

The Somatic Connection

“The Somatic Connection” highlights and summarizes important contributions to the growing body of literature on the musculoskeletal system’s role in health and disease. This section of *The Journal of the American Osteopathic Association* (JAOA) strives to chronicle the significant increase in published research on manipulative methods and treatments in the United States and the renewed interest in manual medicine internationally, especially in Europe.

To submit scientific reports for possible inclusion in “The Somatic Connection,” readers are encouraged to contact JAOA Associate Editor Michael A. Seffinger, DO (mseffingerdo@osteopathic.org), or JAOA Editorial Advisory Board Member Hollis H. King, DO, PhD (hhking@ucsd.edu).

Can a Light Touch Sham Therapy Be Effective in Cranial Osteopathic Manipulative Medicine Research?

Haller H, Ostermann T, Lauche R, Cramer H, Dobos G. Credibility of a comparative sham control intervention for craniocervical therapy in patients with chronic neck pain [published online October 6, 2014]. *Complement Ther Med*. 2014;22(6):1053-1059. doi:10.1016/j.ctim.2014.09.007.

German integrative medicine researchers at the University of Duisburg-Essen assessed the applicability of a sham-controlled intervention of craniocervical therapy (CST) in the treatment of patients with chronic neck pain. The data reported were secondary findings of a randomized controlled trial on neck treatment (the primary outcome measures have not yet been reported). Fifty-four patients were randomly assigned to either a CST group or a sham-CST group. The CST protocol included cranial manual techniques well known to osteopathic physicians who use osteopathic cranial manipulative medicine (OCMM). The sham-CST was light touch “without therapeutic intention” for the same amounts of time and applied to the same regions of the body as the CST.

Each patient was seen at 8 weekly 45-minute sessions. The patients all had chronic neck pain lasting at least 3 months with moderate intensity of

at least 45 on a 100-mm visual analog scale. Four different therapists provided the interventions.

Outcome measures were the Credibility/Expectancy Questionnaire and the Helping Alliance Questionnaire obtained at the end of the eighth session. The results for adjusted ORs showed no difference between groups for the following Credibility/Expectancy Questionnaire items: (1) How confident are you that CST will be successful in reducing your neck pain symptoms? (2) How logical does CST seem to you for treating your limitations due to neck pain? and (3) How confident would you be in recommending CST to a friend with the same problem? Likewise, there was no difference between groups for the Helping Alliance Questionnaire variables of relation to therapist and satisfaction with treatment. Per-protocol analysis by regression coefficient revealed a significant difference between the groups for satisfaction with treatment, but findings were not significant in the intent-to-treat analysis.

Previous osteopathic research using “light touch” found light touch to have a treatment effect.¹ As a treatment provider in that study, I can say that had there been a more concerted effort to mentally avoid “therapeutic intent,” results might have been different. However, in a study² that

showed the effects of OCMM on cerebral tissue oxygenation, light touch without therapeutic intent (not reported in the study) was used effectively (Scott T. Stoll, DO, verbal communication, January 2012).

I believe light touch sham OCMM is valid and this study presents a way to use such procedures in osteopathic research. (doi:10.7556/jaoa.2015.008)

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References

1. Noll DR, Degenhardt BF, Morley T, et al. Efficacy of osteopathic manipulation as an adjunctive treatment for hospitalized patients with pneumonia: a randomized controlled trial. *Osteopath Med Prim Care*. 2010;4:2. doi:10.1186/1750-4732-4-2.
2. Shi X, Rehner S, Prajapati R, Stoll ST, Gamber RG, Downey HF. Effect of cranial osteopathic manipulative medicine on cerebral tissue oxygenation. *J Am Osteopath Assoc*. 2011;111(12):660-666.

Osteopathic Manipulative Treatment Is Effective for Nonspecific Low Back Pain

Franke H, Franke J-D, Fryer G. Osteopathic manipulative treatment for nonspecific low back pain: a systematic review and meta-analysis. *BMC Musculoskelet Disord*. 2014;15:286. doi:10.1186/1471-2474-15-286.

Nonspecific low back pain (LBP) has been defined as tension, soreness, or stiffness in the lower back region, the specific cause of which is unidentifiable.¹ This systematic review and meta-analysis provides a rigorous assessment of the effectiveness of osteopathic manipulative treatment (OMT) on nonspecific LBP.

