

Feasibility of a Tablet-Based App for Exercise Program Prescription and Monitoring in Vestibular Rehabilitation

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Disclosures

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Learning Objectives

- Describe the role of tablet-based apps in prescribing and monitoring vestibular rehabilitation exercises for patients with mild traumatic brain injury and vestibular disorders.
- Evaluate the feasibility and usability of a tablet-based application for delivering vestibular home exercise programs.
- Discuss how remote monitoring vestibular rehabilitation technology may aid in recovery in service members with dizziness following mild traumatic brain injury.



VOR Training



Benefits

- Improve recovery of balance
- Reduce symptom complaints
- Improve ADLs
- Reduce fall risk
- Improve quality of life



Goals

- Promote gaze stability through adaptation of VOR gain
- Habituation to symptoms by repeated exposure



Early initiation results in best outcomes

Hall et al. J Neurol Phys Ther. 2022;46(2):118–177.

Lacour M, et al. J Vestib Res. 2021;31(5):407–421.

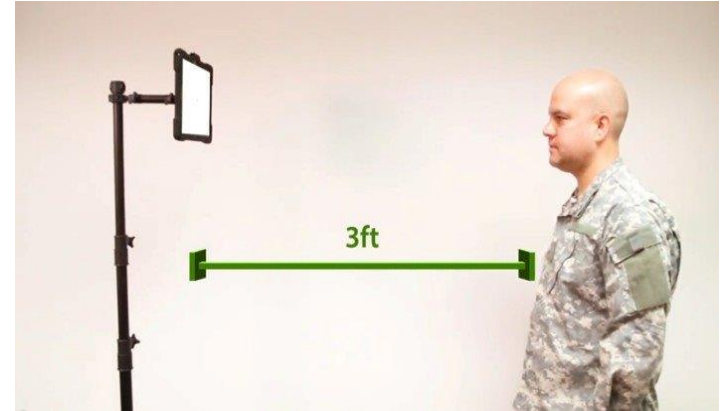


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VestAid

- Tablet-based app for vestibular rehabilitation
- Allows clinicians to create individualized patient exercise programs
- Detects face and eye movement (using tablet camera) to analyze VOR exercises
- Enables real-time tracking of exercise performance



Clinician Web-based Portal

- Create and modify VOR exercises using the following parameters:
 - Type of exercise
 - Duration
 - Speed
 - Optotype color
 - Optotype size
 - Background color
 - Background pattern
 - Background movement
 - Background movement speed

nxtHEALTH ANALYTX

Studies All Patients Admin Dataset List

Study: Efficacy Study 2025 / Cohort: Default Cohort / Patient: pitttest / [Edit Therapy](#)

Activity*
VORx1 Exercise

Direction*
Horizontal

Description For Patient*
Head shaking right/left
- checkerboard

Dosage (Times Each Day)*
3

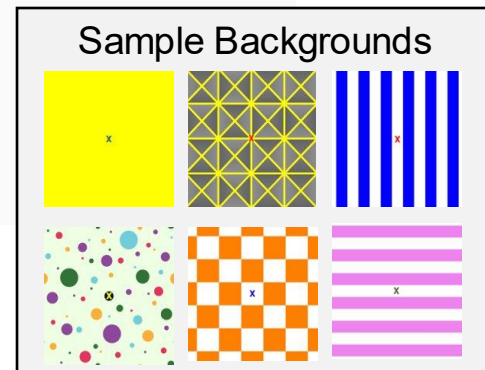
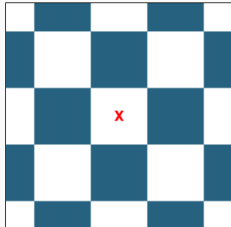
Duration (Seconds)*
20

