
# Cardiometabolic health benefits of a six-week high-intensity interval training intervention: a case study

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# Cardiometabolic health benefits of a six-week high-intensity interval training intervention: a case study

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**Title:** Cardiometabolic health benefits of a six-week high-intensity interval training intervention: a case study.

**Background:** Regular physical activity is recommended for patients diagnosed with impaired glucose tolerance (IGT) and Type 2 Diabetes. However, “lack of time” is a common cited barrier in achieving the recommended weekly physical activity guidelines. High-intensity interval training (HIT) has been proposed as a time efficient exercise modality able to elicit similar adaptations in aerobic fitness as traditional moderate-intensity endurance exercise. **Purpose:** The purpose of this case study was to highlight the possible application of a HIT programme for the prevention and treatment of metabolic disorders. The participant was recruited from a larger study, investigating the efficacy of a six-week HIT intervention in a sedentary, male cohort. Pre-testing screening indicated that the participant had IGT. **Methods**: Before commencement the study received institutional ethical approval. The participant was male and sedentary (age; 21 years, stature; 1.88 m, body mass; 134.4 kg, body fat; 33.7%, $\dot{V}O_{2\,peak}$; 16.8 ml/kg/min). The intervention, involved three weekly, supervised, low volume HIT sessions for six weeks. Each session involved 28 minutes of exercise (18 sessions; 5 x 2 minutes starting at 80% of peak power output [weeks 1-2], increasing 10% every two weeks for the remainder of the intervention). Three months after the HIT intervention a follow up assessment was scheduled. Pre, post HIT intervention and 3-month follow up 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). **Results:** Changes in two-hour post OGTT glucose were observed (pre; 9.1 mmol/l vs post; 4.0 mmol/l and 3-months; 4.4 mmol/l). The $\dot{V}O_{2\,peak}$ increased from 16.8 ml/kg/min to 27.1 ml/kg/min pre vs post-intervention, with a further increase (29.1 ml/kg/min) at 3-months follow up. Body weight decreased (pre; 134.4 kg vs post; 127.5 kg, and 3-months; 117.2 kg). Body fat decreased (pre; 33.7% vs post; 32.7%, and 3-months; 30.3%). Reductions in resting systolic (pre; 141 mmHg vs post; 138 mmHg, and 3-months; 129 mmHg) and diastolic (pre; 90 mmHg vs post; 85 mmHg, and 3-months; 65 mmHg) blood pressure were observed. **Discussion and conclusions:** Improvements in aerobic fitness and metabolic markers associated with glucose metabolism were observed after a six-week HIT training programme, for an individual with impaired glucose tolerance. Further improvements in the reduction of risk factors for chronic disease were observed after three months follow up. Blood glucose response demonstrated the potential application of HIT for the treatment and prevention of IGT.

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**Key words:** high intensity interval training, HIT, Type 2 Diabetes, T2D, VO2max, OGTT