METs and HR at Moderate Intensity on the Thorotread:
Adding to the Compendium of Physical Activity

James A. Holland, Jerryl Pridgett
Faculty: Jeremy A. Patterson

Department of Human Performance Studies, College of Education

Abstract. The Compendium of Physical Activities is a list of estimated energy expenditures of more than six hundred physical activities. No studies have established the estimated energy expenditure of the Thorotread treadmill. 14 active, college aged subjects (25.1±4.01 years), weight range of 100 to 220 lbs (169.3± 38.4 lbs), participated in one bout of a 10 minute protocol. A 5 minute walking phase at 3.5 mph and an incline of 0.5 immediately followed by a 5 minute work phase pressing the console which applied a resistance at 15-20% of their total body weight. A paired samples t-test, P ≤0.05, found energy expenditure during working conditions was significantly greater (8.73±1.51 METs) then walking conditions (5.38±1.15 METs).

1. Introduction

Running produces about three times the impact force on the lower extremities then does walking [1,2]. There are alternative activities that produce energy expenditure comparable to that of running whilst avoiding the physical pain and structural damage that some runners experience. Activities such as carrying hand weights or the use of poles while walking burns similar number of calories as running [2, 3, 4]. It has been observed that increasing arm movement alone can be attributed to a 63% increase in energy expenditure over a normal walking arm movement [2, 3, 4].

The Thorotread is a new style of treadmill that aims to combine strength training and cardiovascular training into a single activity. This treadmill differs from others in that it features a pushing mechanism, or “console”, that resists against the user when they press it while walking. The action is similar to pushing a shopping cart, or if done with repetitions similar to a chest press. The resistance against the user from the console can be adjusted from 5 to 45 lbs of force and this combined with walking should result in the user expending significantly higher amount calories than walking alone. However, to date, there are no published studies establishing the estimated energy expenditure of the Thorotread treadmill [5, 6].

The Compendium of Physical Activities is a list of the estimated energy expenditure of more than six hundred physical activities. The general purpose of this study was to acquire energy expenditure of operating the Thorotread console at a moderate intensity level and more specifically to determine a population average expenditure, adding the Thorotread exercise to the Compendium of Physical Activities [5, 6].

2. Experiment, Results, Discussion, and Significance

Table 1

Group averages of the percentage of heart rate max and VO2 max over the 10 min trial,
3. Conclusions

The duration spent at the full press position greatly affects heart rate and perceived exertion. The exercise is more intense when full presses are held for longer periods than a brief pause and relax. We are not accounting for the effect of an isometric contraction. Furthermore, individuals with less upper body mass fatigue sooner at console resistance of 15% total body weight, thus preventing them from achieving steady state VO2 and the reported RPE increases from moderate intensity to high intensity. Lastly, use of subjects that weighed more than 225 lbs exceeded the limits of the console (45lbs). Using percentages of body weight to set the upper body’s console resistance limited the upper boundary of subject weight.

This study recruited from a population of convenience thus limiting the age range from 19 to 30 years that were physically active individuals. This leaves out a large number of users that may report different metabolic expenditures during use of the Thorotread treadmill.

4. References