

# Collected Scientific Research Relating to the Use of Osteopathy with Back pain

## Important:

1) Osteopathy involves helping people's own self-healing abilities to work better, rather than focussing primarily on particular conditions.

2) Each person is different, and osteopathy treats them differently.

Therefore people respond to osteopathic treatment in different ways. Treatments that work for one person cannot be guaranteed to work for another person in the same way. The fact that there is scientific research supporting a treatment in a group of people does not mean that it will always work in the same way (which is probably true of all research).

A number of things make research into osteopathy challenging. These include the two aspects of osteopathy mentioned above, and also the lack of major commercial interests to provide funding in expectation of financial returns. At the same time, there is an emerging body of research demonstrating the usefulness of osteopathic treatment.

Please note: there is room for debate about the classifications used for these studies. Please let John Smartt know if you believe that any of these classifications are incorrect.

# These studies are from peer-reviewed journals

Number  
of studies:  
61

## Clinically and statistically significant results

Number  
of studies:  
57

### Systematic reviews

Number of studies: 5

HelgeFranke H, Franke J, Belz S, GaryFryer G 2017 **Osteopathic manipulative treatment for low back and pelvic girdle pain during and after pregnancy: A systematic review and meta-analysis** Journal of Bodywork and Movement Therapies Volume 21, Issue 4, October, Pages 752-762 <https://www.sciencedirect.com/science/article/pii/S1360859217301146>

#### "Background

Low back pain (LBP) is a common complaint during pregnancy. This study examined the effectiveness of osteopathic manipulative treatment (OMT) for LBP in pregnant or postpartum women.

#### Methods

Randomized controlled trials unrestricted by language were reviewed. Outcomes were pain and functional status. Mean difference (MD) or standard mean difference (SMD) and overall effect size were calculated.

#### Results

Of 102 studies, 5 examined OMT for LBP in pregnancy and 3 for postpartum LBP. Moderate-quality evidence suggested OMT had a significant medium-sized effect on decreasing pain (MD, -16.65) and increasing functional status (SMD, -0.50) in pregnant women with LBP. Low-quality evidence suggested OMT had a significant moderate-sized effect on decreasing pain (MD, -38.00) and increasing functional status (SMD, -2.12) in postpartum women with LBP.

#### Conclusions

This review suggests OMT produces clinically relevant benefits for pregnant or postpartum women with LBP. Further research may change estimates of effect, and larger, high-quality randomized controlled trials with robust comparison groups are recommended."

Clinical Guideline Subcommittee on Low Back Pain; American Osteopathic Association. 2010 **American Osteopathic Association guidelines for osteopathic manipulative treatment (OMT) for patients with low back pain.** J Am Osteopath Assoc Nov;110(11):653-66 <http://jaoa.org/article.aspx?articleid=2093924>

"Six trials, involving eight OMT vs control treatment comparisons, were included because they were randomized controlled trials of OMT that involved blinded assessment of low back pain in ambulatory settings. Data on trial methodology, OMT and control treatments, and low back pain outcomes were abstracted by two independent reviewers. Effect sizes were computed using Cohen d statistic, and meta-analysis results were weighted by the inverse variance of individual comparisons"

"Osteopathic manipulative treatment significantly reduced low back pain (effect size, -0.30; 95% confidence interval, -0.47 to -0.13; P=.001). Subgroup analyses demonstrated significant pain reductions in trials of OMT vs active treatment or placebo control and OMT vs no treatment control. "

"Significant pain reductions were also observed during short-, intermediate-, and long-term follow-up."

"Osteopathic manipulative treatment significantly reduces low back pain. The level of pain reduction is clinically important, greater than expected from placebo effects alone, and may persist through the first year of treatment."

Licciardone JC, Brimhall AK, King LN 2005 **Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials**. BMC Musculoskelet Disord Aug 4;6:43 <http://www.ncbi.nlm.nih.gov/pubmed/16080794>

"Overall, OMT [osteopathic manipulative therapy] significantly reduced low back pain (effect size, -0.30; 95% confidence interval, -0.47 - -0.13; P = .001). Stratified analyses demonstrated significant pain reductions in trials of OMT vs active treatment or placebo control and OMT vs no treatment control. There were significant pain reductions with OMT regardless of whether trials were performed in the United Kingdom or the United States. Significant pain reductions were also observed during short-, intermediate-, and long-term follow-up."

"OMT significantly reduces low back pain. The level of pain reduction is greater than expected from placebo effects alone and persists for at least three months. Additional research is warranted to elucidate mechanistically how OMT exerts its effects, to determine if OMT benefits are long lasting, and to assess the cost-effectiveness of OMT as a complementary treatment for low back pain."

Whitman JM, Flynn TW, Fritz JM. 2003 **Nonsurgical management of patients with lumbar spinal stenosis: a literature review and a case series of three patients managed with physical therapy**. Phys Med Rehabil Clin N Am Feb;14(1):77-101, vi-vii <https://www.ncbi.nlm.nih.gov/pubmed/12622484>

"This article critically reviews the available literature regarding nonsurgical management for lumbar spinal stenosis (LSS) and presents a case series of three patients managed with manual physical therapy. This case series uses a well-defined, impairment-based, noninvasive, outpatient treatment program for patients with LSS and provides patient-centered, long-term outcome information. The outpatient treatment program focuses on patients' individualized, prioritized impairments identified on initial examination, and emphasizes manual physical therapy techniques targeting each patient's impairments, specific exercises to either reinforce the manual physical therapy treatment or strengthen specific muscles, and a walking program. The results demonstrate that patients with LSS can make significant gains in disability, symptoms, and function in relatively short periods of time and that these gains can be maintained for up to 18 months. Under this physical therapy program, patients experienced significant improvements, and the potential adverse effects of invasive therapies or pharmacologic management strategies, which often are included in other "nonsurgical" treatment programs, were avoided."

Bronfort G, Haas M, Evans RL, Bouter LM. 2004 **Efficacy of spinal manipulation and mobilization for low back pain and neck pain: a systematic review and best evidence synthesis**. The Spine Journal May-Jun;4(3):335-56 <http://www.ncbi.nlm.nih.gov/pubmed/15125860>

"Our data synthesis suggests that recommendations can be made with some confidence regarding the use of SMT (spinal manipulation therapy) and/or MOB (mobilisation) as a viable option for the treatment of both low back pain and NP."

Perez LL, A.Sneed J, Eland D, 2012 **Evidence-based osteopathic manipulative treatment for common conditions** Osteopathic Family Physician Volume 4, Issue 1, January–February, Pages 8-12 <https://www.sciencedirect.com/science/article/pii/S1877573X11002188>

"Osteopathic manipulative treatment (OMT) is a unique aspect of osteopathic medicine that has served as a useful adjunct to traditional surgical and pharmacological treatment of medical conditions for more than 100 years. Using an approach based on five basic body functions, as well as traditional modern medical and surgical therapeutics, OMT enhances the body's innate ability to fight inflammation and other systemic results of disease states. OMT has been shown to be a safe and cost-effective treatment for back pain, in particular for patients who have continued pain despite standard treatments and for those who are unable or unwilling to take pain relievers. For patients with pneumonia, OMT can reduce the need for potentially dangerous antibiotics and reduce the length of a patient's hospital stay. In addition, in children with otitis media, OMT can be used as an adjunct to antibiotic and surgical treatment to decrease morbidity, reduce antibiotic usage, and decrease the discomfort associated with the symptoms of a middle ear infection."

Backstrom KM, Whitman JM, Flynn TW. 2011 **Lumbar spinal stenosis-diagnosis and management of the aging spine**. Manual Therapy Aug;16(4):308-17 <http://www.ncbi.nlm.nih.gov/pubmed/21367646>

"Low back pain and lumbar spinal stenosis (LSS) is an extensive problem in the elderly presenting with pain, disability, fall risk and depression. The incidence of LSS is projected to continue to grow as the population ages. In light of the risks, costs and lack of long-term results associated with surgery, and the positive outcomes in studies utilizing physical therapy interventions for the LSS patient, a non-invasive approach is recommended as a first line of intervention. This Masterclass presents an overview of LSS in terms of clinical examination, diagnosis, and intervention. A focused management approach to the patient with LSS is put forward that emphasizes a defined four-fold approach of patient education, manual physical therapy, mobility and strengthening exercises, and aerobic conditioning."

Rademeyer I 2003 **Manual therapy for lumbar spinal stenosis: a comprehensive physical therapy approach**. Phys Med Rehabil Clin N Am Feb;14(1):103-10, vii <http://www.ncbi.nlm.nih.gov/pubmed/12622485>

"A physical therapy approach to lumbar spinal stenosis involves techniques directed at opening up the neurovascular spaces in the lumbar spine to reduce the stenosis. This entails manual therapy techniques for improving intervertebral motion, regaining neural mobility, and restoring muscle function, followed by an active exercise program that often involves flexion exercises. Techniques for unloading the spine and patient education are included in this physical therapy approach. A successful functional outcome requires a comprehensive and individualized approach to the patient with spinal stenosis."

Cislo S, Ramirez MA, Schwartz HR. 1991 **Low back pain: treatment of forward and backward sacral torsions using counterstrain technique**. J Am Osteopath Assoc Mar;91(3):255-6, 259 <https://www.ncbi.nlm.nih.gov/pubmed/1827633>

"The sacral foramen tender points are newly identified, specific indicators of somatic dysfunction. The use of counterstrain to release these tender points and relieve the associated somatic dysfunction is a safe, specific, and nontraumatic means of treating any patient even in the presence of illness or acute trauma. These new tender points and their releases provide a means of treating sacral torsions with counterstrain."

Martí-Salvador M, Hidalgo-Moreno L, Doménech-Fernández J, Lisón JF, Arguisuelas MD. 2018 **Osteopathic manipulative treatment including specific diaphragm techniques improves pain and disability in chronic non-specific low back pain: a randomized trial.** Arch Phys Med Rehabil May 19 <https://www.ncbi.nlm.nih.gov/pubmed/29787734>

**"OBJECTIVE:**

To investigate the effects of an osteopathic manipulative treatment (OMT) which includes a diaphragm intervention compared to the same OMT with a sham-diaphragm intervention in chronic non-specific low back pain (NS-CLBP).

**DESIGN:**

Parallel group randomized controlled trial SETTING: private and institutional health centers.

**PARTICIPANTS:**

Sixty-six subjects (18-60 yrs.) with a diagnosis of NS-CLBP lasting at least 3 months.

**INTERVENTIONS:**

Participants were randomized to receive either an OMT protocol including specific diaphragm techniques (n=33) or the same OMT protocol with a sham-diaphragm intervention (n=33), conducted in five sessions provided during 4 weeks.

**MAIN OUTCOME MEASURE:**

The primary outcomes were pain [evaluated with the Short-Form McGill Pain Questionnaire (SF-MPQ) and the Visual Analogue Scale (VAS)] and disability [assessed with the Roland Morris Questionnaire (RMQ) and the Oswestry Disability Index (ODI)]. Secondary outcomes were fear-avoidance beliefs, level of anxiety and depression, and pain catastrophization. All outcome measures were evaluated at baseline, at week 4, and at week 12.

