

Metabolic Responses to a Battling Rope Protocol Performed in the Seated or Stance Positions

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ABSTRACT

Achieving the recommended amount of physical activity is a greater challenge for individuals who are disabled than those who are not disabled. Battling ropes is an intense exercise that has been shown to promote elevation of heart rate and increased oxygen consumption, and may be a beneficial exercise alternative for individuals with disabilities. **PURPOSE:** To compare the levels of perceived exertion (RPE), oxygen consumption (VO_2) and heart rate (HR) responses elicited by a treadmill (TM) or bicycle (BK) VO_2 max test with a standing or sitting battling rope protocol (BRP) (TM vs. standing BRP) (BK vs. seated BRP). To examine the associations between the peak RPE, HR and VO_2 responses elicited from the two BRP with their respective VO_2 max tests (TM vs. standing BRP) (BK vs. seated BRP). **METHODS:** Forty healthy subjects, 24 females and 16 males, mean age 24.83 years, performed either a ramped VO_2 max TM or BK test (respiratory exchange ratio > 1.0). At least 3 days later, the subjects who performed the ramped TM test did the standing BRP, and the subjects who performed the ramped BK test did the sitting BRP. Each BRP (standing and sitting) consisted of 15 seconds of double arm swings, followed by 45 seconds of rest for 10 rounds. The highest recorded RPE, VO_2 and HR values (RPE peak, VO_2 peak and HR peak, respectively) were recorded after each round. **RESULTS:** Metabolic responses were significantly lower for the BRP in both sitting (VO_2 peak and HR peak: $p < .001$) and standing (VO_2 peak and HR peak: $p < .001$) as compared to the HR max and VO_2 max values derived from the BK and TM tests. The subjects' RPE peak elicited from the standing and seated BRP was not significantly different from the RPE peak of the TM or BK, respectively. The BRP produced a VO_2 peak that was 71.87% (sitting) and 68.37% (standing) of the subjects' VO_2 max assessed via the BK and TM protocol, respectively. Moderate correlations were found between the VO_2 during the seated ($r = .61$; $p = .003$) and standing ($r = .43$; $p = .03$) BRP and the BK and TM VO_2 max tests, respectively. The HR peak obtained from the BRP done in sitting ($r = .52$; $p = .009$) and standing ($r = .67$; $p = .001$) had a moderate correlation with the HR max derived from the BK and TM tests. A moderate correlation was found between the RPE peak elicited from the seated BRP and the BK ($r = .55$; $p = .008$). A weak correlation was found between the RPE peak from the standing BRP and the TM ($r = .18$; $p = .22$). **CONCLUSION:** Both the seated and standing BRPs demonstrated the capacity to produce acute metabolic responses that may enhance aerobic capacity. Battling ropes may be a low cost, accessible option to improve cardiovascular endurance for individuals who cannot stand or move their lower extremities in a rhythmic manner to conduct aerobic exercise.