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Spinal Manipulation vs Sham Manipulation for Nonspecific Low Back Pain: A Systematic Review and Meta-Analysis

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Abstract

Objective: The purpose of this systematic review was to identify and critically evaluate randomized controlled trials of spinal manipulation (SM) vs sham manipulation in the treatment of nonspecific low back pain.

Methods: Four electronic databases were searched from their inception to March 2015 to identify all relevant trials. Reference lists of retrieved articles were hand-searched. All data were extracted by 2 independent reviewers, and risk of bias was assessed using the Cochrane Back Review Group Risk of Bias tool.

Results: Nine randomized controlled trials were included in the systematic review, and 4 were found to be eligible for inclusion in a meta-analysis. Participants in the SM group had improved symptoms compared with participants receiving sham treatment (standardized mean difference = −0.36; 95% confidence interval, −0.59 to −0.12). The majority of studies were of low risk of bias; however, several of the studies were small, the practitioner could not be blinded, and some studies did not conduct intention-to-treat analysis and had a high level of dropouts.

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Conclusion: There is some evidence that SM has specific treatment effects and is more effective at reducing nonspecific low back pain when compared with an effective sham intervention. However, given the small number of studies included in this analysis, we should be cautious of making strong inferences based on these results.

Introduction

Over the course of a lifetime, approximately 80% of people will experience low back pain (LBP). Nonspecific low back pain (NSLBP) is the second most common reason for worker absenteeism [1,2] and is the most common reason to attend a manual therapy clinic. [3,4]

Nonspecific low back pain is a common and costly condition which will affect the majority of people in their lifetime. Successful treatment of this condition would be of great benefit to the general population. Spinal manipulation (SM) has been suggested as an effective treatment. However, there is still debate over whether the supposed benefit is due to specific treatment effects or a nonspecific "placebo effect." Issues around safety of the technique have also been raised. NSLBP is characterized by pain in the posterior lumbar spine, sacral spine, or paraspinal tissues which may be accompanied by decreased range of motion. [5] The etiology is unclear, and a definitive cause remains elusive for researchers. [6] Several different approaches to treatment have been identified, with mixed evidence for their success. [7–9] One of the treatments widely used is SM.

SM and Mobilization

Spinal manipulation can be defined as "treatments that use high velocity/low amplitude (HVLA) to move a joint that is exhibiting somatic dysfunction through its restrictive barrier." Several models suggest that this technique would be able to produce a hypoanalgesic effect, either by structural [10–12] or neurological processes, [13,14] whereas others have postulated that it acts through nonspecific or "placebo" effects. [15,16]

In contrast, spinal mobilization uses low-velocity/low-amplitude cyclical techniques (nonthrust mobilization). It has been argued that this method of action differs from that of HVLA techniques; thus, mobilization and manipulation should be investigated separately. [17] SM can have serious (although very rare) adverse outcomes such as intervertebral disk prolapse and fracture, [18] whereas there are no reported adverse events reported from receiving nonthrust spinal mobilization. [5] If it could be established that there were no specific treatment benefits from HVLA techniques on NSLBP, then it would be inappropriate to perform them on patients.

Controlling the Placebo Effect in Trials of SM

To exclude possible placebo effects in trials of SM, the control group must either be screened for previous experience of SM [19] or be exposed to an effective sham intervention.

There is little agreement among experts as to what constitutes an effective sham manipulation. [20] However, there is some evidence as to what may be acceptable as an effective sham manipulation of the lumbar spine. Hancock et al (2006) [20] demonstrated that the most credible sham procedure was Maitland's "log roll." [21] This procedure comprises "placing the patient in a side-lying position and placing the physiotherapist's hands over the over the lower ribs and ilium. The pelvis and trunk are then rolled together so no lumbar inter-vertebral motion occurs" (Hancock 2006 p136).

Fulda et al (2007) [22] showed participants videos of side-lying SM, light touch, or ultrasound to gauge patients' perceptions of treatments for lumbar spine pain. The participants viewed SM as the therapy most likely to reduce pain and improve function, suggesting that a sham needs to physically resemble a SM technique for it to be believable. Hawk and Long (2000) [23] and Machado et al (2008) [24] also identified the importance of equalization of the nonspecific effect of physical touch between participants. The use of an indistinguishable placebo should counteract any subtle differences between groups shown to influence treatment outcomes. [25,26] Other active therapies are not considered a viable control because they can lead to erroneous interpretation due to varied contextual factors which produce a placebo effect or specific treatment effects. [27] Thus, for a sham manipulation to be an effective control, it should physically resemble an HVLA technique and be performed so as to eliminate subtle differences between the intervention group and the control group. For the purpose of this review, the