**RESULTS:**

A statistically significant reduction was observed in the experimental group compared to the sham group, in all variables assessed at week 4 and at week 12 [SF-MPQ (MD -6.2;95%CI: -8.6 to -3.8); VAS (MD -2.7;95%CI: -3.6 to -1.8); RMQ (MD -3.8;95%CI: -5.4 to -2.2); ODI (MD -10.6;95%CI: -14.9 to 6.3)]. Moreover, improvements in pain and disability were clinically relevant.

**CONCLUSION:**

An OMT protocol that includes diaphragm techniques produces significant and clinically relevant improvements in pain and disability in patients with NS-CLBP compared to the same OMT protocol using sham diaphragm-techniques.

Tamer S, Öz M, Ülger Ö 2017 **The effect of visceral osteopathic manual therapy applications on pain, quality of life and function in patients with chronic nonspecific low back pain.** J Back Musculoskelet Rehabil 30(3):419-425 <https://www.ncbi.nlm.nih.gov/pubmed/27858681>

"The efficacy of osteopathic manual therapy (OMT) applications on chronic nonspecific low back pain (LBP) has been demonstrated. However, visceral applications, which are an important part of OMT techniques, have not been included in those studies.

**OBJECTIVE:**

The study's objective was to determine the effect of OMT including visceral applications on the function and quality of life (QoL) in patients with chronic nonspecific LBP.

**DESIGN:**

The study was designed with a simple method of block randomization.

**METHODS:**

Thirty-nine patients with chronic nonspecific LBP were included in the study. OMT group consisted of 19 patients to whom OMT and exercise methods were applied. The visceral osteopathic manual therapy (vOMT) group consisted of 20 patients to whom visceral applications were applied in addition to the applications carried out in the other group. Ten sessions were performed over a two-week period. Pain (VAS), function (Oswestry Index) and QoL (SF-36) assessments were carried out before the treatment and on the sixth week of treatment.

**RESULTS:**

Both of the treatments were found to be effective on pain and function, physical function, pain, general health, social function of the QoL sub-parameter. vOMT was effective on all sub-QoL parameters ( $p < 0.05$ ). Comparing the groups, it was determined that the energy and physical limitations of the QoL scores in vOMT were higher ( $p < 0.05$ ).

**CONCLUSION:**

Visceral applications on patients with non-specific LBP gave positive results together with OMT and exercise methods. We believe that visceral fascial limitations, which we think cause limitations and pain in the lumbar segment, should be taken into consideration."

Arguisuelas MD, Lisón JF, Sánchez-Zuriaga D, Martínez-Hurtado I, Doménech-Fernández J 2017 **Effects of Myofascial Release in Nonspecific Chronic Low Back Pain: A Randomized Clinical Trial**. Spine (Phila Pa 1976) May 1;42(9):627-634 <https://www.ncbi.nlm.nih.gov/pubmed/28441294>

**"STUDY DESIGN:**

Double-blind, randomized parallel sham-controlled trial with concealed allocation and intention-to-treat analysis.

**OBJECTIVE:**

To investigate the effects of an isolate myofascial release (MFR) protocol on pain, disability, and fear-avoidance beliefs in patients with chronic low back pain (CLBP).

**SUMMARY OF BACKGROUND DATA:**

MFR is a form of manual medicine widely used by physiotherapists in the management of different musculoskeletal pathologies. Up to this moment, no previous studies have reported the effects of an isolated MFR treatment in patients with CLBP.

**METHODS:**

Fifty-four participants, with nonspecific CLBP, were randomized to MFR group ( $n=27$ ) receiving four sessions of myofascial treatment, each lasting 40 minutes, and to control group ( $n=27$ ) receiving a sham MFR. Variables studied were pain measured by means Short Form McGill Pain Questionnaire (SF-MPQ) and visual analog scale (VAS), disability measured with Roland Morris Questionnaire, and fear-avoidance beliefs measured with Fear-Avoidance Beliefs Questionnaire.

**RESULTS:**

Subjects receiving MFR displayed significant improvements in pain (SF-MPQ) (mean difference  $-7.8$ ; 95% confidence interval [CI]:  $-14.5$  to  $-1.1$ ,  $P=0.023$ ) and sensory SF-MPQ subscale (mean difference  $-6.1$ ; 95% CI:  $-10.8$  to  $-1.5$ ,  $P=0.011$ ) compared to the sham group, but no differences were found in VAS between groups. Disability and the Fear-Avoidance Beliefs Questionnaire score also displayed a significant decrease in the MFR group ( $P < 0.05$ ) as compared to sham MFR.

**CONCLUSION:**

MFR therapy produced a significant improvement in both pain and disability. Because the minimal clinically important differences in pain and disability are, however, included in the 95% CI, we cannot know whether this improvement is clinically relevant."

Castro-Sánchez AM, Lara-Palomo IC, Matarán-Peñarrocha GA, Saavedra-Hernández M, Pérez-Mármol JM, Aguilar-Ferrándiz ME 2016 **Benefits of Craniosacral Therapy in Patients with Chronic Low Back Pain: A Randomized Controlled Trial**. The Journal of Alternative and Complementary Medicine Aug;22(8):650-7 <https://www.ncbi.nlm.nih.gov/pubmed/27347698>

**"Abstract**

**OBJECTIVES:**

To evaluate the effects of craniosacral therapy on disability, pain intensity, quality of life, and mobility in patients with low back pain.

**DESIGN:**

A single-blinded randomized controlled trial.

**PATIENTS:**

Sixty-four patients with chronic nonspecific low back pain (mean age  $\pm$  SD,  $50 \pm 12$  years; 66% female) who were referred for physical therapy at a clinical unit of the Health Science School of the University of Almeria (Spain).

#### INTERVENTIONS:

Participants were randomly assigned to an experimental group (10 sessions of craniosacral therapy) or a control group (10 sessions of classic massage).

#### OUTCOME MEASURES:

Disability (Roland Morris Disability Questionnaire [RMQ, primary outcome] and Oswestry Disability Index), pain intensity (10-point numeric pain rating scale), kinesiophobia (Tampa Scale of Kinesiophobia), isometric endurance of trunk flexor muscles (McQuade test), lumbar mobility in flexion, hemoglobin oxygen saturation, systolic blood pressure, diastolic blood pressure, hemodynamic measures (cardiac index), and biochemical estimation of interstitial fluid. These outcomes were registered at baseline, after treatment, and 1-month follow-up.

#### RESULTS:

No statistically significant differences were seen between groups for the main outcome of the study, the RMQ ( $p = 0.060$ ). However, patients receiving craniosacral therapy experienced greater improvement in pain intensity ( $p \leq 0.008$ ), hemoglobin oxygen saturation ( $p \leq 0.028$ ), and systolic blood pressure ( $p \leq 0.029$ ) at immediate- and medium-term and serum potassium ( $p = 0.023$ ) level and magnesium ( $p = 0.012$ ) at short-term than those receiving classic massage.

#### CONCLUSIONS:

Ten sessions of craniosacral therapy resulted in a statistically greater improvement in pain intensity, hemoglobin oxygen saturation, systolic blood pressure, serum potassium, and magnesium level than did 10 sessions of classic massage in patients with low back pain."

Kim BJ, Ahn J, Cho H, Kim D, Kim T, Yoon B, 2015 **Rehabilitation with osteopathic manipulative treatment after lumbar disc surgery: A randomised, controlled pilot study** International Journal of Osteopathic Medicine Volume 18, Issue 3, September , Pages 181–188 <http://www.sciencedirect.com/science/article/pii/S1746068914001205>

"Randomised controlled pilot study."

"Patients who underwent lumbar microdiscectomy due to low back pain with referred leg pain resulting from a herniated disc were enrolled in the study. Thirty-three patients aged 25–65 years were randomly assigned using a random number table to the OMT ( $n = 16$ ) group or exercise group ( $n = 17$ ). Patients received the allocated intervention twice a week for 4 weeks. Each session was 30 min. Primary outcomes were post-surgical functional disability and intensity of low back and leg pain"

"Thirty-three participants were analysed. Both rehabilitation interventions improved all primary and secondary outcomes. Post-surgical physical disability improved more with OMT rehabilitation than the exercise programme (54% vs. 26%,  $P < 0.05$ ). Residual leg pain decreased with OMT (53%) and exercise (17%). Post-operative low back pain decreased by 37% in the OMT group and 10% in the exercise group. Patients in both groups required less frequent use of medication and were highly satisfied with the rehabilitation interventions. No side effects or complications from any intervention were reported."

"Post-surgical physical disability improved more with OMT rehabilitation than the exercise programme (54% vs. 26%,  $P < 0.05$ ). Residual leg pain decreased with OMT (53%) and exercise (17%). Post-operative low back pain decreased by 37% in the OMT group and 10% in the exercise group. Patients in both groups required less frequent use of medication and were highly satisfied with the rehabilitation interventions. No side effects or complications from any intervention were reported."

Licciardone JC, Kearns CM, Crow WT 2014 **Changes in biomechanical dysfunction and low back pain reduction with osteopathic manual treatment: Results from the OSTEOPATHIC Trial** Manual Therapy Vol 19 (4) pages 324-330 <http://www.sciencedirect.com/science/article/pii/S1356689X14000381>

"The purpose of this study was to measure changes in biomechanical dysfunction following osteopathic manual treatment (OMT) and to assess how such changes predict subsequent low back pain (LBP) outcomes. Secondary analyses were performed with data collected during the OSTEOPATHIC Trial wherein a randomized, double-blind, sham-controlled,  $2 \times 2$  factorial design was used to study OMT for chronic LBP. At baseline, prevalence rates of non-neutral lumbar dysfunction, pubic shear, innominate shear, restricted sacral nutation, and psoas

syndrome were determined in 230 patients who received OMT. Five OMT sessions were provided at weeks 0, 1, 2, 4, and 6, and the prevalence of each biomechanical dysfunction was again measured at week 8 immediately before the final OMT session. Moderate pain improvement ( $\geq 30\%$  reduction on a 100-mm visual analogue scale) at week 12 defined a successful LBP response to treatment. Prevalence rates at baseline were: non-neutral lumbar dysfunction, 124 (54%); pubic shear, 191 (83%); innominate shear, 69 (30%); restricted sacral nutation, 87 (38%), and psoas syndrome, 117 (51%). Significant improvements in each biomechanical dysfunction were observed with OMT"

Licciardone JC, Aryal S, 2014 **Clinical response and relapse in patients with chronic low back pain following osteopathic manual treatment: Results from the OSTEOPATHIC Trial** Manual Therapy Volume 19, Issue 6, December , Pages 541–548 <http://www.sciencedirect.com/science/article/pii/S1356689X14001143>

"Clinical response and relapse following a regimen of osteopathic manual treatment (OMT) were assessed in patients with chronic low back pain (LBP) within the OSTEOPATHIC Trial, a randomized, double-blind, sham-controlled study. Initial clinical response and subsequent stability of response, including final response and relapse status at week 12, were determined in 186 patients with high baseline pain severity ( $\geq 50$  mm on a 100-mm visual analogue scale). Substantial improvement in LBP, defined as 50% or greater pain reduction relative to baseline, was used to assess clinical response at weeks 1, 2, 4, 6, 8, and 12. Sixty-two (65%) patients in the OMT group attained an initial clinical response vs. 41 (45%) patients in the sham OMT group (risk ratio [RR], 1.45; 95% confidence interval [CI], 1.11–1.90)."

"Overall, 49 (52%) patients in the OMT group attained or maintained a clinical response at week 12 vs. 23 (25%) patients in the sham OMT group (RR, 2.04; 95% CI, 1.36–3.05). The large effect size for short-term efficacy of OMT was driven by stable responders who did not relapse."

