



Meta-analysis of Randomized-Controlled Trials Evaluating the Efficacy of Osteopathic Manipulative Treatment as an Adjunct Treatment Modality for Pain



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Abstract

Osteopathic manipulative treatment has historically been used to treat a variety of issues ranging from musculoskeletal abnormalities to improving the body's natural healing capabilities. The purpose of this study was to look at the effects of osteopathic manipulative treatment on pain. We hypothesize that this treatment will show a significant reduction in pain. To investigate this, we looked at five other studies and conducted a meta-analysis of their findings. Problems encountered included differing scales of pain, small sample sizes, and scarcity of data. Overall, the results of the studies we investigated showed a significant reduction in pain with osteopathic manipulative treatment, confirming our hypothesis. Since this treatment has been shown to reduce pain, it should be more widely considered as a non-pharmacological option for pain management.

Introduction

Pain is a pervasive and potentially nonspecific finding in patients.¹ The perception of pain is a subjective experience altered by biological, psychological, emotional, and social factors as described by current pain theory.² The subjectivity of pain brings variability to establishing standards for the utility of pain severity and localization for diagnosis.³ Thus, pain can be a lingering, difficult, and sometimes dismissed complaint in the healthcare setting.⁴ Currently, outcomes of healthcare interventions for pain are commonly monitored by establishing a pain baseline using a numerical 1-10 pain scale and interpreting the patient's trend up or down from that baseline number.^{3,4}

The treatment of pain is difficult. In the 1990s, the campaign of pain as a "fifth vital sign" alongside aggressive opioid marketing led to a large increase in opioid prescription, abuse, addiction, overdose, and death.⁵ Matters are further complicated by the recent opioid epidemic in the United States, wherein the USA leads the world in opioid overdose deaths by twice the rate of the next most affected country.⁵ The current healthcare approach to pain has been altered by recent, appropriate measures to reduce the prescription of opioids for the treatment of pain.⁴ Consequently, a non-pharmacologic modality for pain treatment that coincides with objective and measurable improvement is highly desirable.

Osteopathic Manipulative Treatment (OMT) has been long championed by the Osteopathic community as a modality for the treatment of pain, with particular efficacy in the treatment of chronic pain.⁶ Studies have concluded that OMT used in the treatment of low back pain yielded lower back pain intensity, opioid use, and back-related disability when compared to physicians that did not use OMT.⁷ In order to further investigate efficacy of OMT in the treatment of pain, we reviewed five papers that compared general pain outcomes between OMT and non-OMT treatment using a meta-analysis. Thus, the aim of our review is to determine if OMT provides improved outcomes in pain perception compared to care that did not include OMT in their care.

Question

- Does OMT improve pain compared to control?

Hypothesis

- We hypothesize that groups treated with OMT will have statistically significant reduction in pain as compared to control groups in randomized, controlled trials.

Methods & Materials

- Data Search:

Studies were searched for using PubMed, as well as relevant reviews and meta-analyses that included pain and OMT. The search period was 1990-August 2020. Search keywords were "pain", "OMT", and "manipulation". No language limitation was applied.

- Inclusion Criteria:

The included trials (1) were controlled and randomized (2) measured pain in a numerical scale, (3) Compared an OMT/manipulation group to a non-OMT/manipulation control. The studies also needed to report a mean and standard deviation for pre and post treatment pain ratings.

- Exclusion Criteria:

Studies that did not include a control group or report pain in a numerical scale were excluded. Additionally, any studies that significantly differed in pain rating between pre-treatment control and OMT groups were excluded.

- Data Extraction and Analysis:

Data used from each study included mean pain ratings at longest study endpoints within both the manipulation and control group, as well as their standard deviations. No unpublished data was requested of the authors. Effect size and weights for each study were calculated using RevMan 5.4. Meta-analysis was performed by RevMan using a random effects model. Heterogeneity was assessed using the I2 index test. Minimally important difference was not assessed, and no sensitivity analysis was undertaken.