Speed (Bpm)*
100

Distance To Screen (ft)*
3

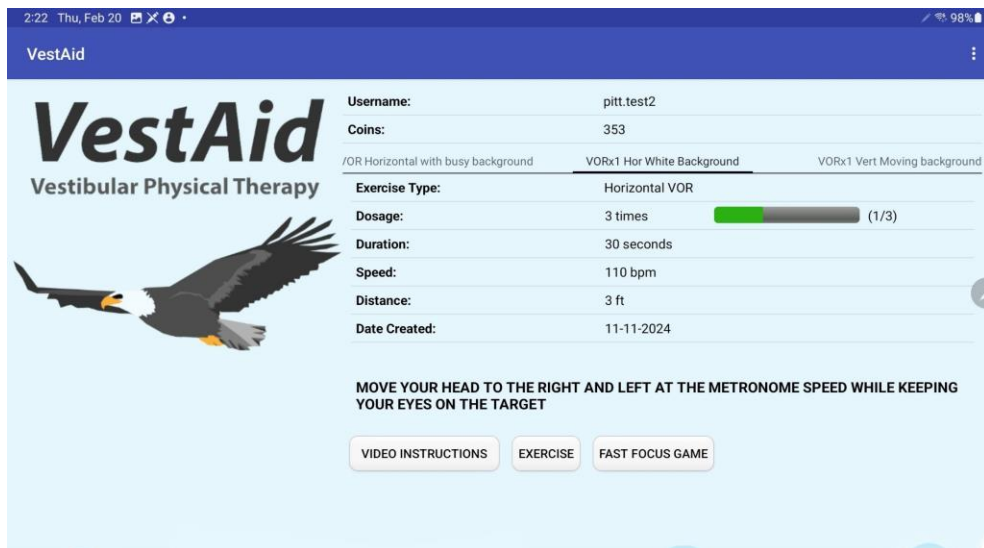
Optotype Font Color
Red

Preview



Patient Tablet-based App

- All assigned exercises
- Video of exercise instructions
- Progress bar to track daily exercise progress
- Fast focus racing game for gamification



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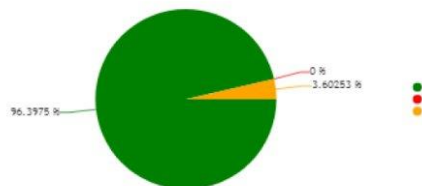
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Exercise Performance Report

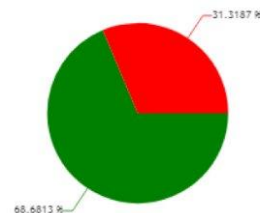
- Review all exercises completed by patients
- Track head speed and eye gaze compliance
- Monitor pre-and post-exercise symptoms and perceived exercise difficulty

Session Summary

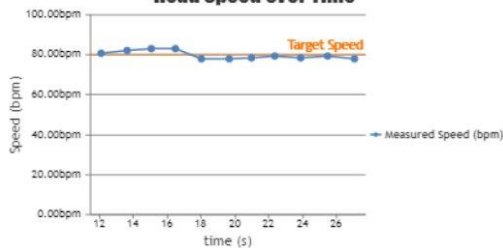
Head Motion Compliance



Eye Gaze Compliance



Head Speed Over Time



Subjective Data

Symptom	Pre-Session Score (0-10)	Post-Session Score (0-10)
Dizziness	0.6	0.9
Headaches	0.0	0.3
Nausea	0.8	1.7
Fogginess	0.0	0.4
Reported Difficulty	5	



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Study Methods

Participants

- 24 patients (11 female, 13 male, ages 19-58)
- Diagnoses
 - Mild Traumatic Brain Injury (n=17)
 - Unilateral vestibular hypofunction (n=6)
 - Bilateral vestibular hypofunction (n=1)

Protocol

- 6-week vestibular home exercise program using VestAid
- Weekly in-person clinic visits
- Exercise programs prescribed, monitored, and progressed by patient's physical therapist
- VestAid usability evaluated using System Usability Scale (SUS) at the end of the 6 weeks



