

User requirements for an upper limb weight support device for stroke rehabilitation

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Background: Upper limb function after stroke can be improved with repetitive, task-specific movement. Achieving high practice intensity necessitates independent activity, outwith routine therapy. Weight support devices (WSDs) can help stroke survivors (SS) perform upper limb exercises by unloading the weight of their arm, providing more opportunity for rehabilitation activities. However, current commercial WSDs are expensive, creating a barrier to adoption by users. The purpose of this work was to interview SS and therapists to obtain the necessary user requirements for an upper limb WSD.

Method: Concepts for a WSD were created through brainstorming sessions with engineers and physiotherapists. These concepts were evaluated using a controlled convergence method utilizing the device's performance criteria from a design specification created through research of literature and existing devices. The best concepts were chosen and presented to two focus groups of SS (n = 3) and therapists (n = 6), respectively. Feedback on the designs was recorded focussing on desirable attributes.

Results/Findings: Desirable attributes recorded were a device that was portable, comfortable, with supports for both the upper arm and forearm. Incorporation of feedback on movement and completion of functional tasks was also desired. Therapists recommended a design that would help facilitate functional tasks without pain or difficulty. The SS group also highlighted their lack of awareness of WSDs.

Conclusion: An upper limb WSD is a desirable tool for rehabilitation. Participant feedback suggests designing a device that is comfortable, has two points of support, and is portable to enable independent home use. A prototype is currently in development.

Keywords: Stroke rehabilitation; Upper limb device; Weight support

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