INTRODUCTION

Concussion, or mild traumatic brain injury (mTBI), is the most common form of

INTRODUCTION

- Previous systematic reviews exist exploring the application of VR as a means of assessment, screening, and rehabilitation in adolescents and adults with traumatic brain injuries (TBI) in various settings.[3]

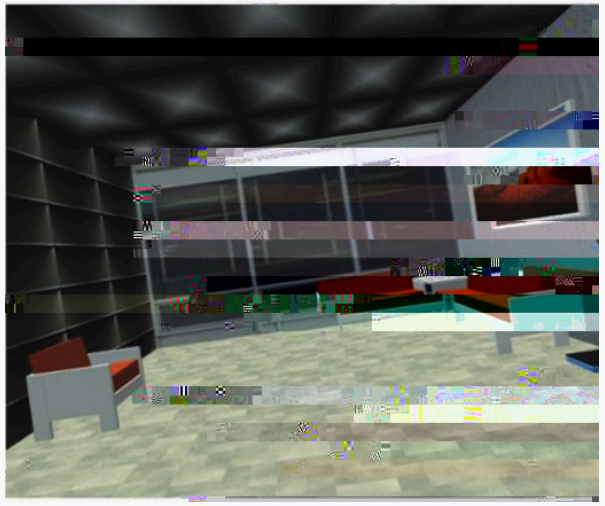
- There is limited research focused on VR applications specifically for mild TBI (concussion) in the adult population.

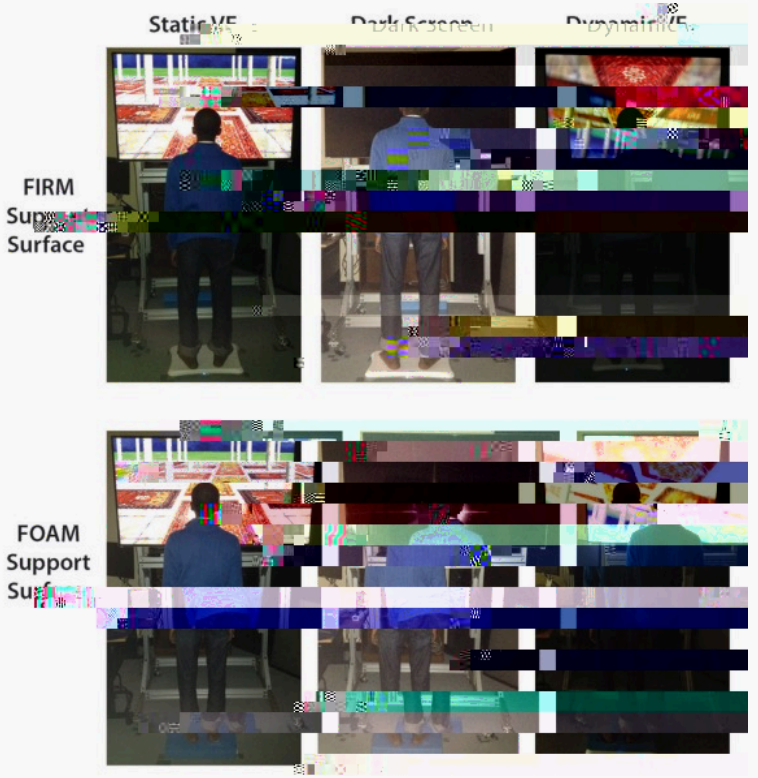
DEFINITIONS

- Virtual Reality - A medium composed of interactive computer simulations that sense the participant's movements and replace or augment the feedback to one or more senses, giving the sensation of being mentally immersed in the simulation.[4]
- Immersive Virtual Reality - Participants are fully immersed and interact with the virtual environment (3D devices).[5]
- Non-Immersive Virtual Reality - Participants are not fully immersed within the virtual environment (2D devices such as keyboards).[5]

CAREN[6]

VisMini[7-9]





VETS[10]

