

Design and development of a mixed reality system for skilled locomotor training in individuals with Parkinsons disease

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Design and development of a mixed reality system for skilled locomotor training in individuals with Parkinsons disease

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Research Abstract

Project Summary/Abstract One of the most disabling limitations for individuals with Parkinson's disease (PD) are impairments that reduce safe walking in the community. Specifically, people with PD demonstrate difficulty in managing the very elements required for independent access

to the community such as completing turns, moving smoothly from one terrain to another such as gravel to grass and avoiding and/or managing obstacles. In fact, tripping over obstacles has been identified as the major cause of falls in community-dwelling people with PD. Commonly, rather than dealing with the challenges of walking in the community, individuals with PD may often be resigned to become home-bound and minimize their risk of adverse events in environment thus negatively impacting their quality of life. However, it is now understood that individuals with PD have the capacity for improved performance and learning of motor skills. Additionally, it has been shown that it is particularly important for individuals with PD that the practice environment matches the real-life environment for learning to transfer from the practice environment to the real world. Thus, it is critical to allow individuals with PD to practice advanced walking skills such as turning and obstacle avoidance in real-world scenarios to maximize functional walking ability. Therefore the primary objective of the proposed study is to develop and test a training system that will allow individuals with PD to practice the advanced walking skills necessary for independence in the community. A preliminary study conducted in support of the current proposal demonstrates the feasibility of using the system while walking on a treadmill. Individuals with PD tolerated walking in the immersive environment without any adverse effects. To accomplish the objectives of this proposal, a low-cost, portable, gait training system will be created to facilitate the practice of advanced locomotor skills (e.g. turning, obstacle avoidance, and dual-tasking) for individuals with PD. Importantly, the system will be capable of being used on multiple platforms (standard treadmills, over-ground in an open space, or in conjunction with newer, omni-directional treadmills). During development, a sample of individuals with PD will be recruited to experience and provide feedback on the value and meaningfulness of the training environments. The secondary objective is to determine the feasibility of individuals with PD completing a set of progressive training sessions in the developed environments. Feasibility will be assessed by participant drop-out rate, the prevalence of adverse effects, and the participant's perceived value of the training environment. This study will result in a new, innovative training approach that will improve skilled locomotor ability in individuals with PD. Furthermore, this study will create a unique, low-cost, and enjoyable system that could be used in the clinic or at home for training and monitoring of movement-related dysfunction.

Further information available at:

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