Vieira-Pellenz F, Oliva-Pascual-Vaca A, Rodriguez-Blanco C, Heredia-Rizo AM, Ricard F, Almazán-Campos G 2014 **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 Sep;95(9):1613-9 <http://www.ncbi.nlm.nih.gov/pubmed/24862763>

"To evaluate the short-term effect on spinal mobility, pain perception, neural mechanosensitivity, and full height recovery after high-velocity, low-amplitude (HVLA) spinal manipulation (SM) in the lumbosacral joint (L5-S1)."

"Men (N=40; mean age  $\pm$  SD, 38  $\pm$  9.14 y) with diagnosed degenerative lumbar disease at L5-S1 were randomly divided into 2 groups: a treatment group (TG) (n=20; mean age  $\pm$  SD, 39  $\pm$  9.12 y) and a control group (CG) (n=20; mean age  $\pm$  SD, 37  $\pm$  9.31 y). All participants completed the intervention and follow-up evaluations."

"A single L5-S1 SM technique (pull-move) was performed in the TG, whereas the CG received a single placebo intervention."

"Measures included assessing the subject's height using a stadiometer. The secondary outcome measures included perceived low back pain, evaluated using a visual analog scale; neural mechanosensitivity, as assessed using the passive straight-leg raise (SLR) test; and amount of spinal mobility in flexion, as measured using the finger-to-floor distance (FFD) test."

"The intragroup comparison indicated a significant improvement in all variables in the TG ( $P < .001$ ). There were no changes in the CG, except for the FFD test ( $P = .008$ ). In the between-group comparison of the mean differences from pre- to postintervention, there was statistical significance for all cases ( $P < .001$ )"

"An HVLA SM in the lumbosacral joint performed on men with degenerative disk disease immediately improves self-perceived pain, spinal mobility in flexion, hip flexion during the passive SLR test, and subjects' full height. Future studies should include women and should evaluate the long-term results."

Licciardone JC, Kearns CM, Hodge LM, Minotti DE. 2013 **Osteopathic manual treatment in patients with diabetes mellitus and comorbid chronic low back pain: subgroup results**

"Severe somatic dysfunction was present significantly more often in patients with diabetes mellitus than in patients without diabetes mellitus. Patients with diabetes mellitus who received OMT [osteopathic manipulative therapy] had significant reductions in LBP [low back pain] severity during the 12-week period. Decreased circulating levels of TNF- $\alpha$  may represent a possible mechanism for OMT effects in patients with diabetes mellitus."

Licciardone JC, Kearns CM, Minotti DE 2013 **Outcomes of osteopathic manual treatment for chronic low back pain according to baseline pain severity: results from the OSTEOPATHIC Trial**. Manual Therapy Dec;18(6):533-40 <http://www.ncbi.nlm.nih.gov/pubmed/23759340>

"The OSTEOPATHIC Trial used a randomized, double-blind, sham-controlled, 2 $\times$ 2 factorial design to study OMT [osteopathic manual treatment] for chronic LBP [low back pain]. A total of 269 (59%) patients reported low baseline pain severity (LBPS) (<50 mm/100 mm), whereas 186 (41%) patients reported high baseline pain severity (HBPS) ( $\geq$ 50 mm/100 mm). Six OMT sessions were provided over eight weeks and outcomes were assessed at week 12. The primary outcome was substantial LBP improvement ( $\geq$ 50% pain reduction). The Roland-Morris Disability Questionnaire (RMDQ) and eight other secondary outcomes were also studied. Response ratios (RRs) and 95% confidence intervals (CIs) were used in conjunction with Cochrane Back Review Group criteria to determine OMT effects."

"There was a large effect size for OMT in providing substantial LBP improvement in patients with HBPS (RR, 2.04; 95% CI, 1.36-3.05;  $P < 0.001$ ). This was accompanied by clinically important improvement in back-specific functioning on the RMDQ (RR, 1.80; 95% CI, 1.08-3.01;  $P = 0.02$ ). Both RRs were significantly greater than those observed in patients with LBPS. Osteopathic manual treatment was consistently associated with benefits in all other secondary outcomes in patients with HBPS, although the statistical significance and clinical relevance of results varied."

"The large effect size for OMT in providing substantial pain reduction in patients with chronic LBP of high severity was associated with clinically important improvement in back-specific functioning. Thus, OMT may be an attractive option in such patients before proceeding to more invasive and costly treatments."

von Heymann W, Schloemer P, Timm J, Muehlbauer B 2013 **Spinal High-Velocity Low Amplitude Manipulation in Acute Nonspecific Low Back Pain: A Double-Blinded Randomized Controlled Trial in Comparison With Diclofenac and Placebo** Spine Issue: Volume 38(7), 01 April, p 540–548 <http://www.ncbi.nlm.nih.gov/pubmed/23026869>

"Objective. To investigate in acute nonspecific low back pain (LBP) the effectiveness of spinal high-velocity low-amplitude (HVLA) manipulation compared with the nonsteroidal anti-inflammatory drug diclofenac and with placebo.

Summary of Background Data. LBP is an important economical factor in all industrialized countries. Few studies have evaluated the effectiveness of spinal manipulation in comparison to nonsteroidal anti-inflammatory drugs or placebo regarding satisfaction and function of the patient, off-work time, and rescue medication.

Methods. A total of 101 patients with acute LBP (for <48 hr) were recruited from 5 outpatient practices, exclusion criteria were numerous and strict. The subjects were randomized to 3 groups: (1) spinal manipulation and placebo-diclofenac; (2) sham manipulation and diclofenac; (3) sham manipulation and placebo-diclofenac. Outcomes registered by a second and blinded investigator included self-rated physical disability, function (SF-12), off-work time, and rescue medication between baseline and 12 weeks after randomization.

Results. Thirty-seven subjects received spinal manipulation, 38 diclofenac, and 25 no active treatment. The placebo group with a high number of dropouts for unsustainable pain was closed praecox. Comparing the 2 active arms with the placebo group the intervention groups were significantly superior to the control group. Ninety subjects were analyzed in the collective intention to treat. Comparing the 2 intervention groups, the manipulation group was significantly better than the diclofenac group (Mann-Whitney test:  $P = 0.0134$ ). No adverse effects or harm

was registered.

Conclusion. In a subgroup of patients with acute nonspecific LBP, spinal manipulation was significantly better than nonsteroidal anti-inflammatory drug diclofenac and clinically superior to placebo."

Licciardone JC, Minotti DE, Gatchel RJ, Kearns CM, Singh KP. 2013 **Osteopathic manual treatment and ultrasound therapy for chronic low back pain: a randomized controlled trial.** *Ann Fam Med* Mar-Apr;11(2):122-9 <http://www.ncbi.nlm.nih.gov/pubmed/23508598>

"PURPOSE:

We studied the efficacy of osteopathic manual treatment (OMT) and ultrasound therapy (UST) for chronic low back pain.

METHODS:

A randomized, double-blind, sham-controlled, 2 × 2 factorial design was used to study OMT and UST for short-term relief of nonspecific chronic low back pain. The 455 patients were randomized to OMT (n = 230) or sham OMT (n = 225) main effects groups, and to UST (n = 233) or sham UST (n = 222) main effects groups. Six treatment sessions were provided over 8 weeks. Intention-to-treat analysis was performed to measure moderate and substantial improvements in low back pain at week 12 (30% or greater and 50% or greater pain reductions from baseline, respectively). Five secondary outcomes, safety, and treatment adherence were also assessed.

RESULTS:

There was no statistical interaction between OMT and UST. Patients receiving OMT were more likely than patients receiving sham OMT to achieve moderate (response ratio [RR] = 1.38; 95% CI, 1.16-1.64; P <.001) and substantial (RR = 1.41, 95% CI, 1.13-1.76; P = .002) improvements in low back pain at week 12. These improvements met the Cochrane Back Review Group criterion for a medium effect size. Back-specific functioning, general health, work disability specific to low back pain, safety outcomes, and treatment adherence did not differ between patients receiving OMT and sham OMT. Nevertheless, patients in the OMT group were more likely to be very satisfied with their back care throughout the study (P <.001). Patients receiving OMT used prescription drugs for low back pain less frequently during the 12 weeks than did patients in the sham OMT group (use ratio = 0.66, 95% CI, 0.43-1.00; P = .048). Ultrasound therapy was not efficacious.

CONCLUSIONS:

The OMT regimen met or exceeded the Cochrane Back Review Group criterion for a medium effect size in relieving chronic low back pain. It was safe, parsimonious, and well accepted by patients."

Tozzi P, Bongiorno D, Vitturinia C, 2012 **Low back pain and kidney mobility: local osteopathic fascial manipulation decreases pain perception and improves renal mobility** *Journal of Bodywork and Movement Therapies* Volume 16, Issue 3, July , Pages 381–391 <http://www.sciencedirect.com/science/article/pii/S1360859212000605>

"Objectives

a) To calculate and compare a Kidney Mobility Score (KMS) in asymptomatic and Low Back Pain (LBP) individuals through real-time Ultrasound (US) investigation. b) To assess the effect of Osteopathic Fascial Manipulation (OFM), consisting of Still Technique (ST) and Fascial Unwinding (FU), on renal mobility in people with non-specific LBP. c) To evaluate 'if' and 'to what degree' pain perception may vary in patients with LBP, after OFM is applied.

Methods

101 asymptomatic people (F 30; M 71; mean age 38.9 ± 8) were evaluated by abdominal US screening. The distance between the superior renal pole of the right kidney and the ipsilateral diaphragmatic pillar was calculated in both maximal expiration (RdE) and maximal inspiration (RdI). The mean of the RdE–RdI ratios provided a Kidney Mobility Score (KMS) in the cohort of asymptomatic people. The same procedure was applied to 140 participants (F 66; M 74; mean age 39.3 ± 8) complaining of non-specific LBP: 109 of whom were randomly assigned to the Experimental group and 31 to the Control group. For both groups, a difference of RdE and RdI values was calculated (RD = RdE–RdI), before (RD-T0) and after (RD-T1) treatment was delivered, to assess the effective range of right kidney mobility.

## Evaluation

A blind assessment of each patient was carried using US screening. Both groups completed a Short-Form McGill Pain Assessment Questionnaire (SF-MPQ) on the day of recruitment (SF-MPQ T0) as well as on the third day following treatment (SF-MPQ T1). An Osteopathic assessment of the thoraco-lumbo-pelvic region to all the Experimental participants was performed, in order to identify specific areas of major myofascial tension.

## Intervention

Each individual of the Experimental group received OFM by the same Osteopath who had previously assessed them. A sham-treatment was applied to the Control group for the equivalent amount of time.

## Results

a) The factorial ANOVA test showed a significant difference ( $p$ -value  $< 0.05$ ) between KMS in asymptomatic individuals (1.92 mm, Std. Dev. 1.14) compared with the findings in patients with LBP (1.52 mm, Std. Dev. 0.79). b) The ANOVA test at repeated measures showed a significant difference ( $p$ -value  $< 0.0001$ ) between pre- to post-RD values of the Experimental group compared with those found in the Control. c) A significant difference ( $p$ -value  $< 0.0001$ ) between pre- to post-SF-MPQ results was found in the Experimental cohort compared with those obtained in the Control.

