**Article Full Title**

Comparing targeted thrust manipulation with general thrust manipulation in patients with low back pain. A general approach is as effective as a specific one. A randomised controlled trial

**Author Names**

McCarthy, C., Potter, L., Oldham, J.

**Reviewer Name**

Miles Moore, SPT CSCS

**Reviewer Affiliations**

Duke University School of Medicine, Doctor of Physical Therapy Division

**Paper Abstract**

Background: Spinal manipulation is commonly used to treat back pain. The application of spinal manipulation has traditionally involved an element of targeting the technique to a level of the spine where the proposed movement dysfunction is sited. We evaluated the effects of a targeted manipulative thrust versus a thrust applied generally to the lumbar region. Methods: A randomized controlled clinical trial in patients with low back pain following CONSORT (Consolidated Standards of Reporting Trials) guidelines. Sixty subjects were randomly allocated to two groups: one group received a targeted manipulative thrust (n=29) and the other a general manipulation thrust (GT) (n=31) to the lumbar spine. Thrust was either localized to a clinician-defined symptomatic spinal level or an equal force was applied through the whole lumbosacral region. We measured pressure-pain thresholds (PPTs) using algometry and muscle activity (magnitude of stretch reflex) via surface electromyography. Numerical ratings of pain and Oswestry Disability Index scores were collected. Results: Repeated measures of analysis of covariance revealed no between-group differences in self-reported pain or PPT for any of the muscles studied. Summary: A GT procedure-applied without any specific targeting-was as effective in reducing participants' pain scores as targeted approaches. Trial registration number: ISRCTN11994230.

**NIH Risk of Bias Tool**

Quality Assessment of Controlled Intervention Studies

1. **Was the study described as randomized, a randomized trial, a randomized clinical trial, or an RCT**

Yes

1. **Was the method of randomization adequate (i.e., use of randomly generated assignment)?**

Yes

1. **Was the treatment allocation concealed (so that assignments could not be predicted)?**

Yes

1. **Were study participants and providers blinded to treatment group assignment?**

No

1. **Were the people assessing the outcomes blinded to the participants' group assignments?**

Cannot Determine, Not Reported, or Not Applicable

1. **Were the groups similar at baseline on important characteristics that could affect outcomes (e.g., demographics, risk factors, co-morbid conditions)?**

Yes

1. **Was the overall drop-out rate from the study at endpoint 20% or lower of the number allocated to treatment?**

Yes

1. **Was the differential drop-out rate (between treatment groups) at endpoint 15 percentage points or lower?**

Yes

1. **Was there high adherence to the intervention protocols for each treatment group?**

Yes

1. **Were other interventions avoided or similar in the groups (e.g., similar background treatments)?**

Yes

1. **Were outcomes assessed using valid and reliable measures, implemented consistently across all study participants?**

Yes

1. **Did the authors report that the sample size was sufficiently large to be able to detect a difference in the main outcome between groups with at least 80% power?**

No

1. **Were outcomes reported or subgroups analyzed prespecified (i.e., identified before analyses were conducted)?**

Cannot Determine, Not Reported, or Not Applicable

1. **Were all randomized participants analyzed in the group to which they were originally assigned, i.e., did they use an intention-to-treat analysis?**

Yes

**Key Finding #1**

There were no differences in disability or pain reduction between the targeted thrust manipulation group and the general thrust manipulation group.

**Key Finding #2**

There was an increase in stretch reflex surface EMG measurement in lumbar multifidus muscles on the targeted thrust manipulation group across three visits.

**Key Finding #3**

Targeting a manipulative thrust technique to a clinically-defined, specific level of the lumbar spine does not improve self-reported pain or disability levels.

**Key Finding #4**

It may be necessary for manual therapy scientists to reevaluate paradigms used to justify therapeutic mechanisms of spinal manipulations and the clinical utility of specialized manipulation training.

**Please provide your summary of the paper**

The results showed that there was no significant difference in disability level or pain reduction between the targeted thrust (TT) spinal manipulation (SM) group and general thrust (GT) spinal manipulation applied to the lumbar region group. Pre- and post-treatment pain levels were documented using the Visual Analogue Scale (VAS) and algometry was used to assess the pressure-pain threshold (PPT) at the center of the muscle belly being evaluated by surface EMG (sEMG) (iliocostalis and local multifidus). Additionally, there was no significant difference in the magnitude or acceleration of the SM thrust between groups. The results show that TT spinal manipulations amplified the local stretch-reflex response of tested muscle bellies measured by sEMG, however, this could be due to protective muscle activation by participants anticipating TT manipulation to specific areas as they participated in sequential sessions. These results call into question the need for comprehensive, hands-on SM training in TT manipulation as GT and TT generated equivocal results in disability and pain reduction. If the benefits of SM can be generated through GT intervention, physical therapists without extensive targeted spinal segment manipulation training can provide GT to patients and expect similar outcomes compared to therapists using TT. These findings broadly allow more low back pain patients to receive beneficial SM treatment as therapists won’t have to complete comprehensive training to gain competency using a technique (TT) that was thought to yield superior results. This study does have several limitations. The study is slightly underpowered, thus, increasing the chance of a false negative. Additionally, this is study is a single-blind study as the spinal manipulator knew which thrust group each subject was allocated into so that the appropriate SM could be applied. This may have introduced bias, impacting the relationship between the manipulator and the subject.

**Please provide your clinical interpretation of this paper. Include how this study may impact clinical practice and how the results can be implemented.**

Clinically, this allows me to appreciate the ambiguity and complexity of manual therapy treatment mechanisms. The results show similar outcomes between general and targeted thrust techniques, potentially allowing clinicians to save time searching for specific spinal segments contributing to pain. Additionally, these results challenge the clinical utility of extensive specialized, targeted spinal manipulation training if similar outcomes are achieved with broad force thrust techniques. According to the study's results, therapists could save time locating spinal segment pain generators and more time applying general thrust spinal manipulation techniques or using other interventions in practice.