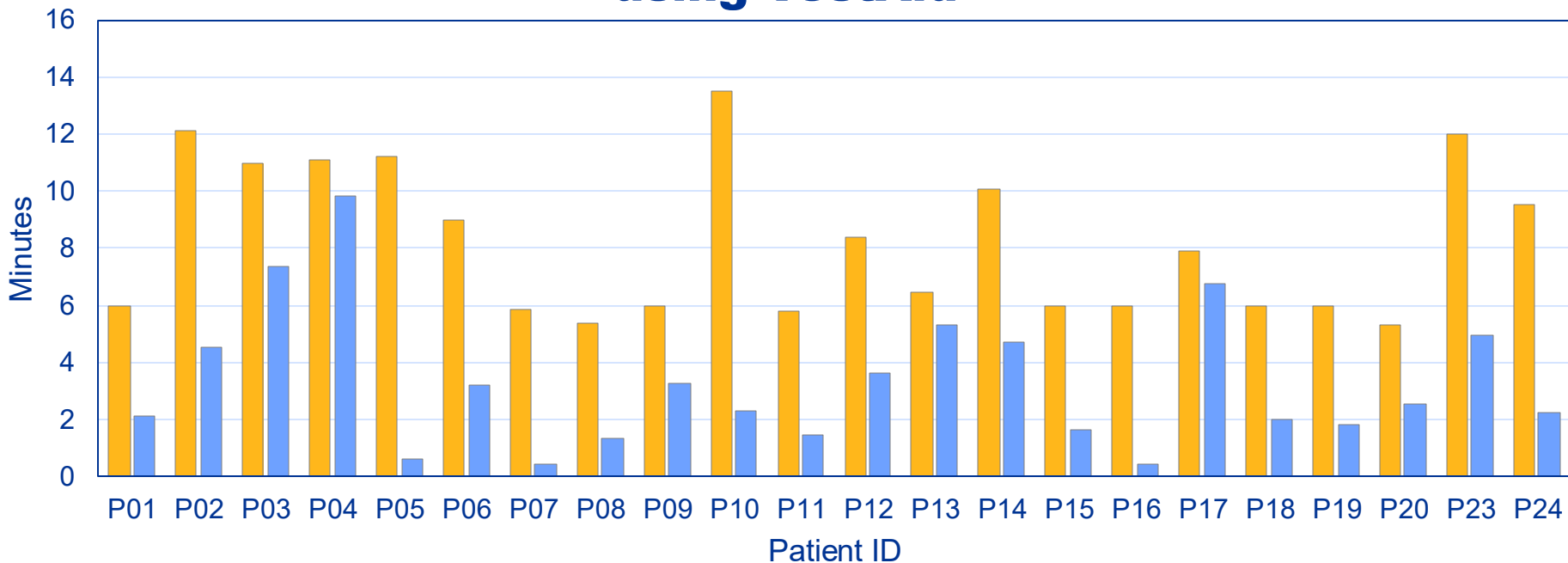
Results

- 22 of 24 patients completed study
 - 2 lost to follow-up

Average study duration	Average exercise prescription	Average time spent exercising
37.5 ± 6.4 days	8.2 ± 2.7 mins/day	3.3 ± 2.4 mins/day



Comparison of Average Daily Prescribed Exercise Time (mins) and Average Daily Time Spent Exercising (mins) using VestAid



■ Average Daily Exercise Prescription Time (mins)

■ Average Daily Time Spent Exercising (mins)



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Usability

- Average VestAid System Usability Score (SUS) was 84 ± 12.1
 - Benchmark score for digital health apps: 68 ± 12.5

Statements with highest level of **agreement**:

