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Title: Effectiveness of a six-week high-intensity interval training programme on cardiometabolic markers in sedentary males.

Background: High-intensity interval training (HIT) has been proposed as an effective, time efficient strategy to elicit similar cardiometabolic health benefits as traditional moderate-intensity endurance training. This is an important consideration as "lack of time" is a common cited barrier to regular physical activity. **Purpose:** The purpose of this study was to investigate the efficacy of a six-week HIT intervention on cardiometabolic markers in sedentary, apparently healthy males. **Methods:** The study received institutional ethical approval and recruited 13 sedentary, apparently healthy males. Participants were matched and randomly assigned to either a non-exercise control group (n=6; age; 24.7 ± 3.7 years, body mass; 83.7 ± 8.8 kg, $\dot{V}O_{2\,peak}$; 35.0 ± 6.1 ml•kg^{-1}•min^{-1}) or HIT intervention group (n=7; age; 28.4 ± 10.7 years, body mass; 84.7 ± 23.1 kg, $\dot{V}O_{2\,peak}$; 31.9 ± 8.2 ml•kg^{-1}•min^{-1}). The HIT group completed a six-week training programme; involving three weekly, supervised, sessions lasting 28 minutes. Sessions consisted of a five minute warm-up and five minute cool-down at 50 Watts. Training sessions comprised five, two minute intervals at 80% (weeks 1-2), 88% (weeks 3-4) and 97% (weeks 5-6) of their individual peak power output (PPO), separated by two minutes of active recovery (50 Watts). Pre, post measures included; a $\dot{V}O_{2\,peak}$ cycle-ergometer protocol; an oral glucose tolerance test (OGTT); mean arterial blood pressure, and anthropometric measures including a 3D body scan (circumferences). Subjective measures of behaviour and mood were also measured. **Results:** There was a significant increase in $\dot{V}O_{2\,peak}$ of 17.1% (95% CI, 2.1 to 8.77%, *P* = 0.007) in the HIT intervention group compared to a 2.2% increase in the controls (*P* = 0.48). Post OGTT glucose levels decreased by 9.7% in the HIT group and by 4.7% in the controls, however, this was not statistically significant (*P* = 0.46). **Discussion and Conclusions:** A six-week HIT programme resulted in a significant increase in cardiorespiratory fitness (CRF) in a sedentary, apparently healthy male cohort. Improvements in CRF, alongside weight loss are important factors in the prevention and treatment of chronic disease. The results from this study provide a glimpse into the potential health benefits of HIT and its application as a time efficient exercise training modality. Two individuals experienced substantial improvements in glucose metabolism following HIT. Further research in larger training studies are required to identify if HIT can induce physiological remodelling necessary for the prevention and treatment of chronic diseases including Type 2 diabetes mellitus.

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Key words: high intensity interval training, HIT, aerobic performance, VO2max, OGTT