“Randomized clinical studies” (identified by the authors as *RCTs*) published or unpublished and unrestricted by language were included to remove reservations held from previous studies²⁻⁴ and to meet criteria identified by the *Cochrane Handbook*.⁵ Criteria for inclusion were *RCTs* with adult participants with nonspecific LBP for any duration who received OMT techniques on the basis of the

clinical judgment of osteopaths or osteopathic physicians. The inclusion criteria identified 307 studies. Further classification identified 15 *RCTs* comprising a total of 1502 participants and 18 associated comparison groups. Studies were evaluated in 4 areas: (1) acute and chronic nonspecific LBP, (2) chronic nonspecific LBP, and (3) nonspecific LBP in pregnant and (4) postpartum women. Primary outcomes were pain and functional status 3 months after treatment. The GRADE (Grades of Recommendation, Assessment, Development, and Evaluation) system was used to assess the quality of evidence.

Using 10 *RCTs*, 12 comparison groups, and 1141 participants, OMT was found to have a significant effect on relief of acute and chronic pain (mean difference [MD], -12.91; 95% CI, -20.00 to -5.82). Using 9 *RCTs*, 10 comparison groups, and 1046 participants, OMT also improved functional status in patients with acute and chronic pain (standardized MD [SMD], -0.36; 95% CI, -0.58 to -0.14). In patients with chronic nonspecific LBP, OMT was found to have a significant effect on pain using 6 *RCTs*, 7 comparison groups, and 769 participants (MD, -14.93; 95% CI, -25.18 to -4.68), and for functional status using 3 *RCTs* (SMD, -0.32; 95% CI, -0.58 to -0.07).

Nonspecific LBP in pregnant women was evaluated using 3 *RCTs*, 4 comparison groups, and 242 participants comparing usual care, sham ultrasound therapy, and no treatment. A significant difference was found in the effects of OMT on pain (MD, -23.01; 95% CI, -44.13 to -1.88) and functional status (SMD, -0.80; 95% CI, -1.36 to -0.23). Two *RCTs* studied nonspecific LBP in postpartum women and reported moderate-quality evidence in support of OMT for improving pain (MD, -41.85; 95% CI, -49.43 to -34.27) and functional status (SMD, -1.78; 95% CI, -2.21 to -1.35).

The results of this analysis, similar to the findings of Licciardone et al,² suggest that OMT im-

proves pain and functional status in patients with acute and chronic nonspecific LBP. (doi:10.7556/jaoa.2015.009)

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References

1. Dagenais S, Caro J, Haldeman S. A systematic review of low back pain cost of illness studies in the United States and internationally. *Spine J*. 2008;8(1):8-20. doi:10.1016/j.spinee.2007.10.005.
2. Licciardone JC, Brimhall AK, King LN. Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials. *BMC Musculoskelet Disord*. 2005;6:43.
3. Franke H. Why reservations remain: a critical reflection about the systematic review and meta-analysis "Osteopathic manipulative treatment for low back pain" by Licciardone et al. *J Bodyw Mov Ther*. 2012; 16(4):411-415. doi:10.1016/j.jbmt.2012.05.002.
4. Orrock PJ, Myers SP. Osteopathic intervention in chronic non-specific low back pain: a systematic review. *BMC Musculoskelet Disord*. 2013;14:129. doi:10.1186/1471-2474-14-129.
5. Higgins JPT, Green S, eds. *Cochrane Handbook for Systematic Reviews of Interventions*. Version 5.1.0. London, England: The Cochrane Collaboration; 2011. <http://www.cochrane-handbook.org>. Updated March 2011. Accessed December 1, 2014.

Spinal Manipulation Improves Pain Perception, Spinal Mobility, and Height in Men With Degenerative Disk Disease

Vieira-Pellenz F, Oliva-Pascual-Vaca Á, Rodríguez-Blanco C, Heredia-Rizo AM, Ricard F, Almazán-Campos G. Short-term effect of spinal manipulation on pain perception, spinal mobility, and full height recovery in male subjects with degenerative disk disease: a randomized controlled trial. *Arch Phys Med Rehabil*. 2014;95(9):1613-1619. doi:10.1016/j.apmr.2014.05.002.

