

Focused Symposium

Best practice for arm recovery post stroke:
an international application[☆]



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Abstract

Objective To develop an evidence-based application ('app') for post-stroke upper extremity rehabilitation that can be used globally by therapists.

Participants Twenty-three experienced neurorehabilitation therapists, applied scientists and physicians, and 10 consultants dedicated to the provision of best practice to stroke survivors.

Design This team evaluated the evidence to support the timely and appropriate provision of interventions and the most defensible outcome measures during a 4-year voluntary information gathering and assimilation effort, as a basis for the sequencing of an algorithm informed by the data and directed by changes in impairment and chronicity.

Outcome measures The primary outcome was the formulation of a testable app that will be available for minimal user cost. The app is for a smartphone, and the comments of a focus group (audience at a World Confederation for Physical Therapy 2015 presentation, approximate $n = 175$) during a 30-minute 'Questions and Answers' session were assessed.

[☆] This paper summarises a Focused Symposium presented at the World Confederation for Physical Therapy Congress, 1–4 May 2015, Singapore.

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Results Analysis of documented, extensive input offered by the audience indicated a highly favourable disposition towards this novel tool, with provision of concrete suggestions prior to launching the final version. Suggestions centred on: inclusion of instructions; visuals and demonstrations; monitoring of adverse responses; availability of updates; autonomous use by patients; and potential to characterise practice.

Conclusions A simple, user-friendly app for decision making in the treatment of upper extremity impairments following stroke is feasible and welcomed.

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Introduction

Rehabilitation clinicians are challenged to keep up with the volume of new evidence. Even after 17 years, the transformation and assimilation of evidence from discovery into practice is still incomplete [1,2]. The barriers that foster this untenable lag include: insufficient literature search and appraisal skills, lack of time, turnover in team members, compromised team communication, limitations in access to equipment, and treatment prioritisation [3,4]. Moreover, evidence syntheses and guidelines rarely provide recommendations specific to the dose and type of intervention, severity of impairment, time post injury and expected outcomes [5]. Given the reality that clinicians anticipate, if not expect, electronic forms of communication and transmission, there is a need to tailor the evidence using information technology to enhance uptake. To this end, an international group of clinicians and researchers in post-stroke rehabilitation reviewed existing recommendations, and recognised the opportunity to develop an algorithm for most compelling evidence treatments that could be incorporated into a smartphone app. This development and initial demonstration were provided at the 2015 World Confederation for Physical Therapy (WCPT) meeting, at which time, concrete suggestions for further improving the utility of the app were gathered. This report provides a brief history of development of the app and subsequent modifications prior to its release.

Methods

Participants

Twenty-three clinicians and researchers, and 10 consultants with expertise in the treatment of survivors of stroke and in exploring novel interventions to improve upper extremity function met in October 2010. They committed to frequent collaborative meetings and electronic communications as they gathered evidence to determine best practice to reduce impairments and enhance participation. The emphasis was on factors contributing to optimal limb use. Issues related to communication, visual perception and cognition were considered according to the extent that they affected the optimal application of interventions.

Procedure

Initially, the group had to identify prognostic factors that could be incorporated into the algorithm. The algorithm for predicting upper limb capacity was based upon the Action Research Arm Test (ARAT), and builds on the presence of two clinical determinants measurable within 72 hours post stroke: (1) some voluntary shoulder abduction, and (2) some voluntary finger extension [6,7]. This shoulder-abduction-finger-extension (SAFE) model has shown that those patients demonstrating some voluntary finger extension and some visible shoulder abduction on day 2 after stroke onset had a 98% probability of achieving some upper limb function at 6 months post stroke [6]. In contrast, patients who did not show this voluntary motor control had a probability of only 25%. Remarkably, 60% of the patients with stroke showing some finger extension within 72 hours post stroke could regain full upper limb function as measured by the ARAT at 6 months post stroke [6]. Retesting the model on days 5 and 9 showed that the probability of regaining function remained 98% for those with some finger extension and shoulder abduction, whereas the probability decreased from 25% to 14% for those without this voluntary control [6].

The SAFE model also showed that a relatively large proportion of patients without finger extension may regain some upper limb capacity despite absence of finger extension within the first 72 hours post stroke [6]. Obviously, these false negatives in the SAFE model suggest that a number of patients with an initial poor prognosis for upper limb recovery may regain some finger extension, and, with that, upper limb capacity at 3 or 6 months post stroke. Repeated measurement analyses indicated that the time window for spontaneous return of finger extension strongly parallels the window of spontaneous neurological recovery restricted to the first 3 months post stroke [3,8,9]. Beyond this critical 3-month time window, motor function of the upper limb is defined [10], and clinical determinants used in prediction models become invariant for time-dependent changes [3,8,9]. These findings suggest that patients with an initial poor prognosis for upper limb capacity following the SAFE model need to be monitored weekly for return of some finger extension in the first 12 weeks post stroke.

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