PROFESSIONAL OPINIONS, RESEARCH ON THE EFFECTS OF INHALED OXYGEN

"THE EFFECT OF INHALING CONCENTRATED OXYGEN ON PERFORMANCE DURING REPEATED ANAEROBIC EXERCISE

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ABSTRACT: The objective of the pilot study was to test the effect of inhaling 99.5% oxygen on recovery. [...] Research subjects completed two thirty-second Wingate tests at an interval of ten minutes, and in the interval between the tests the subjects inhaled either oxygen or a placebo in random order. This procedure was then repeated. The pilot study revealed a significantly ($p<0.03$) smaller performance drop in the second Wingate test following the inhalation of 99.5% oxygen when compared with the placebo. The results of the study indicate that inhaling concentrated oxygen may have a positive effect on short-term recovery processes." (Biology of Sport, Vol. 27 No3, 2010, 169-175)

"INFLUENCE OF HYPEROXIC-SUPPLEMENTED HIGH-INTENSITY INTERVAL TRAINING ON HEMATOLOGICAL AND MUSCLE MITOCHONDRIAL ADAPTATIONS IN TRAINED CYCLISTS

Cardinale DA, Larsen FJ, Lännerström J, Manselin T, Södergård O, Mijwel S, Lindholm P, Ekblom B and Boushel R (2019) Front. Physiol.

As recently reviewed (Cardinale and Ekblom, 2018), hyperoxia acutely improves lactate metabolism (Ekblom et al., 1975), reduces muscle glycogen utilization (Stellingwerff et al., 2006), and enables a higher exercise work rate compared to exercise in normoxia (Powers et al., 1989; Nielsen et al., 1999) while reducing submaximal exercise efficiency (Manselin et al., 2017). Acutely, hyperoxia increases oxygen (O2) delivery to the working muscles (Ekblom et al., 1975) and completely prevents exercise-induced arterial hypoxemia (EIAH), i.e., "oxyhemoglobin SaO2 below 95%" (Powers et al., 1989), a condition often found in individuals exercising at intensities approaching maximal oxygen uptake (VO2max) (Dempsey and Wagner, 1999; Dempsey et al., 2008). Considering the O2 delivery limitation at near maximal exercise intensities (Saltin and Calbet, 2006) and that the mitochondria possess an excess capacity above the O2vdelivery (Boushel et al., 2011), we postulated that hyperoxic-supplemented exercise training allowing a higher training load leads to a greater training stimulus at the muscle level and therefore greater performance enhancement compared to the same training regimen breathing normoxia. This hypothesis is supported by the finding that exercise training with recombinant human erythropoietin treatment enhanced skeletal muscle mitochondrial capacity compared to controls (Plenge et al., 2012)."

"EFFECTS OF INHALATION OF OXYGEN ON MORPHOLOGY OF ERYTHROCYTE AND BLOOD FLUIDITY AFTER INTENSIVE EXERCISE

Xiao Guoqiang, Huang Jia, Qiu Zhuojun, Su Shixiong and Xie Wanmei
(PhysicaL Education Department of South China Normal University, Guangzhou, China) 2002

To observe the effects of inhalation of oxygen on the morphology of erythrocyte and blood fluidity after incremental exercise to exhaustion, blood viscosity (BV), plasma viscosity (PV), red cell aggregation (RCA), red cell deformability (TK), hematocrit (Hct) were obtained at rest, 3, 15, 30 mm after exercise on a cycle ergometer in seven men. The parameters were compared between groups with and without inhaling 70% O2. The results were as follow: (1) all indexes of blood fluidity at rest were not different significantly between two groups, but PV, RCA, TK, Hct 15, 30 mm after exercise and HR at 15 mm after exercise were significantly higher in group without inhaling O2 than that in group with inhaling 70% O2. (2) Morphology of erythrocyte were changed significantly 3, 15, 30 mm after exercise in group without inhaling O2, however, in group with inhaling 70% 02 changes in erythrocytes have been recovered 30 mm after exercise. It is concluded that the inhalation of 70% O2 could speed up the recovery process of all indexes of blood fluidity and erythrocyte after exercise which would be one of important mechanisms for removal of exercise-induced fatigue."

DO PORTABLE RECREATIONAL OXYGEN SUPPLEMENTS SHARE THE SAME PHYSIOLOGICAL BENEFITS AS OTHER FORMS OF HYPEROXIC ENVIRONMENTS DURING MODERATE INTENSITY CYCLING?

Wyton, Lee (2018) University of Chichester, Sport and Exercise Department

"[...] portable recreational O2 supplement did influence recovery principles during fixed, short-term exercise. Administering this portable recreational O2 supplement prior, during and post moderate intensity cycling, as well as other similar athletic activity, can yield positive results by significantly decreasingblood lactate concentrations; enabling individuals to increase endurance and speed of recovery time.

[...]

Healthy people who breathe [canned oxygen] during and after short-term, moderate intensity exercise can increase their endurance and speed up recovery. Exercise enthusiast and athletes can improve their performance through a reduction in lactic acid within the blood, which leads to faster recovery (increases in recovery speed) and endurance (prolonged physical activity)."