

Evaluation of a home-based technology-supported arm/hand training system after stroke

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Introduction: Robotic devices are used increasingly in rehabilitation for the hemiparetic arm after stroke. The next step is to apply such systems at home to enable increased amount of training. In this study, a custom-designed orthosis supporting hand opening (SCRIPT) is combined with a motivational user interface with gaming environment for self-administered training.

Objective: To assess the feasibility of technology-supported arm/hand training at home after chronic stroke.

Patients: Twenty-one chronic stroke patients with impaired arm/hand function were included across the Netherlands, Italy and United Kingdom.

Methods: During six weeks, participants were recommended to exercise 180 minutes per week at home with the SCRIPT system (Fig 1). They trained independently using games while they were supervised remotely, off-line, by a therapist. Evaluation of feasibility involved training duration, usability (System Usability Scale, SUS) and motivation (Intrinsic Motivation Inventory, IMI). Arm/hand function (Fugl-Meyer) was assessed before and after six weeks training.

Results: User acceptance was positive (median SUS = 68%, range 38-100%; median IMI = 5.3, range 3.4-6.7). Compliance with the system was promising: mean training duration per week was 105 minutes (SD=66 minutes). Mean arm/hand function improved from 33.1 (SD=15.8) pre-training to 37.1 (SD=16.3) post-training.

Discussions/conclusions: Training with the SCRIPT system at home was feasible and effective. This was reflected in an actual training duration of 15 minutes per day, and modest clinical improvements on arm/hand function after six weeks training in chronic stroke.

Clinical message: The SCRIPT system is a promising tool for intensive, self-administered practice at home after stroke.

ACKNOWLEDGEMENT

This study is part of the SCRIPT project, which is partially funded by the European Commission under the 7th Framework Programme (FP7-ICT-2011-07) Grant Agreement Number: 288698



Figure 1 SCRIPT hand orthosis