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Cerebral Perfusion in Patients With Chronic Neck and Upper Back Pain

Maxim A. Bakhtadze, MD, PhD, et al.

Objective: The purpose of this study was to determine the correlation between cerebral perfusion levels, Neck Disability Index (NDI) scores, and spinal joint fixations in patients with [neck pain](#).

Methods: Forty-five adult patients (29 female) with chronic neck/upper thoracic pain during exacerbation were studied. The subjects were grouped according to NDI scores: mild, moderate and severe. The number of painful/blocked segments in the cervical and upper thoracic spine and costovertebral joints, pain intensity using the visual analog scale, and regional cerebral blood flow of the brain using single-photon emission computed tomography (SPECT) were obtained. The SPECT was analyzed semiquantitatively. Analysis of variance tests were conducted on total SPECT scores in each of the NDI groups ($P < .05$). Univariate correlations were obtained between blockage, pain and SPECT scores, as well as age and duration. A multivariate analysis was then conducted.

Results: Group 1 (mild) consisted of 14 patients. Cerebral perfusion measured by SPECT was normal in all eight brain regions. Group 2 (moderate) consisted of 16 patients. In this group, a decrease in cerebral perfusion was observed (range, 20%-35%), predominantly in the parietal and frontal zones. Group 3 (severe) consisted of 15 patients. In this group, the decrease in cerebral perfusion observed was from 30% to 45%, again predominantly in the parietal and frontal zones. A significant difference was found between NDI groups ("moderate" and "severe" showed significantly greater hypoperfusion than "mild"). Total blockage score correlated with SPECT scores at $r = 0.47$, $P = .001$. In a multivariate analysis, NDI scores contributed 39% of the variance of SPECT scores.

Conclusion: In this group of patients with neck and/or upper back pain, NDI scores strongly predicted cerebral hypoperfusion. Spinal joint dysfunction may be involved via hyperactivity in the regional sympathetic nervous system.

James W. Brantingham, DC, PhD, et al.

Objective: The purpose of this study is to update a systematic review on manipulative therapy (MT) for **lower extremity** conditions.

Methods: A review of literature was conducted using MEDLINE, MANTIS, Science Direct, Index to Chiropractic Literature, and PEDro from March 2008 to May 2011. Inclusion criteria required peripheral diagnosis and MT with or without adjunctive care. Clinical trials were assessed for quality using a modified Scottish Intercollegiate Guidelines Network (SIGN) ranking system.

Results: In addition to the citations used in a 2009 systematic review, an additional 399 new citations were accessed: 175 citations in MEDLINE, 30 citations in MANTIS, 98 through Science Direct, 54 from Index to Chiropractic Literature, and 42 from the PEDro database. Forty-eight clinical trials were assessed for quality.

Conclusions: Regarding MT for common lower extremity disorders, there is a level of B (fair evidence) for short-term and C (limited evidence) for long-term treatment of hip osteoarthritis. There is a level of B for short-term and C for long-term treatment of knee osteoarthritis, patellofemoral pain syndrome, and ankle inversion sprain. There is a level of B for short-term treatment of plantar fasciitis but C for short-term treatment of metatarsalgia and hallux limitus/rigidus and for loss of foot and/or ankle proprioception and balance. Finally, there is a level of I (insufficient evidence) for treatment of hallux abducto valgus. Further research is needed on MT as a treatment of lower extremity conditions, specifically larger trials with improved methodology.

Effect of Lumbosacral Manipulation on Corticospinal and Spinal Reflex Excitability

Gary Fryer, PhD, BSc, ND, et al.

Objective: The aim of the study was to examine the effects of a high-velocity, low-amplitude (HVLA) manipulation to the lumbosacral joint on corticospinal excitability, as measured by motor-evoked potentials (MEPs) using transcranial magnetic stimulation, and spinal reflex excitability, as measured by the Hoffman reflex (H-reflex).

Methods: In a randomized, controlled, crossover design, 14 asymptomatic volunteers (mean age, 23 ± 5.4 years; 10 men; 4 women) were measured for MEPs and H-reflexes immediately before and after a randomly allocated intervention. The interventions consisted of HVLA applied bilaterally to the lumbosacral joint and a control intervention. Participants returned a week later, and the same procedures were performed using the other intervention. Data for H-reflex and MEP amplitudes were normalized to the M-wave maximum amplitude and analyzed using two-way analysis of variance with repeated measures.

