Edith Cowan University

Innovation in the School of Medical & Health Sciences

Clinical Neuroscience and Adjuncts to Rehabilitation Robotics

Existing strategies to enhance motor function following brain and spinal cord injury are poor, leaving patients with considerable disability. A greater understanding of motor recovery, refinement of existing strategies, and development of new methods is needed. Evidence suggests that motor training can improve function, greater than spontaneous recovery alone. The mechanisms underlying brain plasticity can also be specifically targeted, using non-invasive brain stimulation and pharmacologic intervention.

Rehabilitation Robotics research led by Professor Dylan Edwards incorporates emerging technologies of transcranial magnetic stimulation, and rehabilitation robotics to study motor recovery after neurological damage including adult stroke, spinal cord injury, and cerebral palsy. The robotic movement devices represent the most sophisticated interactive rehabilitation systems available, and are able to quantify various aspects of movement. Transcranial Magnetic Stimulation (TMS) is an accepted tool to probe changes in the brain that might occur with training. Both TMS and Transcranial Direct Current Stimulation (tDCS), are promising neuromodulation methods that can independently lead to transient improvements in motor behaviour. Professor Edwards' research further focuses on examining efficacy and biomarkers of recovery, as well as investigating novel combination therapies such as with new drugs or dietary modification.

Professor Edwards' goal is to develop ECU as a leader in clinical neuroscience by closely working with clinicians and academics, as well as partnering with Harry Perkins Institute, Joondalup Health Campus, Midland Health Campus, Osborne Park Hospitals and Perron Institute in WA.

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