EFFECT OF HIGH INTENSITY EXERCISE ON FAT LOSS IN YOUNG OVERWEIGHT WOMEN

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ORIGINALITY STATEMENT

‘I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in the thesis. I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.’

Signed …….....
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Date …….

Abstract

This thesis investigated the effect of high intensity, intermittent exercise (HIIE) on fat loss in young, sedentary women. It attempted also to identify possible mechanisms underpinning exercise-induced changes in adiposity.

Study 1 investigated some of the metabolic and hormonal responses to two variations of HIIE. Sixteen female subjects were tested. The first session involved a cycle ergometer $\dot{V}O_{2peak}$ test. The next two sessions were completed in random order. After baseline measures the women did 20 min of HIIE. There was a short bout exercise of 8 s work, followed by 12 s relative rest and a long bout exercise of 24 s work followed by 36 s relative rest. Seven subjects had excess postexercise oxygen consumption (EPOC) and resting metabolic rate determined.

Both exercise modalities made significant demands on the participants' oxygen delivery systems. RER diminished over the 20 min of exercise and plasma glycerol concentrations increased. Lactate concentrations rose. Catecholamine concentrations were elevated postexercise. There was an elevated EPOC associated with above baseline fat utilisation.

Study 2, a 15-week training study, was a randomised controlled trial comparing the effects of short bout HIIE and steady state (SS) exercise on fat loss. Forty-five women were randomly assigned to one of three groups: HIIE, SS, or control.

Preliminary and posttraining testing included a DEXA scan and a $\dot{V}O_{2peak}$ test including blood collection. All participants completed 3-d diet diaries and maintained their current diet for the course of the study. Participants exercised three times a week for the next 15 weeks under supervision. The HIIE group did 20 min of HIIE (8 s work:12 s rest)

at a workload determined from the $\dot{V}O_{2peak}$ test. The SS group cycled at 60% $\dot{V}O_{2peak}$, building to a maximum of 40 min exercise.

Both exercise groups increased $\dot{V}O_{2peak}$. The HIIE group had a significant loss of total body mass (TBM) and fat mass (FM) when compared to the other groups. There was no change in dietary intake. There have been a number of studies examining the acute effects of HIIE but, to our knowledge, this is the first study examining the chronic effects of this particular exercise protocol.

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