Results: A significant interaction of treatment by time was found for MEP ($F_{1,13} = 4.87, P = .04$), and post-hoc analyses showed that the MEP/M-wave maximum ratio decreased significantly in the HVLA treatment ($P = .02$; effect size, 0.68). For H-reflex, there was a significant effect of time ($F_{1,13} = 8.186, P = .01$) and treatment and time interaction ($F_{1,13} = 9.05, P = .01$), with post hoc analyses showing that H-reflexes were significantly reduced after the HVLA manipulation ($P = .004$; effect size, 0.94). There were no significant changes in MEP latency or silent period duration.

Conclusion: An HVLA manipulation applied to the lumbosacral joint produced a significant decrease in corticospinal and spinal reflex excitability, and no significant change occurred after the control intervention. The changes in H-reflexes were larger than those in MEPs, suggesting a

greater degree of inhibition at the level of the spinal cord.

Geographic Variations in Availability and Use of Chiropractic Under Medicare

James M. Whedon, DC, et al.

Objective: The purpose of this study was to measure geographic variations in the availability and use of chiropractic under Medicare.

Methods: A cross-sectional design was used to analyze a large nationally representative sample of Medicare data. Data from a 20% representative sample of all paid Medicare Part B fee-for-service claims for 2007 were merged with files containing beneficiary and provider data. The sample was restricted to adults ages 65 to 99 years. Measures of chiropractic availability and use were described and selectively mapped by state. Geographic variations were quantified. Spearman test was used to evaluate for correlation between chiropractic availability and use.

Results: The average number of doctors of chiropractic (DC) by state was 1,135; average DC per 1,000 beneficiaries was 2.5 (SD, 1.1). The average number of chiropractic users by state was 34 502 (SD, 30 844); average chiropractic users per 1,000 beneficiaries was 76 (SD, 41). Chiropractic availability by state varied sixfold, and chiropractic use varied nearly 30-fold. Availability was strongly correlated with use (Spearman ρ , 0.86; $P < .001$). Expenditures per DC were highest in the upper Midwest and lowest in the far West; expenditures per user were highest in New England and New York, and lowest in the West.

Conclusion: Chiropractic availability and use by older adults under Medicare predominated in rural states in the North Central United States. Expenditures were higher in the East and Midwest and lower in the far West. Chiropractic availability and use by state were highly correlated. Future analyses should use small-area analysis and statistical modeling to identify factors predictive of chiropractic use.

Effect of Thumb Joint Manipulation on PPT in Patients With Thumb Osteoarthritis

Jorge H. Villafañe, PT, MSc, et al.

Objective: This study evaluated the effects of Maitland's passive accessory mobilization on local hypoalgesia and strength in thumb carpometacarpal osteoarthritis (TCOA).

Methods: Twenty-eight patients between 70 and 90 years old with secondary TCOA were randomized into glide mobilization and sham groups. This study was designed as a double-blind, randomized controlled trial. Therapy consisted of Maitland's passive accessory mobilization of the dominant hand during four sessions over two weeks. We measured pressure pain threshold (PPT) at the trapeziometacarpal joint (TMJ), the tubercle of the scaphoid bone, and the unciform apophysis of the hamate bone by algometry. The tip and tripod pinch strength was also measured. Grip strength was measured by a grip dynamometer. Measurements were taken before treatment and after one week (first follow-up [FU]) and two weeks (second FU).

Results: All values in the sham group remained unchanged along the treatment period. In the treated group, the PPT in the TMJ was 3.85 ± 0.35 kg/cm², which increased after treatment to 3.99 ± 0.37 and was maintained at the same level during the first FU 3.94 ± 0.39 and second FU 4.74 ± 0.40 . In contrast, we found no differences in PPT in the other studied structures after treatment. Similarly, tip, tripod pinch, and grip strength remained without change after treatment.

Conclusions: Passive accessory mobilization increased PPT in the TMJ; however, it did not increase motor function in patients with TCOA.

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