
"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.


"This is a randomized clinical trial conducted at Hospital Clinico San Borja Arriaran in Chile. Fifty-seven patients with an age range of 50 to 58 years old were enrolled in two groups. Both groups were randomized to receive a treatment of 10 sessions: the experimental group (n=29) received a glenohumeral posterior mobilization technique after training with a cycle ergometer, and the control group (n=28) received conventional physiotherapy. The primary outcome measure was range of passive movement in external rotation; secondary outcomes were forward flexion and shoulder abduction, pain perception using the visual analogue scale and functionality test using the Constant-Murley Score.

"The experimental group was treated with 15 minutes of upper extremity ergometer and then the subsequent mobilization glenohumeral technique was performed with the patient supine, with 30 to 40 degrees of abduction and slight external rotation of the shoulder as tolerance. First an axial distraction was performed inferiorly grade III according to Kaltenborn followed by a glide or later kept sliding, no wobbling, for a minute. This maneuver was repeated 15 times, with one minute rest between each. The control group received conventional physiotherapy treatment program consisting of ultrasound (1 MHz, 1.5 W / cm 2 continuously for 10 minutes, treatment within 4 cm 2 ), self - paced exercises, active exercises type Codman, exercises cane and isometrics, as tolerated [26] . Both groups performed 10 sessions at intervals of two to three times a week.

"The study had the statistical power to detect a difference of four degrees between
the groups in the improvement of the range of external rotation at the end of the treatment period. The experimental group showed a significant improvement with a mean difference of 46.3 degrees (SD=8.7) compared to 18.1 (SD=7.2) in the control group (p<0.0001). There was also a decrease in the perception of pain (p=0.0002) and improved function (p<0.0001) in the group treated with glenohumeral posterior mobilization technique.

"The glenohumeral posterior mobilization technique applied after training with cycle ergometer is an effective short-term technique to treat primary adhesive capsulitis decreasing the severity of pain and improving joint function compared with conventional physiotherapy treatment. The degree of increase in shoulder external rotation is more than 20 degrees beyond the increase achieved with conventional treatment."


"This study investigated the effects of an end-range mobilization technique on the range of motion of the glenohumeral internal rotation and the skin temperature of the shoulder in individuals with posterior shoulder tightness. [Subjects] Thirteen subjects with posterior shoulder tightness who had glenohumeral internal rotation deficit ≥ 15° participated. [Methods] All subjects underwent glenohumeral joint end-range mobilization intervention. The internal rotation range of motion of the glenohumeral joint was measured by a goniometer and the shoulder skin temperature was measured by a digital infrared thermographic imaging device before and immediately after the intervention. Paired t-tests were used to analyze the differences in these parameter pre and post-intervention. [Results] The glenohumeral internal rotation range of motion and skin temperature of the posterolateral shoulder in increased significantly post-intervention. [Conclusion] The end-range mobilization technique is effective for increasing the glenohumeral internal rotation range of motion and skin temperature of the shoulder in individuals with posterior shoulder tightness."


"All patients demonstrated a significant improvement in AROM [arm range of motion] for both flexion and abduction. The data supports the notion that NAT [Niel-Asher technique] is autonomously reproducible. NAT demonstrated significant improvement in AROM for both flexion and abduction with a consistent average of twelve degrees improvement per treatment session. The mean number of treatments was 7. NAT expedites both pain reduction and increased mobility for adhesive capsulitis over and above the natural history."


"A single-blinded quasi-experimental study with a one-group pretest-posttest
design. A transverse group consisted of 21 participants whose neck pain increased with active movements. A non-intervention group of 20 asymptomatic participants was included simply to ensure rater blinding. The treatment group received Grades IV to IV+ transverse mobilizations at T1 through T4 bilaterally. Measurements taken immediately after intervention included pre/post cervical ROM, distant pressure pain threshold (PPT), and a numerical pain rating scale (NPRS). Analysis utilized t-tests and ordinal counterparts."

"The transverse group demonstrated significant gains in extension and bilateral rotation (P≤0.005) but not flexion or side-bend. A total of 57% of mobilized participants reported clinically meaningful decreased pain (P<0.001). Seven participants exceeded the PPT MDC95 of 0.36 kg/cm². The non-intervention group had no significant changes in ROM or NPRS scores.¶DISCUSSION:¶After 8 minutes of transverse mobilization to the upper thoracic spine, significant gains in cervical extension and bilateral rotation, and decreased pain scores were found. There were no adverse effects. Unlike other mobilization studies, PPT changes at a remote site were statistically but not clinically meaningful. Findings suggest that transverse mobilization would be a productive topic for controlled clinical trials."


