

The hand hub: Using technology for upper limb rehabilitation.

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Background

Worldwide there are more than five million people left with a permanent disability following a stroke. Impairment of upper limb (UL) function affects up to 85% of stroke survivors and only 5-20% will achieve full use of the affected UL. Research suggests that improvement in UL requires intensive and repetitive training. Time constraints within the rehabilitation setting may not support the amount of training required. Advances in robotics and gaming technology have the potential to provide intensive training of the UL. This paper describes the Hand Hub study which used emerging technologies to rehabilitate the UL following a neurological event.

Methods

This study utilised a practice based evidence (PBE) approach which builds strength by collecting large amount of patient data and recruiting a heterogeneous sample to improve representativeness. Inclusion criteria were an UL deficit following a neurological event and ability to follow a 2-stage command. Patients were assessed by a rehabilitation consultant and an occupational therapist at baseline, after intervention and six months post-discharge. A broad range of outcomes were assessed including motor control and UL function. Intervention was 12 treatment sessions in the Hand-Hub group which was set up as graded workstations. Data collection is over 5 years and ethics approval was received.

Results

More than 122 patients have completed intervention in the Hand Hub. Both active and passive dimensions of the ArmA showed significant improvement (ES 0.3 and 0.4) as did spasticity (MAS) and quality of life (EQ-5D). There was also evidence of carryover into everyday life.

Discussion

Preliminary results from the Hand Hub study show high rates of acceptance and engagement in the technology and statistically significant motor and functional changes in the UL. Phase 2 of the study will introduce a control intervention prior to Hand Hub in order to control for expectation based influences.