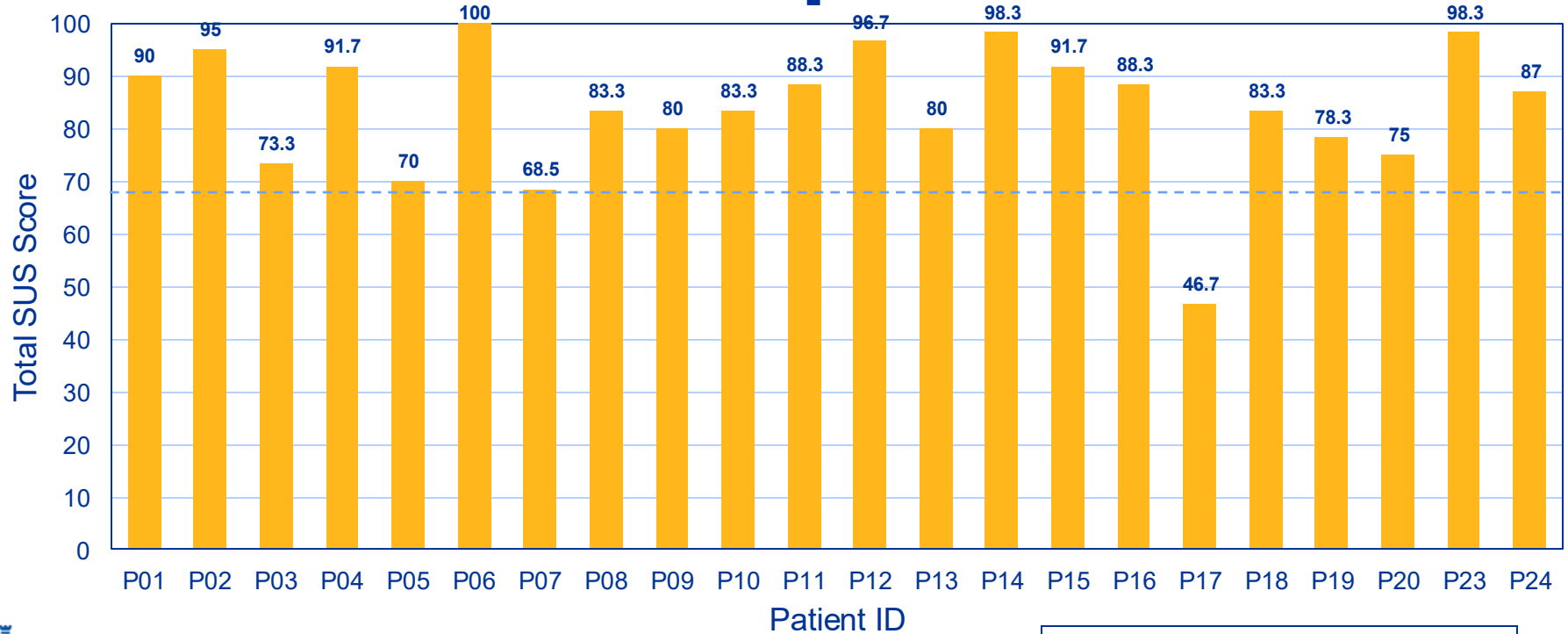
- I thought the system was easy to use
- I would imagine that most people would learn to use this system quickly

Statements with highest level of **disagreement**:

- I think that I would need the support of a technical person to be able to use this system
- I needed to learn a lot of things before I could get going with this system



VestAid System Usability Score for All Participants



----- Benchmark SUS Score of 68



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Future Work



Large randomized controlled trial to compare VestAid to standard vestibular rehabilitation care



Explore impact of VestAid on vestibular symptoms and outcomes



Conclusions

- Seven physical therapists effectively utilized the app to prescribe, monitor, and progress exercises
- Patients found VestAid to have high usability
- VestAid may be a feasible tool for prescribing and monitoring vestibular home exercise programs
- The ability to remotely monitor exercise performance and provide timely exercise modifications may be beneficial in virtual care and in underserved areas



Thank you!

Questions?



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