TACSM Abstract

The Effect of Optic Flow and Gait Speed Disconnect on Dynamic Parameters of Static Posture in Healthy Young Adults

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ABSTRACT

There has been limited research on the usage of virtual reality (VR) for biomechanical gait analysis and rehabilitation. The visual system is very important in balance and posture both during gait and while standing. Little is known concerning how a disconnect between treadmill speed and VR optic flow speed affect gait and further, posture. **PURPOSE:** The purpose of this study was to investigate dynamic parameters of static posture immediately after subjects walked in a virtual reality environment where the optic flow speed and gait speed did not match. **METHODS**: A motion capture system, a monitored fixed-speed instrumented treadmill, and a 180-degree virtual reality system with a park scene on the screen was used for data collection. Eleven healthy college aged students (n = 11, Age = 22.4 ± 4.0, ht = 1.72 ± .10 m, wt = 82.9 ± 23.2 kg) walked on the treadmill for ~4-minutes at a self-selected pace. During the walking trials the virtual reality environment optic flow speed was either matched to gait speed (control), or the optic flow speed was either ± 20% gait speed. Immediately following each of the walking trials, 1-minute of quiet standing posture was collected. The dynamic parameters of standing posture, center of pressure (COP) velocity in the anteroposterior (AP) direction, COP velocity in the mediolateral (ML) directions, and sway area rate, were collected from COP force data. A repeated measures ANOVA was used to determine if any differences existed between the control and ± 20% optic flow speed conditions. **RESULTS**: There were no significant differences for any of the dynamic parameters of posture. **CONCLUSION**: Dynamic parameters of static posture were evidently not influenced by changing optic flow speed in relation to walking speed. This suggests that the impact of optic flow on static posture variables may not be as great as previously thought. However, it is possible that the traditional analysis of static posture is not sensitive enough to detect differences in the organization of static posture. Additional investigation into more advanced analysis of posture, such as nonlinear variability, should be explored.