



Effects of Task Difficulty on Kinematics and Task Performance during Walking Workstation Use

Translational Journal of the American College of Sports Medicine: June 1, 2018 - Volume 3 - Issue 11 - p 74–84 Harry, John, R.¹; Eggleston, Jeffrey, D.²; Dunnick, Dustin, D.²; Edwards, Hannah²; Dufek, Janet, S.²

Although walking workstations do not seem to compromise task performance despite altered gait kinematics, current evidence stems from evaluations of relatively simple tasks that do not reflect typical work duties.

Purpose

This study aimed to examine the effects of simple cognitive (SC) and complex cognitive (CC) tasks on gait kinematics during walking workstation use in comparison to baseline walking.

Methods

Three-dimensional kinematic data of the lower extremity and trunk were collected while walking during baseline, SC, and CC conditions, with each condition performed at a self-selected velocity. Kinematic data were time normalized to 100% of the gait cycle and divided into subphases for analysis. Differences in walking velocity (baseline vs SC/CC) and task performance (SC vs CC) were tested using paired-samples *t*-test ($\alpha = 0.05$). Kinematic data were tested for differences between baseline and SC, baseline and CC, and SC and CC using a point-to-point model statistic analysis ($\alpha = 0.05$) at the single-subject level.

Results

Walking velocity was not different between baseline and SC/CC (1.10 ± 0.25 m·s⁻¹, baseline; 1.11 ± 0.26 m·s⁻¹, SC/CC; $P = 0.409$), nor was task performance time different between SC and CC (81.1 ± 25.6 s, SC; 87.6 ± 17.7 s, CC; $P = 0.394$). Similar percentages of differences were detected across participants during each gait subphase for all lower extremity joint angles during SC and CC when compared with baseline. A greater percentage of differences were observed in trunk angles during SC than during CC when compared with baseline.

Conclusions

Results indicate that trunk kinematics are influenced by task difficulty during walking workstation use, although lower extremity kinematics are not affected regardless of task difficulty. Thus, walking workstations do not compromise task performance during work-related tasks and walking safety does not seem threatened by tasks of greater difficulty.