THE SOCIETY OF ORTHOPAEDIC MEDICINE

# RESEARCH REPORT

## Manipulation and low back pain

This is a summary of freely available literature on manipulation for the treatment of low back pain published since June 2004. Articles prior to this have been appraised in the recent article by Tim Woodhead and Angela Clough in the journal of orthopaedic medicine 27, 3 (2005).

Manipulation was included as part of an evidence review of prevailing approaches to management of chronic low back pain by Bogduk (2004). No indication was given as to how papers were identified or whether there was any publication bias. Papers were quality assessed using Australian national health and medical research council system for grading evidence. Manipulation was found to be slightly more effective than sham therapy but not more effective than other forms of care. This appears to be in conflict with some guidelines that recommend manipulation in preference to other conservative treatment measures for low back pain.

Pragmatic trials aim to reflect clinical reality where treatments are often used in combination. UK BEAM is such a trial investigating the effect of adding exercise classes, spinal manipulation and spinal manipulation followed by exercise classes to "best care" in general practice for low back pain. Participants randomised to 6 groups. Best care in general practice, exercise, manipulation in private premises, manipulation in NHS premises, manipulation in private premises followed by exercise and manipulation in NHS premises followed by exercise. Groups were shown to be similar at start of trial.

Validated long term outcome measures were used Outcome measures were roland and morris disability questionnaire. Von Korff pain score. Back beliefs score, Fear avoidance beliefs questionnaire, SF36 and EuroQuol at 3 and 12 months.
All groups improved over time. There was no significant difference between manipulation delivered in private or NHS premises.

An additional benefit of combined treatment over manipulation appeared to be greater improvements in beliefs about back pain and fear avoidance. A comparison of delivering manipulation in private and NHS premises was also made and no significant difference found.

The authors point out that due to large cost of back pain even small differences in clinical outcomes may have large economic effects. Analysis of cost effectiveness for each strategy concluded that spinal manipulation is a cost effective addition to best care for back pain in general practice and manipulation alone probably gives better value for money than manipulation followed by exercise (UK BEAM trial team 2004)

Manipulation improves back function by a small to moderate margin at 3 months and a small but significant margin at 12 months. It also achieves sustained improvements in disability, pain, adverse back beliefs and general physical health. Combined treatment improves back function by a moderate margin at three months and a small but significant margin at 12 months.

The authors raise the question of whether small to moderate clinical benefits are worth the cost of therapy. They point out that due to the large cost of back pain even small differences in clinical outcomes may have large economic effects. This theme is investigated further in a second paper which provides an analysis of the economic implications of the UK beam trial findings.

Combined treatment had highest therapy costs but lowest subsequent hospital costs over 1 year. Taking this into account combined treatment cost £125 more than best GP care, exercise £140 and manipulation £195.These costs were then combined with QALYS (quality adjusted life years) to assess cost effectiveness for each strategy.

Analysis concludes that spinal manipulation is a cost effective addition to best care for back pain in general practice. Manipulation alone probably gives better value for money than manipulation followed by exercise.

Soft tissue mobilisation in conjunction with exercise was investigated in a trial by Geisser et.al (2005). 100 subjects were selected with chronic low back pain of more than 3 months duration from Michegan university spine treatment program. Randomised to one of 4 treatment groups:

Manual therapy + specific ex
Sham manual therapy + specific ex
Manual therapy + non specific ex
Sham manual therapy + non specific ex

No description of the randomisation procedure is given. Analysis of any pre treatment differences between groups revealed the sham manual therapy + non specific exercise group to be older. Groups were assessed for any significant differences in ex compliance and non was found. It was not possible to blind the treating therapist to treatment allocation, therefore the protocol followed for the manual and sham therapies ensured subjects were treated the same. No significant differences were detected between participants perceptions of whether they received 'real' treatment therefore patients were effectively blinded.

A number of validated assessment tools were used to measure pain and disability. The study concludes manual therapy with specific exercise gives significant improvements in pain in a sub group of chronic low back pain patients. There was no support that manual therapy alone is beneficial. Sham manipulation and specific ex group showed significant increase in disability.

No significant improvements in disability were observed demonstrating a reduction in pain does not necessarily lead to change in function. Non completers were more likely to be male, receiving compensation and had higher reported pain and disability levels. Study findings may not therefore be generalisable to this subgroup. The authors recommend further research into the effect of combining manual therapy with exercise and conclude that manual therapy and specific exercise alone may be beneficial in a sub group CLBP population believed to be heterogeneous. Manual therapy and specific ex may be beneficial aspects of multidisciplinary treatment which has been shown to be efficacious

The effect of manual therapy technique selection was investigated in a trial by Chiradjnant et el (2003). Low back pain patients were randomised to 2 groups. In the therapist selected group the mobilisation technique used to treat the patient was based on examination findings of the treating physiotherapist. A randomly selected manual therapy technique was used to treat patients in the 2nd group. This study only investigated immediate effects from a single treatment on the day. There was no long term follow up.

