

JMPT Abstracts for October 2005

Volume 28 - Number 8

Editorial Staff

Editor's note: Due to space constraints, not all abstracts from the October 2005 issue of JMPT are reprinted below. To review the complete table of contents from the October issue, visit www.mosby.com/jmpt.

Cost-effectiveness of medical and chiropractic care for acute and chronic low back pain.
Mitchell Haas, DC; Rajiy Sharma, PhD; Miron Stano, PhD

Objectives: To identify relative provider costs, clinical outcomes, and patient satisfaction for the treatment of low back pain (LBP).

Methods: This was a practice-based, nonrandomized, comparative study of patients self-referring to 60 doctors of chiropractic and 111 medical doctors in 51 chiropractic and 14 general practice community clinics over a 2-year period. Patients were included if they were at least 18 years old, ambulatory, and had low back pain of mechanical origin ($n = 2,780$). Outcomes were (standardized) office costs, office costs plus referral costs for office-based care and advanced imaging, pain, functional disability, patient satisfaction, physical health, and mental health evaluated at 3 and 12 months after the start of care. Multiple regression analysis was used to correct for baseline differences between provider types.

Results: Chiropractic office costs were higher for both acute and chronic patients ($P < .01$). When referrals were included, there were no significant differences in either group between provider types ($P > .20$). Acute and chronic chiropractic patients experienced better outcomes in pain, functional disability, and patient satisfaction ($P < .01$); clinically important differences in pain and disability improvement were found for chronic patients only.

Conclusions: Chiropractic care appeared relatively cost-effective for the treatment of chronic LBP. Chiropractic and medical care performed comparably for acute patients. Practice-based clinical outcomes were consistent with systematic reviews of spinal manipulation efficacy: manipulation-based therapy is at least as good as and, in some cases, better than other therapeutics. This evidence can guide physicians, payers, and policy-makers in evaluating chiropractic as a treatment option for low back pain.

Effects of a managed chiropractic benefit on the use of specific diagnostic and therapeutic procedures in the treatment of low back and neck pain.

Craig F. Nelson, DC, MS; R. Douglas Metz, DC; Thomas LaBrot, DC

Objective: The aim of this study was to measure the effects of a managed chiropractic benefit on the rates of specific diagnostic and therapeutic procedures for the treatment of back pain and neck pain.

Design: This study is a retrospective analysis of claims data from a managed -care health plan over

a 4-year period. The use rates of advanced imaging, surgery, inpatient care, and plain-film radiographs were compared between employer groups with and without a chiropractic benefit.

Results: For patients with low back pain, the use rates of all 4 studied procedures were lower in the group with chiropractic coverage. On a per-episode basis, the rates in the group with coverage were reduced by the following: surgery (-32.1%); computed tomography (CT)/magnetic resonance imaging (MRI) (-37.2%); plain-film radiography (-23.1%); and inpatient care (-40.1%). On a per-patient basis, the rates were reduced by the following: surgery (-13.7%); CT/MRI (-20.3%); plain-film radiography (-2.2%); and inpatient care (-24.8%). For patients with neck pain, the use rates were reduced per episode in the group with chiropractic coverage as follows: surgery (-49.4%); CT/MRI (-45.6%); plain-film radiography (-36.0%); and inpatient care (-49.5%). Per patient, the rates were surgery (-31.1%); CT/MRI (-25.7%); plain-film radiography (-12.5%); and inpatient care (31.1%). All group differences were statistically significant.

Conclusion: For the treatment of low back and neck pain, the inclusion of a chiropractic benefit resulted in a reduction in the rates of surgery, advanced imaging, inpatient care, and plain-film radiographs. This effect was greater on a per-episode basis than on a per-patient basis.

A cross-sectional study comparing pain and disability levels in patients with low back pain with and without transitional lumbosacral vertebrae.

Cynthia K. Peterson, DC, MMedEd; Jennifer Bolton, PhD, MSc; William Hsu, DC; Angela Wood, DCR(R)

Objective: To determine whether patients with transitional lumbosacral vertebrae report more pain and disability compared with patients with normal lumbar vertebrae.

Methods: Radiographic and questionnaire data were collected from 353 patients with low back pain. Back pain severity was measured using two scales: one for pain over the entire episode and the other for pain during the previous week. All patients completed the Revised Oswestry Disability Questionnaire before radiography was performed. Patients were divided into two groups: those with and those without a transitional lumbosacral vertebra. Differences between patient groups were investigated using the unpaired t test. Multiple linear regression analysis was applied to investigate the effect of the transitional lumbosacral vertebrae on pain and disability controlling for the effects of age and sex.

Results: Forty-three patients (12.2%) had a transitional lumbosacral vertebra. There were no differences in pain or disability levels between the 2 groups on any of the pain scales or revised Oswestry subscales. Older patients reported significantly more pain ($P = .039$) and disability ($P = .002$) than younger patients.

Conclusion: The presence of a transitional lumbosacral vertebra in this group of patients was not related to an increased level of reported low back pain or disability.

Erector spinae and quadratus lumborum muscle endurance tests and supine leg-length alignment asymmetry: an observational study.

