

Effect of Single High Intensity Combined Training with Cryotherapy on Cardiovascular System, Energy Metabolism and Aerobic-Anaerobic Threshold

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Abstract

The purpose of this study was to investigate the effect of single high intensity combined training with cryotherapy on cardiovascular system, energy metabolism and aerobic-anaerobic threshold. Eight students participated in this study. The experiment was divided into aerobic-anaerobic threshold test and the training, both were done by the ergometer. The 1st phase of the aerobic-anaerobic threshold test started from 100 Watt, every phase was 3 min, and the power would be increased 30 Watt next phase until subjects' greatest effort. The training was divided into continuous exercise and intermittent exercise: the intensity of continuous exercise was individual anaerobic threshold 6 mmol/l (10 min), and for the intermittent exercise was individual max load in incremental test (4x90 s). The cryotherapy (-120°C) was applied after pretest and posttest, also before, between, after training, and was 120 s each time. Results indicated that: The differences of body surface temperature between every measured time and before training were: 1st cryotherapy reduced 9.28°C, the 2nd cryotherapy decreased 10.70°C. All of the blood gas had no significant difference. The average heart rate at 5th and 10th min of continuous exercise increased 9.38 bpm, while the difference between 1st and 4th of intermittent exercise was 15.25 bpm. The lactate concentration of continuous exercise after the exercise for the 1st min was 9.64 ± 1.52 mmol/l, and was 6.68 ± 1.89 mmol/l after the exercise for the 10th min, the difference was 2.96 mmol/l, while the difference of intermittent exercise was 2.16 mmol/l. The difference of ammonia after the end of exercise for 5th min between two exercise was 15.50 mmol/l. About aerobic-anaerobic threshold, the aerobic threshold increased 13.91 Watt, and heart rate reduced 3.75 bpm. The anaerobic threshold at 4 mmol/l increase 5.74 Watt. We conclude that the pre-inter-after cryotherapy did not make significant difference on blood gas and lactate, but it indeed decreased the body

surface temperature, and tended to increase pO_2 and reduce pCO_2 . In addition, the aerobic and anaerobic threshold could be improved by single high-intensity exercise quickly.

Keywords: blood gas, ammonia, lactate