## Conclusions

People with non-specific LBP present with a reduced range of kidney mobility compared to the

Vismara L, Cimolin V, Menegonia F, Zaina F, Galli M, Negrini S, Villa V, Capodaglio P, 2012 **Osteopathic manipulative treatment in obese patients with chronic low back pain: A pilot study** *Manual Therapy* Volume 17, Issue 5, October, Pages 451–455 <http://www.sciencedirect.com/science/article/pii/S1356689X12000987>

"We designed a randomized controlled study to investigate whether Osteopathic Manipulative Treatment (OMT) combined with specific exercises (SE) is more effective than SE alone in obese patients with cLBP [chronic low back pain]."

"Significant effects on kinematics were reported only for OMT + SE with an improvement in thoracic range of motion of nearly 20%. All scores of the clinical scales used improved significantly. The greatest improvements occurred in the OMT + SE group."

"Combined rehabilitation treatment including Osteopathic Manipulative Treatment (OMT + SE) showed to be effective in improving biomechanical parameters of the thoracic spine in obese patients with cLBP. Such results are to be attributed to OMT, since they were not evident in the SE group. We also observed a reduction of disability and pain. "

Parker J, Heinking KP, Kappler RE 2012 **Efficacy of osteopathic manipulative treatment for low back pain in euhydrated and hypohydrated conditions: a randomized crossover trial.** *J Am Osteopath Assoc* May;112(5):276-84 <http://www.ncbi.nlm.nih.gov/pubmed/22582197>

"Both euhydrated and hypohydrated conditions were achieved in each participant by modifying water consumption for 36 hours before OMT [osteopathic manipulative therapy] sessions. received 2 sessions of OMT, each in a different hydration condition and with a 1-week washout period in between."

"Improvements in total and severe number of lumbar somatic dysfunction ( $P=.001$  and  $P=.013$ , respectively) and number of asymmetric landmarks on standing structural examination ( $P=.002$ ) were found to be greater in the euhydrated vs the hypohydrated condition. PARTICIPANTS had a mean of 2 fewer areas of posttreatment somatic dysfunction when euhydrated than when hypohydrated, and they had a mean decrease of 2 asymmetric landmarks on the standing structural examination when euhydrated but none when hypohydrated. Osteopathic manipulative treatment improved self-reported pain immediately after treatment regardless of hydration status. Outcome measures improved for all participants, with greater improvement observed after participants were treated in the euhydrated condition than when in the hypohydrated condition. It is reasonable for clinicians to recommend that patients increase their hydration to optimize treatment."

Cruser dA, Maurer D, Hensel K, Brown SK, White K, Stoll ST. 2012 **A randomized, controlled**

**trial of osteopathic manipulative treatment for acute low back pain in active duty military personnel.** *J Man Manip Ther* Feb;20(1):5-15 <http://www.ncbi.nlm.nih.gov/pubmed/23372389>

"Sixty-three male and female soldiers ages 18 to 35 were randomly assigned to a group receiving OMT [osteopathic manipulative treatment] plus usual care or a group receiving usual care only (UCO)."

"The primary outcome measures were pain on the quadruple visual analog scale, and functioning on the Roland Morris Disability Questionnaire. Outcomes were measured immediately preceding each of four treatment sessions and at four weeks post-trial. "

"Analysis found significantly greater post-trial improvement in 'Pain Now' for OMT compared to UCO ( $P=0.026$ ). Furthermore, the OMT group reported less 'Pain Now' and 'Pain Typical' at all visits ( $P=0.025$  and  $P=0.020$  respectively). Osteopathic manipulative treatment subjects also tended to achieve a clinically meaningful improvement from baseline on 'Pain at Best' sooner than the UCO subjects. With similar baseline expectations, OMT subjects reported significantly greater satisfaction with treatment and overall self-reported improvement ( $P<0.01$ )."

"This study supports the effectiveness of OMT in reducing ALBP [acute low back pain] pain in active duty military personnel."

McSweeney TP, Thomson OP, Johnston R 2012 **The immediate effects of sigmoid colon manipulation on pressure pain thresholds in the lumbar spine.** *Journal of Bodywork and Movement Therapies* Oct;16(4):416-23 [http://www.bodyworkmovementtherapies.com/article/S1360-8592\(12\)00063-0/abstract?cc=y=](http://www.bodyworkmovementtherapies.com/article/S1360-8592(12)00063-0/abstract?cc=y=)

"A single-blinded, randomised, within subjects, repeated measures design was conducted on 15 asymptomatic subjects. Pressure pain thresholds were measured at the L1 paraspinal musculature and 1st dorsal interosseus before and after osteopathic visceral mobilisation of the sigmoid colon. The results demonstrated a statistically significant improvement in pressure pain thresholds immediately after the intervention ( $P<0.001$ ). This effect was not observed to be systemic, affecting only the L1 paraspinal musculature. This novel study provides new experimental evidence that visceral manual therapy can produce immediate hypoalgesia in somatic structures segmentally related to the organ being mobilised, in asymptomatic subjects."

Arienti C, Daccò S, Piccolo I, Redaelli T 2011 **Osteopathic manipulative treatment is effective on pain control associated to spinal cord injury.** *Spinal Cord* Apr;49(4):515-9 <http://www.ncbi.nlm.nih.gov/pubmed/21135862>

"We enrolled 47 patients with SCI [spinal cord injury], 26 with pain of both nociceptive and neuropathic origin, and 21 with pure neuropathic pain. In all, 33 patients had a complete spinal cord lesion (ASIA level A) and 14 had incomplete lesion (ASIA level B, C and D). The patients were subdivided in a pharmacological group (Ph), a pharmacological osteopathic (PhO) group and an osteopathic (Os) group. The verbal numeric scale (VNS) was used at various time intervals to evaluate treatment outcomes."

"Ph patients reached a 24% improvement in their pain perception, assessed by the VNS scale after 3 weeks of treatment, whereas Os patients reached a 16% improvement in their pain perception for the same weeks. Both treatments per se failed to induce further improvements at later time points. In contrast, the combination of the two approaches yielded a significantly better pain relief both in patients with nociceptive or pure neuropathic pain in the PhO group."

"Our results suggest the OMT is a feasible approach in patients in whom available drugs cannot be used. Moreover, a benefit can be expected by the association of OMT in patients treated according to existing pharmacological protocols."

Lewis C, Khan A, Souvlis T, Sterling M. 2010 **A randomised controlled study examining the short-term effects of Strain-Counterstrain treatment on quantitative sensory measures at digitally tender points in the low back.** *Man Ther* Dec;15(6):536-41 <https://www.ncbi.nlm.nih.gov/pubmed/20576462>

"Strain-Counterstrain (SCS) intervention has been claimed to elicit immediate and sustained

reductions in tenderness at digitally tender points (DTPs), however, there is little experimental evidence to support this. Twenty-eight volunteer participants with low back pain--LBP (17 females and 11 males with mean [SD] age of 39.2 [11.1] and Oswestry disability index of 15.7 [8.6]) participated in this controlled, within-participants study of the immediate and short-term effects of SCS intervention, on pressure pain threshold (PPT) electrical detection threshold (EDT) and electrical pain threshold (EPT) at DTPs in the low back region. Immediate increases in PPT at DTPs were found following all interventions; control intervention: 30.7 kPa [CI 95% - 3.3-64.8] ( $p = 0.041$ ), sham-SCS intervention: 48.2kPa [CI 95% 14.8-81.7] ( $p = 0.008$ ) and SCS intervention: 93.4kPa [CI 95% 60.0-126.9] ( $p < 0.0001$ ). Results suggest that SCS intervention does elicit an immediate quantifiable reduction in tenderness at DTPs but that some of this reduction is attributable to the manual-contact component of the treatment. Increases in PPT at DTPs following SCS intervention did not appear to be maintained between 24 and 96 h after treatment. A further finding was that the control intervention elicited significant increases in both EDT ( $p = 0.044$ ) and EPT ( $p = 0.026$ ). The explanation for these findings is unclear."

Chown M, Whittamore L, Rush M, Allan S, Stott D, Archer M 2008 **A prospective study of patients with chronic back pain randomised to group exercise, physiotherapy or osteopathy** *Physiotherapy* March Volume 94, Issue 1, Pages 21-28 [https://www.physiotherapyjournal.com/article/S0031-9406\(07\)00126-5/abstract](https://www.physiotherapyjournal.com/article/S0031-9406(07)00126-5/abstract)

"Objective

To investigate the difference in outcome between patients treated with group exercise, physiotherapy or osteopathy.

Design

Prospective study of patients referred at random to one of three treatments, with follow-up 6 weeks after discharge and after 12 months.

Setting

National Health Service physiotherapy department at St Albans City Hospital, part of the West Hertfordshire Musculoskeletal Therapy Service.

Participants

Two hundred and thirty-nine patients aged 18–65 years recruited from referrals to the physiotherapy department with chronic low back pain.

Interventions

Eligible patients were randomised to group exercises led by a physiotherapist, one-to-one predominantly manipulative physiotherapy, or osteopathy.

Main outcomes

Oswestry Disability Index (ODI), EuroQol-5D, shuttle walking test and patients' subjective responses to pain and treatment.

Results

All three treatments indicated comparable reductions in mean (95% confidence intervals) ODI at 6-week follow-up: group exercise,  $-4.5$  ( $-0.9$  to  $-8.0$ ); physiotherapy,  $-4.1$  ( $-1.4$  to  $-6.9$ ); and osteopathy,  $-5.0$  ( $-1.6$  to  $-8.4$ ). Attendance rates were significantly lower among the group exercise patients. One-to-one therapies provided evidence of greater patient satisfaction.

Conclusion

The study supports the use of a variety of approaches for the treatment of chronic low back pain. Particular attention needs to be given to the problems of attracting enough participants for group sessions, as these can be difficult to schedule in ways that are convenient for different participants."

Whitman JM, Flynn TW, Childs JD, Wainner RS, Gill HE, Ryder MG, Garber MB, Bennett AC, Fritz JM 2006 **A comparison between two physical therapy treatment programs for patients with lumbar spinal stenosis: a randomized clinical trial.** *Spine (Phila Pa 1976)* Oct 15;31(22):2541-9 <http://www.ncbi.nlm.nih.gov/pubmed/17047542>

"Fifty-eight patients with lumbar spinal stenosis were randomized to one of two 6-week physical therapy programs. One program included manual physical therapy, body weight supported treadmill walking, and exercise (Manual Physical Therapy, Exercise, and Walking Group), while the other included lumbar flexion exercises, a treadmill walking program, and subtherapeutic

ultrasound (Flexion Exercise and Walking Group). Perceived recovery was assessed with a global rating of change scale. Secondary outcomes included: Oswestry, a numerical pain rating scale, a measure of satisfaction, and a treadmill test. Testing occurred at baseline, 6 weeks, and 1 year. Perceived recovery, pain, and other healthcare resources used were collected with a long-term follow-up questionnaire."

"A greater proportion of patients in the manual physical therapy, exercise, and walking group reported recovery at 6 weeks compared with the flexion exercise and walking group ( $P = 0.0015$ ), with a number needed to treat for perceived recovery of 2.6 (confidence interval, 1.8–7.8). At 1 year, 62% and 41% of the manual therapy, exercise, and walking group and the flexion exercise and walking group, respectively, still met the threshold for recovery. Improvements in disability, satisfaction, and treadmill walking tests favored the manual physical therapy, exercise, and walking group at all follow-up points."

