

Method: Caregivers were invited to complete a postal RSS, CSI and Hospital Anxiety and Depression Scale (HAD). They were then asked to return a repeat postal questionnaire or agree to be interviewed approximately one month later.

Results: Eighty-nine, (47%) of 190 caregivers participated, of whom 45 (51%) cared for a client with MS. Forty six received a repeat postal questionnaire and 20 were followed up by interview at 18–146, mean 49, days between contacts. Thirty-one, (35%) scored within the case range (>10) for anxiety or depression on the HAD. The RSS identified such caregivers with a sensitivity of 87% specificity 63%, the CSI (6/7) with a sensitivity of 71%, specificity 67%. Both scales showed good internal consistency (Cronbach alpha 0.9, 0.8) and correlation with expert opinion (0.61, 0.63). The mean difference between repeat postal administration, was 4 (sd 3.9) points and 1.5 (sd 1.3) points, with no systematic difference between postal and interview presentation.

Conclusion: Postal RSS and CSI appear to be valid measures of caregiver stress in this population.

42.05 Disability, Neuro-psychological, Neuro-physiological, and Clinical Factors Associated with Response to Physiotherapy in Multiple Sclerosis

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Benefit from physiotherapy with respect to mobility in patients with chronic multiple sclerosis (MS) has been demonstrated in a recent randomised crossover trial. In this study some patients obviously benefitted from therapy whilst others did not. To evaluate factors predicting response to physiotherapy, 10 patients with chronic MS who had benefited (responders) and 6 who were unchanged (non-responders) following therapy in the randomised crossover trial were selected and assessed by observers blinded to therapy response.

The patients were evaluated using a battery of disability and handicap scales and neuro-psychological tests. A clinical evaluation of tone and ataxia in the upper legs was made. The muscle strength of knee extensors and flexors was measured during a series of isometric contractions: by using surface EMG recordings from the muscle groups the level of muscle co-activation during agonist and antagonist movements could be measured and the influence which this had on the EMG-moment relation calculated.

There were no differences between responders and non-responders to physiotherapy by general physical disability or neuro-psychological characteristics. Isometric quadriceps and hamstring muscle strength was reduced in MS patients compared to age-

matched controls. However weakness in the non-responder group was contributed to by exaggerated antagonist co-activation. Non-responders showed higher levels of hamstring co-activation during quadriceps isometric contractions ($p < 0.05$). The EMG-moment relationship was similar between groups. The only clinical variable associated with response to therapy was hypotonia which was present in 1/10 responders and 5/6 non-responders ($p = 0.008$, Fisher's exact test).

In this study, a poor response to physiotherapy seemed related to hypotonia and exaggerated co-activation. Cerebellar deficits might provide an explanation for these findings. This may have implications for future research into better methods of physiotherapy.

42.06 Control of Spasticity by Electrical Stimulation of Posterior Structures of the Human Lumbosacral Cord

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Background: Following reports that spinal cord stimulation (SCS) applied below the level of lesion of the posttraumatic spinal cord injury (SCI) is less effective in cases involving severe spasticity, we decided to explore the possibility of optimising the approach by finding an appropriate site of stimulation.

Objective: to evaluate the effect of SCS on severe spasticity of the lower limbs in patients with traumatic SCI under close scrutiny of the site and parameters of stimulation.

Material and Method: Eight SCI patients were included in the study. Levels of spasticity before and during SCS were compared according to a clinical rating scale and by surface electrode poly-electromyography (pEMG) during passive flexion and extension of the knee, supplemented by a pendulum test with the stimulating device switched either on or off over an appropriate period.

Results: Both, the clinical and the experimental parameters clearly demonstrated that SCS, is a highly effective approach to controlling spasticity in SCI subjects. Effective control of spasticity depends on following factors: 1. the epidural electrode must be located over the upper lumbar cord segments, 2. the train frequency of SCS within the range 50–100 Hz, ampl. 2–7 V, stimulus width 210 microseconds; amplitude of stimulation should be adjusted to different body positions.

Conclusion: Severe muscle hypertonia affecting lower extremities of patients with chronic SCI can be effectively suppressed via stimulation of the lower lumbar cord segments.

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