Results

- Of the 50 studies evaluated, only 5 met the eligibility criteria and were included in the analysis
- Evidence from the 5 randomized, controlled trials showed a statistically significant reduction in pain in OMT treated patients versus patients that did not receive OMT (standard mean difference, -0.50[95%CI, -0.78, to -0.22] (Figure 1)
- The heterogeneity statistic (I²)calculated using Chi squared and degrees of freedom showed a value of 29% (Figure 1). No sensitivity or subgroup analysis was undertaken.
- The difference in mean pain rating for each study comparing control and OMT groups is shown in Figure 2.

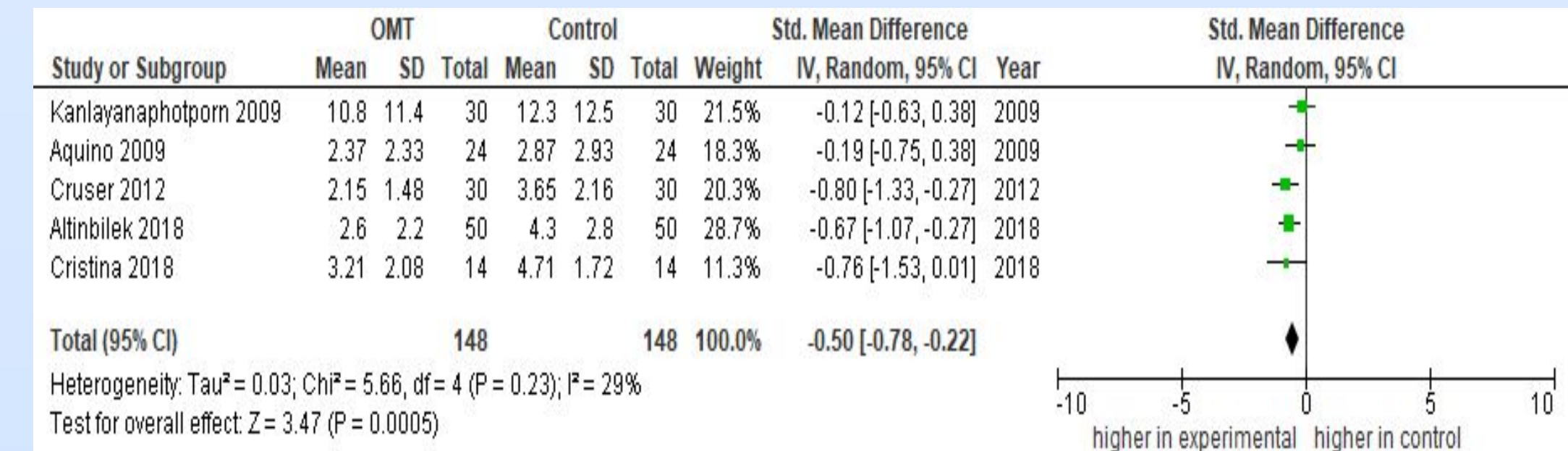


Figure 1: Table and Forest Plot of Standard Mean Difference. Std. Mean difference in groups receiving OMT vs. Controls at study endpoint was -0.50(-0.78,-0.22) 95%CI. P=0.0005 for overall effect statistic (z).