The researcher and patients were blinded to treatment allocation. It was not possible to blind the treating physiotherapist. Outcome measures were current pain intensity measured on 0-10 scale, active range of movement and global perceived effect on an 11 point scale.

A significantly greater increase in range of right lateral flexion was found when therapist selected technique was given to subjects whose most painful movements were extension and right lateral flexion. A significantly greater increase in left lumbar lateral flexion range was recorded when therapist selected technique was used on subjects whose most painful movement direction was right lateral flexion. An additional finding was that better outcomes were achieved when mobilisation applied to lower lumbar levels (L4-5).

Overall there was no difference between therapists selected and randomly selected mobilisation techniques. This is contrary to recommendations in manual therapy texts. Authors suggest these findings may be due to the homogenous sample of patients with non specific low back pain used and recommend further research into the effect of specific treatment techniques with heterogeneous samples.

In a study by frost et al (2004) patients with mild to moderate low back pain were randomised to an advice group or a physiotherapy group. The advice group received a 1 hour advice session from a physiotherapist. The therapy group were assessed and treated as judged to be appropriate by a physiotherapist on up to 5 subsequent occasions. This was not specifically a trial of manipulation but is relevant as a large proportion of patients in the therapy group received manual therapy treatments. Both groups received a copy of the back book.

Some patients randomised to the advice group subsequently received further treatment. Reasons for this were the patients being unhappy with advice

only, the treating physio deeming it unethical to withhold further treatment for example due to increased pain or the GP referred for more treatment.

There was a 30% drop out rate at 12 months but few differences between completers and non completers. Many low back pain trials report high drop out rates, an important consideration when designing low back pain trials.

Outcome measures were Oswestry disability index, Roland and Morris and SF36 and patient perceived benefit on a 0-10 scale all at 2, 6 and 12 months

The authors conclude that routine physio for mild to moderate low back pain is no more effective than a session with a physiotherapist that includes advice and suggest these findings challenge the traditional model of physiotherapy. However patient perception of benefit was in conflict with validated outcome measures and the clinical significance of this is recommended for further investigation.

Review articles by Sran (2004) and Nadler (2004) identify reasons why studies of manipulation have mixed outcomes. Positive results for manipulation were reported in those studies where a clear protocol based on clinical guidelines or expert texts for the manipulative treatment provided was described (Sran 2004).

Sran (2004) investigated the apparent inconsistent data yielded by trials comparing spinal manipulative therapy to other standard treatments for low back and neck pain.

Medline, cinahl, embase were searched for randomised trials of spinal manipulative therapy versus other conservative treatments. A full description of the search strategy is given this does not mention any attempt to address publication bias.13 full papers published in English between 01/01/98 and 31/12/03 were identified.

No methodological scoring system was used but factors influencing quality of these papers were identified. Only one of the identified studies used a control group. Less than 1/3 of studies included a power calculation. Populations of the studies reviewed were shown to be homogeneous.

Article suggests differences in results of trials of manipulation could be due to differences in methodology employed. Methodological variations include treatment techniques and protocols used, dosage (number of sessions, duration of sessions, grade of technique used) and combination therapies (manipulation in conjunction with some other form of treatment).

Nadler (2004) carried out a descriptive literature review to assist selection of evidence based non pharmacologic treatments for chronic neck and back pain. Manipulation was one of the modalities reviewed. The method of selecting studies and publication bias was not discussed and no methodological scoring system was used.

Studies that were reviewed and involved manipulation had mixed outcomes. The authors attribute this to poor study design, execution and poorly quantifiable objective measures.

The review conducted by Nadler (2004) found significant results for manipulation easier to demonstrate in the early stages of a painful episode and therefore suggests "aggressive treatment" with manipulation in the early stages of a painful episode may be beneficial when it is easier to demonstrate significant results.

The results of 3 USA trials of osteopathic manipulation were reviewed by Licciarclone (2004), concluding it to be beneficial in many low back pain patients.
No indication was given as to how papers were identified. General methodological considerations are discussed pertaining to any trial of manipulation. No analysis of the specific methodologies employed in the 3 trials reviewed in this article was undertaken. Publication bias, missing information and any differences in results between the 3 trials reviewed are not mentioned.

Article concludes that results of the 3 trials reviewed suggest osteopathic manipulation will be beneficial in many low back pain patients. However these findings are not necessarily applicable to the UK back pain population as the article is an appraisal of the role of osteopathic physician which does not widely exist in the UK healthcare system.

There is a study in progress described by Hancock et al (2005) due to report in 2007. The aim of this study is to evaluate NSAIDS and/or manipulation as first line therapy using validated outcome measures. This study may provide evidence whether manipulation is more beneficial when introduced as part of first line management or would be better reserved for those cases not responding to GP care.

