

The effect of osteopathic manipulative medicine and other manual manipulation techniques on dysmenorrhea

Authors: Kaitlyn Yong OMS IV, Samuel Westra OMS IV, Hazel Patel OMS IV, Shelby Kratt OMS IV, Michael P. Rowane DO, MS

Affiliations:

1) Lake Erie College of Osteopathic Medicine, Erie, PA

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Abstract:

Introduction:

Worldwide, menstrual pain affects up to 90% of reproductive-age women. Dysmenorrhea can cause significant disruption to the daily lives of menstruating persons and absenteeism from work or school. The combination of first line treatment ineffectiveness and significant prevalence calls for further investigation into alternative treatments such as Osteopathic Manipulative Treatment (OMT).

Methods:

This meta-analysis aims to aggregate the evidence supporting the use of OMT as a successful treatment option to reduce pain symptoms due to dysmenorrhea. The criteria for accepted articles in our analysis included the studies that mentioned primary dysmenorrhea, the use of a quantitative pain scale, and the inclusion of only patients with regular cycle lengths.

Results:

A total of four studies were compiled to compare the relative improvement that manual manipulative treatments had on reported pain intensity of primary dysmenorrhea, using the Numeric Rating Scale (NRS). Total number of subjects in the experimental group was 88. The mean numeric pain rating scale amongst the studies was 5.4 before treatment and 2.6 after. The p-value of 0.023 is <0.05 and therefore statistically significant.

Conclusion:

The meta-analysis combining data from four studies showed significant improvement of dysmenorrhea when treated with manual manipulative treatments. Findings warrant further investigation with a larger sample size with utilization of standardized OMM regimen.

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Corresponding Author: Samuel Westra **E-mail:** swestra40106@med.lecom.edu

Introduction:

Worldwide, menstrual pain affects up to 90% of reproductive-age women.¹ Dysmenorrhea, or menstrual pain, can be categorized as primary and secondary. Primary dysmenorrhea is a diagnosis of exclusion which is defined as recurrent, crampy menstrual pain in the absence of other diseases or pathologic findings. Secondary dysmenorrhea is recurrent menstrual pain that is due to an underlying condition such as endometriosis, uterine fibroids, and pelvic inflammatory disease. The pathophysiology behind primary dysmenorrhea lies behind prostaglandin E2 and F2 release from endometrial sloughing. This causes uterine contractions and the activation of stretch receptors in the pelvis. When

intrauterine pressures exceed arterial pressure, uterine ischemia develops and anaerobic metabolites stimulate type C pain neurons.² Additionally, prostaglandin levels in people with dysmenorrhea are elevated and correlate with the severity of pain.³ Dysmenorrhea can have a profound impact on the daily lives of women as 38% report inability to perform their normal daily activities and 13.8% report missing school or work due to their symptoms.^{4,5} Furthermore, first line medications such as NSAIDs are not always effective as up to 18% of women report no relief at all.⁶ The combination of first line treatment ineffectiveness and significant prevalence calls for further

investigation into alternative treatments such as Osteopathic Manipulative Treatment (OMT).

Osteopathic Manipulative Medicine (OMM) represents one of two distinct schools of medicine that is distinct from an allopathic approach to medicine, with osteopathic physicians practicing in every medical specialty with training that integrates osteopathic principles. Osteopathic physicians consider the integration of body, mind and spirit as crucially important in their evaluation of the neuromuscular system. One important principle in osteopathic medicine is recognizing that structure and function are reciprocally related, which lays the foundation for assessment and correction of mechanical dysfunction with OMT techniques. OMM integrates diagnosing somatic dysfunction and with a therapeutic treatment for biomechanical disorders that utilizes gentle, controlled OMT techniques directed towards the dysfunctional muscles and fascia.⁷ During menstruation, lymphatic and blood stasis is associated with tissue texture changes in the muscles and myofascia of the spinal and pelvic regions. It is suggested that stimulation of parasympathetic innervation of the abdominopelvic organs via the vagus nerve and splanchnic nerves can aid in decreasing the inflammatory markers and increasing vasodilation, thereby decreasing ischemia induced pain.⁸ OMM has long been used to treat somatic dysfunction related to menstrual pain, however, there is a need for more evidence to prove its effectiveness and encourage its use as a standard treatment model.

Methods:

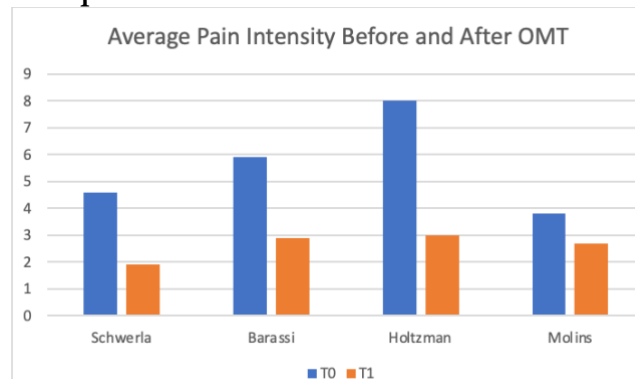
A literature search strategy involved the use of PubMed and the Learning Resource Center through the LECOM library for relevant articles. The search term originally used was OMT and menstrual pains, however the search terms were broadened to manual medicine and menstrual pains. Eight articles involving randomized controlled trials and case studies were found and after assessing the search results, a total of 6 articles out of the total articles that were part of the initial search. The eligibility criteria used for the articles were that they had to mention primary dysmenorrhea. They also had to use a scale to describe the pain intensity. The pool of articles was limited to those using either the visual analog scale and the numerical rating scale. These scales are

numerically comparable in evaluating pain perceptions. The inclusion criteria for the subjects was a pain intensity assessment. The cutoff value for Visual Analog Scale (VAS) was 50 and Numeric Rating Scale (NRS) was 5. Another inclusion criteria is regular cycle lengths of 28 ± 7 days. The exclusion criteria include patients with secondary dysmenorrhea, such as polycystic ovary syndrome, endometriosis, fibroids, pelvic inflammatory disease, irregular menstrual cycles. After narrowing down the search using these stated inclusion and exclusion criteria, there were a total of 4 articles in which data was used.⁹⁻¹²

