The Effects of Scapular Postural Control on Neck and Upper Limb Muscular Activities During Static and Dynamic Functional Tasks

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Background and Purpose: The concept of shoulder postural control or "scapular stabilization" has been commonly adopted as a therapeutic exercise in physiotherapy for the management of work-related neck and upper limb disorders (WRNULD). The objective of the present study is to investigate the muscle activities of the neck and upper limb muscles, while individuals perform functional tasks with and without scapular stabilization.

Methods: Twenty healthy subjects aged between 20 and 40 will be recruited in this study. Surface electromyography (EMG) was recorded while the subjects performed a 5-min static typing task and a dynamic forward reaching task - with and without scapular stabilization. The muscles examined were the right upper and lower trapezius, anterior deltoid, biceps, triceps, flexor carpi radialis and extensor carpi radialis. EMG activities and amplitude ratios between agonistic and antagonistic muscles are compared with paired t-tests in different tasks.

Results: In the pilot trials, upper trapezius demonstrated significantly lower activity (p = 0.045) with scapular stabilization compared to the condition without scapular stabilization. In contrast, lower trapezius showed higher activity (p = 0.028) with scapular stabilization. Anterior deltoid and forearm muscles did not show obvious changes with and without scapular stabilization. This pattern was consistent in both typing and dynamic movement tasks.

Conclusion: The results have provided evidence to confirm the influence of scapular postural control on the muscle activity in the shoulder and upper limb muscles. This may provide better understanding to the physiotherapists when using scapular stabilization as a treatment for their patients with work-related neck and shoulder pain.

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Sedentary Lifestyle and Electronic Game Use Contributes to Musculoskeletal Discomfort in Hong Kong Primary and Secondary School Students

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Background and Purpose: Previous studies have reported that young persons in different countries adopt inactive lifestyle from prolonged electronic game (EG) use, computer use and television viewing. Participation in such sedentary activities has been associated with adverse health effects, but research on the effect of EG use in relation to musculoskeletal discomforts are sparse. The objectives of this study were (1) to examine the pattern of different types of EG use and (2) to explore the pattern of EG use with musculoskeletal discomforts in different body regions.

Methods: Students from two local primary and two secondary schools completed a questionnaire which was designed to acquire information on the frequency and duration of use of different electronic game devices. They were also asked to report any bodily discomfort experienced in the past month. Correlation between electronic game use and musculoskeletal discomfort in various body regions were examined.

Results: 1690 questionnaires were analyzed (response rate was about 84%). 24% of students were high intensity use (>4 hrs/day) of EG types including large screen-based and small handheld game devices. High rates of musculoskeletal discomforts were reported in upper limb (24%) and neck (20%), while significant correlation was found between EG use and upper limb discomforts (r = 0.135, p = 0.001).

Conclusion: These results suggested that a high proportion of students have adopted inactive lifestyle with high intensity of EG use. The biomechanical loading of prolonged EG use is associated with neck and upper limb discomforts. Physiotherapist should investigate on these adverse health effects of intensive electronic game use in young persons.

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Reliability of Transcranial Magnetic Stimulation Induced Corticomotor Excitability for a Hand Muscle

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Background and Purpose: Transcranial magnetic stimulation (TMS) has been a neurophysiological measurement of corticomotor synaptic activities in human. This study aimed to determine the reliability of TMS-induced corticomotor excitability measurements for the first dorsal interosseous hand muscle.

Methods: Ten young healthy subjects attended two assessment sessions of 1 week apart. Each session consisted of a baseline measurement, then at 60, 90 and 120 minutes while the subject was sitting. Corticomo- tor excitability was evaluated in terms of the resting motor threshold (rMT), peak motor-evoked potentials (pMEP) and slope of the input-output (I-O) curve plotted for input TMS stimulus intensities of 100% to 140% rMT, applied at 10% increments. Linear regression was used to analyze the slopes of I-O curves for 4 TMS intensity ranges - 100-140% rMT, 110-140% rMT, 100-150% rMT and 110-150% rMT. Test-retest repeatability within and between sessions were analyzed with intra-class correlation coefficients.

Results: The measurement repeatability within-session was strong to excellent (ICC >0.94) with rMT, >0.90 for pMEP, and >0.8 for the slopes of I-O curves. Repeatability between sessions was good for rMT (ICC >0.74) and moderate for I-O curve slope in the range of TMS intensities 100-140% rMT(p >0.60); those of the other ranges showed weak reliability.

Conclusion: Corticomotor excitability measurements with TMS for the first dorsal interosseous muscle were reliable within- and between-sessions for rMT, pMEP and slope of I-O curve plotted in range of 100-140% TMS intensities. rMT, pMEP and the slope of I-O curve are reliable parameters in corticomotor excitability investigations.

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Effectiveness of Physiotherapy Management After Bariatric Operation

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Background and Purpose: Literature showed bariatric operation was effective for treating obesity. In this study, the effectiveness of physiotherapy management after bariatric operation in terms of physical performance and quality of life was evaluated.

Methods: This was a quasi-experimental study using the one-group pre-test post-test design. Bariatric cases were recruited from endocrine clinic at New Territories West Cluster (NTWC) with body mass index (BMI) >37kg/m². Patient received post-operative physical training with exercise guidelines recommended by American College of Sport Medicine. All cases received exercise capacity assessment and home exercises protocol (strengthening exercises, abdominal and upper limbs muscle tone-up exercises, and diet monitoring). Six-minute walk test (6MWIT), incremental shuttle walk test (ISWT), general health perception and vitality in quality of health questionnaire (SF-36) were assessed pre-operatively and at 3-month post-operation. Non-parametric Wilcoxon test was used to analyze the difference on performance in exercise capacity and quality of life after physiotherapy management.

Results: 8 patients (5 men and 5 women) from Oct 2009 to Mar 2011. The results showed a significant improvement in ISWT (from 373m ±5.8 to 370m ±3.1, p = 0.02), and ISWT (from 100-150% rMT intensities. rMT, pMEP and the slope of I-O curve are reliable parameters in corticomotor excitability investigations.

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