Degenerative disk (DD) disease is the most common cause of low back pain (LBP) in adults and accounts for 90% of surgical procedures performed on the back.¹ Studies have sought to understand the role of

spinal manipulation (SM) in this population; however, the data are conflicting. Some evidence suggests that SM decreases pain and improves function in patients with intervertebral disk disease.² Others hypothesize that structural disruption of a DD may lead to a loss of intervertebral disk height and spinal range of motion³; however, it remains unclear whether SM has these effects. The authors set out to determine whether high-velocity, low-amplitude (HVLA) manipulation of the lumbosacral spine has an immediate effect on LBP, spinal mobility, and participant height.

Inclusion criteria were men aged between 18 and 55 years, body mass index between 20 and 25, presence of LBP, and magnetic resonance imaging evidence of lumbosacral disk degeneration. Exclusion criteria included professional athletics, unstable disk herniation, cauda equina syndrome, surgery for DD disease, radicular pain with neurologic signs, or SM within 3 months.

A total of 40 men were randomly assigned to the treatment group (n=20) or the control group (n=20). The treatment group underwent 1 SM performed by a physical therapist using the lateral recumbent HVLA to the lumbosacral spine maneuver, and the control group underwent sham therapy, with similar positioning as the treatment group but without segment tension or thrust. Measurements were taken 3 minutes before and 3 minutes after intervention, including self-perceived LBP (visual analog scale), passive straight-leg raise range of motion (goniometer), spinal mobility in flexion (finger-to-floor distance test), and participant height (stadiometer).

Pre- and postintervention intragroup difference analyses showed significant differences in the treatment group across all variables ($P<.001$). In contrast, the finger-to-floor distance test results were significant in the control group ($P=.008$). From before to after the intervention, the between-group comparison of mean differences were significant across all variables ($P<.001$). Minimum important differences that indicated notable change in clinical status were met for all variables except perceived LBP. A 45.94%

pre- to postintervention change was observed for perceived LBP, with a minimum important difference greater than 50%. The authors concluded that HVLA to the L5-S1 joint has immediate positive effects on LBP, spinal mobility, and height in men with DD disease. (doi:10.7556/jaoa.2015.010)

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References

1. An HS, Anderson PA, Haughton VM, et al. Introduction: disc degeneration: summary. *Spine (Phila Pa 1976)*. 2004;29(23):2677-2678.
2. Burton AK, Tillotson KM, Cleary J. Single-blind randomized controlled trial of chemonucleolysis and manipulation in the treatment of symptomatic lumbar disc herniation. *Eur Spine J*. 2000;9(3):202-207.
3. Beattie PF. Current understanding of lumbar intervertebral disc degeneration: a review with emphasis upon etiology, pathophysiology, and lumbar magnetic resonance imaging findings. *J Orthop Sports Phys Ther*. 2008;38:329-340.

Osteopathic Manipulative Treatment Improves Clinical Response and Lowers Relapse Rates Among Patients With Chronic Low Back Pain

Licciardone JC, Kearns CM, Crow WT. Changes in biomechanical dysfunction and low back pain reduction with osteopathic manual treatment: results from the OSTEOPATHIC trial. *Man Ther*. 2014;19(4):324-330. doi:10.1016/j.math.2014.03.004.

Low back pain (LBP) is a common complaint encountered by osteopathic physicians. Kappler¹ identified psoas muscle imbalance as a key component of dysfunction related to chronic LBP. Greenman² then reported on 6 common somatic dysfunctions in patients with chronic LBP: (1) pelvic tilt and short leg syndrome, (2) nonneutral lumbar mechanics, (3) pubic shears, (4) innominate shears, (5) restricted sacral nutation, and (6) muscular imbalance. More

recently, a randomized clinical trial³ found that the management of these 6 common dysfunctions with osteopathic manipulative treatment (OMT) correlated to the lowest rate of relapse among patients with chronic LBP. Several subgroup analyses of the data from this trial have since been published, with the current article being the most recent.