IMMERSIVE
VIRTUAL REALITY

NON-IMMERSIVE
VIRTUAL REALITY

VR PLATFORMS

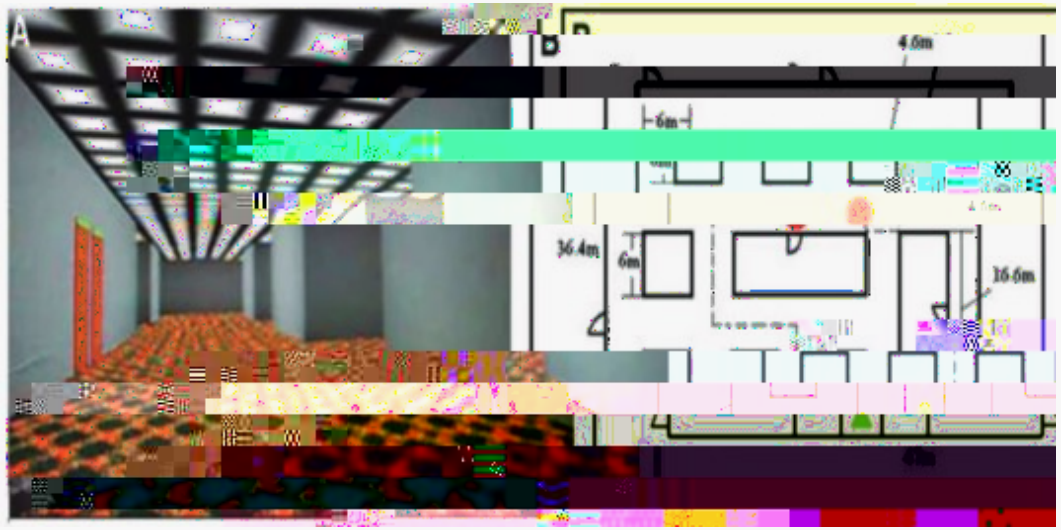
Immersive Virtual Reality Systems

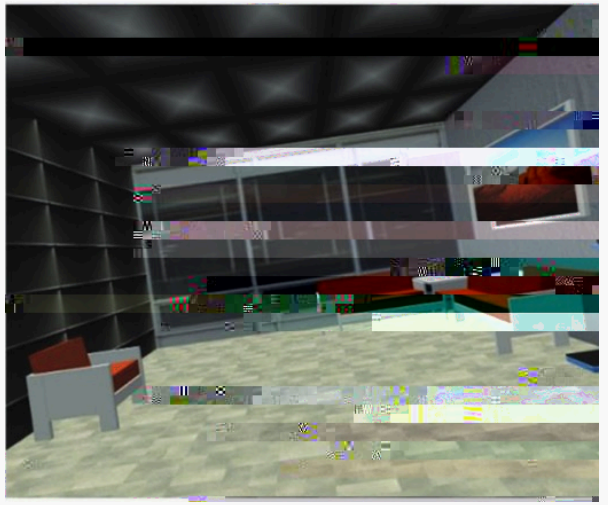
CAREN[6]