"Patients with lumbar spinal stenosis can benefit from physical therapy. Additional gains may be realized with the inclusion of manual physical therapy interventions, exercise, and a progressive body-weight supported treadmill walking program."

Williams NH, Wilkinson C, Russell I, Edwards RT, Hibbs R, Linck P, Muntz R 2003 **Randomized osteopathic manipulation study (ROMANS): pragmatic trial for spinal pain in primary care** Family Practice Volume 20, Issue 6 pp 662–669 <http://fampra.oxfordjournals.org/content/20/6/662.full>

"A pragmatic randomized controlled trial was carried out in a primary care osteopathy clinic accepting referrals from 14 neighbouring practices in North West Wales. A total of 201 patients with neck or back pain of 2–12 weeks duration were allocated at random between usual GP care and an additional three sessions of osteopathic spinal manipulation. The primary outcome measure was the Extended Aberdeen Spine Pain Scale (EASPS). Secondary measures included SF-12, EuroQol and Short-form McGill Pain Questionnaire. Health care costs were estimated from the records of referring GPs"

"Results. Outcomes improved more in the osteopathy group than the usual care group. At 2 months, this improvement was significantly greater in EASPS [95% confidence interval (CI) 0.7–9.8] and SF-12 mental score (95% CI 2.7–10.7). At 6 months, this difference was no longer significant for EASPS (95% CI –1.5 to 10.4), but remained significant for SF-12 mental score (95% CI 1.0–9.9). Mean health care costs attributed to spinal pain were significantly greater by £65 in the osteopathy group (95% CI £32–£155). Though osteopathy also cost £22 more in mean total health care cost, this was not significant (95% CI –£159 to £142).

Conclusion. A primary care osteopathy clinic improved short-term physical and longer term psychological outcomes, at little extra cost. Rigorous multicentre studies are now needed to assess the generalizability of this approach."

Burton AK, Tillotson KM, Cleary J 2000 **Single-blind randomised controlled trial of chemonucleolysis and manipulation in the treatment of symptomatic lumbar disc herniation**. Eur Spine J Jun;9(3):202–7 <https://www.ncbi.nlm.nih.gov/pubmed/10905437>

"This single-blind randomised clinical trial compared osteopathic manipulative treatment with chemonucleolysis (used as a control of known efficacy) for symptomatic lumbar disc herniation. Forty patients with sciatica due to this diagnosis (confirmed by imaging) were treated either by chemonucleolysis or manipulation. Outcomes (leg pain, back pain and self-reported disability) were measured at 2 weeks, 6 weeks and 12 months. The mean values for all outcomes improved in both groups. By 12 months, there was no statistically significant difference in outcome between the treatments, but manipulation produced a statistically significant greater improvement for back pain and disability in the first few weeks. A similar number from both groups required additional orthopaedic intervention; there were no serious complications. Crude cost analysis suggested an overall financial advantage from manipulation. Because osteopathic manipulation produced a 12-month outcome that was equivalent to chemonucleolysis, it can be considered as an option for the treatment of symptomatic lumbar disc herniation, at least in the absence of clear indications for surgery "

Perrin RN, Edwards J, Hartley P 1998 **An evaluation of the effectiveness of osteopathic**

"The term Myalgic Encephalomyelitis (ME) was initially used in the 1950s. ME describes a syndrome where there is general muscle pain associated with evidence of a disturbed nervous system. ME, commonly referred to as Chronic Fatigue Syndrome (CFS), or post-viral fatigue syndrome is a condition in which mental and physical fatigue predominate. It is characterized by gross abnormal muscle fatigue which occurs after relatively mild activity. Other symptoms regularly complained of include sleep disturbance, headaches, cognitive dysfunction, feeling depressed, bouts of low grade fever (not exceeding 38.6C), increased sensitivity to light, back and neck pain, sore throat, irritable bowel and bladder. The symptoms of ME typically become apparent following a viral infection"

"There has been a long-standing debate over the naming of this disorder. Some have expressed the opinion that ME is a highly specific disease, whereas CFS is an umbrella term covering many conditions which exhibit fatigue."

"The treatment of each ME patient consisted of the following techniques:

- (1) Soft tissue massage of the paravertebral muscles, the trapezii, levator scapulae, rhomboids and muscles of respiration.
- (2) High and low velocity manipulation of the thoracic and upper lumbar spinal segments using supine and side-lying combined leverage and thrust techniques.
- (3) Gentle articulation of thoracic and upper lumbar spine, plus the ribs. This was achieved by both long and short lever techniques.
- (4) Functional techniques to the suboccipital region and the sacrum.
- (5) Stimulation of the cranio-sacral rhythm by functional-cranial techniques.
- (6) Efflourage to aid drainage in thoracic and cervical lymphatic vessels.
- (7) Exercises to improve the mobility of the thoracic spine, and to improve the physical coordination."

"Our hypothesis, based on clinical evidence, is that following osteopathic treatment the symptoms are reduced due to stabilizing nffment sympathetic flow. It is believed by the authors that this equilibrium may be achieved due to relaxation of soft tissue and an improvement in visceral function plus increased blood and lymph circulation."

"This present study has revealed a demonstrable improvement in ME symptoms as a result of osteopathic treatment."

Arab AM, Saadati H, Sheikhhoseini R 2016 **The Effect of Harmonic Technique vs End Range Loading Exercises on Pain and Disability in Patients With Non-Specific Chronic Low Back Pain: A Preliminary Study.** J Chiropr Med Mar;15(1):3-8 <https://www.ncbi.nlm.nih.gov/pubmed/27069426>

"The purpose of this study was to compare the effects of end range loading (ERL) vs harmonic technique (HT) on patients with chronic low back pain (LBP).

METHOD:

Fourteen volunteer patients with LBP were randomly assigned to 2 groups based on a blocked randomization method with 7 patients in the HT group and 7 patients in the ERL group. The patients received 10 sessions of treatment for 5 sessions per week. Pain intensity and disability score were recorded using the numeric pain scale and Roland-Morris Disability questionnaire (RMQ), respectively, before and after the treatment period.

RESULTS:

Although pain intensity ( $P = .02$ ) and the RMQ score ( $P = .03$ ) decreased in the HT technique group, no statistically significant change was found in the ERL group for the RMQ score ( $P > .05$ ). The effect size for HT was .6 and .3 for numeric pain scale and RMQ, respectively.

CONCLUSION:

This preliminary study showed that pain intensity and disability improved in subjects with chronic LBP in the HT group."

Schwerla F, Rother K, Rother D, Ruetz M, Resch KL 2015 **Osteopathic Manipulative Therapy in Women With Postpartum Low Back Pain and Disability: A Pragmatic Randomized Controlled Trial** J Am Osteopath Assoc Jul 1;115(7):416-25 <http://jaoa.org/article.aspx?>

"A pragmatic randomized controlled trial was conducted among a sample of women with a history of pregnancy-related LBP [low back pain] for at least 3 months after delivery. "

"During 8 weeks, OMTh [osteopathic manipulative therapy] applied 4 times led to clinically relevant positive changes in pain intensity and functional disability in women with post-partum LBP."

"At each visit, OMTh was applied only to those structures with relevant osteopathic findings. Standard OMTh techniques were applied, including direct (high-velocity, low-amplitude; muscle energy; and myo-fascial release), indirect (functional techniques and balanced ligamentous tension), visceral, and cranial techniques. No predefined, standardized OMTh protocol was implemented; each osteopath was free to decide which techniques to use. Participants were not allowed to receive any additional treatment (ie, medication, physical therapy, or other sources of pain relief) during the study period. Participants in the control group did not receive OMTh, nor were they evaluated for somatic dysfunctions during the 8-week study period. At the first visit, control participants were required to fill out the VAS and ODI. The osteopath then told them that they would be placed on a waiting list for OMTh to be scheduled 2 months later. At 2 months, the control participants filled out the VAS and ODI for the second time. During the study period, participants were not allowed to receive any additional treatment for pain relief (eg, medication, physical therapy, or other sources of pain relief). After study completion, they were offered 2 free appointments for OMTh."

"During 8 weeks, OMTh applied 4 times led to clinically relevant positive changes in pain intensity and functional disability in women with post-partum LBP. "

Licciardone JC, Aryal S 2013 **Prevention of progressive back-specific dysfunction during pregnancy: an assessment of osteopathic manual treatment based on Cochrane Back Review Group criteria.** J Am Osteopath Assoc Oct;113(10):728-36 <http://www.ncbi.nlm.nih.gov/pubmed/24084800>

"A randomized sham-controlled trial including 3 parallel treatment arms: usual obstetric care and OMT (UOBC+OMT), usual obstetric care and sham ultrasound therapy (UOBC+SUT), and usual obstetric care (UOBC)."

"A total of 144 patients were randomly assigned"

"Progressive back-specific dysfunction was defined as a 2-point or greater increase in the Roland-Morris Disability Questionnaire (RMDQ) score during the third trimester of pregnancy. Risk ratios (RRs) and 95% confidence intervals (CIs) were used to compare progressive back-specific dysfunction in patients assigned to UOBC+OMT relative to patients assigned to UOBC+SUT or UOBC. Numbers needed to treat (NNTs) and 95% CIs were also used to assess UOBC+OMT vs each comparator. Subgroup analyses were performed using median splits of baseline scores on a numerical rating scale for back pain and the RMDQ."

"Overall, 68 patients (47%) experienced progressive back-specific dysfunction during the third trimester of pregnancy. Patients who received UOBC+OMT were significantly less likely to experience progressive back-specific dysfunction (RR, 0.6; 95% CI, 0.3-1.0; P=.046 vs UOBC+SUT; and RR, 0.4; 95% CI, 0.2-0.7; P<.0001 vs UOBC). The effect sizes for UOBC+OMT vs UOBC+SUT and for UOBC+OMT vs UOBC were classified as medium and large, respectively. The corresponding NNTs for UOBC+OMT were 5.1 (95% CI, 2.7-282.2) vs UOBC+SUT; and 2.5 (95% CI, 1.8-4.9) vs UOBC. There was no statistically significant interaction between subgroups in response to OMT."

"Osteopathic manual treatment has medium to large treatment effects in preventing progressive back-specific dysfunction during the third trimester of pregnancy. The findings are potentially important with respect to direct health care expenditures and indirect costs of work disability during pregnancy."

Licciardone JC, Buchanan S, Hensel KL, King HH, Fulda KG, Stoll ST, 2010 **Osteopathic manipulative treatment of back pain and related symptoms during pregnancy: a randomized controlled trial** American Journal of Obstetrics and Gynecology Volume 202, Issue 1, January , Pages 43.e1–43.e8 <http://www.sciencedirect.com/science/article/pii/S0002937809008436>

"A randomized, placebo-controlled trial was conducted to compare usual obstetric care and osteopathic manipulative treatment, usual obstetric care and sham ultrasound treatment, and usual obstetric care only. Outcomes included average pain levels and the Roland-Morris Disability Questionnaire to assess back-specific functioning."

"During pregnancy, back pain decreased in the usual obstetric care and osteopathic manipulative treatment group, remained unchanged in the usual obstetric care and sham ultrasound treatment group, and increased in the usual obstetric care only group, although no between-group difference achieved statistical significance."

"Osteopathic manipulative treatment slows or halts the deterioration of back-specific functioning during the third trimester of pregnancy."

