The Vestibular Rehabilitation App™ Improves Accuracy and Enjoyment with Exercises in Older Adults with Vestibular Dysfunction

1Linda J. D’Silva, 1Tarah Phongsavath, 1Kelly Partington, 1Frances Korer, 2Timothy P. Zehnbauer, 3Karen M. Skop, 2Nathan T. Pickle, 3Paulien E. Roos
1University of Kansas Medical Center, Kansas City, KS, 2CFD Research Corporation, Huntsville, AL, 3James A. Haley Veterans’ Hospital, Tampa, FL

Introduction
Almost half the people over the age of 60 experience dizziness
Vestibular rehabilitation is effective in reducing dizziness and risk for falls in people with a vestibular disorder
Adherence to exercise programs can be as low as 50%
Outcomes of rehabilitation are poor due to inaccurate and inconsistent exercise performance
Early literature cites the potential for improved adherence with gaming integrated into rehabilitation

Research Aims
Aim 1: To compare the accuracy of gaze stability exercises with and without the use of the Vestibular Rehabilitation App™
Aim 2: To explore the attitude towards technology, enjoyment, and motivation while playing “games” using the Vestibular Rehabilitation App™

Materials and Methods
Vestibular Rehabilitation App™
• Clinician-directed rehabilitation
• Sensor based technology to capture the range and frequency of movement
• Feedback (written and auditory) provided during games if movements were too slow/fast/jerky

Participants:
• 40 adults (20 females) mean age 67± 5.7 years
• Diagnosis of unilateral or bilateral vestibular dysfunction
• No history of recent lower extremity surgery, severe pain

Methods:
• Performed exercises with and without the app
• Answered questionnaires on enjoyment, motivation and usefulness

Discussion
Participants demonstrated lower range of head motion when using the app (compared to without the app) in the yaw and pitch planes.
The frequency of head motion was closer to the prescribed frequency and had less variability when using the app, favoring the use of the Vestibular Rehab App.™
In general, adults with a diagnosed vestibular disorder and complaints of dizziness enjoyed using the tablet-based technology, felt motivated during the exercises, understood the directions, and reported that the app would improve their effectiveness with vestibular rehabilitation.

Conclusions
Technology can enhance the adherence and effectiveness of vestibular rehabilitation by making it more enjoyable.
Feedback during exercises and feedback on overall results motivates individuals.
The Vestibular App can improve the accuracy and reduce variability in exercise performance compared to traditional paper-based VOR exercise prescriptions.

Next Steps
Calibrate prescribed head angles to actual angles in the game.
Investigate the effects of using the App on rehabilitation outcomes.

Research reported in this publication was supported by the NIDCD of the National Institutes of Health (NIH) (R44DC0117408). Content is solely the author’s responsibility and does not necessarily represent official views of the NIH or represent official policy or position of the Department of Veteran Affairs or any other U.S. government agency.