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Effect of Cervical Mobilization on Motor Function and Pressure Pain Threshold

Benjamin Soon, BSc(Phty), MManipTher, et al.

Objective: Cervical mobilization has been shown to elicit effects on pain perception, autonomic function, and motor function in subjects who experience musculoskeletal pain. The improvement in motor function may be a direct effect of the treatment or secondary to a hypoalgesic effect. This study tested whether it is possible to alter motor function following joint mobilization in situations where motor performance is not impaired by pain.

Methods: Twenty-four asymptomatic subjects participated in this double-blind, controlled, within-subjects crossover study. Pressure pain thresholds and electromyographic activity of the superficial neck flexor muscles were compared with repeated-measures analysis of variance between a posteroanterior cervical mobilization, manual contact, and noncontact condition.

Results: The results indicate no significant change in the pressure pain threshold ($P = .846$) after posteroanterior cervical mobilization. There was no significant difference in superficial neck flexor muscle activity during the craniocervical flexion test ($P = .713$). Post hoc power analysis demonstrated the ability to detect a 15% difference in electromyographic activity with 70% power.

Conclusion: The improvement in motor function demonstrated in previous studies was not replicated, suggesting that either it is only possible to produce an effect when motor function is impaired or the change in motor function is secondary to the pain inhibitory effect of the treatment.

Reliability of the Passive Knee Flexion and Extension Tests in Healthy Subjects

Rafal Gnat, PhD, Michal Kuszewski, PhD, Robert Koczkar, MSc, Agata Dziewonska, MSc

Objective: Information on the reliability of the passive knee extension (PKE) and passive knee flexion (PKF) tests is still incomplete. Moreover, standardization of the two test procedures could be enhanced. The present study investigates interrater and test-retest reliability of the modified versions of the PKE and PKF tests to establish whether the level of reliability is sufficiently high to

justify their use in scientific studies and [clinical practice](#).

Methods: A total of 14 healthy subjects met the selection criteria. The two tests were carried out successively by each of the 3 clinicians/raters involved in the study, and each test was repeated 3 times. Two series of such measurements were performed. To evaluate interrater and test-retest reliability of the two tests, we calculated the intraclass correlation coefficients (ICCs), the standard errors of measurement, and the smallest detectable differences.

Results: The PKE and PKF tests showed excellent and good reliability, respectively. Mean ICCs for the PKE were greater than those for the PKF. Mean ICCs for the interrater reliability (0.88-0.93) were higher than those for test-retest reliability (0.84-0.93). No mean ICCs lower than 0.84 were found (test-retest for PKF). The lowest ICCs of 0.73 and 0.75 were registered for the test-retest reliability of PKF in the case of rater 1.

Conclusion: These results show excellent and good interrater and test-retest reliability of the PKE and PKF, respectively. The PKE test seems to be slightly more reliable. These findings may help clinicians when using these tests. For research purposes, investigators must critically evaluate whether the presented amount of error is acceptable for a specific setting.

Relationship Between Cervicogenic Headache and Impairment: The Flexion-Rotation Test

Toby Hall, MSc, Kathy Briffa, PhD, Diana Hopper, PhD, Kim W. Robinson, BSc

Objective: This study evaluates the association between probable [cervicogenic headache](#) (CGH) and associated headache symptoms and cervical spine impairment identified by the flexion-rotation test (FRT).

Methods: This was an observational study. Ninety-two subjects were evaluated, 72 with probable CGH and 20 who were asymptomatic. Headache symptoms were evaluated by questionnaire. A single blind examiner conducted the FRT, reporting the test state (positive or negative) before measuring range of motion (ROM). Fifteen subjects reported headache during testing and were subsequently retested when pain-free. A paired t test was used to determine whether FRT mobility to the most restricted side differed when the subject was experiencing headache. Univariate linear regression analysis and multiple regression analysis were used to examine the relationship between subject and headache characteristics, and range of motion during the FRT. Logistic regression analysis was used to examine relationships between subject and headache characteristics and whether the FRT was positive or negative.

Results: Mean ROM was significantly reduced ($P < .01$) by 6° in the presence of headache, but this did not influence test interpretation. Regression analysis revealed that half the variance in FRT ROM was explained by an index of headache severity or component parts but not by other headache characteristics.

Conclusions: These findings indicate a relationship between cervical movement impairment and the presence and severity of CGH.

Electromyographic Effect of Mat Pilates Exercise on Back Muscle Activity

Maryela Menacho, MSc, Karen Obara, PT, Josilene Conceicao, PT, et al.

Objective: The purpose of this study was to examine back muscle activity during three traditional

mat [Pilates exercises](#).

