

Moderate Intensity Interval Training on Functional Outcomes and Body Composition: Case Study

Sean S. Ellis, SPT, Kyle A. Smith, SPT, Eric Shamus, DPT, PhD, Ahmed Elokda PT, PhD
Florida Gulf Coast University, Department of Rehabilitation Sciences, Fort Myers, FL, USA

Introduction

- Cardiovascular benefit can be achieved from a number of traditional models and formats, more recently High Intensity Interval Training (HIIT) has increased in popularity. High intensity efforts required for HIIT may be a potential drawback for some participants
- Moderate Intensity Interval Training (MIIT) programs have the same basic model as HIIT but the exercise intensity is lowered below the high intensity range (>80% HR Max).
- Current research regarding MIIT is relatively sparse. Only 3 randomized controlled trials were found. These 3 studies utilized different forms of exercise but followed the same basic MIIT scheme of lower intensity exercise, longer work intervals, and a longer total duration than a typical HIIT workout. These studies showed various positive benefits including HOMA-IR scores, body mass, BMI, percentage body fat, and some blood biomarkers as well including LDL, HDL, etc.
- This case study investigates an 8-week moderate intensity interval training program for functional outcomes and body composition.

Patient History/Systems Review

- The 35 yo case subject had previously performed steady-state cardiovascular exercise with minimal positive benefits, and was interested in finding a time-efficient method to see positive changes in her body composition. Subject received physician's clearance prior to starting the protocol that was approved by the IRB.

Examination

- Pre-intervention measures were taken including 6-Minute Walk Test (6MWT) Distance, Resting Heart Rate, Resting Blood Pressure, VO₂max Estimation via the YMCA Cycle Test, Body Composition via the BODPOD
- During pre-intervention data collection no adverse reactions or contraindications to cardiovascular exercise were noted and the subject had a baseline cardiovascular program making this subject appropriate for the planned intervention.

Clinical Impression

- Based on initial anthropometric measurements, subject's previous training methods, BODPOD results, and cardiovascular testing, it was hypothesized that significant decreases in body fat percentage, body weight, and an increase in VO₂max would be seen after the 8-week intervention period.

Intervention

- The 3x per week, 8 week intervention program was designed using a combination of ACSM standards for cardiovascular exercise and the basic MIIT interval scheme published by Racil et al.
- Each session was 50 total minutes of cycling – four, 10 minute intervals with 5 minutes of cycling keeping heart rate at 60-80% of HR max (110-148 beats per minute) followed by 5 minutes of cycling at 40-50% (90-100 beats per minute). Five minutes were provided at the beginning and end of the session as warm-up and cool-down respectively.

Data Comparison	Pre-Intervention	Post-Intervention	Change
Age	35 years old	35 years old	
Height	162 centimeters	162 centimeters	
Weight	123.6 pounds	119.8 pounds	-3.17%
Resting Blood Pressure	126/80	118/76	-6.8% / -5.2%
Resting Heart Rate	81 bpm	72 bpm	-12.5%
Resting Oxygen Saturation	99%	99%	0%
Body Fat Percentage	24.3%	22.4%	-1.9%
VO ₂ Max Estimation	30.2 ml/min/kg	35.0 ml/min/kg	+15.9%
6 Minute Walk Distance	983 meters	907 meters	-8.4%



Outcomes

- Over the 8-week intervention period the case subject showed many positive changes that can lead to numerous health related benefits:
 - Clinically significant weight loss is commonly referred to weight loss of 5% or greater, in 8 weeks the case patient decreased her body weight by 3.17%.
 - Decreases observed in both systolic and diastolic blood pressure are clinically significant and can lead to a reduction in cardiovascular morbidity and mortality.
 - The decrease in resting heart rate observed over the intervention period can lead to increased life expectancy, cardiovascular function, and a decrease in all-cause mortality.
 - The reduction in body fat percentage is relevant due to the standard error of BODPOD measurement.
 - 6MWT is not a challenging test for healthy subjects.
 - The subject stated increased enjoyment of MIIT exercise compared to steady-state cardiovascular exercise and planned to continue with the protocol after the 8-week intervention period.

Clinical Implications

- The participant displayed preferable changes in most measured outcomes including:
 - Body weight, resting blood pressure, resting heart rate, body fat percentage, estimated VO₂max.
- MIIT offers similar benefits to continuous, steady state cardiovascular exercise with the added potential bonus of increased adherence/lesser total exercise time.
- In the future, randomized controlled trials of larger scale should be utilized to compare MIIT to HIIT and steady state cardiovascular groups to ascertain whether MIIT can provide similar benefits in a randomized clinical trial.
- MIIT seems to be a health, safe, high adherence intervention which can improve different outcomes including body weight, VO₂max, resting vitals, and body fat percentage.