**Article Full Title**

Association of Spinal Manipulative Therapy With Clinical Benefit and Harm for Acute Low Back Pain: Systematic Review and Meta-analysis

**Author Names**

Paige NM, Miake-Lye IM, Booth MS, Beroes JM, Mardian AS, Dougherty P, Branson R, Tang B, Morton SC, Shekelle PG

**Reviewer Name**

Kimberlyn Hayes, SPT

**Reviewer Affiliations**

Duke University School of Medicine, Doctor of Physical Therapy Division

**Paper Abstract**

Importance Acute low back pain is common and spinal manipulative therapy (SMT) is a treatment option. Randomized clinical trials (RCTs) and meta-analyses have reported different conclusions about the effectiveness of SMT. Objective To systematically review studies of the effectiveness and harms of SMT for acute (≤6 weeks) low back pain. Data Sources Search of MEDLINE, Cochrane Database of Systematic Reviews, EMBASE, and Current Nursing and Allied Health Literature from January 1, 2011, through February 6, 2017, as well as identified systematic reviews and RCTs, for RCTs of adults with low back pain treated in ambulatory settings with SMT compared with sham or alternative treatments, and that measured pain or function outcomes for up to 6 weeks. Observational studies were included to assess harms. Data Extraction and Synthesis Data extraction was done in duplicate. Study quality was assessed using the Cochrane Back and Neck (CBN) Risk of Bias tool. This tool has 11 items in the following domains: randomization, concealment, baseline differences, blinding (patient), blinding (care provider [care provider is a specific quality metric used by the CBN Risk of Bias tool]), blinding (outcome), co-interventions, compliance, dropouts, timing, and intention to treat. Prior research has shown the CBN Risk of Bias tool identifies studies at an increased risk of bias using a threshold of 5 or 6 as a summary score. The evidence was assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) criteria. Main Outcomes and Measures Pain (measured by either the 100-mm visual analog scale, 11-point numeric rating scale, or other numeric pain scale), function (measured by the 24-point Roland Morris Disability Questionnaire or Oswestry Disability Index [range, 0-100]), or any harms measured within 6 weeks. Findings Of 26 eligible RCTs identified, 15 RCTs (1711 patients) provided moderate-quality evidence that SMT has a statistically significant association with improvements in pain (pooled mean improvement in the 100-mm visual analog pain scale, −9.95 [95% CI, −15.6 to −4.3]). Twelve RCTs (1381 patients) produced moderate-quality evidence that SMT has a statistically significant association with improvements in function (pooled mean effect size, −0.39 [95% CI, −0.71 to −0.07]). Heterogeneity was not explained by type of clinician performing SMT, type of manipulation, study quality, or whether SMT was given alone or as part of a package of therapies. No RCT reported any serious adverse event. Minor transient adverse events such as increased pain, muscle stiffness, and headache were reported 50% to 67% of the time in large case series of patients treated with SMT. Conclusions and Relevance Among patients with acute low back pain, spinal manipulative therapy was associated with modest improvements in pain and function at up to 6 weeks, with transient minor musculoskeletal harms. However, heterogeneity in study results was large.

**NIH Risk of Bias Tool**

Quality Assessment of Systematic Reviews and Meta-Analyses

1. **Is the review based on a focused question that is adequately formulated and described?**

Yes

1. **Were eligibility criteria for included and excluded studies predefined and specified?**

Yes

1. **Did the literature search strategy use a comprehensive, systematic approach?**

Yes

1. **Were titles, abstracts, and full-text articles dually and independently reviewed for inclusion and exclusion to minimize bias?**

Yes

1. **Was the quality of each included study rated independently by two or more reviewers using a standard method to appraise its internal validity?**

Yes

1. **Were the included studies listed along with important characteristics and results of each study?**

Yes

1. **Was publication bias assessed?**

Yes

1. **Was heterogeneity assessed? (This question applies only to meta-analyses.)**

Yes

**Key Finding #1**

Spinal manipulative therapy (SMT) treatments for patient with acute low back pain was associated with a modest improvement in pain and function at up to 6 weeks.

**Key Finding #2**

There was minimal harm to the musculoskeletal system that lasted for a short period of time following SMT treatments in patients with acute low back pain.

**Key Finding #3**

**Key Finding #4**

**Please provide your summary of the paper**

This systematic review and meta-analysis found that spinal manipulative therapy (SMT) treatments were associated with modest improvement in pain and function in patients with acute low back pain. Additionally, there was minimal musculoskeletal harm that only lasted for a short period of time. One notable study limitation was the large heterogeneity in treatment effects which may be an area for further research. While this article has a low risk for bias, it must also be noted that of the studies that were reviewed, more of them were classified as low quality than high quality. Nonetheless, SMT appears to be a safe and effective treatment for this patient population.

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

Clinically, it may be beneficial to implement spinal manipulative therapy techniques with patients that have acute low back pain. The potential benefits appear to outweigh the potential harms. However, with only a modest improvement in pain and function, it may be beneficial to use a multimodal approach when considering treatments.