

Hemodynamic and Metabolic Responses to Moderate and Vigorous Cycle Ergometry in Men with Transtibial Amputation

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ABSTRACT

Adults with amputation face barriers to an active lifestyle which attenuates cardiorespiratory fitness. Prior studies in amputees typically involve treadmill walking or arm ergometry, yet physiological responses to leg cycling are less understood. **PURPOSE:** To assess hemodynamic and metabolic responses to moderate and vigorous cycle ergometry in men with transtibial amputation (TTA), with broader application towards exercise programming. **METHODS:** Using a randomized within-subjects crossover design, five men with unilateral TTA (age = 39 ± 15 yr) and six able-bodied controls (CON) (age = 31 ± 11 yr) performed two 20 min bouts of cycling differing in intensity. Cardiac output (CO), heart rate (HR), stroke volume (SV), and oxygen consumption (VO_2) were measured during moderate intensity continuous exercise (MICE) and high intensity interval exercise (HIIE) using thoracic impedance and indirect calorimetry. **RESULTS:** In response to MICE and HIIE, HR and VO_2 were similar ($p > 0.05$) between groups. Stroke volume and CO were higher ($p < 0.05$) in CON which was attributed to their higher body mass. In men with TTA, HIIE elicited peak HR = 88 %HR_{max} and substantial blood lactate accumulation, representing vigorous exercise intensity. **CONCLUSION:** Men with TTA show similar responses to MICE and HIIE versus CON. These results provide important insight for developing exercise programs for adults with TTA, and based on similar acute responses versus CON, it appears that moderate and vigorous physical activity recommendations designed for implementation in non-amputees can be applied to men with transtibial amputation.