

Use of gaming technology in upper limb prosthetic rehabilitation

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Background:

Upper limb amputees need to learn a range of controls to operate myoelectric prosthetic devices. These controls often require activation of muscles that are not usual for the desired action. Learning to sequence controls in functional tasks requires a lengthy period of repetitive training. Several studies report high rejection rates of upper limb prosthetic users and inadequate training to meet individual needs. The repetitive training, although necessary, can lead to a lack of interest and disengagement for patients and contribute to poor outcomes.

This study aims to explore whether gaming technology can assist in facilitating upper limb myoelectric prosthetic training.

Method:

A single subject design was used to explore whether gaming technology was a feasible and effective method for repetitive practice during early training of upper limb prosthetic use. Intervention consisted of 10 x individual therapy sessions using the Saebo Rejoyce system. Multiple outcome measures were taken before and after intervention including the modified box and blocks test and assessment of motor and process skills (AMPS). Overall satisfaction and community integration were measured using the revised Trinity amputation and prosthesis experience scale.

Results:

Data demonstrates an observable increase in motor and process ability, using upper limb prosthesis within functional tasks. Engagement and participation in therapy were high, indicating good acceptance of this technology.

Discussion:

The findings from this case study suggest that gaming technology provides an engaging and interactive environment for the repetitive task training that is necessary in upper limb myoelectric prosthetic training. This technology may promote patient adherence to training protocols, and subsequent positive functional outcomes. Further research is required to compare effectiveness of gaming technology in comparison to traditional therapy in prosthetic rehabilitation. It would also be interesting to explore whether this type of technology has any impact on long-term prosthetic rejection rates in this population.