"Fibromyalgia (FM) has been associated with cardiac autonomic abnormalities and pain. Heart rate variability (HRV) is reduced in FM with autonomic tone dominated by sympathethic activity. The purpose of this study was to evaluate the effects of one session of a posteroanterior glide technique on both autonomic modulation and pain in woman with FM. This was a controlled trial with immediate followup; twenty premenopausal women were allocated into 2 groups: (i) women diagnosed with FM (n = 10) and (ii) healthy women (n = 10). Both groups received one session of Maitland mobilization grade III posteroanterior central pressure glide, at 2 Hz for 60 s at each vertebral segment. Autonomic modulation was assessed by HRV and pain by a numeric pain scale before and after the intervention. For HRV analyses, heart rate and RR intervals were recorded for 10 minutes. FM subjects demonstrated reduced HRV compared to controls. Although the mobilization technique did not significantly reduce pain, it was able to improve HRV quantified by an increase in rMSSD and SD1 indices, reflecting an improved autonomic profile through increased vagal activity. In conclusion, women with FM presented with impaired cardiac autonomic modulation. One session of Maitland spine mobilization was able to acutely improve HRV."


"Thirty-four asymptomatic female volunteers completed baseline auto-questionnaires about anxiety, body satisfaction and global self-perception. Then, they were randomly assigned to OG or to control group (restful state)."

"At baseline, characteristics were comparable between groups. Following the intervention, we observed improvements in psychological state in both OG [general osteopathic treatment] and control groups. Nevertheless, OG had a significant
larger effect over restful state for anxiety and global self-perception (p < 0.02)."
"The present study suggests that an osteopathic approach using articular and soft tissue mobilisations has an effect, at least in the short term, on anxiety and global body perception. Further investigation is needed to confirm the relevance and broaden the scope of the present study."


"Forty-five healthy volunteers participated in this randomized, single-blinded, parallel-group 3-arm design (experimental, sham [placebo], and control group), comprising 15 subjects each. For the experimental group, lumbar mobilization involving an active movement, the Mulligan sustained natural apophyseal glide (SNAG), was applied on L4 spinous process by an experienced manual therapist. Sustained natural apophyseal glides were performed in sitting with active flexion (6 times × 3 sets). The sham technique simulated the SNAG without applying any force. In the control group, participants were placed in a static sitting position throughout the experiment. Measures of skin conductance in the lower limbs (L4 dermatome) were recorded to reflect sympathetic nervous system activity in the preintervention, periintervention, and postintervention periods. Differences in percentage change of skin conductance were analyzed with analysis of variance and post hoc tests.

RESULTS:
Lumbar SNAG produced sympathoexcitation compared with the control group in the intervention period (P = .04). No significant difference was found between SNAG and sham groups, and no statistically significant difference was found between groups in the final rest period.¶CONCLUSION:¶The results of this study showed that, in asymptomatic participants, both lumbar SNAG and sham techniques performed on L4/5 intervertebral joint with active flexion induced a sympathoexcitatory response in lower limbs compared with the control group."


"The OMT [osteopathic manipulative technique] protocol consisted of the following elements: Soft-tissue and myofascial release at T1 to L5 and sacral “rock” (patient prone) (3-4 minutes); myofascial release in the shoulders and scapulae bilaterally26 (patient lateral recumbent) (4-5 minutes) Cervical spine myofascial, counterstrain,muscle energy, or soft-tissue techniques for release and correction (patient supine) (3-4 minutes); Occipitoatlantal and condylar decompression (1-2 minutes) Venous sinus technique (5-6 minutes) V-spread, frontal and parietal lifts, or both (2-3 minutes); CV4 technique26 (3-4 minutes); Recheck for other key tender points (2-3 minutes) and treat according to findings"
"The OMT group had significantly reduced sway for the eyes-open test after 4 visits (P=.001)"
"The OMT protocol used in the present study improved the postural stability of healthy elderly patients, as measured by changes in sway values."

"A randomised, double blind, repeated measures study was conducted to investigate the initial effects of an accessory mobilisation technique applied to the ankle joint in 13 patients with a unilateral sub-acute ankle supination injury. Ankle dorsiflexion range of motion, pressure pain threshold, visual analogue scale rating of pain during functional activity and ankle functional scores were assessed before and after application of treatment, manual contact control and no contact control conditions. There were significant improvements in ankle dorsiflexion range of motion (p = 0.000) and pressure pain threshold (p = 0.000) during the treatment condition. However no significant effects were observed for the other measures. These findings demonstrate that mobilisation of the ankle joint can produce an initial hypoalgesic effect and an improvement in ankle dorsiflexion range of motion."


