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Editorial Staff

Editor's note: Due to space constraints, we are unable to reprint all abstracts from the May 2006 issue of *JMPT*. To review the complete table of contents from the May issue, please visit www.mosby.com/jmpt.

The effect of chiropractic adjustments on movement time: a pilot study using Fitts Law.
Dean L. Smith, DC, PhD, Marvin J. Dainoff, PhD, Jane P. Smith, DC

Objective: To investigate the effect of chiropractic adjustments on movement time using Fitts Law.

Methods: This was a prospective, randomized controlled trial. Ten patients from a private chiropractic practice participated. Participants in the treatment group received high-velocity, low-amplitude chiropractic adjustments to areas of joint dysfunction (chiropractic subluxation). A nonintervention group was used to control for improvement resulting from time and practice effects.

Movement time was measured as participants moved a cursor onto a target appearing on a computer screen. A range of target widths and target distances were used to vary the index of difficulty.

Results: All participants in the experimental group had significantly improved movement times following spinal adjustments compared with only one participant in the control group. The average improvement in movement time for the experimental group was 183 ms, a 9.2% improvement, whereas the average improvement in movement time for the control group was 29 ms, a 1.7% improvement. The difference (improvement) scores after the intervention were significantly greater for the chiropractic group compared with the control group as measured by a 2-tailed independent samples *t* test ($P < .05$).

Conclusion: The results of this study demonstrated a significant improvement in movement time with chiropractic care. These results suggest that spinal adjustments may influence motor behavior.

Effect of chiropractic care on heart rate variability and pain in a multisite clinical study.
John Zhang, MD, PhD, Douglas Dean, PhD, Dennis Nosco, PhD, Dennis Strathopoulos, DC, Minas Floros, DC

Objective: The purpose of this study is to investigate the effect of chiropractic care in a multiclinic setting on sympathetic and parasympathetic nervous system activities using heart rate variability (HRV) analysis.

Methods: Physicians of chiropractic in private practice were provided with an HRV device to

perform analysis before and after chiropractic adjustments on 10 subjects. At each site, eight subjects were monitored before and after a single chiropractic adjustment, and two additional patients were followed for a four-week period with two HRV recordings per week. Patient information forms and a visual analog scale (VAS) questionnaire were completed both before and after each chiropractic adjustment.

Results: Data from 96 physicians were divided into single-visit and four-week groups. After one chiropractic adjustment, pain as analyzed by VAS was reduced significantly from 3.7 ± 2.2 to 2.1 ± 2.0 ($P < .001$). The mean heart rate reduced from 76.7 ± 12.7 to 74.3 ± 12.4 ($P < .01$), the SD of normal-to-normal QRS increased from a range of 55.8 to 44.6 to a range of 60.6 to 47.2 ($P < .001$), the high-frequency component increased from 359 ± 968 to 444 ± 1069 ($P < .01$), the low-frequency component increased from 403 ± 753 to 465 ± 755 ($P < .05$), and the total power increased from 1063 ± 1886 to 1265 ± 2048 ($P < .01$). After four weeks of chiropractic adjustments, pain measured by the VAS was reduced significantly before and after each visit as analyzed by *t* tests, but the significant changes were not found using analysis of variance analysis. The reduction of pain from each treatment was not maintained over the four weeks of the study period. The analysis of variance on the HRV four-week data found that changes in the SD of normal-to-normal QRS, total power, and low-frequency components reached statistically significant levels ($P < .05$). The heart rate and the high-frequency component did not change significantly ($P > .05$).

Conclusion: In this study, HRV and VAS changed in patients as a result of chiropractic care.

Fatigue in the sternocleidomastoid muscle and hip dysplasia: a surface electromyographic assessment in adult women.

Virgilio F. Ferrario, MD, Claudia Dellavia, DDS, PhD, Michela Turci, PhD, Chiarella Sforza, MD

Objective: The aim of this study is to assess a possible relationship between unilateral hip dysplasia and sternocleidomastoid muscle function during a fatiguing task.

Methods: In this patient-control, cross-sectional study, 11 female patients (aged 37-63 years) with unilateral coxoarthrosis subsequent to hip dysplasia and nine female control subjects matched for age were assessed.

Surface electromyography of the right and left sternocleidomastoid muscles was measured in the women performing a standardized endurance test. The median power frequency was calculated at the beginning (T_0) and at the end of the task (T_1 , endurance time). For each subject and muscle, percentage decrements in the median power frequency were computed at T_1 .

Results: Endurance time ranged between 15 and 125 s (control group) and 10 and 200 s (patient group), without a significant difference between the two groups (Mann-Whitney test, $P > .05$). In the patient group, no significant differences in the median power frequency between the ipsilateral to coxoarthrosis and contralateral sides were found (Wilcoxon test, $P > .05$). The percentage decrements of the median power frequency in the control (right and left side pooled) and patient group did not significantly differ either in the ipsilateral to coxoarthrosis and contralateral sides (Mann-Whitney test, $P > .05$).