Krouwel O, Hebron C, Willett E 2010 **An investigation into the potential hypoalgesic effects of different amplitudes of PA mobilisations on the lumbar spine as measured by pressure pain thresholds (PPT)** *Manual Therapy* Volume 15, Issue 1, February, Pages 7–12 <https://www.ncbi.nlm.nih.gov/pubmed/19643656>

"Studies have shown that mobilisation to the spine can decrease pain. The optimum treatment dose for achieving this has not so far been investigated. Previous studies that demonstrate the pain relieving effects of mobilisations have used large amplitude of oscillations. The importance of amplitude on pain relief has not been established. The current study aims to: a) Investigate the importance of amplitude as part of the treatment dose. b) To explore the extent of any pain relieving effects seen following mobilisations."

"Results demonstrated a significant increase in PPT [an increase in pressure pain threshold means a decrease in pain sensitivity] following lumbar mobilisations ( $p = 0.013$ ) at all measured sites. However, no significant difference was found between amplitude conditions ( $p = 0.864$ ). This study suggests that in asymptomatic subjects a systemic hypoalgesic response is caused by lumbar mobilisation regardless of amplitude."

Guthrie RA, Martin RH 1982 **Effect of pressure applied to the upper thoracic (placebo) versus lumbar areas (osteopathic manipulative treatment) for inhibition of lumbar myalgia during labor** *J Am Osteopath Assoc* 82(4):247-251 <http://jaoa.org/article.aspx?articleid=2097814>

"In a study of five hundred women during labor, 352 experienced pain in the lumbar area during labor, an incidence of 70.4 percent. One of the most interesting findings of the study was the association of back pain during labor and abnormal fetal presentation. Application of pressure to the lumbar area to inhibit lumbar pain reduced the need for major narcotic pain medication and minor tranquilizing medication. The placebo treatment project was compared to lumbar treatment for pain relief of lumbar myalgia."

"Concerning back pressure, the technique had no significant effect on length of labor. However, the subjective evaluation of the technique by the patient noted its effectiveness at an average of 81 percent. Also subjectively, 88 percent of those women who used back pressure for back pain during labor stated that they needed less pain medication than anticipated during labor because they were given the back pressure technique. Objectively, there was a marked decrease in pain medication given to women with back pain during labor who were given the back pressure technique. Less than one-half of the minor tranquilizing medication (Vistaril) and almost one-third less major narcotic pain medication was used when back pain during labor was treated with back pressure in the lumbar area."

Fryer G, Carub J, McIver S 2004 **The effect of manipulation and mobilisation on pressure pain thresholds in the thoracic spine** *Journal of Osteopathic Medicine* Volume 7, Issue 1, April, Pages 8–14 <https://www.sciencedirect.com/science/article/pii/S1443846104800030>

"Background and Objectives: High velocity low amplitude thrust manipulation and mobilisation are commonly used by manual therapists to relieve spinal pain and improve mobility. The aim of this controlled, single blinded study was to investigate the effect of manipulation and mobilisation on pressure-pain thresholds in the thoracic spine in an asymptomatic population."

Methods: Subjects (n=96) were screened for tender thoracic segments, and pressure-pain threshold measurements were made using an electronic pressure algometer immediately before and after treatment intervention. Subjects were randomly allocated into three intervention groups, and received either a single high velocity extension thrust, thirty seconds of extension mobilisation, or thirty seconds of sham treatment (control) consisting of simulated 'laser acupuncture'.

Analysis: Within-group pre- and post-intervention pressure-pain threshold values were analysed using dependent t-tests, revealing significant changes in the mobilisation ( $P < 0.01$ ) and manipulation ( $P = 0.04$ ) groups, but not the sham treatment group ( $P = 0.88$ ). Analysis of mean group changes using a one-way analysis of variance and post-hoc analysis revealed a significant difference between the mobilisation and control group ( $P = 0.01$ ), but no significant difference between the manipulation and control group ( $P = 0.67$ ). Pre-post effect sizes in the mobilisation group were medium to large ( $d = 0.72$ ), small to medium for manipulation ( $d = 0.32$ ), and small in the control group ( $d = 0.02$ ).

Conclusion: Both manipulation and mobilisation produced significantly increased pressure-pain thresholds (decreased sensitivity to pressure) in the thoracic spine, whereas the sham treatment did not. Mobilisation appeared to be more effective than manipulation for increasing pressure-pain thresholds when applied to the thoracic spine in asymptomatic subjects."

## Case controlled studies

Number of studies: 2

Clark BC, Walkowski S, Conatser RR, Eland DC, Howell JN. 2009 **Muscle functional magnetic resonance imaging and acute low back pain: a pilot study to characterize lumbar muscle activity asymmetries and examine the effects of osteopathic manipulative treatment.**

Osteopathic medicine and primary care Aug 27;3:7 <http://www.ncbi.nlm.nih.gov/pubmed/19712459>

"In the subjects with LBP [low back pain], psoas T2 asymmetry was significantly reduced immediately following OMT (25.3 +/- 6.9 to 6.1 +/- 1.8%,  $p = 0.05$ ), and the change in LBP immediately following OMT was correlated with the change in psoas T2 asymmetry ( $r = 0.75$ ,  $p = 0.02$ )."

"This pilot work provides insight into the mechanistic actions of OMT [osteopathic manipulative therapy] during acute LBP, as it suggests that it may attenuate muscle activity asymmetries of some of the intrinsic low back muscles."

Fritz JM, Brennan GP, Leaman H 2006 **Does the evidence for spinal manipulation translate into better outcomes in routine clinical care for patients with occupational low back pain? A case-control study** The Spine Journal Volume 6, Issue 3, May–June, Pages 289–295 <http://www.sciencedirect.com/science/article/pii/S1529943005010399>

"Physical therapy notes for the first two sessions were examined. Patients were categorized as having received thrust manipulation, nonthrust manipulation, or no manipulation. Pain intensity and disability were recorded at initial and final sessions. The number of sessions, length of stay, and costs of physical therapy were recorded. Comparisons were made between patients receiving manipulation versus no manipulation, and between those receiving thrust versus nonthrust manipulation."

"Two hundred fifteen patients were included (mean age 35.9 [ $\pm 10.1$ ] years, 67.9% male). Thrust manipulation was received by 107 (49.8%) patients; 36 (16.7%) received nonthrust manipulation and 72 (33.5%) received no manipulation. Patients receiving manipulation (thrust or nonthrust) experienced greater reductions in pain and disability with treatment. Patients receiving thrust manipulation had fewer sessions, a shorter length of stay, and lower costs in physical therapy than patients receiving nonthrust manipulation."

"The evidence supporting superior clinical outcomes with the use of manipulation for a subgroup of patients was corroborated by this retrospective review of patients with occupational low back pain. The use of thrust manipulation appeared to be more efficient than the use of nonthrust manipulation for these patients."

## Other controlled clinical trials

Number of studies: 1

Norén L, Ostgaard S, Nielsen TF, Ostgaard HC 1997 **Reduction of sick leave for lumbar back and posterior pelvic pain in pregnancy** Spine 22(18):2157-2160 <http://www.ncbi.nlm.nih.gov/pubmed/9322326>

"In this prospective, consecutive, controlled cohort study, the authors analyzed the impact of a differentiated, individual-based treatment program on sick leave during pregnancy for women experiencing lumbar back or posterior pelvic pain during pregnancy."

"All pregnant women who attended a specific antenatal clinic and experienced lumbar back or posterior pelvic pain were included in an intervention group, and results were compared with women in a control group from another antenatal clinic."

"The intervention group comprised 54 women, compared with 81 women in the control group. Thirty-three women were on sick leave for an average of 30 days in the intervention group versus 45 women for an average of 54 days in the control group ( $P < 0.001$ ). The reduction in sick leave reduced insurance costs by approximately \$53,000 U.S."

"Sick leave for lumbar back and posterior pelvic pain in the intervention group was significantly reduced with the program, and the program was cost effective."

## Cohort studies

Number of studies: 10

Childs JD, Fritz JM, Wu SS, Flynn TW, Wainner RS, Robertson EK, Kim FS, George SZ. 2015 **Implications of early and guideline adherent physical therapy for low back pain on utilization and costs.** BMC Health Serv Res Apr 9;15:150 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4393575/>

"753,450 eligible patients with a primary care visit for LBP [low back pain] between 18–60 years of age were considered. Physical therapy was utilized by 16.3% ( $n = 122,723$ ) of patients, with 24.0% ( $n = 17,175$ ) of those receiving early physical therapy that was adherent to recommendations for active treatment. Early referral to guideline adherent physical therapy was associated with significantly lower utilization for all outcomes and 60% lower total LBP-related costs."

"Of particular interest, the 24% of patients who received early physical therapy that was also adherent to practice guidelines had the lowest utilization and costs compared to any of the other 3 possible combinations of timing and adherence. Early and adherent physical therapy was associated with significantly lower utilization of advanced imaging, lumbar spinal injections, lumbar spine surgery, and use of opioids. Given the enormous burden of excessive and unnecessary care for patients with LBP on society, cost savings from early guideline adherent physical therapy has important implications."

Ammendolia C, Chow N 2015 **Clinical outcomes for neurogenic claudication using a multimodal program for lumbar spinal stenosis: a retrospective study.** Journal of Manipulative and Physiological Therapeutics Mar-Apr;38(3):188-94 <http://www.ncbi.nlm.nih.gov/pubmed>

"The purpose of this preliminary study was to assess the effectiveness of a 6-week, nonsurgical, multimodal program that addresses the multifaceted aspects of neurogenic claudication."

"In this retrospective study, 2 researchers independently extracted data from the medical records from January 2010 to April 2013 of consecutive eligible patients who had completed the 6-week Boot Camp Program. The program consisted of manual therapy twice per week (eg, soft tissue and neural mobilization, chiropractic spinal manipulation, lumbar flexion-distraction, and muscle stretching), structured home-based exercises, and instruction of self-management strategies. A paired t test was used to compare differences in outcomes from baseline to 6-week follow-up. Outcomes included self-reported pain, disability, walking ability, and treatment

satisfaction."

"A total of 49 patients were enrolled, with a mean age of 70 years. The mean difference in the Oswestry Disability Index was 15.2 (95% confidence interval [CI], 11.39-18.92), and that for the functional and symptoms scales of the Swiss Spinal Stenosis Questionnaire was 0.41 (95% CI, 0.26-0.56) and 0.74 (95% CI, 0.55-0.93), respectively. Numeric pain scores for both leg and back showed statistically significant improvements. Improvements in all outcomes were clinically important."

"This study showed preliminary evidence for improved outcomes in patients with neurogenic claudication participating in a 6-week nonsurgical multimodal Boot Camp Program."

Prinsen JK, Hensel KL, Snow RJ 2014 **OMT associated with reduced analgesic prescribing and fewer missed work days in patients with low back pain: an observational study.** J Am Osteopath Assoc Feb;114(2):90-8 <http://www.ncbi.nlm.nih.gov/pubmed/24481801>

"A segregated patient cohort (n=539) showed statistically significant differences between patients who received OMT and those who did not with the use of analgesics, steroids, spinal injections, straight-leg raising, and days off or limited work duties."

"The observational findings of the present study, which suggest that analgesic medication use is lower in patients who receive OMT, align with previous findings of RCTs and support the generalizability of these findings."