"The purpose of this study was to analyze changes in the recruitment of the muscles longus colli (Lco) and sternocleidomastoid (SCM) as measured by ultrasonography in patients with chronic neck pain before and immediately after a single cervical Maitland's posterior-anterior central mobilization technique. METHODS: This was a cross-sectional, case-control research design study. Ultrasonographic images of Lco and SCM were taken in 31 patients with chronic neck pain and matched controls during the 5 phases of the craniocervical flexion test before and after a Maitland's posterior-anterior central mobilization session at the cervical spine. Changes in muscle thickness during the test were calculated to infer muscle recruitment. Separate analysis of variance models for each muscle was built.

RESULTS: Both groups showed increases in Lco and SCM recruitment between phases (F = 7.95, P < .001; F = 21.29, P < .001), with patients with chronic neck pain demonstrating lesser increases for Lco changes in thickness compared with controls, mainly at phase 5 (-0.09, P = .004; 95% confidence interval [CI], 0.03 -0.15). After the mobilization, Lco recruitment increased more significantly in patients with chronic neck pain, and previous difference between groups in phase 5 was no longer significant (-0.07, P = .07; 95% CI, -0.14 to 0.01). The SCM recruitment decreased in phase 1 for patients with chronic neck pain (P = .01; 95% CI, -0.06 to -0.01).

CONCLUSION:Cervical mobilization appeared to modulate neck muscles function by increasing deep muscle and reducing superficial muscles recruitment."


"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."


"Joint mobilisation to the T4 vertebra has been advocated as a treatment for T4 syndrome. To date no controlled studies have investigated the effects of thoracic spinal manual therapy (SMT) applied to T4 on sympathetic activity in the hands. This study investigated whether a grade III postero-anterior rotatory joint mobilisation technique applied to the T4 vertebra at a frequency of 0.5 Hz had demonstrably greater effects than a validated placebo intervention on skin conductance (SC) in the hands of healthy subjects. A power analysis calculation was performed and using a double blind, placebo-controlled, independent groups design, 36 healthy subjects (18-35 years) were randomly assigned to two groups (placebo intervention or treatment intervention). A BioPac unit recorded continuous SC measures before, during and after each experimental intervention. An exit questionnaire was used to validate the expectancy effects of the placebo intervention. Results demonstrated a significant difference between groups in SC in the right hand during the post-treatment rest period (F = 4.888, p = 0.034); with the treatment intervention being sympathoexcitatory in nature. A trend towards a significant difference between groups was also demonstrated in the left hand during the rest period (F = 4.072, p = 0.052). This study provides preliminary evidence that joint mobilisation applied to the T4 vertebra at a frequency of 0.5 Hz can produce sympathoexcitatory effects in the hand. Further research is recommended in a patient population."


"Physiotherapeutic management of lumbar disorders often utilises specific segmental joint mobilisation techniques; however, there is only limited evidence of any neurophysiological effects and much of this has focused on the cervical spine and upper limbs. This study aims to extend the knowledge base underpinning the use of a unilaterally applied lumbar spinal mobilisation technique by exploring its effects on the peripheral sympathetic nervous system (SNS) of the lower limbs. Using a double blind, placebo controlled, independent groups study design and based upon power calculations, 45 normal naive healthy males were randomly assigned to one of three experimental groups (control, placebo or treatment; a unilaterally applied postero-anterior mobilisation to the left L4/5 zygapophyseal joint). SNS activity was determined by recording skin conductance (SC) obtained from lower limb electrodes connected to a BioPac unit. Validation of the placebo
technique was performed by post-intervention questionnaire. Results indicated that there was a significant change in SC from baseline levels (13.5%) that was specific to the side treated for the treatment group during the intervention period (compared to placebo and control conditions). This study provides preliminary evidence that a unilaterally applied postero-anterior mobilisation technique performed, at a rate of 2 Hz, to the left L4/5 lumbar zygopophyseal joint results in side-specific peripheral SNS changes in the lower limbs.


