VR for Pain & Injury Rehabilitation
Fiction, Fad, or Future

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• 1 in 5 Australians have a persistent pain state (MBF Foundation)

• Low back and neck pain: the greatest cause of years lived with disability world wide (Vos)

• Whiplash inj: 1/2 people have ongoing symptoms (Stirling)

• SCI: Over 60% of people develop ongoing pain after SCI (van Gorp)
Multimodal (biopsychosocial) treatments are best but insufficient for many (Plethora).

- New pain science
- Consumer needs
- New tech

New (potential) Solutions
EXTENDED REALITY

Birth of Consumer VR
2014-2019

- oculus
- Microsoft
- HTC
- PlayStation VR
Pain with movement depends on perceived movement, not only real movement

• Great plasticity in human perception when faced with visual trickery

• Can potentially leverage this feature of humans, for therapeutic gain…

• Ability to simulate a wide range of parameters
  • Environment
  • Task
  • Bodily appearance
  • Functional ability
  • Modes of feedback/gamification
CURRENT PROJECTS

VR FOR NECK PAIN + WCL

VR FOR BACK PAIN @ Princess Alexandra Hospital Persistent Pain Management Service (Hopkins Seeding Grant)

VR FOR SCI PAIN VR-simulated walking for SCI-related pain
Lead: Prof. Coppieters, *Pending funding
Immersive therapeutic education

• Targets specific learning outcomes linked to poor recovery (e.g. misunderstanding that pain=damage)

Exercise

• Body confidence, range of movement, control
• Gamified for engagement/adherence
• Progress tracking

Stress modulation

• Stress (i.e. hyperarousal) linked to non-recovery following MVA

VR FOR NECK PAIN/WAD
IMMERSIVE EDUCATION
*Currently on the development slow track, seeking support.
Embodying Einstein in VR makes you smarter & Reduces ageism (bias against the elderly)

Banakou et al. (2018) Virtually being Einstein results in an improvement in cognitive task performance and a decrease in age bias.
Virtual race transformation reverses in-group bias
Human cognition & behaviour is strongly linked to the bodies (perceived) capabilities – “Embodied cognition”
Like embodying Einstein improved intelligence....

Does looking stronger and more capable, reduce perceptions of vulnerability and increase perceptions of capability?
Perceived Vulnerability Scale

Rate how strong your body FEELS (not how it looks):

0 1 2 3 4 5 6 7 8 9 10
Very weak

Very Vulnerable

Very Strong

Very Resistant to Injury
Prof. Coppieters (*pending funding applications)
Soo Oh, Prof. Elizabeth Kendall
A space where technologists, clinicians, researchers come together to create custom solutions that support independence.

Prof. Heidi Zeeman
Can VR promote recovery in patients with brain injury and stroke?

Dr. Ali Lakhani
Simulated Natural Environments and the Psychological Health of People with Traumatic Injury

Prof. Michel Coppieters
Can virtual reality relieve neuropathic leg pain (via cortical reorganization) in people with paraplegia?
VR enables new possibilities for rehabilitation, but…

Like any new idea, development and efficacy research takes time and resources.

On that note…
Thanks to The Hopkins Centre’s Core Partnerships

Foundation Partners

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Affiliate Partners

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HCQ
Health Consumers Queensland
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Research for Rehabilitation and Resilience

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Bold ideas. Better solutions.

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