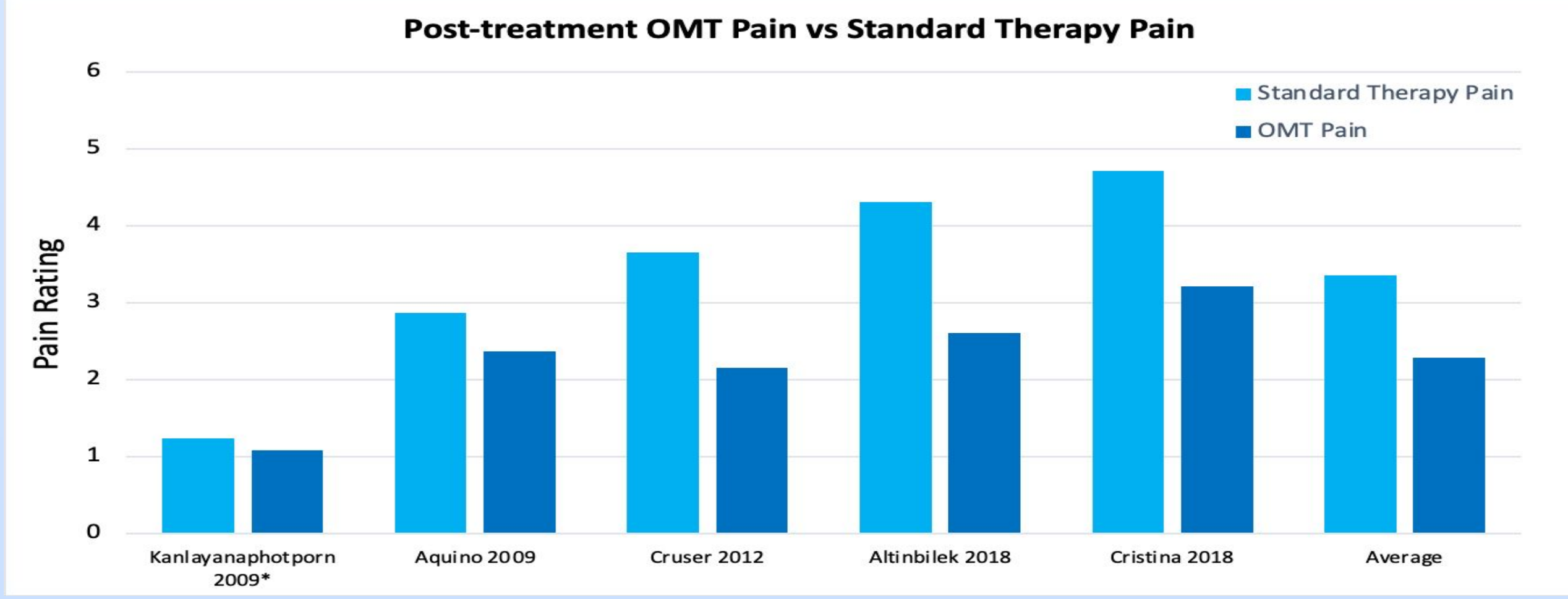


Figure 2: Post-Treatment OMT Pain vs. Standard Therapy. The graph shows the mean pain rating of each study compared to control groups at endpoint, along with mean of each group across all studies. Note:Kanlayanaphotporn et al. used a VAS 100 point scale, which has here been reduced to a 10 point scale for data presentation.

Discussion

The onset of pain typically limits the physical activity of those affected.² The aim of OMT is to reduce the pain experienced to allow patients to regain daily function.^{7,8} Our goal was to evaluate the effect of OMT on a patient reported pain versus controls.

Our study showed a statistically significant reduction in pain as compared to control groups (Figure 1). We conclude that this difference is due to somatic dysfunction being addressed and corrected in patients who are experiencing pain. While the majority of our analysis included studies that addressed musculoskeletal pain, it is possible that OMT may be able to address some instances of visceral and neuropathic pain as well, in light of its potential to remove restrictions and allow free flow of blood, lymph, and extracellular fluid. Further studies should be done to evaluate the differences in efficacy of OMT on these different types of pain.

There are several limitations to our study. First, each study used a different time endpoint. Second, each chose a different "control" for evaluating the efficacy of OMT. For example, the studies on neck pain¹¹ chose movement alone, while some used sham OMT. A standardized control treatment in the setting of pain evaluation would go a long way in increasing the validity of further studies. The authors suggest the use of sham OMT where possible. Lastly, our study did not involve the calculation of a minimum significant reduction in pain. Thus, while statistical significance was attained, it is unclear whether the patients were able to notice a benefit to their quality of life. Where possible, subjective or objective quality of life metrics should be included alongside analyses of pain studies.

Conclusion

In this meta-analysis of RCT studies evaluating the impact of OMT on pain treatment, the collective evidence was statistically significant for greater pain reduction with OMT. Future studies would benefit by tracking subjects over a consistent timeframe as well as narrowing the scope of what is described and evaluated as an etiology for pain. Overall analysis reveals better outcomes, yet the sources of pain from each study lacked uniformity.

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