TACSM Abstract

The Effect of Optic Flow and Gait Speed Disconnect on Joint Range of Motion in Healthy Young Adults

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ABSTRACT

The use of virtual reality (VR) for rehabilitation and biomechanical gait analysis has been researched in a small capacity. However, there is a lack of information regarding the effect that unmatched VR optic flow conditions and treadmill speeds have on gait kinematics. Investigating optic flow changes is important because we can understand how visual impairments affect an individual's gait. **PURPOSE**: The purpose of this study was to investigate joint range of motion (ROM) during gait with disconnected optic flow speed and gait speed in a virtual reality environment in healthy young adults. **METHODS**: A 180-degree VR system with a park scene displayed on the screen was used along with a motion capture system and instrumented fixed-speed treadmill. 37 reflective markers were placed on the lower extremity and trunk to collect motion capture data during each trial. 11 participants completed 3 4-minute randomized walking trials at a self-selected pace on the treadmill. Trials included matched VR and treadmill speed and the VR at +/- 20% of their self-selected walking speed. **RESULTS**: A repeated measures ANOVA was used to determine any interaction between variables with LSD post hoc analysis conducted if necessary. There were no significant effects from VR speed changes for ankle plantar flexion/ dorsiflexion ROM ($P > .05$), knee flexion and extension ROM ($P > .05$), or hip flexion and extension ROM ($P > .05$). **CONCLUSION**: Manipulating optic flow speed relative to walking speed does not change ankle, knee, and hip ROM. This indicates that optic flow does not have as much of an effect on joint kinematic variables as previously thought. It is possible that analyzing simple gait measures are not affected by manipulating the sensory system during walking in the VR environment, but that the organization and coordination of the movements may be affected. Future research should investigate the influence of optic flow manipulation on gait variability and the organization of movements.