研究摘要

Research Highlight

Effects of Inspiratory Muscle Training on Performing Intense Intermittent Exercise

Objective

This study was designed to examine the effects of inspiratory muscle (IM) training on the maximum dynamic IM function and the ability to perform intense intermittent runs.

Methodology

Fourteen male participants, aged 21-23, who were undergoing regular training in intermittent type sports (e.g. soccer, rugby and basketball) were recruited in this study. According to their ability to perform intense intermittent runs, seven of them were assigned to the IM training (IMT) group (Age: 21.4±0.9 yrs, Height: 175.7±5.9 cm, Weight: 69.6±6.8 kg, VO_{2max}: 61.5±5.0 $ml.kg^{-1}.min^{-1}$), the rest to the control group (Age: 21.6±1.4yrs, Height: 175.3±6.4 cm, Weight: 65.8±7.0 kg, VO_{2max}: 60.9±3.6 $ml.kg^{-1}.min^{-1}$). Both groups had similar sports training background, intense intermittent running ability and physical characteristics. In the IMT group, participants performed two sets of 30 voluntary breaths six days per week for six weeks. At the beginning of the IMT, voluntary breaths were performed against a pressure-threshold load equivalent to 40% maximum static inspiratory mouth pressure. The loading was increased progressively according to the training adaptation of individual during the IMT period. The control group received no IMT. Both groups maintained their regular physical training during the period. The training effect on dynamic IM functions was identified by comparing the Pre- and Post-IMT values of a set of parameters.

Results

Within the IMT group, the components of maximum dynamic IM function including the maximal inspiratory pressure at zero flow, maximal power, and inspiratory pressure at the flow corresponding to W_{lmax} and maximal rate of P_0 development improved significantly after IMT.

Pre-IMT intense intermittent exercise ability revealed by the maximum repetitions of 20-m shuttle runs during the Yo-Yo test was also augmented 18.4±4.0% (Pre-IMT: 35.9±5.3 bouts, Post-IMT: 42.4±5.7 bouts). The increase in ratings of perceived breathlessness and physical exertion were reduced. No change was found in ventilatory and metabolic responses and metabolic stress.

Within the control group, there were no significant differences between pre-IMT and post-IMT values on the same set of parameters.

Implications

Our findings suggest that specific IMT can enhance the ability to repeat the intense 20-m shuttle run in the Yo-Yo intermittent recovery test. The performance enhancement may be attributed partly to the lessening of the exercise-induced breathlessness sensation that is associated possibly with an increase in IM function.

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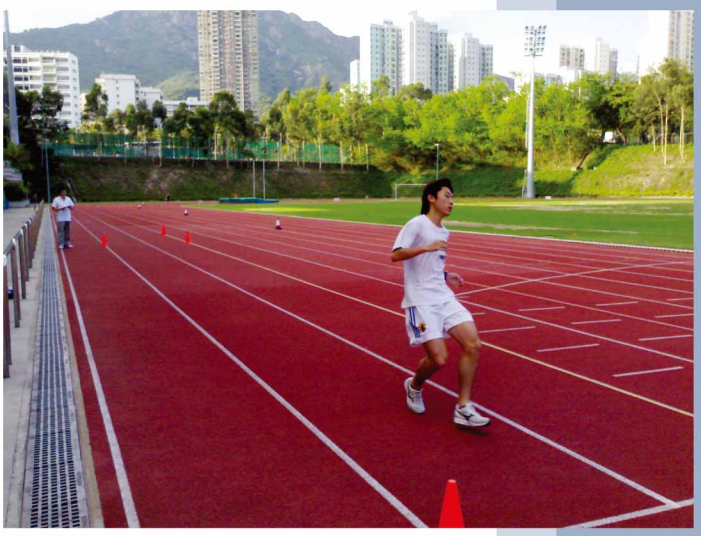

A Yo-Yo Intermittent Recovery Test was used to evaluate IMT effect
間歇式Yo-Yo測試用於評估通氣肌肉訓練效果

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