Gary A. Knutson, DC; Edward Owens, DC

Objective: To determine if there is an association between supine leg-length alignment (LLA) asymmetry and the endurance of the erector spinae (ES) and quadratus lumborum (QL) muscles.

Methods: Forty-seven subjects (21 women; average age, 36 years old) were tested for ES endurance using the Biering-Sorensen (B-S) test, and 69 (31 women; average age, 34.5 years) were tested for QL endurance. Subjects were examined for supine LLA and tested for ES and QL muscle endurance. The muscle endurance times were compared against those who did and did not demonstrate LLA asymmetry and the side of the "short leg."

Results: In the B-S test, volunteers with LLA asymmetry (n = 27) had a mean endurance time of 89.7 seconds (SD, 43.3), and the no-LLA asymmetry group (n = 20) had a mean endurance time of 161.5 seconds (SD, 57.1), a significant difference ($P < .001$). In the QL test, after correction for the effects of sex and exercise, those with a right "short leg" (n = 22) had a right QL endurance time of 25.9 seconds (SE, 4.2) and a left QL endurance time of 34.7 seconds (SE, 4.3). The right QL endurance time was significantly different from those subjects with balanced legs ($P = .001$). Those with a left "short leg" (n = 20) had a left QL endurance time of 28.6 seconds (SE, 4.7) and a right QL endurance time of 38.1 seconds (SE, 4.5). Both QL endurance times were significantly different from those with balanced leg-length ($P = .002$ and $.016$, respectively).

Conclusion: This study suggests that, using the B-S test, the group of volunteers who demonstrated a commonly used sign of subluxation/joint dysfunction, supine LLA asymmetry, had a decreased endurance times over those who did not. The QL endurance tests showed that the QL muscle ipsilateral to the supine short leg had significantly decreased endurance times over the same-side QL fatigue times in the no leg-length asymmetry group.

Effect of high-intensity strength training on functional measures of balance ability in balance-impaired older adults.

Jennifer A. Hess, DC, MPH, PhD; Marjorie Woollacott, PhD

Object: The aim of this study was to evaluate the effect of a 10-week, high-intensity strength-training program targeting key lower extremity muscles for the purpose of improving postural control in balance-impaired older adults.

Methods: A quasi-experimental, delayed entry controlled design was used to evaluate balance ability in balance-impaired older adults after participation in 10 weeks of high-intensity strength training focused on the quadriceps, hamstrings, tibialis anterior, and gastrocnemius muscles. Participants were evaluated using validated clinical measures of functional balance ability: the Berg Balance Scale, the Timed Up and Go, and the Activities-Specific Balance Confidence Scale.

Results: After strength training, the exercisers were significantly stronger than the control subjects. They improved significantly on the Berg Balance Scale ($P = .030$) from a mean score of 48.8 ± 2.4 of 56 before training to 51.2 ± 4.3 of 56 after training. The Timed Up and Go ($P = .045$) and the Activities-Specific Balance Confidence Scale ($P = .038$) also improved significantly in the experimental group. These changes are associated with a decrease in fall risk.

Conclusion: High-intensity strength training can safely and effectively strengthen lower extremity muscles in balance-impaired older adults, resulting in significant improvements in functional balance ability and decreased fall risk.

Measurement of the pressure applied during motion palpation and reliability for cervical spine rotation.

Justin Marcotte, DC; Martin C. Normand, DC, PhD; Pierre Black, MS

Objective: To measure the pressure applied during motion palpation for cervical spine rotation and to verify its effect on reliability when the kinematics of the test are standardized.

Methods: The pressure of palpation used during the test of cervical spine rotation was measured by means of flexible and extra-fine pressure sensors linked to an electronic interface. Seven pressure measurements (left rotation from C1 to C7) for each of 24 examiners were taken. In addition, the examiners were asked to detect the presence of intervertebral fixation while palpating.

Results: Pressure of palpation varied from 4.0 to 41.0 N/cm² among the examiners. Standardization of the kinematics of the test establishes a strong reliability of identifying a fixation (K varying from 0.701 to 0.748).

Conclusion: The pressure applied during motion palpation for cervical spine rotation is light to moderate. It can vary tenfold (4-41 N/cm²) and remain reliable for identifying a fixation as long as the kinematics of the test are standardized.

Validity of the lateral gliding test as tool for the diagnosis of intervertebral joint dysfunction in the lower cervical spine.

Cesar Fernández-de-las-Peñas, PT; Cristobal Downey, PT, MSc; Juan Carlos Miangolarra-Page, MD, PhD

Objective: To determine if the lateral gliding test for the cervical spine is a valid clinical test compared with radiological assessment as a tool for the diagnosis of intervertebral joint dysfunctions in the lower cervical spine in patients presenting with mechanical neck pain.

Methods: Twenty-five patients with mechanical neck pain presenting with an asymmetry of at least 5° between left and right cervical lateral flexion and diagnosed with an intervertebral joint dysfunction in the lower cervical spine based on the lateral gliding test were studied. Two anterior-posterior X-rays were performed on each patient at maximum end-range of right and left cervical lateral flexion. The intervertebral motion was compared between the hypomobile side and the contralateral side at the level diagnosed as hypomobile by the lateral gliding test.

