

### KEY WORDS

- Adult physical & psychological rehabilitation
- Virtual reality environment (VRE)
- 3-dimensional motion capture
- Kinetics
- Assessment & treatment of gait
- Military
- Civilian
- Trauma

### WHY?

Australia faces significant challenges in healthcare due to success of medical developments e.g. trauma surgery, neurology, intensive care and the growing aging population. However, this success has **not** been matched by innovation in physical rehabilitation.

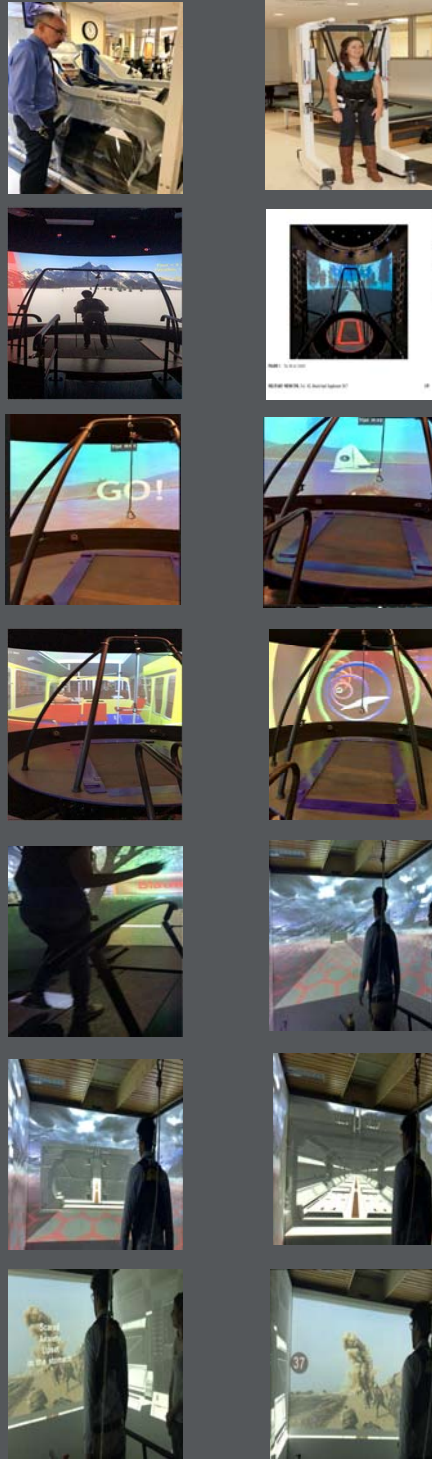
### AIM

To investigate the expanded & enhanced use of 3-dimensional motion capture **and** other technology including robots & virtual reality environments in physical & psychological rehabilitation for substantial movement dysfunction- especially in walking.

### METHODS

As a recipient of the Dr Dorothy Sandars Church Fellowship, I visited leading international military & civilian centres for adult physical rehabilitation & attended the premier international clinical gait conference to inform the design, equipment of a state-of-art clinical rehabilitation facility in Brisbane.

### INNOVATIONS



### FINDINGS

3-Dimensional motion analysis is the gold-standard for paediatric physical rehabilitation in Australia to inform & monitor clinical practice for walking disorders; this is not so for patients post-adolescents who continue with or acquire walking dysfunction following trauma or developing a condition.

1. For inpatients, the use of **robots** by therapists was prevalent to support & guide patients in early therapy allowing the patient to “walk” in a symmetrical upright posture.
2. Once upper body control was restored, patients could be progressed to **antigravity treadmills** which gradually allowed full-weight bearing bilaterally.
3. **3D- motion capture systems in virtual reality (VR) settings**, with force plate embedded treadmills (with **6 degrees of freedom**), were observed which assessed walking, **and** provided physical therapy at increasing levels of challenge (tilting {fore/aft & side-side} & vertical (up & down). The VRE were chosen by the patient. This enabled **immediate visual feedback** for patients & **real-time 3D quantitative data** for therapists providing treatment.
4. With the addition of visual information from the patient & special software, the same equipment was used for the treatment of **Post-Traumatic Stress Disorder** incorporating the technique of **EMDR- eye movement desensitization & reprocessing**.

### My full report

<https://www.churchilltrust.com.au/fellows/detail/4126/Robyn+Grote>

I welcome opportunities for part-time work to assist in planning & implementing a new rehabilitation centre.

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