

Course Assessment

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## **The Underlying Mechanism Responsible For Significant Increase In VO<sub>2</sub> Max In Exercising Individuals**

“VO<sub>2</sub> Max is considered by most exercise physiologists to be the best measure of cardiorespiratory capacity” (Munsey & LaFontaine, 2010). It defines the maximum amount of oxygen that can be used during respiration and used by the body to generate cardiac output. According to Munsey and LaFontaine (2010), VO<sub>2</sub> max is determined by the combination of the ability of the heart to pump blood, and the ability of the exercising tissues to use oxygen.

In previously untrained individuals, the increase in VO<sub>2</sub>max with training is due to an equal increase in maximal cardiac output and maximal arteriovenous oxygen difference. “A range of 15 to 40% increase in VO<sub>2</sub>max can be achieved with training in previously untrained individuals” (Robert, n.d.). For individuals with a current ongoing training regimen, the increase in VO<sub>2</sub> Max will be limited compared to non-trained individuals, as it is already high, to begin with. Moreover, individuals exercising several months three to five times a week will experience long-term or chronic adaptations to the repeated stress of regular exercise. Both maximal cardiac output and maximal arteriovenous oxygen difference will adapt via the overload principle to the training stimulus (Robert, n.d.).

The underlying reasons for the increased VO<sub>2</sub> Max can be discussed in multiple parts. First of all, there will be an increase in red blood cell number, improving the oxygen transport to muscles. Second, an increase in the number of capillaries per muscle fiber will enhance oxygen diffusion into muscles. Finally, more mitochondria will allow for higher utilization of the oxygen delivered to muscles. (Robert, n.d.) Combined, all these training adaptations result in a more significant arteriovenous oxygen difference. (Schubert, et al., 2017)

VO<sub>2</sub> Max is the measure of cardio horsepower that indicates the body's capacity to move O<sub>2</sub> from the lungs to the muscles (Bastone, et al., 2014). Intensive aerobic training can boost it from 40 ml/kg/min, the average for active adults, to a superfit 60 ml/kg/min. It is a perfect measurement device for overall cardiovascular fitness.

### References

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