

Effect of Hypoventilation Training on Anaerobic Power and Blood Lactate of Basketball Players

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Abstract

Introduction: Competitive sports training, a growing trend, has adopted faster speeds over time due to continual changes in the rules and regulations of competition. As a result, athletes must be able to withstand higher/increased anaerobic loads. Past studies have examined various ways of applying anaerobic training, but few have explored the topic using anaerobic portable training tools. Therefore, the purpose of this study was to investigate the effects of hypoxia caused by voluntary hypoventilation at low lung volume (VHL) on anaerobic motility and blood lactate.

Methods: University Basketball Association Division II female basketball players were used as subjects. (mean \pm SD age 21.6 \pm 1.18 years; height 1.64 \pm 4.46 m; body mass 56.56 \pm 6.96 kg;)

Subjects performed eight voluntary hypoventilatory training sessions within four weeks. Each training session was performed on the cycle ergometer in two groups of eight 6-second sprints, followed by a 24-second static recovery. Before (Pre-) and after training (Post-), the peak power (PP), mean power (MP) and fatigue index (FI%) were measured using the Wingate Anaerobic Test (WAnT). The biological parameters were collected as blood lactate. The collection time points are the quiet value and the recovery period first (E1), 5 (E5), and 7 (E7) minutes.

Results: The mean difference in blood lactate between pre and post test was found to be +0.65 ($p=0.00$) at the 5th minute of the recovery period, and +0.22 ($p=0.02$) at the 7th minute, which is a significant difference. Peak power (PP) ($p=0.03$) and mean power (MP) ($p=0.04$) also showed significant differences. Although resting heart rate have significant difference ($p=0.01$) and maximum heart rate were not found to be significantly different, it was observed that the heart rate decreased by 6 beats per minute (bpm) ($p=0.07$).

Conclusions: Analysis of the study's results suggest that there was a significant change in lower limb strength through four weeks of VHL training. However, there was no change in heart rate.

Keywords: Training, Hypoventilation, Hypoxia