Mid Atlantic Regional Chapter
of the
American College of Sports Medicine

Annual Scientific Meeting, November 2nd - 3rd, 2018
Conference Proceedings
International Journal of Exercise Science, Issue 9, Volume 7

Metabolic and Cardiovascular Effects of Standing While Performing Computer Work

Joseph Willet, Evan L. Matthews, Peter A. Hosick. Montclair State University, Montclair, NJ

Current information regarding the efficacy of standing desks and there long-term health benefits are conflicting. Short term studies have focused on the metabolic effects and generally report increased energy expenditure. However, long term research suggests occupational standing may increase the risk of cardiovascular disease. **PURPOSE:** To evaluate the metabolic and cardiovascular differences between sitting and standing while doing computer work. **METHODS:** Twelve healthy subjects (23 ± 2.1 yrs; 5 females, 7 males) were examined. Subjects participated in two trials (sitting and standing) during which they completed simple mouse driven computer tasks. Trials where completed back-to-back beginning with seated. Each trial lasted 15 minutes. Throughout the test indirect calorimetry was used to monitor oxygen consumption (VO_2), carbon dioxide production (VCO_2) and ventilation (V_E), a continuous blood pressure system monitored systolic BP (SBP), diastolic BP (DBP), mean arterial pressure (MAP) and heart rate (HR), and three near-infrared spectroscopy units were used to monitor muscle oxygen saturation (SmO_2) of the quad (Q), calf (C) and forearm (FA). Data from the last five minutes of each condition was averaged together and used in the analysis. All BP measures were calculated as change scores from the first 5 minutes of seated baseline. Analysis consisted of comparing the mean from the last 5 minutes in the sitting vs. standing trial using a student's t-test. **RESULTS:** Standing vs. sitting HR (78 ± 9 bpm vs. 68 ± 10 bpm; $p<0.001$), VO_2 (4.1 ± 0.9 mL/kg/min vs. 3.5 ± 0.9 mL/kg/min; $p=0.019$) and V_E (9.9 ± 2.7 L/min vs. 8.8 ± 2.0 L/min; $p=0.041$) were elevated while standing compared to sitting. VCO_2 was no different between trials (0.25 ± 0.08 L/min vs. 0.22 ± 0.07 L/min; $p=0.106$). SBP (7 ± 12 mmHg vs. 5 ± 12 mmHg; $p=0.698$) and MAP (5 ± 8 mmHg vs. 1 ± 8 mmHg; $p=0.174$) were not different between conditions, but DBP (6 ± 6 mmHg vs. 0 ± 6 mmHg; $p=0.023$) was greater in the standing condition. The standing vs. sitting Q SmO_2 (70 ± 13 % vs. 85 ± 11 %; $p<0.001$), C SmO_2 (60 ± 11 % vs. 75 ± 12 %; $p=0.005$), and FA SmO_2 (55 ± 8 % vs. 62 ± 9 %; $p=0.003$) were all lower while standing. **CONCLUSION:** These results support the idea that standing desks increase energy expenditure, but the elevated DBP may indicate increased cardiovascular stress.