



US DEPARTMENT OF DEFENSE
BLAST INJURY RESEARCH PROGRAM
COORDINATING OFFICE

Neurocognitive Function and Psychological Health Vestibular Rehabilitation Using an Immersive Virtual Environment at the NHRC

This project established novel rehabilitation therapies for patients with mTBI needing vestibular therapy as a result of blast or other injury under the sponsorship of BUMED. The therapies aim to accelerate recovery from mTBI and allow for faster return to duty or reintegration into society by using an immersive virtual environment, also known as computer assisted rehabilitation environment (CAREN), for vestibular therapy at the NHRC. The project hosts one of the largest cohorts of vestibular patients that have participated in a single study at any of the US DoD CAREN sites. The novel rehabilitation program on the CAREN was compared with a program using traditional vestibular rehabilitation therapy in the clinical setting at NMCSO. 39 patients participated in the study. Patients were assigned to one of three groups and underwent 12 vestibular therapy sessions. Group 1 participated in six sessions in the traditional clinical setting and six sessions on the CAREN system, Group 2 participated in 12 sessions on the CAREN system, and Group 3 participated in twelve sessions of therapy in the traditional clinical setting. Preliminary results show that all groups significantly improved on standardized vestibular tests—such as the Activities-specific Balance Confidence Scale, Dizziness Handicap Inventory, Sensory Organization Test/Posturography, and the Functional Gait Assessment—over a six-week rehabilitation program. Walking speeds and weight shifting abilities of the patients participating in therapy on the CAREN were similar to those of an uninjured control population at six weeks. This work has shown the ability of physical and cognitive improvements to carry over to activities of daily life, demonstrating that training and rehabilitation in the CAREN environment is not only useful for CAREN-specific tasks but benefits the mTBI patient in daily living. Research findings suggest that the CAREN system can be an effective and challenging treatment modality for persons with vestibular dysfunction. Currently, similar therapy is being introduced to other subject populations such as those with vertigo and motion sickness.