



# The Impact of Osteopathic Manipulative Treatment on Postoperative Hospital Length of Stay



Ahmed S<sup>1</sup>, Bui J<sup>1</sup>, Atway R<sup>1</sup>, Bernard M<sup>1</sup>, Benzinger B<sup>1</sup>, Shan Shan Wu, DO<sup>2</sup>

<sup>1</sup>Lake Erie College of Osteopathic Medicine

<sup>2</sup>Allergy/Immunology Associates, Inc. Mayfield Heights, Ohio

## Abstract

Postoperative hospital stays are one of the many reasons for increasing healthcare costs in our nation. Because of this, Osteopathic Manipulative Treatment (OMT) has been studied after a variety of surgeries, most notably cardiac and gastric surgeries, to determine if it can be used to reduce hospital length of stay, thereby reducing overall healthcare costs. Techniques such as myofascial release, rib raising, and soft tissue stretches have been utilized in the hospital setting in order to do so<sup>1</sup>. To evaluate the relationship between OMT and postoperative length of stay (LOS), previous studies were collected for a systematic review of the literature. After analysis of the literature, it was determined that there is a significant difference in postoperative hospital LOS in OMT vs. non-OMT groups for post-cardiac and gastric surgeries. Based on these findings, further research should investigate whether this holds true for other types of surgeries.

## Introduction

OMT is used in a variety of circumstances to improve patient outcomes. OMT includes a set of hands-on techniques that manipulate a patient's muscles, joints, and tissues to diagnose and treat a variety of illnesses. It is often utilized in respiratory treatment, pain management, and postoperative ileus. These are factors that often play a significant role in postoperative care<sup>2,3,4</sup>. Improved pain with reduced pharmacological intervention and stimulation of the parasympathetic nervous system within the gastrointestinal tract reduce postoperative ileus<sup>5</sup>. Ultimately, improvement in postoperative ileus reduces postoperative hospital LOS. LOS is a metric used to determine healthcare proficiency, and reductions in LOS improve overall healthcare costs and efficiency<sup>4,6</sup>. OMT has been associated with reduced pain levels, decreased time to flatus, and reduced postoperative hospital LOS<sup>7,8</sup>. However, there is still a question of its efficacy<sup>9</sup>. This study is a review of the recent literature to better identify the role OMT may play in decreasing LOS after cardiac and abdominal procedures.

## Question

Does OMT reduce postoperative length of stay in cardiac and abdominal surgeries?

## Hypothesis

OMT reduces postoperative length of stay in comparison to patients who did not receive OMT.

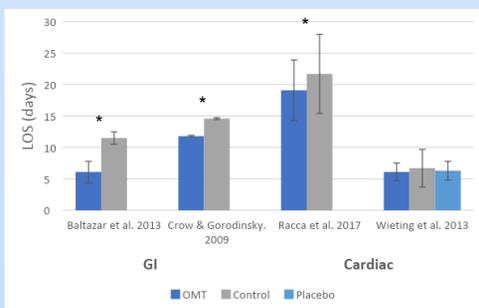
## Methods

- A literature search was performed using online journal resources such as PubMed and Google Scholar to find clinical trials that evaluated the use of OMT in post-surgical recovery and length of stay for cardiac and abdominal surgeries.
- Two studies of abdominal surgery and two studies of cardiac surgery were collected and examined for length of stay after two or three treatments: standard treatment, standard treatment with OMT adjunctive therapy, and standard treatment with sham OMT treatment.
- Average length of stay, along with standard deviation were extracted and compiled from each study and graphed to create a visual representation of the results.
- For studies that did not include standard deviation, it was calculated using the standard error.

## Results

Study	Values	OMT	Control	Placebo
<b>GI Studies</b>				
Baltazar et al. 2013	LOS	6.1	11.5	-
	St.D	1.7	1	-
	n	17	38	-
	p	0.006	-	-
Crow & Gorodinsky, 2009	LOS	11.8	14.6	-
	St.D	0.14	0.14	-
	n	139	172	-
	p	0.029	-	-
<b>Cardiac Studies</b>				
Racca et al. 2017	LOS	19.1	21.7	-
	St.D	4.8	6.3	-
	n	40	40	-
	p	<0.05	-	-
Wieting et al. 2013	LOS	6.1	6.7	6.3
	St.D	1.4	3	1.5
	n	17	18	18
	p	NR, but not significant		

**Table 1.** Relationship between OMT and LOS from selected studies for review. (LOS = length of stay, St.D = standard deviation, n = sample size, p = p value)



**Figure 1.** The relationship between OMT and postoperative LOS for GI and Cardiac operations. (\*p<0.05; error bars indicate standard deviation)

## Discussion

Three of the four statistical studies that were analyzed showed a significant decrease in postoperative hospital length of stay (LOS)<sup>1,7,10,11</sup>. The subjects were specifically post-cardiac and post-gastrointestinal surgical patients. The data suggests that OMT is a practical tool that a physician can utilize to ensure their patients have a healthy postoperative course.

