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Comparison Between Elderly and Young Males' Lumbopelvic Extensor Muscle Endurance

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Objective: Endurance of the back extensor muscles has become important for clinical decisions that guide interventions, particularly for chronic low back pain patients. Very little information is available regarding back muscle endurance in the elderly. The aim of this study was to investigate back extensor muscle endurance in healthy elderly subjects during a modified Sorensen test.

Methods: Sixteen elderly and 20 young male adults participated in our cross-sectional study. The subjects performed a modified Sorensen test (on a 45 degree Roman chair) to quantify lumbopelvic extensor muscle endurance. Pre- and post-fatigue back extension maximal voluntary force was assessed according to an isometric lift test in a semicrouched position. Endurance time, perceived exertion (Borg CR10 scale), and post-fatigue reduction of lifting force were recorded and compared among groups.

Results: Elderly subjects showed a trend toward decreased endurance time compared to young adults, but the difference was not significant. Similar perceived exertion and diminished maximal force after the fatiguing protocol were observed in both young and elderly subjects. Maximal isometric lift force was significantly associated with endurance time in young but not in elderly subjects.

Conclusions: Lumbopelvic extensor muscle endurance and perceived exertion do not differ between young and healthy elderly individuals. However, back muscle endurance seems to be modulated by different neurophysiologic factors in the elderly. Normative data on young adults should be interpreted with caution in assessing back fitness in elderly subjects.

Motion Palpation Used as a Postmanipulation Assessment Tool for Monitoring End-Feel Improvement

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Objective: A tenet of motion palpation theory is the ability to confirm postadjustive segmental end-

feel improvement (EFI). Only one previous trial has evaluated the responsiveness of EFI; this was a study of the thoracic spine. The purpose of this study was to evaluate the responsiveness of postadjustive end-feel for evaluating improvement in putative segmental spinal motion restriction after spinal manipulative therapy (SMT) of the cervical spine.

Methods: A prospective, blinded, randomized, placebo-controlled pilot trial was conducted with 20 symptomatic and 10 asymptomatic participants recruited from a chiropractic teaching clinic. The treatment group received SMT, and the control group received placebo detuned ultrasound. Responsiveness was evaluated as the etiologic fraction (percentage of cases with EFI attributable to SMT) and as the sensitivity and specificity of change.

Results: For the entire sample, the etiologic fraction was 63% ($P = .002$), sensitivity was 93%, and specificity was 67%. For symptomatic participants, a strong relationship appeared to exist between receiving SMT and EFI (etiologic fraction = 78%, $P = .006$; sensitivity = 90%; specificity = 80%). A strong relationship was not found for asymptomatic participants (etiologic fraction = 40%, $P = .444$; sensitivity = 100%; specificity = 40%), where EFI was recorded frequently, whether participants received SMT or detuned ultrasound.

Conclusion: The findings of this study showed that motion palpation of end-feel assessment appears to be a responsive postmanipulation assessment tool in the cervical spine for determining whether perceived motion restriction found before treatment improves after SMT. This observation may be limited to symptomatic participants.

Effect of Ultrasound and Ischemic Compression for the Treatment of Trapezius Latent Myofascial Trigger Points

Javier Montañez Aguilera, PT, Daniel Pecos Martin, PT, Rosana Arnau Masanet, MD, et al.

Objective: The purpose of this study was to determine immediate effects of ischemic compression (IC) and ultrasound (US) for the treatment of myofascial trigger points (MTrPs) in the trapezius muscle.

Methods: Sixty-six volunteers, all CEU-Cardenal Herrera University, Valencia, Spain, personnel, participated in this study. Subjects were healthy individuals diagnosed with latent MTrPs in the trapezius muscle. Subjects were randomly placed into one of three groups: G1, which received IC treatment for MTrPs; G2, which received US; and G3 (control), which received sham US. The following data were recorded before and after each treatment: active range of motion (AROM) of cervical rachis measured with a cervical range-of-motion instrument; basal electrical activity (BEA) of muscle trapezius measured with surface electromyography; and pressure tolerance of MTrP measured with visual analogue scale assessing local pain evoked by the application of 2.5 kg/cm² of pressure using a pressure analog algometer.

Results: The results showed an immediate decrease in BEA of the trapezius muscle and a reduction of MTrP sensitivity after treatment with both therapeutic modalities. In the case of IC, an improvement of AROM of cervical rachis was also obtained.

Conclusion: In this group of participants, both treatments were shown to have an immediate effect on latent MTrPs. The results show a relation among AROM of cervical rachis, BEA of the trapezius muscle, and MTrP sensitivity of the trapezius muscle gaining short-term positive effects with use of IC.

Reduction in High Blood Tumor Necrosis Factor- α Levels After Manipulative Therapy

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Objective: This case report discusses the treatment of two patients with cervicogenic headache (CHA) attending the Outpatient Clinic of the Hungarian National Institute for Rheumatology and Physiotherapy (Budapest, Hungary) and reviews the pathophysiology, therapeutic strategy, and problems associated with the treatment of CHA.

Clinical Features: Patient 1 was a 27-year-old female who sustained a whiplash injury. A sharp, shooting headache developed, readily induced and aggravated by just bending the neck backward or by turning her head. Magnetic resonance imaging revealed a disk protrusion at C4-C5 pressing the anterior cerebrospinal space.

