

# Research Paper Review

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# The effectiveness of sub-group specific manual therapy for low back pain: A systematic review Manual Therapy 2012; 17: 201-212

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# ABSTRACT

## Background

Manual therapy is frequently used to treat low back pain (LBP), but evidence of its effectiveness is limited. One explanation may be sample heterogeneity and inadequate sub-grouping of participants in randomized controlled trials (RCTs) where manual therapy has not been targeted toward those likely to respond.

## **Objectives**

To determine the effectiveness of specific manual therapy provided to sub-groups of participants identified as likely to respond to manual therapy.

#### Data Sources

A systematic search of electronic databases of MEDLINE, EMBASE, CINAHL, and the Cochrane Central Register of Controlled trials (CENTRAL). TRIAL ELIGIBILITY CRITERIA: RCTs on manual therapy for participants identified as belonging to a sub-group of LBP likely to respond to manual therapy were included.

## Trial Appraisal And Synthesis Methods

Identified trials were assessed for eligibility. Data from included trials were extracted by two authors independently. Risk of bias in each trial was assessed using the PEDro scale and the overall quality of evidence rated according to the GRADE domains. Treatment effect sizes and 95% confidence intervals were calculated for pain and activity.

#### Results

Seven RCTs were included in the review. Clinical and statistical heterogeneity precluded meta-analysis. Significant treatment effects were found favouring sub-group specific manual therapy over a number of comparison treatments for pain and activity at short and intermediate follow-up. However, the overall GRADE quality of evidence was very low.

#### Conclusions

This review found preliminary evidence supporting the effectiveness of sub-group specific manual therapy. Further high quality research on LBP sub-groups is required.

#### **ANALYSIS**

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#### **Background Information**

When one looks at the entire body of literature on the treatment of low back pain (LBP), it becomes readily apparent that, in general, no one treatment or intervention is clearly superior to all others. In fact, many treatment options have just as many studies supporting their efficacy as those demonstrating no effect, or no advantage over 'placebo' or some other form of treatment. This can be frustrating for the practicing clinician, policy makers, and not least of all, patients!

As we have discussed on RRS previously, at least part of this research ambiguity stems from the fact that in many randomized studies, LBP is treated as a homogenous condition. It is now well accepted that it is not – pain between the lower costal margin and lower gluteal folds in one person is not necessarily the same 'thing' as pain in the same location in another person. Therefore, sample heterogeneity and inadequate sub-grouping of LBP patients may have resulted in manual medicine interventions being provided to patients who were not very likely to respond well in the first place. Wouldn't it be nice to be able to utilize simple pieces of historical information and physical examination findings to decide if a patient would respond better to manipulation, exercise, or extension/positional therapy? In theory (and hopefully practice!), this is what we do with our patients every day. From a research perspective, it makes sense that if we have been studying the effects of SMT (for example) on patients who are unlikely to benefit from it, the results will be less than stellar, or at least inconclusive. Determining which historical or clinical factors can guide decision-making in LBP treatment has been the goal of one particular group of researchers for a number of years and RRS has reviewed much of their research (Childs, Cleland, Fritz et al should ring a bell). This area of study is still evolving but it represents realistic clinical reasoning, and a reasonable high priority for future LBP research.

Therefore, the purpose of this study was to conduct a systematic review to determine the effectiveness of specific manual therapy provided to sub-groups of participants identified as likely to respond to manual therapy. For the purpose of this study, manual therapy was defined as a high velocity thrust manipulation or lower velocity mobilization directed at the vertebral articulations.

## PERTINENT RESULTS

- A total of 7 studies met inclusion criteria (1-7), randomizing a total of 463 subjects.
- All 7 trials were conducted in a physical therapy clinic setting 6 in the USA and 1 in the Netherlands.
- Across the seven trials 3 sub-groups were defined by:
  - Centralization of symptoms with repeated lumbar extension (1)
  - Centralization of symptoms as well as symptom reproduction in three out of four provocative tests for sacroiliac joint pain (extension-mobilization sub-group) (4, 5)
  - A pre-determined clinical prediction rule (CPR) for spinal manipulation (2, 3, 6, 7). The CPR included five variables predicting a positive response to spinal manipulation comprising: duration of symptoms < 16 days, Fear Avoidance Beliefs Questionnaire work subscale score < 19, at least one hip with > 35° internal rotation, hypomobility in the lumbar spine and no symptoms distal to the knee.
- Primary Interventions: Heterogeneity was noted among the trials regarding the type of manual therapy and co-interventions utilized. In 6 trials, SMT was provided in conjunction with a co-intervention including trunk stabilization (2, 3, 7), an extension-oriented program (4), flexion and extension exercises (5), and a range of motion exercise (7). The seventh study (1) utilized mobilization as a component of an extension-oriented treatment approach.
- Comparison Interventions: These also varied and included flexion oriented exercise program (4), an extension oriented program (5), and trunk muscle training (1, 2, 7). Trunk muscle training incorporated stabilization exercise, and, in two of the three trials, an additional low stress aerobic exercise program (2, 7). Two trials included alternative manual therapy as the comparison, defined as a manipulation technique not used in the development of Flynn et al.'s CPR for spinal manipulation (3, 7).
- All 7 trials assessed short-term follow-up at less than 3 months and 3 trials assessed intermediate follow-up between 3 months and one year.
- The average PEDro score for the 7 trials was 6/10 five trials scored 6 or more out of ten indicating a low risk of bias. In the other two that scored lower than 6/10 (4, 5), limitations included inadequate concealment of treatment allocation, insufficient blinding of assessors and failure to apply intention to treat principles. All studies were not able to blind treating therapists or patients, a universal problem in manual medicine studies.
- Overall, meta-analysis was not possible for any combination of trials due to inconsistency in design and study populations.