Participants with high baseline pain severity scores have been shown to have a greater response to OMT than patients with low baseline pain.⁴ Therefore, in this subgroup analysis, patients with high baseline pain severity scores (n=186) were randomized into OMT (n=95) and sham therapy (n=91) groups to identify distinguishing characteristics that favored response to OMT. Low back pain was measured before each treatment session at weeks 1, 2, 4, 6, and 8, as well as at the 12-week exit visit using a 100-mm visual analog scale for pain. Patients who showed improvement at any time throughout the trial were termed *initial responders*. Initial responders who maintained their clinical improvement by the 12-week visit were deemed *stable responders*. Those who did not show any improvement throughout the trial were labeled *nonresponders*.

The authors found that the proportion of time in which the patient experienced relief of LBP was higher in the OMT group ($P<.001$). In the OMT group, 62 patients (65%) were initial responders, and in the sham therapy group, 41 patients (45%) were initial responders (relative risk [RR], 1.45; 95% CI, 1.11-1.90). The OMT group had 42 stable responders, and the sham therapy group had 18 stable responders (RR, 2.12; 95% CI, 1.36-3.30). In the OMT group, 13 patients (24%) responded initially and then relapsed by the 12-week exit visit, and 18 patients (51%) in the sham therapy group relapsed (RR, 0.47; 95% CI, 0.26-0.83). The authors found that patients with psoas dysfunction who received OMT were less likely to experience relapses of LBP. This randomized controlled trial is the first, to our knowledge, to support Kappler's and

Greenman's clinical approaches to patients with LBP. (doi:10.7556/jaoa.2015.011)

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References

1. Kappler RE. Role of psoas mechanism in low-back complaints. *J Am Osteopath Assoc*. 1973;72(8):794-801.
2. Greenman PE. Syndromes of the lumbar spine, pelvis, and sacrum. *Phys Med Rehabil Clin N Am*. 1996;7(4):773-785.
3. Licciardone JC, King HH, Hensel KL, Williams DG. Osteopathic health outcomes in chronic low back pain: the OSTEOPATHIC Trial. *Osteopath Med Prim Care*. 2008;2(5). doi:10.1186/1750-4732-2-5.
4. Licciardone JC, Aryal S. Clinical response and relapse in patients with chronic low back pain following osteopathic manual treatment: results from the OSTEOPATHIC Trial. *Man Ther*. 2014;19(6):541-548. doi:10.1016/j.math.2014.05.012.

Are Some of Us Doomed to Have Chronic Low Back Pain?

Junqueira DRG, Ferreira ML, Refshauge K, et al. Heritability and lifestyle factors in chronic low back pain: results of the Australian Twin Low Back Pain Study (the AUTBACK study). *Eur J Pain*. 2014;18(10):1410-1418.

Australian researchers at the Faculty of Health Sciences at the University of Sydney examined genetic and lifestyle factors related to chronic low back pain (LBP) in a cohort of monozygotic and dizygotic twins. The large Australian Twin Low Back Pain (AUTBACK) study database was used to recruit 243 pair responders, of whom 105 pairs provided complete and valid data related to their LBP in an online survey. A subgroup of 38 pairs, in which only 1 of the twins had LBP, provided data on lifestyle activities possibly related to LBP.

The authors' definition of chronic LBP was based on the twin's self-report of having had back pain for 3 months and having had a whole month without LBP longer than 3 months before com-

pleting the survey. The overall prevalence of LBP was 55.4%, with a calculated heritability factor of 32.0%, which was considered by the authors to be important in the understanding of what causes LBP. Also, among the 105 pairs of twins, when 1 of the twins was affected with LBP, monozygotic twins were 5 times more likely than dizygotic twins to have LBP. Regarding lifestyle activities, a sedentary lifestyle or time spent in activities such as vigorous lifting and gardening was associated with LBP, but moderate activities such as swimming, cycling, and jogging were not associated with LBP.

From my osteopathic perspective, I seriously question that genetics are this large of an etiologic factor in LBP. Most importantly, there are structural factors that genetic researchers do not address, mainly that the twins come down the same birth canal or at least are subjected to the same uterine environment if born via cesarean delivery. The biomechanics of neonatal bodies are indeed affected by the birth process,¹ which could predispose a person to LBP later in life.

The authors' speculation on genetic mechanisms contributing to LBP is interesting. They cite research suggesting that genetics control expression of the inflammatory cytokines tumor necrosis factor- α , interleukin 1, and interleukin 6 that relate to disk degeneration and nerve growth factors affecting axonal function. Osteopathic research has shown relationships between these cytokines and LBP as well. Licciardone et al^{2,3} found that TNF- α was reduced by osteopathic manipulative treatment (OMT),^{2,3} whereas in vitro OMT modeling in a study by Standley and Meltzer⁴ showed impact on interleukin 1 and interleukin 6.