"Randomized clinical trial.
OBJECTIVE:
To compare the effectiveness of anterior versus posterior glide mobilization techniques for improving shoulder external rotation range of motion (ROM) in patients with adhesive capsulitis.
BACKGROUND:
Physical therapists use joint mobilization techniques to treat motion impairments in patients with adhesive capsulitis. However, opinions of the value of anterior versus posterior mobilization procedures to improve external rotation ROM differ.
METHODS AND MEASURES:
Twenty consecutive subjects with a primary diagnosis of shoulder adhesive capsulitis and exhibiting a specific external rotation ROM deficit were randomly assigned to 1 of 2 treatment groups. All subjects received 6 therapy sessions consisting of application of therapeutic ultrasound, joint mobilization, and upper-body ergometer exercise. Treatment differed between groups in the direction of the mobilization technique performed. Shoulder external rotation ROM measured initially and after each treatment session was compared within and between groups and analyzed using a 2-way ANOVA, followed by paired and independent t tests.
RESULTS:
There was no significant difference in shoulder external rotation ROM between groups prior to initiating the treatment program. A significant difference between groups (P = .001) was present by the third treatment. The individuals in the anterior mobilization group had a mean improvement in external rotation ROM of 3.0 degrees (SD, 10.8 degrees; P = .40), whereas the individuals in the posterior mobilization group had a mean improvement of 31.3 degrees (SD, 7.4 degrees; P < .001).
CONCLUSIONS:
A posteriorly directed joint mobilization technique was more effective than an anteriorly directed mobilization technique for improving external rotation ROM in subjects with adhesive capsulitis. Both groups had a significant decrease in pain."


"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.¶"


"The results of this study suggest a potential benefit of osteopathic manipulative treatment as adjuvant therapy in children with recurrent AOM [acute otitis media]; it may prevent or decrease surgical intervention or antibiotic overuse."

"Treatments were gentle techniques on areas of restriction consisting of articulation, myofascial release, balanced membranous tension (according to teachings of William Garner Sutherland, DO, and others25), balanced ligamentous tension, facilitated positional release, and/or counterstrain treatments."


"Recent findings that spinal manual therapy (SMT) produces concurrent hypoalgesic and sympathoexcitatory effects have led to the proposal that SMT may exert its initial effects by activating descending inhibitory pathways from the dorsal periaqueductal gray area of the midbrain (dPAG). In addition to hypoalgesic and sympathoexcitatory effects, stimulation of the dPAG in animals has been shown to have a facilitatory effect on motor activity. This study sought to further investigate the proposal regarding SMT and the PAG by including a test of motor function in addition to the variables previously investigated. Using a condition randomised, placebo-controlled, double blind, repeated measures design, 30 subjects with mid to lower cervical spine pain of insidious onset participated in the study. The results indicated that the cervical mobilisation technique produced a hypoalgesic effect as revealed by increased pressure pain thresholds on the side of treatment (P=0.0001) and decreased resting visual analogue scale scores (P=0.049). The
treatment technique also produced a sympathoexcitatory effect with an increase in skin conductance (P<0.002) and a decrease in skin temperature (P=<0.02). There was a decrease in superficial neck flexor muscle activity (P<0.0002) at the lower levels of a staged cranio-cervical flexion test. This could imply facilitation of the deep neck flexor muscles with a decreased need for co-activation of the superficial neck flexors. The combination of all findings would support the proposal that SMT may, at least initially, exert part of its influence via activation of the PAG."


"SUMMARY. Spinal manipulative therapy techniques are frequently applied by physiotherapists to relieve pain of musculo-skeletal origin and to improve the quality of joint movement in a variety of musculo-skeletal conditions. However, there has been little research into the physiological effects of these techniques, or the mechanisms responsible for these effects. The aim of this study was to establish whether a grade III posteroanterior mobilization technique applied centrally to the cervical spine would affect respiratory and cardiovascular indicators of sympathetic nervous system function in pain-free, normal volunteers. A significant increase in respiratory rate, heart rate, systolic and diastolic blood pressure occurred during application of the technique to C5/6, when compared to the control and placebo conditions. There was little change in any of the measured variables during the placebo condition. This study provides objective evidence that application of this mobilization technique elicits changes in sympathetic nervous system activity distinct from placebo in pain-free individuals. These results provide a basis for further research into the physiological effects of manipulative procedures, and in particular, exploration of the mechanisms responsible for analgesia produced by this method."


"SUMMARY. The aim of this study was to compare the effects of different rates of application of a commonly used physiotherapeutic spinal manipulative therapy technique on sympathetic function in normal pain-free volunteers. A randomized, repeated measures, double blind, controlled study design was used to investigate the effects of two different rates of a C5 grade III central postero-anterior mobilization technique on skin conductance (SC) and skin temperature (ST) in the distal C6 dermatome of asymptomatic subjects. Sixteen asymptomatic male volunteers participated in the study. Application of a C5 central postero-anterior grade III mobilization at the rate of 2Hz produced significantly greater increases in SC values than that at the rate of 0.5 Hz and control. The results of this study suggest that mobilization with the rate which is commonly used clinically causes a greater increase in sympathetic efferent activity in the upper limb of normal pain-free volunteers than a slower rate. These results may also provide a basis for further investigation into the physiological effects of different rates of mobilization and in particular exploration of the relationship between changes in sympathetic function following mobilization and manipulation-induced analgesia. Copyright 1996 Harcourt Publishers Ltd."