DEVELOPMENT OF INDIRECT TESTS TO ESTIMATE MAXIMAL OXYGEN CONSUMPTION AND BODY COMPOSITION IN INDIVIDUALS WITH SPINAL CORD INJURY

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Objectives

Cardiovascular complications and obesity are common secondary complications after spinal cord injury (SCI). Due to the complexity and cost of direct measurements of maximal oxygen consumption (VO2max) and body composition, regression equations to estimate VO2max from submaximal tests based on heart rate (HR) and skinfolds measurements have been developed. Because of sympathetic impairments secondary to SCI, HR may not accurate to predict VO2max in SCI. Additionally, since SCI individuals cannot adopt standard positions for skinfold measurement, validation of current equations in supine position are needed. The aims of this study were: 1) to validate a submaximal test based on Ratings of Perceived Exertion (RPE) to predict VO2max and, 2) to validate current skinfold equation to estimate %fat for people with SCI.

Methods

Ten able-bodied and 14 SCI individuals participated in this study. The standardized test protocols for VO2max were performed on a total body recumbent stepper. Expired gases were analyzed every 10 seconds; HR, ECG and RPE were recorded. Estimation of %fat by skinfold measurement in supine position was compared with values obtained by DXA scans.

Results

There was a strong positive correlation between predicted and observed VO2max in able-bodied subjects using RPE (p = 0.86; p≤0.05) and RPE + watts (p = 0.88; p≤0.05). SCI subjects were able to perform both protocols (80 steps per minute). Current validated skinfolds equations underestimate %fat in SCI individuals.

Conclusions

The results of this study show promise for the development of submaximal RPE-based protocols for the prediction of VO2max in this population. New prediction equations to estimate %fat for SCI need to be developed.