

## **Acute physiological responses to a single bout of high-intensity intermittent exercise: Implications for health promotion in obesity, Polycystic Ovary Syndrome (PCOS) and cardiovascular disease**

*N.K. Stepto, Institute of Sport Exercise and Active Living (ISEAL), Victoria University, PO Box 14428, Melbourne, VIC 8001, Australia.*

A growing body of evidence demonstrates that a number of different high-intensity intermittent exercise training (HIIT) protocols induce superior or equivalent health benefits compared to traditional endurance exercise when compared on a work-matched basis (Gibala *et al.*, 2012). While the evidence that HIIT provides clinical benefits is compelling, there is little information regarding the individual's tolerance at a physiological and psychological level nor the health risk to individuals with obesity, PCOS or cardiovascular disease. In this context many medical practitioners and researchers do not engage with or consider HIIT appropriate for the numerous individuals who may benefit the most. In order to overcome this "fear" or lack of engagement we need to consider the physiological evidence that HIIT is indeed safe and provides appropriate physiological stimulus for health benefits. Thus we will explore current and novel data on acute physiological responses in a number of clinical populations to single bouts of modified low volume HIIT (8-10 x 1 minute at 100% of  $W_{max}$  with 1 minute recover) and aerobic HIIT (4-8 x 4 minute at 80-85% of  $W_{max}$  with 1-4 minutes recover) compared to work matched constant load endurance exercise. Specifically we will look at cardiovascular/central haemodynamic (heart rate, blood pressure and endothelial function), metabolic (glycaemic control by clamp or continuous glucose monitoring, muscle mitochondrial function), thermogenic and simple psychological (RPE) responses to or 1h to 24 h after various HIIT sessions.

The data thus far show that, in stable cardiovascular disease patients, the different HIIT training sessions induce larger or equivalent central haemodynamic effects to work matched constant load exercise, improving vascular endothelial function from between 30 min to 24 h post HIIT with minimal reported adverse events. Similarly, in overweight/obese individuals (18-75y) HIIT improves glycaemic control from 1-24h after the various HIIT sessions. Thus highlighting the substantial physiological perturbations that can be achieved in a short intense exercise sessions in relative safety for people with cardiovascular disease and overweight/obese populations (including women with and without PCOS). Most importantly, these data will provide physiological evidence that HIIT should be considered as an appropriate, safe and achievable mode of exercise for most clinical populations.

Gibala MJ, Little JP, MacDonald MJ & Hawley JA. (2012) *Journal of Physiology* **590**, 1077-84.