Results: The asymmetry between left and right cervical lateral flexion motion was $7.64^{\circ} \pm 2.25^{\circ}$ ($P = .001$). Fourteen patients were diagnosed with intervertebral dysfunctions on the right side, whereas 11 patients showed cervical hypomobility on the left. Joint dysfunction at the C3 vertebra was the most prevalent ($n = 16$), followed by the dysfunction at the C4 vertebra ($n = 9$). The intervertebral radiological motion at the hypomobile side (mean 19.1, SD 2.1 mm) was 3.44 ± 1.9 mm less than the intervertebral radiological motion at the contralateral side (mean 22.6, SD 2.5 mm) with $P = .002$.

Conclusion: The lateral gliding test for the cervical spine was as good as a radiological assessment for the diagnosis of intervertebral dysfunctions in the lower cervical spine.

An analysis of the etiology of cervical artery dissections: 1994 to 2003.

Michael T. Haneline, DC, MPH; Gary N. Lewkovich, DC

Objective: To provide a literature review of the etiologic breakdown of cervical artery dissections.

Methods: A literature search of the MEDLINE database was conducted for English-language articles published from 1994 to 2003 using the search terms cervical artery dissection (CAD),

vertebral artery dissection, and internal carotid artery dissection. Articles were selected for inclusion only if they incorporated a minimum of 5 case reports of CAD and contained sufficient information to ascertain a plausible etiology.

Results: One thousand fourteen citations were identified; 20 met the selection criteria. There were 606 CAD cases reported in these studies; 321 (54%) were internal carotid artery dissection and 253 (46%) were vertebral artery dissection, not including cases with both. Three hundred seventy-one (61%) were classified as spontaneous, 178 (30%) were associated with trauma/trivial trauma, and 53 (9%) were associated with cervical spinal manipulation. If one apparently biased study is dropped from the data pool, the percentage of CADs related to cervical spinal manipulation drops to approximately 6%.

Conclusion: The case series that were reviewed in this article indicated that most CADs reported in the previous decade were spontaneous but that some were associated with trauma/trivial trauma, and a minority with cervical spine manipulation. This etiologic breakdown of CAD does not differ significantly from what has been portrayed by most other authors.

The biomechanical and clinical significance of the lumbar erector spinae flexion-relaxation phenomenon: a review of literature.

Christopher J. Colloca, DC; Richard N. Hinrichs, PhD

Objective: The aim of this study was to review the biomedical literature to ascertain the biomechanical and clinical significance of the lumbar erector spinae flexion-relaxation phenomenon (FRP).

Data Sources: Index Medicus via PubMed, the Noble Science Library's e-journal archives, and the Manual Alternative and Natural Therapy Index System databases were searched using the same search terms.

Discussion: The presence of the FRP during trunk flexion represents myoelectric silence consistent with increased load sharing of the posterior discoligamentous passive structures. Passive contributions from erector spinae stretching during the flexion posture and active contributions from other muscles (quadratus lumborum and deep erector spinae, among others) further assist in load sharing in the trunk flexion posture. A number of studies have shown differences in the FRP between patients with chronic low back pain and healthy individuals, and the reliability of the assessment. Persistent activation of the lumbar erector spinae musculature among patients with back pain may represent the body's attempt to stabilize injured or diseased spinal structures via reflexogenic ligamentomuscular activation, thereby protecting them from further injury and avoiding pain.

Conclusion: The myoelectric silencing of the erector spinae muscles in the trunk flexion posture is indicative of increased load sharing on passive structures, the tissues of which have been found to fail under excessive loading conditions and shown to be a source of low back pain. The studies that show differences in the presence of the FRP among patients and control subjects are encouraging for this type of clinical assessment and suggest that assessment of the FRP is a valuable objective clinical tool to aid in the diagnosis and treatment of patients with low back pain.

Labral injuries of the hip: a review of diagnosis and management.

Matt Schmerl, MChiro; Henry Pollard, Grad DC, MSportSc, PhD; Wayne Hoskins, MChiro

Objective: To report the current knowledge of the diagnosis and treatment of acetabular labral tears.

Methods: A search of the MEDLINE, CINAHL, and Science Direct indexing systems (1966 to September 2004) was conducted using the following key indexing terms: labrum, labral, hip, acetabulum, injury, and treatment. One hundred eighty-six publications were sourced using this methodology and were considered in this review. The literature was sorted according to publication date and relevance.

Results: There is a small amount of literature on the topic of labral lesions. This is particularly true of the use of conservative (manual therapy) methods for the treatment of labral lesions. The literature on surgical diagnosis and management is more mature; however, longer-term follow-up studies are required to conclusively show the benefit of surgical intervention.

Conclusion: Early diagnosis is important as labral tears may be linked to the progression of hip osteoarthritis. Initial treatment consisting of partial weight-bearing may respond if initiated early. Arthroscopy currently represents the gold standard in both the diagnosis and treatment of labral tears. Future research must investigate the long-term outcomes of partial labrectomy, as well as the efficacy of conservative approaches to care.

DECEMBER 2005