Fritz JM, Childs JD, Wainner RS, Flynn TW 2012 **Primary care referral of patients with low back pain to physical therapy: impact on future health care utilization and costs.** Spine (Phila Pa 1976) Dec 1;37(25):2114-21 <http://www.ncbi.nlm.nih.gov/pubmed/22614792>

"Physical therapy utilization was 7.0% with significant geographic variability. Early physical therapy timing was associated with decreased risk of advanced imaging (odds ratio [OR] = 0.34, 95% confidence interval [CI]: 0.29, 0.41), additional physician visits (OR = 0.26, 95% CI: 0.21, 0.32), surgery (OR = 0.45, 95% CI: 0.32, 0.64), injections (OR = 0.42, 95% CI: 0.32, 0.64), and opioid medications (OR = 0.78, 95% CI: 0.66, 0.93) compared with delayed physical therapy. Total medical costs for LBP were \$2736.23 lower (95% CI: 1810.67, 3661.78) for patients receiving early physical therapy. Physical therapy content showed weaker associations with subsequent care."

"Early physical therapy following a new primary care consultation was associated with reduced risk of subsequent health care compared with delayed physical therapy. Further research is needed to clarify exactly which patients with LBP should be referred to physical therapy; however, if referral is to be made, delaying the initiation of physical therapy may increase risk for additional health care consumption and costs."

Campbell GA, Leighton C, Brook M, Janna F 2012 **Management Patterns in Acute Low Back Pain: The Role of Physical Therapy** Spine Issue: Volume 37(9), 20 April, p 775–782 <http://www.ncbi.nlm.nih.gov/pubmed/21099735>

"To evaluate the relationship between early physical therapy (PT) for acute low back pain and subsequent use of lumbosacral injections, lumbar surgery, and frequent physician office visits for low back pain."

"Wide practice variations exist in the treatment of acute low back pain. PT has been advocated as an effective treatment in this setting although disagreement exists regarding its purported benefits."

"A national 20% sample of the Centers for Medicare and Medicaid Services physician outpatient billing claims was analyzed. Patients were selected who received treatment for low back pain between 2003 and 2004 (n = 439,195). To exclude chronic low back conditions, patients were excluded if they had a prior visit for back pain, lumbosacral injection, or lumbar surgery within the previous year. Main outcome measures were rates of lumbar surgery, lumbosacral injections, and frequent physician office visits for low back pain during the following year."

"Based on logistic regression analysis, the adjusted odds ratio for undergoing surgery in the group of enrollees that received PT in the acute phase (<4 weeks) compared to those receiving PT in the chronic phase (>3 months) was 0.38 (95% confidence interval [CI], 0.360.41),

adjusting for age, sex, diagnosis, treating physician specialty, and comorbidity. The adjusted odds ratio for receiving a lumbosacral injection in the group receiving PT in the acute phase was 0.46 (95% CI, 0.44-0.49), and the adjusted odds ratio for frequent physician office usage in the group receiving PT in the acute phase was 0.47 (95% CI, 0.44-0.50)."

"There was a lower risk of subsequent medical service usage among patients who received PT early after an episode of acute low back pain relative to those who received PT at later times. Medical specialty variations exist regarding early use of PT, with potential underutilization among generalist specialties."

Crow WT, Willis DR. 2009 **Estimating cost of care for patients with acute low back pain: a retrospective review of patient records.** J Am Osteopath Assoc Apr;109(4):229-33 <http://www.ncbi.nlm.nih.gov/pubmed/19369510>

"To estimate the cost of standard care compared to standard care plus osteopathic manipulative treatment (OMT) for acute LBP [low back pain] of less than 6 months' duration."

"A retrospective review of electronic medical records from patients who visited Florida Hospital East Orlando in Orlando. All patients had LBP of less than 6 months' duration and had received care between January 1, 2002, and December 31, 2005. The control group comprised patients who received standard care; the study group consisted of patients who received OMT in addition to standard care. Healthcare utilization (eg, radiologic scans, prescriptions) was determined by "episodes of care," and costs were averaged per patient."

"A total of 1556 patients and 2030 episodes of care met inclusion criteria. Compared with subjects in the control group, individuals in the OMT group had an average of 0.5 more office visits per EOC, resulting in 38% more office visits. However, OMT patients had 18.5% fewer prescriptions written, 74.2% fewer radiographs, 76.9% fewer referrals, and 90% fewer magnetic resonance imaging scans. In the OMT group, total average costs were \$38.26 lower (P=.02), and average prescription costs were \$19.53 lower (P<.001). Patients in the OMT group also had \$63.81 less average radiologic costs (P<.0001)."

"Osteopathic manipulative treatment may reduce costs for the management of acute LBP."

Pinnington MA, Miller J, Stanley I 2004 **An evaluation of prompt access to physiotherapy in the management of low back pain in primary care** Family Practice Vol. 21, No. 4 <http://www.ncbi.nlm.nih.gov/pubmed/15249525>

"Adult patients with a new episode of LBP referred by their GPs were managed in accordance with recent recommendations. Data on pain, disability and well-being were collected at recruitment and some 12 weeks later. Patient diaries and interviews with GPs before and after the study provided qualitative data. Comparative costings were derived from national and local sources."

"A total of 614 patients, representing 3.2% of the adult population, were referred, of whom 522 (85%) were seen at the back pain clinics within 3–4 days, the majority within 72 h. Although this represents less than half the adult patients thought to be presenting to their GPs with LBP, patients exhibited levels of pain and disability comparable with those described in other studies of LBP in primary care. More than 70% of patients required only a single clinic visit and  
"For primary care patients with a new episode of LBP referred by their GP, prompt access to a dedicated physiotherapy service is both feasible and acceptable. Comparison with other published interventions suggests that it is also cost-effective and that a typical Primary Care Trust (PCT) would rapidly recoup the cost of additional physiotherapists. However, questions remain about the availability of sufficient physiotherapists to make such a service available nationally. The influence of the service upon GPs' own approach to the management of LBP is likely to be gradual and to come about largely through positive feedback from patients."

Daly JM, Frame PS, Rapoza PA 1991 **Sacroiliac subluxation: a common, treatable cause of low-back pain in pregnancy** Fam Pract Res J 11(2):149-159 <https://www.ncbi.nlm.nih.gov/pubmed/1829312>

"A retrospective review of 100 consecutive pregnancies, involving 94 women receiving prenatal care at a rural western New York family practice, was conducted. Back pain was spontaneously

reported to the physician by 23 women in 23 pregnancies. Eleven of the 23 women met diagnostic criteria for sacroiliac subluxation. These criteria include absence of lumbar spine and hip pathology, pain in the sacral region, a positive Piedallu's sign (asymmetrical movement of the posterior superior iliac spines upon forward flexion), a positive pelvic compression test, and asymmetry of the anterior superior iliac spines. A cohort of 11 women meeting criteria for sacroilia subluxation was treated with rotational manipulation of the sacroiliac joints. After manipulative therapy, 10 of the 11 women (91%) had relief of pain and no longer exhibited signs of sacroiliac subluxation."

Diakow PR, Gadsby TA, Gadsby JB, Gleddie JG, Leprich DJ, Scales AM 1991 **Back pain during pregnancy and labor** Journal of Manipulative and Physiological Therapeutics 14(2):116-118 <http://www.ncbi.nlm.nih.gov/pubmed/1826921>

"A retrospective study of 400 pregnancies and deliveries was undertaken by interview of 170 consecutive female patients presenting to five chiropractic offices in the Niagara Peninsula. Back pain was reported during 42.5% (170) of the pregnancies and 44.7% (179) of the deliveries. There was a statistically significant association between back pain during the two events (p less than .001). Of the 170 pregnancies with reported back pain, 72% (122) also reported back labor. A subsample of 170 painful pregnancies was divided into those that had received manual manipulation and those that had not. The treated group experienced less pain during labor (p less than .001)."

Harrison RE, Page JS 2011 **Multipractitioner Upledger CranioSacral Therapy: descriptive outcome study 2007-2008**. The Journal of Alternative and Complementary Medicine Jan;17 (1):13-7 <http://www.ncbi.nlm.nih.gov/pubmed/21214395>

"Outcome by diagnostic groups suggested that UCST [Upledger craniosacral therapy] is particularly effective for patients with headaches and migraine, neck and back pain, anxiety and depression, and unsettled babies. Seventy percent (70%) of patients on medication decreased or discontinued it, and patients' average general practitioner consultation rate fell by 60% in the 6 months following treatment."

"Patients' ages ranged from neonates to 68 years. Seventy-four percent (74%) of patients reported a valuable improvement in their presenting problem. Sixty-seven percent (67%) also reported a valuable improvement in their general well-being and/or a second health problem. Outcome by diagnostic groups suggested that UCST is particularly effective for patients with headaches and migraine, neck and back pain, anxiety and depression, and unsettled babies."

## Surveys

Number of studies: 1

Ong CK, Doll H, Bodeker G, Stewart-Brown S 2004 **Use of osteopathic or chiropractic services among people with back pain: a UK population survey.** Health Soc Care Commun <https://www.ncbi.nlm.nih.gov/pubmed/19777716>

"Questionnaires covering health and the use of complementary, alternative and conventional health services were mailed to a random sample of 14 868 adults aged 18-64 years living in four counties of England in 1997. The present study examined the use of osteopathy/chiropractic among the 15% (n = 1377) of respondents reporting back pain. Osteopaths/chiropractors were seen by 13.4% (n = 184) of respondents with back pain during the past 3 months compared with 9.8% (n = 135) who consulted physiotherapists. The presence of back pain and non-manual social class were the strongest predictors of consultation with both types of practitioner. Women, older respondents, non-smokers and those who exercised for 30 minutes at least once a week were more likely to use osteopathy/chiropractic. The only other significant predictor of physiotherapy use was desire for more physical exercise. While those reporting back pain had Short-Form 36 (SF-36) scores suggesting very significant levels of disability, respondents with back pain who consulted osteopaths/chiropractors reported better health in all dimensions of the SF-36 than those using physiotherapy services. Although they reported worse pain scores than people not consulting any practitioners, their mental health, physical functioning, energy and health perception were better. It is impossible to disentangle cause and effect in this cross-sectional study, but the data suggest that people who can afford to pay are more likely to choose osteopath/chiropractor treatments than physiotherapy. The possibility that osteopath/chiropractor treatment has a generalised positive effect on health, allowing people with back pain to function better than those not receiving such treatment, warrants further investigation."

## Case series

Number of studies: 1

Ramirez MA, Haman J, Worth L. 1989 **Low back pain: diagnosis by six newly discovered sacral tender points and treatment with counterstrain.** J Am Osteopath Assoc Jul;89(7):905-6, 911-3 <https://www.ncbi.nlm.nih.gov/pubmed/2527838>

"Although counterstrain and exercises reestablished relative lumbar stability in a patient with chronic low back pain and lumbar hypermobility on gross and segmental motion testing, the patient still had tender points in the middle of the sacrum. After initially ignoring these tender points, we tested various release positions in an attempt to relieve the patient's discomfort. Next, we discovered that 14 patients with low back pain had tenderness at one or more of the tender points. Eventually, we discovered what we believe to be six previously undocumented medial sacral tender points. Two are located 1.5 cm directly medial to the inferior aspect of the posterior iliac spine bilaterally; two are located 1 cm medial and 1 cm superior to the inferior lateral angles bilaterally; one lies on the midline between the first and second spinous tubercles of the sacrum; and one lies on the midline on the cephalad-most border of the sacral hiatus. We describe the use of these tender points in diagnosis and their release by counterstrain technique."

