Dynamic Chiropractic

BACK PAIN

Research in Review: Manual Physical Therapy Techniques for LBP

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The Study

Title: "Comparison of the Effectiveness of Three Manual Physical Therapy Techniques in a Subgroup of Patients With Low Back Pain Who Satisfy a Clinical Prediction Rule: A Randomized Clinical Trial."
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Background

Those who stay current with literature will be familiar with the low back pain clinical prediction rule (CPR) that has been in development for low back pain patients for the past few years. This important and unique work has been authored mainly by Cleland, Fritz, Childs, et al. To quickly review, clinical prediction rules are tools designed to assist clinical decision-making by using combinations of specific historical information and physical examination findings to guide treatment decisions. Developing a CPR takes time and requires numerous steps involving a variety of study designs.

The multi-center, randomized clinical trial reviewed here is important for this LBP CPR, as it is an appropriate project that addresses recent concerns among the CPR's critics, as well as a common question from field practitioners.[1] The question under investigation here is, for patients who satisfy the CPR for low back pain (as potential responders to spinal manipulation), does the method of lumbar manipulation matter to patient outcome?

As you may know, the authors of this line of research have always employed a supine lumbar manipulation, which is quite different than the side-posture techniques utilized by most chiropractors and many physiotherapists. In general, the literature to date indicates that similar clinical outcomes can result from a variety of thrust manipulation methods. A trial published in 2009 involving older adults with LBP provides a recent example of this.[2] However, the literature is not as clear on the difference in efficacy between thrust and non-thrust manipulation, and this question is also investigated here.

Study Methods

In this study, 122 patients (average age ~ 40 years; 49 percent female) were randomized to receive one of three treatment interventions for a short course of two treatments, followed by a standardized exercise program that was given to all groups. Patients were recruited from New Hampshire, Utah and Los Angeles. In order to be eligible, patients had to satisfy the following criteria:

- modified OSWESTRY Disability Questionnaire (ODQ) score of > 25%;
- 18 to 65 years of age;
- positive for the LBP CPR for manipulation by having at least four of these five findings: pain duration < 16 days, no symptoms distal to the knee, FABQW subscale score < 19, positive segmental hypomobility test (≥ 1 segment), and hip internal rotation > 35° on at least one side.

Exclusion criteria were standard and included the presence of any red flags (tumor, infection, etc.), signs consistent with nerve root compression (+ve SLR, muscle weakness, sensory deficit, reflex deficit), prior lumbar surgery or pregnancy.

All subjects completed the following outcome measures at baseline, one week, four weeks and six months: Numeric Pain Rating Scale to capture the patient's level of pain; ODQ to assess the patient's level of disability; and Fear Avoidance Beliefs Questionnaire (FABQ) to quantify the patient's fear of pain and beliefs about avoiding activity.

Treatment Interventions (each subject treated twice over a few days)

Supine thrust manipulation group (n = 37): This group received the manipulation used in the creation and validation of the CPR. The patient was supine with fingers interlocked behind the head. The clinician stood on the side opposite of that to be manipulated. The patient was passively moved into side-bending away from the clinician, who stabilized the contralateral ASIS while passively rotating the patient using the contralateral shoulder (rotating upper body toward clinician). A thrust was then applied. If no cavitation was heard, the clinician repositioned the patient and attempted the treatment again (a maximum of two times).

Side-posture thrust manipulation group (n=38): The patient was positioned in side-lying with the painful side up. The clinician then stabilized the upper torso while flexing the up-side leg until motion was perceived at the target level. A thrust was then delivered, imparting segmental side flexion and rotation into the target segment using a hand contact (this will be familiar to most chiropractors as a "Bonyun" manipulation). As above, a second attempt was made if no cavitation was heard on the first thrust.

Non-thrust manipulation group (n=37): Patients in this group were prone and received lumbar posterior-anterior non-thrust mobilization directed at L4-5 via the hypothenar eminence of the treating clinician. Mobilizations were oscillatory (roughly 2 Hz) and were delivered for 60 seconds at each spinal level (L4 and L5).

Subjects in all groups were given general exercise instructions for supine lumbar mobility exercises (flexion/extension) to be performed 10 times, three to four times daily until the third treatment/assessment session.

Pertinent Study Results

Baseline characteristics, including symptom duration and severity, were similar for the three treatment groups, aside from a slightly higher body mass index in the side-posture group. Repeated measures analysis revealed significant group X time interactions for the ODQ ($P < 0.001$) and NRPS ($P = 0.001$) scores. Both thrust manipulation groups improved in similar amounts/patterns, while the non-thrust group improved to a lesser degree

Both thrust manipulation interventions were clinically effective, and no differences were noted in the degree of improvement between the thrust manipulation groups at any follow-up period. After week one, success rates in the supine thrust group and side-lying thrust group were 54.1 percent

and 52.6 percent respectively, while the corresponding value for the non-thrust group was only 8.1 percent ($P < 0.001$).

At the four-week follow-up, these values were 86.5 percent, 81.6 percent and 18.9 percent, respectively ($P < 0.001$), again indicating superiority of the thrust interventions. The six-month rates were 91.9 percent, 89.5 percent and 67.6 percent, respectively ($P = 0.009$).

Twenty-eight patients (25 percent) reported at least one side effect (similar percentage in all groups), the most common being a slight aggravation of symptoms within four hours of treatment that resolved within 48 hours. No serious complications were reported.

Conclusions / Practical Application

This study's primary goal was to assess the generalizability of the clinical prediction rule that was developed to identify patients who are most likely to respond well to thrust manipulation versus a different thrust manipulation method; and also to compare the thrust techniques to a non-thrust method. The findings here support such generalizability to the additional side-posture technique, but not to the prone non-thrust mobilization technique. This lends further support to the concept that a thrust force can be applied to a spinal joint in more than one manner with similar resultant clinical effects. Further, the results support previous literature by exemplifying the utility of the CPR in identifying subjects who are likely to respond well to manipulation.[3]

Recent literature has re-examined our beliefs about how manipulation works. Traditional theories regarding the underlying mechanisms of manipulation include primarily structural concepts - disruption of "adhesions," release of trapped intra-articular material in facets, realignment of spinal structure and so on.[4] More recent explanations tend to focus on neurophysiologic effects, including mechanoreceptor stimulation and motor neuron excitability modulation, reflecting the unique sensory input caused by a high-velocity thrust.[5] The exact answer is not yet known, but the most compelling evidence to date lies on the neurophysiological end of the spectrum. Such responses seem dependent on the velocity and amplitude of the force, further emphasizing that from a research (and clinical) perspective, close attention must be paid to distinguishing between manipulation and mobilization.

Study Critique

Although this study was generally well-conducted, the following shortcomings should be considered when interpreting the results: 1) The number of patients recruited from each location was unbalanced, making any firm conclusions about the generalizability of the CPR to different clinical settings difficult. 2) The authors were not able to track the number of subjects screened for eligibility for the study across locations. 3) No placebo treatment was used (it is worth noting that a suitable, standardized placebo for lumbar spinal manipulation has not yet been established). 4) No control group was used; therefore one cannot conclude whether manipulation is superior to no treatment in a group that satisfies the CPR. 5) The study included patients who were pre-determined to respond well to manipulation, so the general improvement in both thrust manipulation groups was to some degree expected. 6) Only 14 percent of patients had pain less than 16 days, while the average pain duration was around 50 days. This did not differ among groups, however, and spontaneous resolution was likely not a factor.

References

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