Measurements of physical exertion during Racerunning

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Conclusion

- Racerunning enables individuals with CP to reach a cardiorespiratory intensity known to promote central and peripheral adaptations.
- Our data support the use of a combination of several rather than a single modality to measure physical exertion in individuals with CP.

Introduction

The Racerunner, a three-wheeled running bike, enables individuals with cerebral palsy (CP) to exercise with enough intensity to promote training adaptations. Intensity can be assessed using heart rate and blood lactate measurements. Ratings of perceived exertion (e.g. BORG-RPE) is commonly used as a non-invasive approximation of training intensity. Whether the Borg scale is suitable for assessing the intensity of Racerunning exercise is not known.

Patients and methods

Thirty-nine individuals (mean age 21, range 9-43, 18 males/21 females) with CP (GMFCS I-V; 2-10-9-16-2) completed a 6-min Racerunning test.

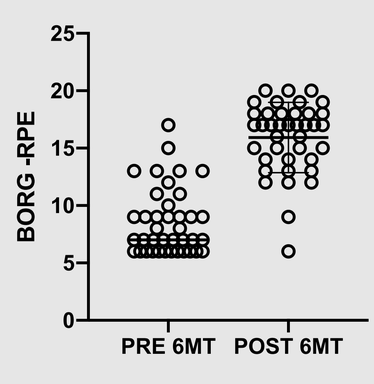
- Heart rate monitored throughout the test
- Blood lactate measurements before and 2 minutes after the test.
- Rating of their perceived exertion before and at completion of the 6-min Racerunning test

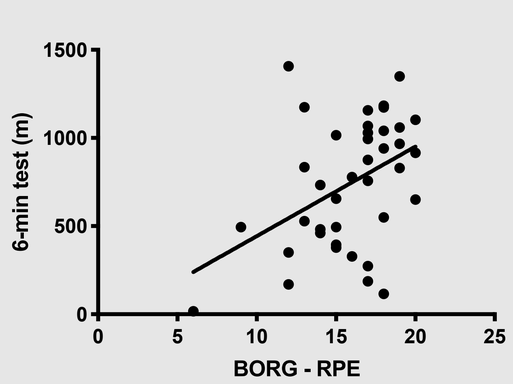
#	Level of Exertion
6	No exertion at all
7	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard (heavy)
16	
17	Very hard
18	
19	Extremely hard
20	Maximal exertion

Borg –RPE scale

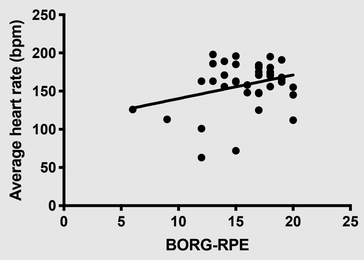
Results

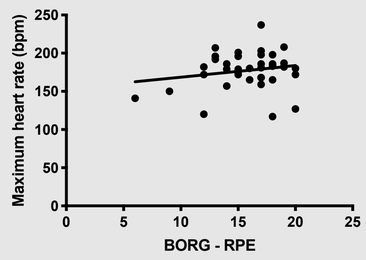
All but two subjects had a lower Borg rating before vs. after the 6-min Racerunning test (before median 7, range 6-17 vs. after median 16, range 6-20). The typical increase in Borg rating before vs. after the 6-min Racerunning test was 8 units (range 0-13).

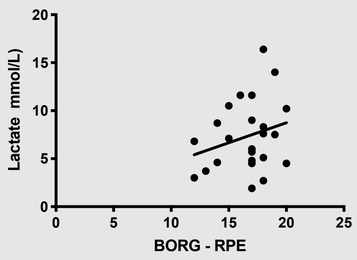




The Borg rating correlated positively to the distance covered on the 6-min Racerunning test (R^2=0.43, p<0.01).







BORG-RPE did not correlate to average heart rate (R^2=0.20, p=0.236), maximum heart rate (R^2=0.30, p=0.065), or blood lactate measurements (R^2=0.26, p=0.22).

Future plans

- Increase sample number to allow for subgroup analysis
- Measurements of fatigue (EMG, bio-impedance)
- More detailed blood analysis pre vs post exercise.

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