TACSM Abstract

Increased Standing Time Is Indicative of Better Cardiometabolic Health and Fitness

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ABSTRACT

Sedentary lifestyles have been shown to be highly associated with increased cardiovascular disease risk, insulin resistance, and increased adiposity. While both sitting and standing fall within sedentary classification, excessive sitting time has been associated with decreased blood flow, insulin resistance and increased adiposity. Previous ergonomic studies have proposed substituting sitting time with standing to decrease all-cause mortality and pain. **PURPOSE**: The purpose of this study was to determine if time spent standing, compared to sitting, is associated with cardiometabolic health markers and physical performance. **METHODS**: 120 sedentary (<150 minutes of moderate-vigorous physical activity per week), participants without diabetes (fasting blood glucose ≤125 mg/dL) participated in this study (Male 50/Female 70; Age: 28.01±1.05 years; BMI: 29.29±0.78 kg/m²). Physical activity was determined for all participants wearing an accelerometer for 7 days. Time spent in sedentary standing and sedentary sitting were determined from the accelerometer. The standing-to-sitting ratio was calculated by dividing the percentage of time spent standing by the percentage of time spent sitting. Body composition was determined via DXA scan. Substrate utilization was determined by indirect calorimetry. Glucose tolerance was assessed via an oral glucose tolerance test. Maximal aerobic capacity (VO2 max) was determined via a standard treadmill protocol. Grip strength was assessed via a handheld dynamometer. Statistical analyses were performed using GraphPad Prism 10 (GraphPad Software). Associations were determined using Pearson correlations and statistical significance was set using a p-value of < 0.05. All values are presented as the mean ± standard error of mean. **RESULTS**: A greater standing-to-sitting ratio was negatively associated with BMI ($r= -0.3447$, $p= 0.0003$), total fat percentage ($r= -0.5166$, $p<0.0001$), android to gynoid ratio ($r= -0.4067$, $p< 0.0001$), 120-minute blood glucose during OGTT ($r= -0.2039$, $p= 0.0361$), glucose area under the curve ($r= -0.2141$, $p= 0.0299$). Having a greater standing to sitting ratio was positively associated with relative resting energy expenditure ($r= 0.3114$, $p= 0.0058$) and VO2max ($r= 0.3108$, $p= 0.0083$) with a positive trend for grip strength ($r= 0.3173$, $p= 0.0675$). **CONCLUSION**: Greater standing, relative to sitting, time was associated with better cardiometabolic health and physical performance markers. Increasing time spent standing compared to sitting during sedentariness may potentially reduce the detrimental health effects of a sedentary lifestyle.