Advancing Telehealth Concussion Assessment Through Novel Virtual Technology Development

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INTRODUCTION

- Concussion commonly occurs in sports and military venues and is difficult to diagnose and manage.
- Impairments associated with concussion can be subtle and symptoms are often under-reported.
- Therefore, a medical device is needed to perform an assessment for concussion and identify functional deficits in-person and through remote technology.

METHODS

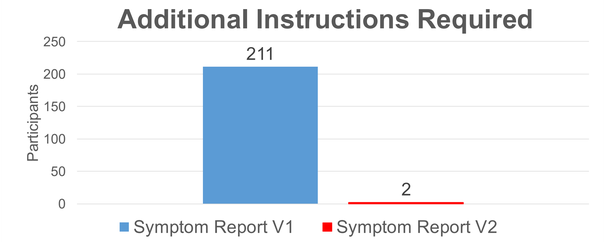
- Data collection occurred from 2020 – 2024 (N=1008)
- Age 18 – 40 years old
- During software development, the unique capabilities of VR were harnessed to objectively assess oculomotor control, visual perception, positional awareness, and the vestibular system.
- These tests were re-imagined from traditional clinical tests, informed by research evidence, and translated by a multi-disciplinary team into the virtual environment.
- Participant symptoms were reported at baseline and after each test.
- Investigators recorded when participants required supplemental instructions in addition to the headset audio.

This report highlights the successful integration of clinical assessments into a virtual reality environment.

RESULTS

Participant Characteristics	
Total Participants	1,008
Female	49.2% (n = 496)
Non-White	25.0% (n = 252)
Mean Age (years)	21.9 ± 4

>2-Point Increase Symptom Provocation	
Headache	<5%
Nausea	<5%
Mental Fogginess	<5%
Dizziness	9.2%



CONCLUSION

- Clinical tests of functional neurology were translated into virtual environment and multidimensional sensor-based data was collected on participants, who did not experience unexpected symptom provocation.
- Pending results of the machine learning classification, this device may prove useful in decision support for concussion diagnostics and determination of recovery.

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