The effect of intermittent training in hypobaric hypoxia on sea-level exercise: a cross-over study in humans

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Protocol:

- 2 hours per day, 10 days, 60-70% of heart rate reserve at 8,200 feet
- "After" tests were performed 9 days after the final altitude session

Results:

Change in Maximum Power Output

- Altitude group...Increased by 5.2%
- Sea-Level control group...No significant change (2.1%)

Change in Mean Anaerobic Power

- Altitude group...Increased by 5.1%
- Sea-Level control group...No significant change (2.0%)

Change in Peak Anaerobic Power

- Altitude group...Increased by 3.8%
- Sea-Level control group...No significant change (0.2%)

Conclusion in Abstract: "The results of this study indicate that intermittent hypobaric training can improve the anaerobic energy supplying system, and also, to a lesser extent, the aerobic system. It can be concluded that the overall results of the cross-over study showed predominantly improvements in the anaerobic metabolism at variance with the previous study of our own group, where the relative VO2max and Wmax increased by 7%."

Abstract:
The purpose of this study was to examine the effect of intermittent training in a hypobaric chamber on physical exercise at sea level. Over a 10 day period, 16 male triathletes trained for 2 h each day on a cycle ergometer placed in a hypobaric chamber. Training intensity was at 60%□70% of the heart rate reserve. There were 8 subjects who trained at a simulated altitude of 2,500 m, the other 8 trained at sea level. A year later, a cross-over study took place. Baseline measurements were made on a cycle ergometer at sea level, which included an incremental test until exhaustion and a Wingate Anaerobic Test. Altogether, 12 subjects completed the cross-over study. At 9 days after training in hypoxia, significant increases were seen in maximal power output ( )(5.2%), anaerobic mean power (4.1%), and anaerobic peak power (3.8%). A non-significant increase in maximal oxygen uptake (V˙O2max) of 1.9% was observed. At 9 days after training at sea level, no significant changes were seen in (2.1%), V˙O2max (2.0%), anaerobic mean power (0.2%) and anaerobic peak power (0.2%). When comparing the results of the two training regimes, the anaerobic mean power was the only variable that showed a significantly larger increase as a result of training at altitude. And, although the differences in percentage change between the two training protocols were not significant, they were substantial for as well as for anaerobic peak power. The results of this study indicate that intermittent hypobaric training can improve the anaerobic energy supplying system, and also, to a lesser extent, the aerobic system. It can be concluded that the overall results of the cross-over study showed predominantly improvements in the anaerobic metabolism at variance with the previous study of our own group, where the relative V˙O2max and increased by 7%.