The article describes a proposed methodology for a trial not yet conducted. Australian guidelines currently advocate advice and paracetamol for treatment of a new episode of acute back pain. NSAIDS and/or manipulation are recommended as second line therapy. The aim of this study is to evaluate NSAIDS and/or manipulation as first line therapy.

Subjects will be randomised to 4 groups.
Placebo NSAIDS + placebo manipulation
Active NSAIDS and placebo manipulation
Placebo NSAIDS and active manipulation
Active NSAIDS and active manipulation.

Placebo manipulation will be de-tuned ultrasound

The researcher will be blinded to allocations. As it is not possible to blind the treating physio they will receive specific training to respond identically to all patients. All patients will also receive GP care as defined in Australian

guidelines (paracetamol and advice).Validated tools will be used for outcome measures.

Results are due 2007 and may provide evidence to help determine whether manipulation is more beneficial when introduced as part of first line management or would be better reserved for those cases not responding to first line management

## Conclusions

The findings of Geisser et.al (2005) and Chiradjnant et.al (2003) reflect a need for current research to work towards development of assessment tools that identify subgroups of low back pain patients that will respond favourably to specific treatments. Ultimately evidence based protocols and guidelines for the management of low back pain could be produced by such work.

Trials published more recently appear to be in agreement with the findings of the review by Tim Woodhead and Angela Clough (2005) that spinal manipulative therapy is an effective treatment for low back pain and with the recommendations of the Cochrane review that it is not more effective than other advocated therapies.

## Relevance to SOM practice

Spinal manipulation is a cost effective addition to best care for back pain in general practice and manipulation alone probably gives better value for money than manipulation followed by exercise (UK BEAM trial team 2004).

Manual therapy technique selection does not appear to have an effect on outcome. This is contrary to recommendations in manual therapy texts including SOM..

Positive results for manipulation were reported in those studies where a clear protocol based on clinical guidelines or expert texts for the manipulative treatment provided was described (Sran 2004). The SOM lumbar manipulative procedure is such a protocol.

Hancock et al (2005) due to report in 2007 may provide evidence to help determine whether manipulation more beneficial when introduced as part of first line management or would be better reserved for those cases not responding to first line management

## References

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**Further articles on back pain**

**Patel SN Kettner NW**

**Abdominal aortic aneurysm presenting as back pain to a chiropractic clinic: a case report journal of manipulative and physiological therapeutics June 2006 29 (5) p409 PMID 1676271**

Description of patient with low back pain referring into lower limb. X-ray revealed degenerative change and abdominal aortic aneurysm (AAA). The aneurysm was treated with elective surgical repair.

This case study gives brief overview of AAA including underlying pathophysiological mechanisms, clinical diagnosis, diagnostic imaging, and treatment options. This article is a useful guide to differential diagnosis of low back pain and a reminder that AAA is a diagnosis that must be considered in the geriatric/high-risk patient population particularly when many patients with degenerative back pain are not routinely x-rayed. When AAA is suspected urgent medical opinion should be sought.

**Menzel N Robinson M**

**Back pain in direct patient care providers. Early intervention with cognitive behavioural therapy (CBT). Pain management nursing June 2006 7 (2) p 53-63 PMID 16730318**

This article will be of interest to those working in an occupational health setting or involved with manual handling training/ back pain prevention programs.

It is a Pilot study that suggests CBT may be of value as a secondary prevention strategy for work related back pain. There are some methodological flaws acknowledged by the authors. These include use of a self selecting small sample with a short follow up period recommendations for correcting these in longer term study are made. It is also not clear whether any analysis of pre-treatment differences between groups was carried out.

Literature is cited that suggests a possible link between psychological stress and spinal loading hypothesising that mental stress may initiate a biomechanical response via increased muscle co-activation increasing spinal compression.

This introduces the concept that back pain prevention programs and manual handling guidelines should consider this psychological dimension and take steps to reduce the psychological as well as the physical stresses of the job. The suggestion is made that failure of many programs to address psychological issues may be the reason why in some organisations despite investment in preventative programs the incidence of work related back pain has not been reduced.

**Interrater reliability of a passive physiological intervertebral motion test in the mid thoracic spine Journal of manipulative and physiological therapeutics June 2006 29 (5) 368-73 PMID 16762664**

Several studies have investigated the reliability of palpatory findings. This study looked at passive physiological intervertebral motion (PPIM) of a mid-thoracic spine motion segment. Much manual therapy treatment is based upon accurate palpation. As with any modality evidence supporting effectiveness is important. This study contributes to the body of evidence.

Fair to substantial interrater reliability was demonstrated using very experienced manual therapy clinicians. In clinical practice however not every patient will be seen by similarly experienced clinicians. It is therefore not

known whether less experienced clinicians are as reliable and whether this has an effect on treatment outcome.