Patient 2 was a 62-year-old female who sustained a whiplash injury; her cervical movements became restricted, which precipitated headaches. Magnetic resonance imaging revealed a paramedian disk hernia between the C4 and C5 vertebrae that intruded into the right ventral cerebrospinal space.

Intervention and Outcome: After four weeks of manipulative therapy for patient 1, both active and passive range of motion returned to normal, and the high tumor necrosis factor- α (TNF- α) level (63 pg/mL) was substantially reduced (28 pg/mL). Patient 2 was started on manipulative therapy twice a week for four weeks; after two months, the patient became symptom-free, and high TNF- α level (72 pg/mL) was reduced greatly (35 pg/mL).

Conclusion: Two patients with whiplash injury and disk herniation developed CHA associated with very high TNF- α levels. After manipulative therapy, these patients became symptom-free and their TNF- α levels decreased substantially.

Normative Cross-Sectional Area of the Brachial Plexus and Subclavian Artery Using Ultrasonography

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Objective: Ultrasonography has been used to measure the cross-sectional area (CSA) of peripheral nerves, but the CSA of the brachial plexus has not previously been reported. The purpose of this study was to establish a reference range of values for the CSA of the brachial plexus, subclavian artery, and peak systolic velocity (PSV) of the subclavian artery in healthy subjects using ultrasonography.

Methods: Thirty-two asymptomatic subjects (19 men, 13 women) from a chiropractic college with an average age of 29.5 ± 9.6 participated in the study. The brachial plexus and subclavian artery CSA were measured at three locations: interscalene, first rib, and infraclavicular. The PSV of the subclavian artery was measured in both supraclavicular and infraclavicular locations. Each subject was imaged bilaterally. Means and 95% confidence intervals were calculated. Interexaminer reliability was evaluated between two examiners on 15 randomly selected subjects.

Results: The average CSA for the brachial plexus at the interscalene space, first rib, and infraclavicular location was 0.75 ± 0.05 , 0.96 ± 0.07 , and 0.98 ± 0.07 cm², respectively. The average CSA for the subclavian artery at the same locations was 0.35 ± 0.03 , 0.38 ± 0.03 , $0.35 \pm$

0.03 cm², respectively. The average subclavian artery PSV in supraclavicular and infraclavicular locations was 98 ± 8 and 93 ± 7 cm/s, respectively. The overall interexaminer reliability was poor at 0.39 (0.20-0.55).

Conclusions: This is the first study to obtain normative CSA measurements of the brachial plexus and subclavian artery in multiple locations of the thoracic outlet as well as interexaminer reliability data. These data may be beneficial in future studies designed to assess the brachial plexus and subclavian artery in patients with thoracic outlet syndrome.

Short-Term Effects of Manual Therapy on Heart Rate Variability, Mood State and Pressure Pain Sensitivity

Cristina Toro-Velasco, PT, Manuel Arroyo-Morales, MD, PT, PhD, et al.

Objective: The purpose of this study was to investigate the immediate effects of head-neck massage on heart rate variability (HRV), mood states, and pressure pain thresholds (PPTs) in patients with chronic tension-type headache (CTTH).

Methods: Eleven patients (eight females) between 20 and 68 years old with CTTH participated in this crossover study. Patients received either the experimental treatment (massage protocol) or a placebo intervention (detuned ultrasound). Holter electrocardiogram recordings (standard deviation of the normal-to-normal interval, square root of mean squared differences of successive NN intervals, index HRV, low-frequency component, and high-frequency component), PPT over both temporalis muscles and Profile of Mood States questionnaire (tension-anxiety, depression-dejection, anger-hostility, vigor, fatigue, confusion) were obtained preintervention, immediately after intervention, and 24 hours postintervention. Self-reported head pain was also collected preintervention and 24 hours postintervention. Separate analyses of covariance (ANCOVAs) were performed with each dependent variable. The hypothesis of interest was group x time interaction.

Results: The ANCOVA showed a significant group x time interaction for index HRV ($F = 4.5$, $P = .04$), but not for standard deviation of the normal-to-normal interval ($F = 1.1$, $P = .3$), square root of mean squared differences of successive NN intervals ($F = 0.9$, $P = .3$), low-frequency component ($F = 0.03$, $P = .8$), or high-frequency component ($F = 0.4$, $P = .5$) domains. Pairwise comparisons found that after the manual therapy intervention, patients showed an increase in the index HRV ($P = .01$) domain, whereas no changes were found after the placebo intervention ($P = .7$). The ANCOVA also found a significant group x time interaction for tension-anxiety ($F = 5.3$, $P = .03$) and anger-hostility ($F = 4.6$, $P = .04$) subscales. Pairwise comparisons found that after the manual therapy intervention, patients showed a decrease in tension-anxiety ($P = .002$) and anger-hostility ($P = .04$) subscales, whereas no changes were found after the placebo intervention ($P > .5$ both subscales). No significant changes were found in PPT levels (right $F = 0.3$, $P = .6$, left $F = 0.4$, $P = .5$). A significant group x time interaction for pain ($F = 4.8$, $P = .04$) was identified. No influence of sex was found ($F = 1.5$, $P = .3$). Pairwise comparisons showed that head pain (numerical pain rating scale) decreased 24 hours after manual therapy ($P < .05$) but not after the placebo intervention ($P = .9$).

Conclusions: The application of a single session of manual therapy program produces an immediate increase of index HRV and a decrease in tension, anger status, and perceived pain in patients with CTTH.

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