Methods: Eleven healthy female volunteers, aged between 18 and 30 years, participated in this cross-sectional study. Surface electromyography (sEMG) of lumbar extensor muscles was recorded simultaneously with kinematics data to identify the phases of movement. Three mat Pilates back exercises were compared: (1) swimming, (2) single leg kick with static prone back extension, and (3) double leg kick. Root mean square values of each muscle were recorded with two pairs of surface electrodes placed bilaterally on one lumbar extensor muscle (at L5). During phases of each exercise, sEMG signals were identified by video analysis. Electrical muscle activation was normalized by the maximal voluntary isometric contraction and used to compare back muscle activity among exercises. A two-way repeated measures analysis of variance was performed to assess the differences in activation level during the exercises.

Results: The value of electrical muscle activity in the lumbar extensors ranged between 15% and 61% of MIVC for the three types of Pilates mat work exercise. The swimming exercise increased lumbar extensor activity (29% on average) in comparison to the other two Pilates conditions. Interestingly, the double leg kick exercise generated significantly more lumbar extensor activity (26% on average) than the single leg kick.

Conclusions: For this group of participants, the swimming exercise increased muscle activation relative to the other two exercise modes.

Cervical Spine Osteochondroma: Rare Presentation of a Common Lesion

Kenneth Reckelhoff, DC, Mayer Green, DC, Normal Kettner, DC

Objective: This case report describes the rare presentation of an [osteochondroma](#) arising from the anterior body of C4. This is the first known reported case of an osteochondroma arising from the anterior vertebral body of C4.

Clinical Features: A 24-year-old male sought consultation with his primary care physician for neck pain. The patient was then referred for cervical radiography and for chiropractic evaluation and treatment. An osseous lesion was noted arising from the C4 vertebra. Osteochondroma was suspected; however, chondrosarcoma could not be ruled out. After orthopedic consultation, osteochondroma was the confirmed diagnosis with the lesion likely incidental to the chief complaint.

Intervention and Outcome: The patient underwent 12 chiropractic treatments for eight weeks including thoracic and cervical high-velocity, low-amplitude spinal manipulation, interferential current, therapeutic ultrasound, stretching, and therapeutic exercise of the paraspinal musculature. Reevaluation revealed the patient experienced no pain with occupational duties, activities of daily living, and improved sleep quality. He was discharged with a home stretching and strengthening regimen targeting the thoracic and cervical paraspinal musculature. Follow-up at six months revealed no return of symptoms.

Conclusion: We described the first case of an osteochondroma arising from the anterior aspect of the C4 vertebral body. The clinical evaluation, differential diagnosis, imaging workup, and treatment are addressed. This case also demonstrates that an asymptomatic osteochondroma of the cervical spine may be a relative, not an absolute, contraindication for high-velocity, low-amplitude spinal manipulation.

Integrative Health Care Under Review: An Emerging Field

Ian D. Coulter, PhD, Raheleh Khorsan, MA, Cindy Crawford, BA, An-Fu Hsiao, MD, PhD

Objective: The purpose of this study was to review the research literature for the emerging field of [Integrative Medicine/Integrative Health Care](#) (IM) using the methods of systematic review.

Methods: We conducted an electronic literature search using PubMed, Allied and Complementary Medicine, BIOSIS Previews, EMBASE, the entire Cochrane Library, MANTIS, Social SciSearch, SciSearch Cited Ref Sci, PsychInfo, CINAHL, and NCCAM grantee publications listings from database inception to May 2009, as well as searches of the gray literature. Available studies published in English language were included. Three independent reviewers rated each article and assessed the methodological quality of studies using the Scottish Intercollegiate Guidelines Network.

Results: Our initial search yielded 11 591 citations. Of these, only 660 were judged to be relevant to the purpose of our search. Most articles deal with implementing and implemented programs. They focus on practice models, strategies for integrative health, the business case, and descriptive studies. This is followed in terms of numbers by conceptual/philosophical writings. These in turn are followed by research articles including randomized controlled trials, program evaluations, and cost-effectiveness studies. The literature reflects an emerging field in that it is focused more on how to create IM than on researching outcomes. However, the lack of definition and clarity about the term integrative medicine (also known as integrative health care) and the absence of taxonomy for models of IM make it very difficult to efficiently conduct systematic reviews of this field at the moment.

Conclusion: Our review revealed that most articles focused on describing practice models and conceptual/ philosophical models, whereas there are fewer randomized controlled trials and observation studies. The lack of consensus on a clear definition and taxonomy for integrative health care represents a major methodological barrier on conducting systematic literature reviews and meta-analysis in this emerging field.

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