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Editorial Staff

Editor's note: Due to space constraints, not all abstracts from the February 2006 issue of JMPT are reprinted below. To review the complete table of contents from the February issue, visit www.mosby.com/jmpt.

The relative responsiveness of three different types of clinical outcome measures on chiropractic patients with low back pain.

Lene Hare-Mortensen, BSc, Henrik Lauridsen, DC, Niels Grunnet-Nilsson, DC, MD, PhD

Objective: The purpose of this study is to compare the responsiveness/sensitivity of three fundamentally different types of outcome measures in low back pain.

Method: This study is a longitudinal evaluation of outcome measures. Thirty-one private chiropractic practices in Denmark participated in this study. The outcome measures chosen for this study are the serial measurements using the Roland-Morris Disability Questionnaire, the patient's prospective global assessment on a visual analog scale, and the patient's retrospective global assessment of improvement on a visual analog scale.

Results: The three outcome measures differed significantly in their ability to register clinical improvement, with the retrospective global assessment of improvement being the most responsive.

Conclusion: More research is needed in this area, and caution must be taken in choosing outcome measures for randomized clinical trials on low back pain.

Improvement after chiropractic care in cervicocephalic kinesthetic sensibility and subjective pain intensity in patients with nontraumatic chronic neck pain.

Per J. Palmgren, DC, Peter J. Sandström, DC, Fredrik J. Lundqvist, DC, Hannu Heikkilä, MD, PhD

Objective: The objective of this study was to examine alteration in head repositioning accuracy (HRA), range of motion, and pain intensity in patients with chronic cervical pain syndrome without a history of cervical trauma.

Methods: The study was a prospective, randomized, controlled trial. Forty-one patients with chronic cervical pain were randomly assigned to either a control group or a chiropractic treatment group. All patients were clinically examined, given general information on cervical pain, and provided with training instructions based on the clinical evaluation. The treatment included sessions with high-velocity and low-amplitude manipulation, proprioceptive neuromuscular facilitation, ischemic compression of myofascial trigger points, and spinal rehabilitation exercises aiming to normalize cervical range of motion (CROM) and HRA. Subjective pain intensity, cervical kinesthetic sensibility, and CROM were recorded before and after the study period.

Results: There was no difference between the treatment patients and the control subjects at the beginning with regard to age, sex, subjective pain intensity, range of motion, and HRA. At the 5-week follow-up, the treatment patients showed significant reductions in pain and improvement of all HRA aspects measured whereas the control subjects did not show any reduction in pain and improvement in only one HRA aspect. No significant difference was detected in CROM.

Conclusions: The results of this study suggest that chiropractic care can be effective in influencing the complex process of proprioceptive sensibility and pain of cervical origin. Short, specific chiropractic treatment programs with proper patient information may alter the course of chronic cervical pain.

Efficacy of treating low back pain and dysfunction secondary to osteoarthritis: chiropractic care compared with moist heat alone.

Kathleen L. Beyerman, RN, EdD, Mark B. Palmerino, PhD, Lee E. Zohn, DC, Gary M. Kane, DC, Kathy A. Foster, BS

Objective: To evaluate the efficacy of chiropractic spinal manipulation, manual flexion/distraction, and hot pack application for the treatment of low back pain from osteoarthritis (OA) compared with moist heat alone.

Methods: Two hundred fifty-two patients with low back pain secondary to OA were randomly assigned to either the treatment group (moist hot pack plus chiropractic care) or the moist heat group subjects, which attended 20 treatment sessions over several weeks. At sessions 1, 5, 10, 15, and 20, they rated pain using a visual analog pain scale, activities of daily living using the Oswestry Low Back Pain Questionnaire, and a range of motion (ROM) using a dual digital inclinometer (JTECH Medical Model no. AA036).

Results: Session 1 ratings indicated that the two groups were equivalent on all pain and flexion scores. The treatment group reported greater and more rapid pain reduction and greater and more rapid ROM improvement than the moist heat group. The treatment group also had greater improvements than the moist heat group in daily living activities in four of the nine areas measured.

Conclusion: Chiropractic care combined with heat is more effective than heat alone for treating OA-based lower back pain. Pain reduction occurs more rapidly and to a greater degree, and ROM increases more rapidly and to a greater degree.

The effect of seat belt use on the cervical electromyogram response to whiplash-type impacts.
Shrawan Kumar, PhD, DSc, Robert Ferrari, MD, Yogesh Narayan, PEng, Troy Jones, BScPT

Objective: The objective of this study was to determine the effect of a standard three-point lap-and-shoulder seat belt and car seat on the electromyogram (EMG) response of the cervical muscles to increasing low-velocity impacts in comparison with that of a rigid seat and five-point restraint.

Methods: Seventeen healthy volunteers were subjected to rear, frontal, right and left lateral and bilateral anterolateral, and posterolateral impacts with an acceleration varying from 4.4 to 16.8 m/s² while in a car seat with lap-and-shoulder seat belt.