# **STUDY FINDINGS & STRENGTH OF EVIDENCE:**

- <u>Specific Manual Therapy vs. Flexion Exercises:</u> One trial (with a high risk of bias) involving 24 subjects provided low quality evidence that specific manual therapy (SIJ manipulation followed by extension exercises) was better than flexion exercises at short term follow-up (4).
- <u>Specific Manual Therapy vs. Extension-Oriented Exercise</u>: Another trial with high risk of bias (24 subjects) compared specific manual therapy (and the co-intervention of flexion exercises) with an extension oriented program (5). The results demonstrated a large and significant effect size for activity at short term follow-up favouring manual therapy, but provided very low quality evidence

that specific manual therapy was better than an extension oriented program at short term follow-up.

- <u>Specific Manual Therapy vs. Other Manual Therapy</u>: Two trials with low risk of bias compared SMT applied as per Flynn et al.'s CPR with SMT applied without using the CPR (3, 7) and mobilization (7). One of the trials included 112 patients (3) and showed a large and significant treatment effect on pain and activity at short term follow-up, as well as a moderate and significant effect on activity at intermediate term follow-up in favour of the specific manipulation over mobilization. The two comparisons between manipulation matched to the CPR and unmatched manipulation showed no significant difference. Overall, there was very low quality evidence that specific manual therapy was better than other manual therapy at reducing pain and increasing activity at any follow-up period.
- <u>Specific Manual Therapy vs. Trunk Stabilizing Exercise/Training</u>: Three trials with low risk of bias compared specific manual therapy to trunk muscle training (1, 2, 6). Two trials (2, 6) compared SMT with trunk muscle training to trunk muscle training alone in a group of participants positive on Flynn et al.'s CPR. One of these trials included 131 subjects and demonstrated a large and significant effect on pain and activity in the short term and intermediate term in favour of the specific manipulation group (2). The second trial included 64 subjects and showed no significant differences. The third trial (with 48 subjects) compared manual therapy as part of an extension oriented treatment approach to trunk muscle training (1). This trial demonstrated a moderate and significant effect on improving activity at both short and intermediate follow-up in favour of the group receiving manual therapy. To summarize, there was only very low quality evidence that specific manual therapy was better than trunk muscle training at reducing pain and increasing activity at any follow-up period.

#### **CLINICAL APPLICATION & CONCLUSIONS:**

This was the first time studies of this nature have been systematically reviewed. Given the recent call for RCTs on LBP treatments that employ patient sub-classification strategies, the inclusion of only 7 studies is somewhat disappointing. Having said that, the studies included in this review at least provide preliminary evidence that when manual therapy (SMT, essentially) is targeted to a sub-group likely to respond, it may produce a greater reduction in pain and greater increase in activity than comparison treatments. Because a meta-analysis was not possible, the authors chose to employ a qualitative GRADE evaluation of the included trials (this has become standard in such reviews). Despite the overall GRADE quality of the evidence being very low, two trials with low risk of bias (2, 3) and two with high risk of bias (4, 5) produced large treatment effects in favour of specific manual therapy. This is an important finding that, despite requiring further study, suggests that practitioners who employ one treatment only for all LBP cases may be misguided. Unfortunately, this sort of belief and practice habit remains commonplace in far too many offices...

Sub-grouping LBP patients into specific treatment options is a complex process, and evidence-informed clinicians are encouraged to continue integrating current research concepts with their clinical skills and needs of each individual patient.

#### STUDY METHODS

This study began with a search of the following databases for relevant trials: MEDLINE, EMBASE, CINAHL and the Cochrane Central Register of Controlled Trials. In order to be included, studies had to:

- be randomized trials published in English
- include subjects between 18-65 years of age with LBP +/- leg pain attributable to mechanical causes (other more serious causes resulted in exclusion of the particular paper)
- include at least one group receiving therapist-applied manual therapy including manipulation (HVLA) or mobilization (low-velocity) and at least one comparison group
- sub-classify participants as likely to respond to manual therapy based on some type of LBP subgrouping criteria (see below)
- measure outcomes on a Visual Analogue Scale (VAS) or Numeric Pain Rating Scale (NPRS) and/or activity modification via low back-specific scales

Two reviewers independently extracted data using a standardized form and analyzed included studies for risk of bias using the PEDro scale. Group means, standard deviations, 95% confidence intervals and treatment effect sizes were all extracted when possible. The authors intended to perform a meta-analysis but the heterogeneity of the literature prevented this. Studies were also qualitatively assessed using the GRADE criteria.

## **STUDY STRENGTHS / WEAKNESSES**

## Strengths

• Although systematic reviews on the effectiveness of manual therapy for LBP exist, this is the first one to specifically focus on sub-group specific manual therapy.

## Weaknesses

- No meta-analysis was performed due to trial heterogeneity.
- A potential limitation is the inclusion of studies using co-interventions in addition to the specific manual therapy.

## Additional References

Studies Meeting Inclusion Criteria for Systematic Review:

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