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The Effects of Different Forms of Exercise on Body Composition  
and Cardiorespiratory Fitness in Previously Sedentary Females

A thesis in partial fulfilment of the requirements for the degree of

Masters of Science

in

Exercise Physiology

at Massey University, Palmerston North,

New Zealand

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2002

## Erratum in the light of Examiners Comments

### Amendments

1. Appendix B. 1., new heading 'Pre-training Mean Values and Comparisons of Age, Body Mass, Height, Blood Pressure, Pre-Exercise Heart Rate, Circumferences, Skinfold Measurements and Estimated  $\text{VO}_2\text{max}$  for Control, 'Pump It' and Walking groups, Experiment 2 (Week = 0)'.  
Appendix B.2., new heading 'ANOVA Summary Tables Comparing Groups Prior to Exercise Intervention, Experiment 2 (Week = 0)'
2. Pg. 42, replace incorrectly written formula 'Work = Mass x Vertical height' with Work = Force x Distance (vertical height) and Force = Mass x Acceleration (where acceleration is that due to Gravity,  $\sim 9.81 \text{ m.s}^{-2}$ ) as was used for the calibration and calculation of Work on the treadmill.
3. Typographical and spelling errors:
  - Abstract line 2 add 'physical' before training.
  - Pg. v 1.1.8 'F' instead of 'f' in Fitness
  - Pg. xi  $\text{VO}_2$  – Volume of oxygen consumption (ml/kg/min),  
 $\text{VO}_2\text{max}$  – Maximal Volume of Oxygen Consumed (ml/kg/min)
  - Throughout text V should have a dot over it when it is integrated with time
  - Pg. 10 pgraph 3 spelling of cardiorespiratory
  - Pg. 14 pgraph 4 whose rather than who's
  - Pg. 36 pgraph 3 Replace currently with previously
  - Pg. 37 pgraph 2 labs should read laboratories
  - Pg. 41 pgraph 2 replace 'Q' with RER
  - Pg. 46 pgraph 4 should read 'duration *at which* the exercises'
  - Pg. 48 pgraph 3 change 'inputed' to 'entered'
  - Pg. 49 pgraph 2 delete 'also represented' replace with 'in'
  - Pg. 53 pgraph 2 remove 'for gas'
  - Pg. 54 pgraph 3 remove 'to'
  - Pg. 59 pgraph 4 between fifty five *and* sixty minutes
  - Pg. 74 pgraph 1 remove 'greater'
  - Throughout text ACSM's (not ASCM's) Resource Manual for Guidelines for Exercise Testing and Prescription, 3<sup>rd</sup> Edition (1998)
  - Throughout text the correct symbol for the statistical term alpha is  $\alpha$  not  $\infty$
  - Appendix D5 the workload for subject 2 should be Watts not L/min
4. Errors and omissions in the Bibliography
  - Pg. 84 Baldy et al were contributing authors. Change to ACSM
  - Throughout text journal 'Medicine and Science in Sports and Exercise' is incorrectly cited as Exercise & Science in Sports and Exercise.

## **Abstract**

Thirty-five healthy females between the ages of 18 and 45 who had not undertaken any training for at least two months prior to the experiment were studied to determine the effects of six weeks of 'Pump It' aerobics or walking training on body composition and cardiorespiratory fitness, expressed as estimated maximal oxygen consumption ( $VO_2\text{max}$ ). Twelve of the volunteers participated in 'Pump It' aerobics while eleven took part in walking training. The remaining twelve subjects served as controls.

Prior to the training programme, subjects were assessed for their current levels of cardiorespiratory fitness and body composition (fitness test 1). Testing was repeated at the conclusion of the training period (fitness test 2). Estimated  $VO_2\text{max}$  was determined from heart rate and oxygen uptake during a submaximal treadmill-walking test. This method was validated in a preliminary experiment. Oxygen consumption during 'Pump It' was overestimated by approximately 0.38L/min using the HR/ $VO_2$  relationship obtained during treadmill walking. This was taken into account for the calculation of  $VO_2$  in Experiment 2. Body composition was evaluated from the sum of five skinfolds (triceps, subscapular, suprailiac, abdomen, thigh) and the sum of six circumferences (forearm, upper arm, waist, hips, thigh and calf). Data were analysed using one factor ANOVA and regression analysis.

The training programmes consisted of three 55-60 minute sessions a week. Massey University 'Pump It' aerobics consisted of a variety of traditional weight training exercises performed using light weights and high repetitions to music. Walking training involved brisk walking as a group, in and around the Massey University, Turitea Campus.

Six weeks of 'Pump It' and Walking training failed to produce significant improvements in cardiorespiratory fitness and body composition compared

with the Control group. There were no significant changes in body mass, the sum of skinfolds or the sum of circumferences. It was concluded that the length of the fitness programmes were too short to improve cardiorespiratory fitness and the training intensity of 'Pump It' and Walking were insufficient to improve body composition.

## **Acknowledgements**

I wish to thank my supervisors Dr Rodger Pack and Patsy Watson for their help in preparing this thesis. I would also like to thank Dr Hugh Morton for his guidance throughout the study. Thanks to Christine Scott and the staff at the Massey University Recreation Centre for their support and the use and transportation of their treadmill. Special thanks are given to Georgina Cuttance for her sense of humour during the long hours spent in the lab. Thanks to all of my 'Guinea Pigs', without your hard work this thesis could not have happened. . A very special thanks goes to Dr Heather Simpson for her time and effort in the last few days. Thanks to Dave, Sarah and Rissy for crossing my t's and dotting my i's. Finally, I would also like to thank my family and friends for the wonderful support they have given me.

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## List of Abbreviations

ATP	adenosine triphosphate
ANOVA	analysis of variance
BF	body fat
BMI	body mass index
BP	blood pressure
bpm	heart rate in beats per minute
CHD	coronary heart disease
CWT	circuit weight training
HDL	high density lipoprotein
HR	heart rate
HRmax	maximum heart rate
HRR	heart rate reserve
HW	hydrostatic weighing
L/min	litres per minute
ml/kg/min	millilitres per kilogram per minute
pre-exercise HR	heart rate prior to submaximal exercise test
Repetition	a single complete action of an exercise from starting position to completion and back to the starting position
RMR	resting metabolic rate
SAID	specific adaptations to imposed demands
SC-6	sum of forearm, upper arm, waist, hip, thigh and calf circumferences
SSK-5	sum of triceps, subscapular, suprailiac, abdomen and thigh skinfolds
VO <sub>2</sub>	volume of oxygen consumption
VO <sub>2</sub> max	maximal oxygen uptake