Results: For rear-end impacts, whether straight on, right posterolateral, or left posterolateral, all

muscles generated 50% or less of the maximal voluntary contraction (MVC) EMG. In straight-on rear impacts, the sternocleidomastoid was symmetrically the most active; however, in posterolateral impacts, the sternocleidomastoid contralateral to impact direction was more active than its counterpart. For a right lateral impact, at the highest acceleration, the left splenius capitis generated 47% of its MVC and the left trapezius did 46% of its MVC. In a left lateral impact, the right splenius capitis generated 48% of its MVC and the right trapezius did 57% of its MVC. In a straight-on frontal impact, the left trapezius generated 35% of its MVC and the right trapezius did 48% of its MVC. In a left anterolateral impact, the right splenius generated 60% of its MVC and the right trapezius did 66% of its MVC. Similarly, in a right anterolateral impact, the contralateral splenius muscle increased its activity to 52% of its MVC and the left trapezius was at 52% of its MVC.

Conclusions: Compared with previously reported impact studies with a rigid seat and five-point harness, the use of a three-point lap-and-shoulder seat belt with a standard car seat did not appear to adversely affect cervical muscle response. In very-low-velocity and low-velocity impact experiments, seat belt and seat type may not significantly alter cervical EMG and kinematics.

The accuracy of ultrasonic indentation in detecting simulated bone displacement: a comparison of three techniques.

Gregory N. Kawchuk, PhD, Tasha R. Liddle, BScPT, Rod Fauvel, PhD, Clifton Johnston, PhD

Purpose: Palpation is used most commonly to assess tissue stiffness despite its well-known deficiencies. As an improvement, a mechanical technique known as ultrasonic indentation has been proposed. The purpose of this study was to compare the accuracy of three ultrasonic indentation techniques in quantifying bone displacement in a specially constructed tissue simulator.

Methods: Three ultrasonic in-dentation techniques were tested for their accuracy: a rigid, laboratory-based method (rigid), a less rigid system actuated by hand (assisted), and a totally free-hand system (handheld). Each indentation technique was applied on a tissue simulator, which consisted of a deformable phantom overlying a displaceable piston to simulate soft tissue overlying bone. Measures of piston (i.e., bone) displacement obtained by each indentation technique were compared with a gold standard of piston displacement to determine the accuracy of each technique. Statistical tests were used to determine if differences between experimental and reference measures of piston displacement were significant.

Results: When indented, phantom deformation preceded piston displacement because of unequal stiffness between the two. The rigid and assisted indentation techniques showed the best accuracy for measuring simulated bone displacement. Differences in accuracy between the rigid and assisted techniques were insignificant. The accuracy of the handheld technique was significantly less than the rigid and assisted techniques.

Conclusions: The clinical utility of assisted ultrasonic indentation should be explored given its accuracy and the excessive size, cost, and complexity of the rigid technique. The large error magnitude of the handheld technique may exclude it from clinical use now.

Lee E. Olson, PT, DC, A. Lyn Millar, PT, PhD, Jeremy Dunker, BS, Jennifer Hicks, BS, Devin Glanz, BS

Objective: Endurance deficiencies of the deep cervical flexors are associated with pain, increased lordosis, and headache. A need exists for reliable clinical tests of flexor endurance. This study determined intrarater and inter-rater reliability of such a test in persons without neck pain.

Methods: Twenty-seven subjects (ages 20-35 years) without a history of neck pain or injury were tested. Supine subjects were timed in maintaining a position involving two components: (1) craniovertebral flexion (chin tuck) and (2) lower cervical flexion (holding the occiput at a fixed height). Each subject was examined twice by three different examiners with 1 to 2 days between trials.

Results: When two values were averaged, inter-rater reliability for the 3 testers was 0.83, 0.85, and 0.88. Intrarater reliability values were 0.78 and 0.85 for tests 1 and 2, respectively.

Conclusions: The flexor endurance test showed good intertester and intratester reliability when two values were averaged and, thus, may represent a useful clinical tool for practitioners involved in treating and preventing neck pain.

Vastus medialis: anatomical and functional considerations and implications based upon human and cadaveric studies.

Richard Lefebvre, PhD, Alain Leroux, PhD, Georges Poumarat, PhD, Bruno Galtier, MD, Michel Guillot, MD, Guy Vanneuville, PhD, Jean P. Boucher, PhD

Objective: To provide an electrophysiological and functional description of the vastus medialis and contrast it to an anatomical description.

Methods: Motor points of all superficial portions of the quadriceps were identified on the dominant side of eight human subjects and electrically stimulated to achieve a light contraction to trace and measure the orientation of the fibers. Electromyography of the VM was then recorded over two motor points during isometric and isokinetic maximum knee extensions. An independent laboratory dissected 39 cadaveric specimens focusing on fiber orientations and distal insertions of the VM.

