TACSM Abstract

Metabolic Costs of Stair-Stepping Methods

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ABSTRACT

Walking up stairs is physically demanding, causing high levels of perceived exertion and increased oxygen consumption compared to level walking. While stair-climbing exercise can be used to improve one's cardiorespiratory fitness, individuals often choose the elevator for convenience and to minimize perceived exertion. Determining if a single step or double step method of stair-climbing requires different levels of oxygen consumption, and thereby exertion, could provide useful information potentially encouraging people to use the stairs. **PURPOSE:** This study was performed to determine whether stair-climbing using the single step method or double step method on a staircase creates greater oxygen consumption. The single step method was also done on a stepmill machine to have a standardized comparison between a building's staircase and a workout machine. **METHODS:** Twelve participants (20±1 years) walked up a staircase at a set pace for 4 trials. Participants returned to perform the single step method on a stepmill machine. Each trial was done under the same time constraints using a metronome. Oxygen consumption was measured using a portable metabolic device (PNOĒ). Data was analyzed using a one-way repeated measures ANOVA on SPSS. **RESULTS:** Oxygen consumption for the double step method (2521 ± 367 ml/min) was significantly greater ($p<0.05$, $\eta p2=0.290$) than the single step method (2318± 449 ml/min) and the single step method on the stepmill (2294 ± 224ml/min). The total work completed was theoretically the same between the experimental conditions yet, there was still a significant difference in the economical cost of stair usage. **CONCLUSION:** Even when matched for total work rate, the double step method requires higher oxygen consumption. This study supports previous literature that determines double step as a method that requires more energy expenditure.