Thompson Digital Switch: Helping Stroke Patients to Help Themselves by Promoting Proprioception During Therapy. Brief Report and Podcast as a Teaching Aid for Professionals

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Abstract

Stroke affects an estimated 4.6 million people with over 500,000 new cases each year and 100,000 people having a second stroke. There is a huge demand on our healthcare services for treating such people. Proprioception is the body’s natural feedback mechanism that becomes disrupted during a stroke because of damaged nerve pathways. Tapping into this phenomenon enables us to re-establish feedback and thus help stroke patients return some of their lost function. The Thompson Digital Switch (TDS) has been used for several decades in assisting occupational therapists and physiotherapists during rehabilitation of stroke patients. Use of the TDS to help other injuries such as leg trauma and deficits following surgery, are presented in a podcast that also informs professionals about the aetiology and prognosis of stroke that can be used as a teaching aid.

Introduction

The use of cues for improving cognitive deficits following stroke have been followed with great interest by the author. In particular, the use of coloured strips of paper placed in the margin of the page on the patient’s neglected side have resulted in improvement in reading ability by reducing the patient’s tendency to lose their place in the text (Thompson & Morgan, 1996).

Cueing for neglect in stroke is no new and is dependent upon using the modality of the cue that matches the task? e.g.? for a visual modality task, a visual cue should be used (Thompson, 1999). Ongoing investigations by the author have focused on the reaction times of the quadriceps muscle group, situated in the upper thigh, especially where incomplete innervation has resulted from a stroke and also following a serious road traffic accident (Illustration 1).

Extensive testing in the university and in field tests at various occupational therapy departments (Queen Alexandra Hospital, Cosham; Salisbury District Hospital, Odstock; Royal Naval Hospital, Haslar (Thompson, 1987a,b; 1998), involved?the use of the ?quadriceps switch?, used throughout most UK hospitals and in Northern Ireland during the rehabilitation of gunshot injury to the leg muscle, and a fast digital sampler and interpreter of electrical nerve impulses from the movement of leg muscles (Thompson, 2011; Thompson & Coleman, 1987; 1989) (Illustration 2).

Computer and electromyography (EMG) was used to measure the muscular electrical nerve activity. Variations in displays and tones were designed and validated in order to optimise on the best type of cue (Illustrations 3 - 5).

The podcast associated with this article (Video 1) presents the demands of a stroke in terms of cognitive and perceptual deficits and aetiology and prognosis. This is intended as a teaching aid for professionals whether occupational or physical therapists, clinical psychologists, nurses or doctors.

Conclusions

Feedback systems typically had limited application in the early 1960s but later gave clinicians more than just familiarity with this new way of representing ?body waves?. The deficits of stroke can be far reaching and it is important to offer explore innovative approaches to assist in rehabilitation. Being realistic about goals during rehabilitation is of paramount importance (Thompson, 2006) but new technologies do provide hope for the future for our valued patients. Podcasts are also a valuable way of presenting information in an interesting and individual format.

References


Illustrations

Illustration 1

Using the apparatus for rehabilitation of skiing injuries
Illustration 2

Set-up incorporating the Thompson Digital Switch interface unit
Illustration 3

Bridge open (muscles relax)
Illustration 4

Bridge closed (muscles contract) - lorry moves across screen
Illustration 5

Audible tones (blue) and patients responses (green)
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