Results: Results revealed five motor points for the quadriceps: one point for the vastus lateralis, one point for the rectus femoris (RF), and three points for the VM. The three VM motor points suggest three separate groups of fibers: proximal (pf), median (mf), distal (df). Fiber orientations ranged from 45° for VMpfs to 55° for VMdfs. Motor point stimulation and anatomical dissection clearly showed that the VMpfs and VMmfs were inserted on a tendon common to the RF, whereas VMdfs were attached directly to the medial aspect of the patella. Furthermore, the VMpfs were more active ($P < .05$) than VMdfs during maximum knee extensions.

Conclusion: The anatomy, motor points, and electromyography clearly support an important distinction between the VMpfs and VMdfs. The role of the VMpfs would be one of assisting the RF in knee extension, whereas the VMdfs would track the patella medially without participating in knee extension. Because of these anatomical and functional differences, the VMpfs and VMdfs should be addressed very differently during quadriceps rehabilitation in patellofemoral dysfunctions.

A pilot study comparing the effects of spinal manipulative therapy with those of extra-spinal

manipulative therapy on quadriceps muscle strength.

Bernd Hillermann, MChiro, Adrian Neil Gomes, MChiro, MMedSc, Charmaine Korporaal, MChiro, Dennis Jackson, BS

Objective: The objective of this study was to assess whether tibiofemoral joint manipulation is as effective as sacroiliac (SI) joint manipulation in increasing quadriceps muscle strength.

Design and Setting: Twenty subjects were divided into two groups of 10. After all base measurements of the maximum voluntary force of the quadriceps muscles were taken, subjects in group A received tibiofemoral joint manipulation and those in group B received ipsilateral SI joint manipulation. After these treatments, the maximum voluntary forces of the subjects' quadriceps muscles were retested.

Results: A significant improvement ($P = .05$) in quadriceps muscle strength was noted in the subjects who received an SI joint manipulation.

Conclusion: This study showed a significant change within the SI joint manipulation group before and after the manipulation, but did not show any significant difference between the groups (tibiofemoral joint vs. SI joint manipulation) in increasing quadriceps muscle strength.

Validity of infrared thermal measurements of segmental paraspinal skin surface temperature.

Richard Roy, DC, Jean P. Boucher, PhD, Alain S. Comtois, PhD

Objective: The purpose of this study was to evaluate the validity of thermal measurements by infrared camera thermometry.

Methods: Seventeen subjects underwent a 30-minute acclimatizing period in a controlled environment room. Thermal recordings were executed at the levels of C4 and L4. Fifteen recordings per segment were acquired in an alternating mode that always started at L4. Each subject was required to participate on five occasions. The exclusion criteria for the subjects included the following: no inflammatory disease or fever, no consumption of beverages containing caffeine, and no participation in physical activity two hours before the recording session; female subjects could not be menstruating on a day of recording.

Results: A total of 2,550 recordings for the cervical area and the lumbar area were recorded. Strong significant correlations were found for the left ($r = .77$) and right ($r = .71$) lumbar sections ($P < .0001$), whereas weaker significant correlations were observed for the left ($r = .56$) and right ($r = .63$) cervical areas ($P < .0001$). The limits of agreement (Bland-Altman) showed good relationships but poor interchangeability.

Conclusions: In this study, the infrared cameras showed that they were valid tools in a controlled environment; however, the technique for the cervical measurements needs to be reassessed.

Immunization and the chiropractor-patient interaction: a western Canadian study.

Stacey A. Page, PhD, Margaret L. Russell, MD, PhD, Marja J. Verhoef, MD, H. Stephen Injeyan, DC, PhD

Objective: To explore how the topic of vaccination arises during interactions between chiropractors and their patients, the advice that is given to patients, and the factors that influence the opinions of the chiropractors.

Methods: Data were collected in semistructured interviews with a purposeful sample of

chiropractors in Calgary, Alberta, Canada. Data were analyzed using qualitative content analysis and constant comparison. Participants were chiropractors who had participated in a postal survey of immunization-related beliefs and behaviors and who consented to contact for further study.

Results: Data redundancy was attained after 14 interviews were complete. Immunization arose in clinical encounters by both indirect (provision of reference materials and/or posting of media stories in clinic waiting rooms) and direct communication. Direct communications were most commonly patient initiated and were prompted by media reports, clinic waiting room material, or patient perceived adverse reactions; however, they were also initiated by the chiropractors, particularly if they were seeing young children with their parents. For some chiropractors, the emphasis was on providing information of a negative, antivaccination nature; others referred clients to physicians and nurses. Factors that influenced their opinions included their chiropractic training, philosophy of health and illness, and self or important others having experienced negative reactions that were perceived to result from immunization.

Conclusions: Both patients and chiropractors initiate discussions on immunization in practice, with many chiropractors using indirect stimuli to open the topic. Doctors of chiropractic in this particular sample were heterogeneous with respect to the information provided to patients. However, study findings may not be generalizable outside Canada.

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