If the OMT impact on cytokine levels is confirmed by future research, I believe researchers will have to reevaluate the idea that genetics have such great control over our lives. (doi:10.7556/jaoa.2015.012)

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References

1. Frymann VM. Relation of disturbances of craniosacral mechanism to symptomatology of the newborn: study of 1250 infants. *J Am Osteopath Assoc.* 1966;65(10):1059-1075.
2. Licciardone JC, Kearns CM, Hodge LM, Bergamini MV. Associations of cytokine concentrations with key osteopathic lesions and clinical outcomes in patients with nonspecific chronic low back pain: results from the OSTEOPATHIC Trial. *J Am Osteopath Assoc.* 2012;112(9):596-605.
3. Licciardone JC, Kearns CM, Hodge LM, Minotti DE. Osteopathic manual treatment in patients with diabetes mellitus and comorbid chronic low back pain: subgroup results from the OSTEOPATHIC Trial. *J Am Osteopath Assoc.* 2013;113(6):486-478.
4. Standley PR, Meltzer KR. Modeled repetitive motion strain and indirect osteopathic manipulative techniques in regulation of human fibroblast proliferation and interleukin secretion. *J Am Osteopath Assoc.* 2007;107(12):527-536.

Spinal Manipulation and Home Exercises Are Effective for Subacute and Chronic Back-Related Leg Pain

Bronfort G, Hondras MA, Schulz CA, et al. Spinal manipulation and home exercise with advice for subacute and chronic back-related leg pain. *Ann Intern Med.* 2014;161(6):381-391. doi:10.7326/M14-0006.

Back-related leg pain (BRLP) is a common complaint of persons with low back pain (LBP). Patients with LBP-associated BRLP typically have a poorer prognosis and quality of life than those without BRLP. With the increasing costs of medical care and pharmaceuticals, spinal manipulative therapy (SMT) and self-management techniques are becoming more desirable, although there has been little evidence to support their benefit. The purpose of this study was to test the hypothesis that SMT and home exercise and advice (HEA) are superior to HEA alone for the treatment of patients with subacute and chronic BRLP.

A total of 192 patients were enrolled in the study. Inclusion criteria included age 21 years or older; Quebec Task Force on Spinal Disorders category 2, 3, 4, or 6; pain severity of 3 or greater on a 10-point scale; current BRLP episode of 4 weeks or more; and a stable medication regimen. All patients were standardized for “age, BRLP duration, neurologic signs, distress, posi-

tive straight-leg raise, time spent driving a vehicle, and pain aggravation with coughing or sneezing” and then randomly assigned to receive HEA alone or HEA in conjunction with SMT for 12 weeks.

The HEA group (n=96) attended four 1-hour sessions, during which they were educated on personalized ways “to manage existing pain, prevent pain recurrences, and facilitate engagement in daily activities.” They also received take-home review materials. The instructors e-mailed or telephoned patients at 1, 4, and 9 weeks to assess adherence.

The group that received SMT in addition to HEA (n=96) attended a maximum of 20 SMT visits lasting 10 to 20 minutes and 4 HEA sessions as described above. The SMT was applied by 1 of 11 experienced chiropractors and included manual techniques to the lumbar and sacroiliac joints on the basis of patient’s symptoms and the chiropractor’s findings on palpation.

The primary outcome measure was patient-reported leg pain during the previous week, assessed using an 11-point scale. The primary outcome was modeled with mixed-effects regression over baseline and Bonferroni adjustment to control for 2 test groups with 2 different end points (12 and 52 weeks). When considering the primary outcome, the findings showed a statistically significant advantage of SMT plus HEA over HEA alone at 12 weeks ($P=.008$) but not at 52 weeks ($P=.146$). At 12 weeks, 37% of patients in this group had a 75% or greater reduction in leg pain, and 20% had a 100% reduction compared with 19% and 5%, respectively, in the HEA group. The study findings support the use of SMT and HEA for the short-term, conservative treatment of patients with subacute and chronic BRLP. (doi:10.7556/jaoa.2015.013)

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