Results:

A total of four studies were compiled to compare the relative improvement that manual manipulative treatments had on reported pain intensity of primary dysmenorrhea, using the NRS.⁹⁻¹² Figure 1 demonstrates the average reported pain intensity as quantified on the NRS both before and after some form of manipulative treatment (T0/blue and T1/orange, respectively) between all the experimental groups of the included studies.

Figure 1: Average pain intensity before and after manipulation between four different studies



The horizontal axis represents the studies from which data on patients in treatment groups was obtained. The vertical axis represents the average pain intensity reported by the subjects on the NRS. T0 (blue) represents patients before they were treated with manipulative medicine, and T1 (orange) is after intervention.

Table 1 displays the type of treatment and the number of patients who were treated in each of the studies and in total, as well as their reported pain on the NRS before and after manipulation, in each of the studies and in total.

Table 1: Average pain intensity before and after manipulation

Study	N	NRS before OMT	NRS after OMT
Schwerla et al ⁹ (Osteopathic Treatment)	25	4.6	1.9
Barassi et al ¹² (Manual Manipulation)	30	5.9	2.9
Holtzman et al ¹⁰ (Drop-Table Manipulation)	13	8.0	3.0
Molins et al ¹¹ (Global Pelvic Manipulation)	20	3.8	2.7
Totals	88	5.4	2.6

Paired with the number of treatment group participants in four different studies and combined meta-analysis data. Pain intensity was compared between the studies using the NRS. The treatments used per study are included, along with the total number of participants treated in the included studies and their reported pain intensities were totaled and averaged, respectively, in the final row.

The mean reported pain intensity across the studies was then calculated to be 5.36 before treatment and 2.59 after treatment, with a standard deviation of 42.6 before manipulation, and 21.0 after manipulation. Once weighted to reflect the percentage of patients in each study, the average reported pain intensity was analyzed using a paired-t test. The p-value was found to be 0.023. Therefore, manual manipulative treatments of patients experiencing primary dysmenorrhea did have a statistically significant impact in decreasing the reported pain intensity amongst the included studies.

Discussion:

Osteopathic principles and practice (OPP) utilize 5 models of osteopathic medicine (biomechanical, neurological, respiratory-circulatory, metabolic, and behavioral). OMT and OMM are methods and tools used to help promote health and correct dysfunctions that influence the 5 models of osteopathic medicine. Each of the four studies

independently evaluated did show significant symptom improvement when manipulation was used to treat dysmenorrhea. However, each had intrinsic limitations that could interfere with application of these findings. These included methodology, potential confounding factors, and in particular, small sample sizes. To surmount individual barriers to four separate studies, all studies were collectively analyzed to determine the global benefit of treating primary dysmenorrhea with manual manipulative medicine. Assessment of pain is a critical factor in this study and can be difficult to standardize. Pain is an individualized and personal sensation, where numerous factors play into its interpretation.¹³ Studies were selected that used the VAS and the NRS, which have been individually shown to be reliable and valid ways of assessing patient pain, as well as be relatively comparable scales.^{14,15} This analysis including both ways menstrual pain was reported shows that by using manipulation, pain intensity felt during primary dysmenorrhea can be significantly reduced ($p < .05$).

Many past studies on this topic have used either the VAS or numeric rating scale to assess the subject's pain and any changes to it. Multiple studies have shown that these two scales can be reasonably equilibrated, provided they are implemented properly.¹⁶⁻¹⁸ By implementing this equilibration, we were able to double the number of studies included in our meta-analysis and greatly increase its strength. Other studies have however found that VAS and NRS may not always be concordant, and so this must be considered as well when evaluating these results.¹⁹ Other limitations to this analysis include the variety of treatment models and osteopathic ideological approaches taken by the investigators. Certain studies involved full osteopathic evaluations, with an intent to treat whatever somatic dysfunctions are found⁹, while others were more localized in their evaluations.^{10,11} Once any sites of somatic dysfunction were identified, frequently they were treated at the osteopathic physician's discretion, using any OMT technique deemed appropriate. Only one study made specific mention of a standardized treatment protocol.⁹ This heterogeneity in treatment makes determination of which treatment methods and locations, if any in particular, contribute to improvement of symptoms. Finally, multiple studies also allowed patients to continue to take NSAIDs as

needed for their symptoms.^{9,12} While this was acknowledged in the respective studies, it does also provide another potential confounding factor to the analysis.

Conclusion:

Primary dysmenorrhea is a nearly ubiquitous condition that for many women is not well managed by the current treatment methods. This study provides a rationale to add a wide variety of new, effective treatment strategies to the practitioner's toolbelt. Especially in the case of women in whom NSAIDs are either contraindicated or previously ineffective, this may finally provide a measure of relief. Future studies may choose to use fully standardized osteopathic structural evaluations and an OMT protocol in order to eliminate some of the uncertainty around which specific OMT techniques and/or treatment sequence provided this improvement. Further investigation where NSAIDs and other pharmacologic pain relievers are uniformly withheld may also be valuable.

Author Contributions:

All authors provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, drafting and editing of the manuscript.

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