VR PLATFORMS

Immersive Virtual Reality Systems

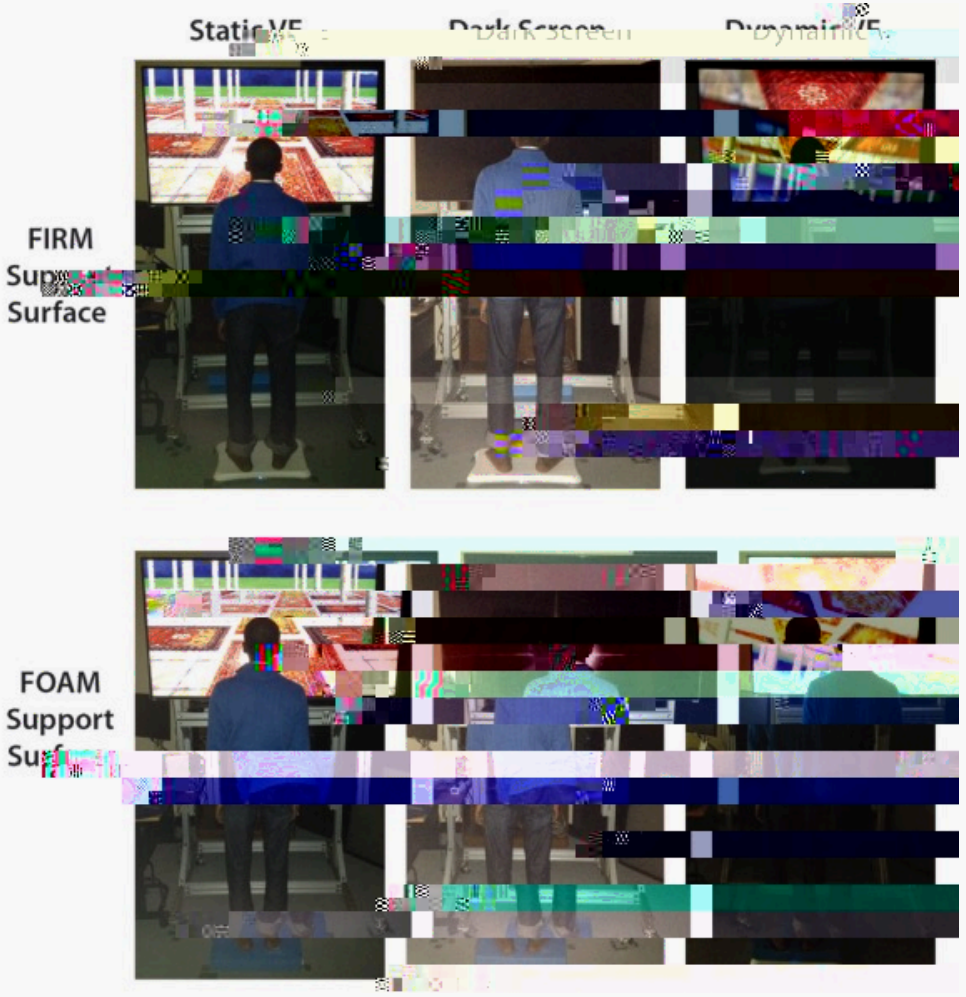
VisMini (3D Projection System)[7-9]





VR PLATFORMS

- Non-Immersive Virtual Reality
  - Virtual Environment TBI Screen (VETS)[10]



PURPOSE

The purpose of this systematic review was to examine the applications of virtual reality (VR) in the clinical management of

METHODS

Search Engines:

ProQuest, PubMed, ScienceDirect, and SpringerLink

Search Limits:

English, peer-

SEARCH TERMS

("Virtual Reality" VR)

(Assessment Evaluation)

Concussion

Treatment

SELECTION CRITERIA

Selection criteria included:

- Adults with concussion
- Immersive and

RESULTS


Records identified from*: n=680
Records removed before
Records screened
Included

RESULTS

Non-Immersive VR Systems	Immersive VR Systems

Rao et al., 2020[6]	Level 3 Non-Randomized Controlled Cohort	Features from

RESULTS

Teel et al., 2016[8]	Level 3 Non-Randomized Controlled Cohort	Determined cutoff scores, sensitivity, and specificity for determining spatial , attention, , and deficits using VizMini and VTC Open GL Developing Kit
Teel et al., 2015		

RESULTS

Author, Year	OCEBM Level of Evidence And Design	Key Findings
Wright et al., 2017[10]	Level 3 Non-Randomized Controlled Cohort	Determined that VETs is an accurate and valid measure for determining balance impairments following mTBI.

RESULTS

A total of 680 studies were screened for eligibility. After detailed appraisal, 5 met selection criteria.

Sample sizes ranged from 21 to 152 participants:

- Concussed participants (n=101)
- Healthy participants (n=382)

All studies conducted single-day testing with no follow-up.

CONCLUSION

Moderate evidence suggested effective use of VR to identify motor and cognitive impairments related to concussions in adults, particularly for postural control

CLINICAL RELEVANCE

Physical therapists should consider using VR for examination of patients with concussions to obtain objective, predictive data on residual impairments.

VisMini and VETs assessments yielded higher sensitivity and specificity than current gold standard assessments such as BESS and SOT.

LIMITATIONS

Limitations include:

- Small sample sizes
- High cost of some VR systems
- Same lead author for 3 of 5

FUTURE RESEARCH

Explore the use of virtual reality for long-term outcomes

THANK YOU

DPT Faculty and Staff

Fellow DPT Peers

Ian O'Hara

Attending Clinicians