Impact of Spinal Manipulation on Migraine Pain & Disability – Systematic Review & Meta-Analysis

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Study Title:

The Impact of Spinal Manipulation on Migraine Pain and Disability: A Systematic Review and Meta-Analysis

Authors:

Rist PM, Hernandez A, Bernstein C et al.

Author's Affiliations:

Division of Preventive Medicine, Department of Medicine, Harvard Medical School and Brigham and Women's Hospital, Boston, MA, USA; Osher Center for Integrative Medicine, Harvard Medical School and Brigham and Women's Hospital, Boston, MA, USA; Osher Clinic Center, Brigham and Women's Hospital, Boston, MA, USA; Department of Neurology, Harvard Medical School and Brigham and Women's Hospital, Boston, MA, USA; Palmer College of Chiropractic, Davenport, IA, USA; The Spine Institute for Quality, Davenport, IA, USA; College of Nursing, Chungnam National University, Daejeon, South Korea.

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Background Information:

Approximately 38 million adults in the United States are reported to suffer from migraine headaches, of which 91% experience migraine-associated disability (1-3). Pharmacological treatments represent the first-line treatment for many migraine sufferers; however, approximately 40% of patients with episodic migraine symptoms have unmet treatment needs (4). One-third of this group report dissatisfaction with current treatment and half report headache-associated disability (4). As such, alternative treatments to the traditional pharmacological approach are warranted.

Spinal manipulation represents a potential non-pharmaceutical treatment option for migraine sufferers. Up to 15.4% of migraine patients have used chiropractic care in a 12-month period (5), and approximately 12% of patients presenting to chiropractic offices list headache as their chief complaint (6). Given this prevalence, there is a need for evidence-based data regarding the efficacy of spinal manipulative therapy (SMT) in treating migraine headaches.

Three systematic reviews have been previously completed regarding the use of SMT in treating migraine headaches (7-9), although all 3 included the same 3 randomized, controlled trials (10-12) and a meta-analysis of pooled data has yet to be completed. Also, since their publication, additional trials have been conducted and published.

Therefore, the purpose of this study was to perform an up-to-date systematic review and meta-analysis of all randomized, controlled trials investigating the use of SMT in the treatment of migraine headache.

Pertinent Results:

Literature Search Results and Study Characteristics

Six studies were identified as eligible from database searches, three of which had been included in previous systematic reviews. A total of 677 patients were randomized in these studies, with an average age of 39.3 years. 75% of participants were female.

Intervention and Control Group Characteristics:
All studies used a parallel-arm design, with participants assigned to the intervention group (spinal manipulative therapy delivered by a chiropractor, osteopathic physician or physiotherapist) or a control group. Treatment duration lasted from 2 to 6 months. Control groups included sham therapy, cervical mobilization, detuned interferential therapy or a combination of SMT and amitriptyline.

Outcomes:
Outcomes included migraine diaries, questionnaires, migraine days per month or migraine frequency, migraine intensity/pain and migraine disability.

Adverse Effects:
Two studies reported adverse effects. One reported adverse effects via headache diaries – with none actually reported in this study. The second study reported adverse events after each intervention session. In this study, few events were reported and none were considered serious. A third study reported neck pain prevalence among those receiving SMT but not control participants.

Risk of Bias Assessment:
Three studies were deemed to be low risk of bias for random sequence generation. Given the nature of the intervention, blinding of intervention group participants was not possible. Two studies provided sufficient information to show low attrition rates. Outcome measures were mentioned in all studies but only 3 identified a primary outcome. Participant compliance was not sufficiently addressed in 5 of 6 studies.

Results

Effects of SMT on Migraine Days/Frequency:
SMT had a significant positive impact on the number of migraine days vs. controls (Hedges' g = −1.16, 95% CI: −1.94, −0.39, P = 0.003). Heterogeneity was high across all 6 studies (I2 ratio = 93.80%). Exclusion of one study by Cerritelli et al. (13) deemed to be the main driver of the heterogeneity improved homogeneity (Q statistic = 3.61, P value = 0.72; I 2 ratio = 0) and revealed improved positive effect on migraine days (Hedges' g = −0.35, 95% CI: −0.53, −0.16, P value < 0.001). Note – the Ceretelli et al. (13) study included only those with chronic migraine and showed effect sizes that were significantly higher than the other studies – this was the reason the authors ran a separate analysis without it, as it was considered to be an outlier.

Effects of SMT on Migraine Pain/Intensity:
Analysis excluding the Cerritelli study (13) observed that SMT reduced migraine pain with a small effect size (Hedges' g = −0.28, 95% CI: −0.46, −0.09, P value = 0.004). The

effect size was similar when limited to studies with an active treatment control group (Hedges' g = −0.23, 95% CI: −0.46, 0, P value = .050) and to passive controls (Hedges' g = −0.36, 95% CI: −0.67, −0.04, P value = .027, Fig. 3).

Effects of SMT on Migraine Disability:
Four of the six included studies examined migraine disability. Excluding the Cerritelli study (13), a small effect size was observed (Hedges' g = −0.16, 95% CI: −0.43, 0.12, P value = 0.265).

Clinical Application & Conclusions:

Overall, the results of this review suggest that SMT may reduce migraine days and pain/intensity. However, variations in study quality limit the ability to firmly make these conclusions. The authors recommend that methodologically rigorous RCTs are warranted to provide improved evidence for the use of SMT as a treatment option for migraine headaches.

Clinicians should consider a short course of care and discuss the documented limitations of the current data when treating patients presenting with a chief complaint of migraine headache. At this point, SMT represents a viable, safe, potentially beneficial intervention that patients may prefer to the potential side-effects (or lack of efficacy) of pharmaceutical interventions.

Study Methods:

In accordance with the PRISMA guidelines, the authors searched the Cochrane Central Registry and PubMed, using the terms: spinal manipulation, osteopathic, chiropractic, manual therapy, and migraine.

Eligibility was limited to randomized, controlled trials where spinal manipulative therapy was the intervention and migraine headache was the primary disorder. No exclusions were made based on the provider type or area of spinal manipulation.

Two authors were responsible for data extraction using a standardized template generated in Microsoft Excel. Three authors used the 7-item Cochrane Collaboration Tool for assessing risk of bias to evaluate methodological quality. Criteria established a priori included: random sequence generation, allocation concealment, blinding of participants, blinding of outcome assessment, incomplete outcome data, selective reporting (including reporting of all outcomes and specifying a primary outcome), and other bias.

Statistical Analysis:
Mean and standard deviation at baseline and post-intervention were extracted for primary and secondary outcomes. Other data included t-score, p-value and sample size. Effect size (Hedges' g) and 95% confidence intervals using random or fixed effects models were used, with effect sizes of 0.2. 0.5 and 0.8 considered small, medium and large. Standard meta-analytic tests for heterogeneity (Q-value and I2 statistic) were used.

Study Strengths / Weaknesses:

Strengths:

- a well-conducted update to previous work in this area

- Strong, comprehensive search criteria
- Strong statistical analysis plan

Weaknesses:

- Heterogeneity among studies limits veracity of pooled data
- Varied control groups may limit strength of conclusions
- Included papers were of relatively low quality (reflecting the state of the literature itself versus the quality of this paper)

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