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

Daniela Terson de Paleville, Douglas Lorenz, John McCulloch, Michael Kloby, Matthew Love, Amy Walden, Susan Harkema. University of Louisville, KY, USA

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 accurately 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 ($\rho = 0.86$; $p \leq 0.05$) and RPE + watts ($\rho = 0.88$; $p \leq 0.05$). 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.