Goyal K, Goyal M, Narkeesh K, Samuel AJ, Sharma S, Arumugam N 2016 **The effectiveness of osteopathic manipulative treatment in an abnormal uterine bleeding related pain and health related quality of life (HR-QoL) - A case report** Journal of Bodywork and Movement Therapies <http://dx.doi.org/10.1016/j.jbmt.2016.08.010> [http://www.bodyworkmovementtherapies.com/article/S1360-8592\(16\)30180-2/fulltext?rss=yes](http://www.bodyworkmovementtherapies.com/article/S1360-8592(16)30180-2/fulltext?rss=yes)

"Abnormal uterine bleeding is characterized by painful and/or excessive menorrhagia, chronic pelvic pain due to the endometriosis (Em). Osteopathic treatment is commonly used in the gynecological dysfunctions. The aim of the present case study was to explore the effect of osteopathic treatment (OT) for a woman with abnormal uterine bleeding related pain and quality of life (QoL). We reported a case of 29 year old female who presented with chief complaints of increased flow during periods, lower abdominal pain, leukorrhoea, lower back pain and with occasional constipation for the last 3 years. Patient is a mother of 6 years old male child born with normal delivery. On diagnostic ultrasonography the uterus was found bulky with insignificant endometriosis and no other abnormality was detected. She did not have any relevant past medical and surgical history. The pre and post osteopathic treatment measurements were measured using Visual Analog Scale (VAS) and the health related quality of life (HR-QoL) questionnaire called short form Endometriosis Health Profile Questionnaire (EHP) – 5. In the present case the pain due to the endometriosis was treated with the osteopathic treatment consists of all the major diaphragms' release (release of pelvic diaphragm, abdominal diaphragm, thoracic outlet release and hyoid diaphragm) during the first session and in the second session gastro-esophageal (GE) junction release, sigmoid colon release, cranial therapy to the occiput, sacral release and dural tube rocking. Following that improvement of pain from VAS 8.3/10 to 3.9/10 and QoL improvement from EHP-5, 72/100 to 26/100 was noted. Osteopathic manipulative approach (OMA) in the patient with Em might improve the abnormal uterine bleeding related pain and health related quality of life (HR-QoL)."

Jones AL, Lockwood MD 2008 **Osteopathic Manipulative Treatment in Pregnancy and Augmentation of Labor: A Case Report** AAO Journal Vol 18 Number 1 March

"In this case study, the use of OMT provided a significant reduction in the patient's initial complaint of back pain. The patient was also a candidate to receive empiric osteopathic manipulative techniques aimed at augmentation of her early stage of labor associated with minimally effective, unorganized contractions. The patient experienced acceleration in contractions and an advancement in labor following OMT. "

## Mixed results (significant for some outcomes, not others)

Number  
of studies:  
4

Fryer G, Bird M, Robbins B, Johnson JC 2017 **Acute electromyographic responses of deep thoracic paraspinal muscles to spinal manual therapy interventions. An experimental, randomized cross-over study.** *J Bodyw Mov Ther Jul;21(3):495-502* <https://www.ncbi.nlm.nih.gov/pubmed/28750955>

"This single group, randomized, cross-over study explored whether manual therapy alters motor tone of deep thoracic back muscles by examining resting electromyographic activity (EMG) after 2 types of manual therapy and a sham control intervention. Twenty-two participants with thoracic spinal pain (15 females, 7 males, mean age  $28.1 \pm 6.4$  years) had dual fine-wire, intramuscular electrodes inserted into deep transversospinalis muscles at a thoracic level where tissues appeared abnormal to palpation (AbP) and at 2 sites above and below normal and non-tender to palpation (NT). A surface electrode was on the contralateral paraspinal mass at the level of AbP. EMG signals were recorded for resting prone, two 3-s free neck extension efforts, two 3-s resisted maximal voluntary isometric contractions (MVIC), and resting prone before the intervention. Randomized spinal manipulation, counterstrain, or sham manipulation was delivered and EMG re-measured. Participants returned 1 and 2 weeks later for the remaining 2 treatments. Reductions in resting EMG followed counterstrain in AbP (median decrease 3.3%,  $P = 0.01$ ) and NT sites (median decrease 1.0%,  $P = 0.05$ ) and for the surface electrode site (median decrease 2.0%,  $P = 0.009$ ). Reduction in EMG following counterstrain during free neck extension was found for the surface electrode site (median decrease 2.7%,  $P < 0.01$ ). Spinal manipulation produced no change in EMG, whereas counterstrain technique produced small significant reductions in paraspinal muscle activity during prone resting and free neck extension conditions. The clinical relevance of these changes is unclear."

Panagopoulos J, Hancock MJ, Ferreira P, Hush J, Petocz P 2015 **Does the addition of visceral manipulation alter outcomes for patients with low back pain? A randomized placebo controlled trial.** *Eur J Pain Aug;19(7):899-907* <http://www.ncbi.nlm.nih.gov/m/pubmed/25378096/>

This study aimed to investigate whether the addition of visceral manipulation, to a standard physiotherapy algorithm, improved outcomes in patients with low back pain. "Sixty-four patients with low back pain who presented for treatment at a private physiotherapy clinic were randomized to one of two groups: standard physiotherapy plus visceral manipulation ( $n = 32$ ) or standard physiotherapy plus placebo visceral manipulation ( $n = 32$ ). The primary outcome was pain (measured with the 0-10 Numerical Pain Rating Scale) at 6 weeks. Secondary outcomes were pain at 2 and 52 weeks, disability (measured with the Roland-Morris Disability Questionnaire) at 2, 6 and 52 weeks and function (measured with the Patient-Specific Functional Scale) at 2, 6 and 52 weeks. "

"The addition of visceral manipulation did not affect the primary outcome of pain at 6 weeks ( $-0.12$ , 95% CI =  $-1.45$  to  $1.21$ ). There were no significant between-group differences for the secondary outcomes of pain at 2 weeks or disability and function at 2, 6 or 52 weeks. The group receiving addition of visceral manipulation had less pain than the placebo group at 52 weeks (mean  $1.57$ , 95% CI =  $0.32$  to  $2.82$ ). Participants were adequately blinded to group status and there were no adverse effects reported in either group."

"Our study suggests that visceral manipulation in addition to standard care is not effective in changing short-term outcomes but may produce clinically worthwhile improvements in pain at 1 year."

Licciardone JC, Stoll ST, Fulda KG, Russo DP, Siu J, Winn W, Swift J Jr 2003 **Osteopathic manipulative treatment for chronic low back pain: a randomized controlled trial.** *Spine (Phila Pa 1976) Jul 1;28(13):1355-62* <http://www.ncbi.nlm.nih.gov/pubmed/12838090>

**The "osteopaths" providing the treatment were students who had not completed their training. Their work was limited to the lumbar spine or adjacent areas (whereas**

**osteopathic treatment would normally be expected to cover any area that may have affected the lower back). The "sham" group involved lighter touch, and was aimed at area deemed less likely to provide a therapeutic effect. Both of these groups did better than the group with no treatment.**

"STUDY DESIGN: A randomized controlled trial was conducted. OBJECTIVE: To determine the efficacy of osteopathic manipulative treatment as a complementary treatment for chronic nonspecific low back pain."

"This trial was conducted in a university-based clinic from 2000 through 2001. Of the 199 subjects who responded to recruitment procedures, 91 met the eligibility criteria. They were randomized, with 82 patients completing the 1-month follow-up evaluation, 71 completing the 3-month evaluation, and 66 completing the 6-month evaluation. The subjects were randomized to osteopathic manipulative treatment, sham manipulation, or a no-intervention control group, and they were allowed to continue their usual care for low back pain. The main outcomes included the SF-36 Health Survey, a 10-cm visual analog scale for overall back pain, the Roland-Morris Disability Questionnaire, lost work or school days because of back pain, and satisfaction with back care."

"As compared with the no-intervention control subjects, the patients who received osteopathic manipulative treatment reported greater improvements in back pain, greater satisfaction with back care throughout the trial, better physical functioning and mental health at 1 month, and fewer cotreatments at 6 months. The subjects who received sham manipulation also reported greater improvements in back pain and physical functioning and greater satisfaction than the no-intervention control subjects. There were no significant benefits with osteopathic manipulative treatment, as compared with sham manipulation."

"Osteopathic manipulative treatment and sham manipulation both appear to provide some benefits when used in addition to usual care for the treatment of chronic nonspecific low back pain. It remains unclear whether the benefits of osteopathic manipulative treatment can be attributed to the manipulative techniques themselves or whether they are related to other aspects of osteopathic manipulative treatment, such as range of motion activities or time spent interacting with patients, which may represent placebo effects."

Andersson GB, Lucente T, Davis AM, Kappler RE, Lipton JA, Leurgans S. 1999 **A comparison of osteopathic spinal manipulation with standard care for patients with low back pain.**

NEJM Nov 4;341(19):1426-31 <http://www.nejm.org/doi/full/10.1056/NEJM199911043411903#t=articleTop>

*org/doi/full/10.1056/NEJM199911043411903#t=articleTop*

"We performed a randomized, controlled trial that involved patients who had had back pain for at least three weeks but less than six months. We screened 1193 patients; 178 were found to be eligible and were randomly assigned to treatment groups; 23 of these patients subsequently dropped out of the study. The patients were treated either with one or more standard medical therapies (72 patients) or with osteopathic manual therapy (83 patients). We used a variety of outcome measures, including scores on the Roland-Morris and Oswestry questionnaires, a visual-analogue pain scale, and measurements of range of motion and straight-leg raising, to assess the results of treatment over a 12-week period."

"Patients in both groups improved during the 12 weeks. There was no statistically significant difference between the two groups in any of the primary outcome measures. The osteopathic-treatment group required significantly less medication (analgesics, antiinflammatory agents, and muscle relaxants) ( $P < 0.001$ ) and used less physical therapy (0.2 percent vs. 2.6 percent,  $P < 0.05$ ). More than 90 percent of the patients in both groups were satisfied with their care."

"Osteopathic manual care and standard medical care have similar clinical results in patients with subacute low back pain. However, the use of medication is greater with standard care."

Number  
of studies:  
1

## No clinically and/or statistically significant results

Number  
of studies:  
1

Number of studies: 1

Gibson T, Grahame R, Harkness J, Woo P, Blagrove P, Hills R. 1985 **Controlled comparison of short-wave diathermy treatment with osteopathic treatment in non-specific low back pain.** *Lancet* Jun 1;1(8440):1258-61 <https://www.ncbi.nlm.nih.gov/pubmed/2860453>

"The effectiveness of spinal manipulation carried out by a non-medical qualified osteopath was compared with that of short-wave diathermy (SWD) and a placebo (detuned SWD) in 109 patients with low back pain. More than half the subjects in each of the 3 treatment groups benefited immediately from therapy. Significant improvements were observed in the 3 groups at the end of 2 weeks' treatment, and these were still apparent at 12 weeks. The outcome of treatment was unrelated to the initial severity or duration of pain or to the trend of pain towards deterioration or improvement. It is, therefore, unlikely that the results simply reflect the natural history of low back pain. Benefits obtained with osteopathy and SWD in this study may have been achieved through a placebo effect."