Conclusions: The lack of significant differences between the sternocleidomastoid muscles of healthy women and those of women with hip dysplasia does not support the presence of a common noxa causing both congenital muscular torticollis and hip joint alterations. Alternatively, the coexistence of the two alterations in infancy may disappear during adult life.

A nonsurgical approach to the management of patients with cervical radiculopathy: a prospective observational cohort study.

Donald R. Murphy, DC, Eric L. Hurwitz, DC, PhD, Amy Gregory, DC, Ronald Clary, DC

Objective: The objective of this study was to describe the clinical outcomes of patients with cervical radiculopathy (CR) treated nonsurgically after a diagnosis-based decision rule.

Methods: A prospective observational cohort study on consecutive patients with CR was performed. Data on 35 consecutive patients were collected at baseline, at the end of the active treatment, and at a minimum of three months after cessation of treatment. Disability was measured using the Bournemouth Disability Questionnaire. Pain intensity was measured using the Numerical Pain Rating Scale. Patients were also asked to self-rate their improvement.

Results: Complete outcome data were available for 31 of the 35 patients. Twenty-seven patients were reached for long-term follow-up. The mean number of months from last treatment to follow-up was 8.2 months. Seventeen patients (49%) reported their improvement as "excellent" and another 14 (40%) did so as "good." The mean patient-rated improvement was 88.2%. The mean percentage of improvement in the Bournemouth Disability Questionnaire score was 78%. The mean percentage of improvement in the Numerical Pain Rating Scale score was 72%. Twenty-four of 31 (77.4%) patients had a clinically significant improvement from baseline to the end of treatment, and 25 of 27 (92.6%) had a clinically significant improvement from baseline to long-term follow-up.

Conclusions: The management strategy that we studied yielded favorable outcomes in this patient sample and appears to be a safe option for patients with CR. However, the absence of randomization and a control group limits interpretation with regard to clinical effectiveness. Randomized clinical trials are necessary to distinguish treatment effects from the natural history of CR.

Symptomatic outcomes and perceived satisfaction levels of chiropractic patients with a primary diagnosis involving acute neck pain.

Michael T. Haneline, DC, MPH

Objective: The aim of this study was to determine the extent to which a group of patients with acute neck pain managed with chiropractic manipulative therapy benefited from chiropractic care and the degree to which they were subsequently satisfied.

Methods: A two-part retrospective survey, each composed of 14 questions. One part was completed by practicing doctors of chiropractic concerning various aspects of their treatment for patients with former acute neck pain. In the second part, these same patients responded to a telephone survey to measure pre- and posttreatment pain levels and their level of satisfaction with the treatment they received. Chiropractic manipulative therapy was the primary independent variable, although other therapies were used, such as physical therapy, nutritional advice and exercise.

Results: A total of 115 patients were contacted, of whom 94 became study participants, resulting in 60 women (64%) and 34 men. The mean age was 39.6 years (SD, 15.7). The mean number of visits was 24.5 (SD, 21.2). Pain levels improved significantly from a mean of 7.6 (median, 8.0) before treatment to 1.9 (median, 2.0) after treatment ($P < .0001$). The overall patient satisfaction rate was 94%.

Conclusion: Patients with acute neck pain involved in this study seemed to be satisfied with chiropractic treatment and reported reductions in associated pain levels and activity restrictions. However, because of the study's design and limitations, care must be taken before drawing firm conclusions from the data presented.

Electromyogram and force patterns in variably timed manual muscle testing of the middle deltoid muscle.

Katharine Conable, DC, John Corneal, DC, Terry Hambrick, DC, Nelson Marquina, DC, PhD, John Zhang, MD, PhD

Objective: The objective of the study was to compare force curves and surface electromyogram from examiners and subjects during manual muscle testing with three examiner-identified variants of manual muscle testing (MMT) - examiner-started (ESMMT), patient-started (PSMMT), and undifferentiated/near-simultaneous (NSMMT).

Methods: Forty-two volunteer applied kinesiology doctors tested 36 volunteer students, doctors and spouses at a professional conference. Start-time difference between examiner and subject muscle contraction, peak force, time of peak force and duration of force was measured. Force and surface electromyogram from examiner and subject were recorded simultaneously during MMT of the middle deltoid muscle for each style of testing used in practice.

Results: The congruence between examiner label and timing was as follows: ESMMT, 39%; PSMMT 61%; and NSMMT 28% within 50 milliseconds of simultaneous. Mean subject/examiner start-time difference differed significantly between PSMMT (-0.116 seconds) and both ESMMT (-0.018 seconds) and NSMMT (-0.0053 seconds). No clear cutoff between styles was evident. Peak force ranged from 0.548 to 23.615 lb (mean, 8.806 lb; SD, 4.543 lb), and all styles were significantly different. Duration of force ranged from 0.325 to 3.490 seconds (mean, 1.338 seconds; SD, 0.576 seconds), with NSMMT significantly shorter than ESMMT or PSMMT. The shape of force curves did not differ between styles of muscle testing, but differed between facilitated vs. inhibited tests.

Conclusions: In this group of doctors, neither start-time difference nor the shape of force curves distinguished styles of MMT. Differences in peak force and test duration may account for differences in outcomes when examiners purposely vary their muscle testing style.

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