low oxygen concentration will cause short of breath (Faisal et al., 2016).

**Application**

1. **We measured the stroke volume of the left ventricle. What was the average stroke volume of the right ventricle at rest and after exercise?**

The volume of the stroke should remain the same at rest for each ventricle but change during exercise. The average stroke volume at rest was 72 and at exercise it was measured at 149.

1. **Assume that for one beat, the stroke volume of the left ventricle is greater than that of the right ventricle. Explain why in a normal heart this would be corrected on the next beat.**

During exercise, regulatory mechanisms take place in the cardiovascular system and one such action is the electrical conductivity. It regulates the filling up and contracting the ventricles for meeting body’s need of oxygen.

1. **Explain why elite athletes have a lower than normal heart rate, yet have a higher than normal ability to increase cardiac output.**

Athletes increase their cardiac muscles capability through vigorous training. While at rest, the heart does not have to undergo hard working but during exercise, it will contract much stronger in order to meet supply sufficient amount of oxygen to the body and exhaling out carbon dioxide.

**References**

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Faisal, A., Alghamdi, B. J., Ciavaglia, C. E., Elbehairy, A. F., Webb, K. A., Ora, J., … O’Donnell, D. E. (2016). Common mechanisms of dyspnea in chronic interstitial and obstructive lung disorders. *American Journal of Respiratory and Critical Care Medicine*, *193*(3), 299–309.