In these studies, data may have been bolstered if the researchers utilized larger sample sizes, limited bias, and improved blinding strategies. Specifically, the Baltazar et al (2013) study had a small sample size and did not utilize a sham group, which limits the use of its data. Crow & Gorodinsky (2009) did not conduct a double-blinded randomized control study with possible selection bias. Patients were assigned to the OMT group only if the surgeon recommended them for treatment; this could have significantly impacted the results of the study.

Racca et al (2007) also did not utilize a sham group in their research. Additionally, they note that their sampling became nonrandom in the last quarter of their enrollment. Because of this lack of randomization, this acts as another source of potential error and bias. Lastly, Wieting et al (2013) used a small sample size, with an n value of 17, which limits the power and generalization of the results. These specific examples show areas that need improvement in future research.

Research strategies regarding OMT in postsurgical patients could be uniform in practice to ensure cohesive and definitive results when discussing postoperative length of stay, with more research. While the data from these studies suggests OMT is a useful tool to reduce hospital LOS, there is still the need for data on efficacy of specific OMT manipulations and frequencies of treatment. When research on hospital LOS is taken to these next steps of analysis, there will be greater insight as to how effective Osteopathic Manipulative Treatment is when applied to postoperative care.

## Conclusions

- The studies reviewed here have shown that there is potential for a significant improvement in LOS following abdominal and cardiac surgeries.
- Although there is significance in 3 out of 4 studies reviewed here, the methodology raises concern for potential for bias.

## Future Work

- The studies reviewed here should be repeated with better use of control and sham groups, as well as with larger sample sizes.
- Specific OMT techniques should be evaluated, rather than OMT as a general treatment
- OMT techniques should be evaluated after a variety of different surgeries and should not be limited to gastric and cardiac cases.

## References

- Wieting JM, Beal C, Roth GL, Gorbis S, Dillard L, Gilliland D, Rowan J. The effect of osteopathic manipulative treatment on postoperative medical and functional recovery of coronary artery bypass graft patients. *J Am Osteopath Assoc.* 2013 May;113(5):384-93. PMID: 23667192.
- Branson, R. D. (2013). The Scientific Basis for Postoperative Respiratory Care. *Respiratory Care*, 58(11), 1974-1984. doi:10.4187/respcare.02832
- Joshi, G. P., Schug, S. A., & Kehlet, H. (2014). Procedure-specific pain management and outcome strategies. *Best Practice & Research Clinical Anesthesiology*, 28(2), 191-201. doi:10.1016/j.bpa.2014.03.005
- Mao, H., Milne, T. G., O'Grady, G., Vather, R., Edlin, R., & Bissett, I. (2019). Prolonged Postoperative Ileus Significantly Increases the Cost of Inpatient Stay for Patients Undergoing Elective Colorectal Surgery. *Diseases of the Colon & Rectum*, 62(5), 631-637. doi:10.1097/dcr.0000000000001301
- Stakenborg, N., Wolthuis, A. M., Gomez-Pinilla, P. J., Farro, G., Giovangiulio, M. D., Bosmans, G.,... Boeckxstaens, G. E. (2017). Abdominal vagus nerve stimulation as a new therapeutic approach to prevent postoperative ileus. *Neurogastroenterology & Motility*, 29(9). doi:10.1111/nmo.13075
- Khan NA, Quan H, Bugar JM, Lemaire JB, Brant R, Ghali WA. Association of postoperative complications with hospital costs and length of stay in a tertiary care center. *J Gen Intern Med.* 2006 Feb;21(2):177-80. doi: 10.1111/j.1525-1497.2006.00319.x.
- Crow, W. T., & Gorodinsky, L. (2009). Does osteopathic manipulative treatment (OMT) improve outcomes in patients who develop postoperative ileus: A retrospective chart review. *International Journal of Osteopathic Medicine*, 12(1), 32-37. doi:10.1016/j.ijosm.2008.03.004
- Fleming, R. K., Snider, K. T., Blanke, K. J., & Johnson, J. C. (2015). The effect of osteopathic manipulative treatment on length of stay in posterolateral postthoracotomy patients: A retrospective case note study. *International Journal of Osteopathic Medicine*, 18(2), 88-96. doi:10.1016/j.ijosm.2014.09.002
- Sposato, N. S., & Bjerså, K. (2018). Osteopathic Manipulative Treatment in Surgical Care. *Journal of Evidence-Based Integrative Medicine*, 23. doi:10.1177/2515690x18767671
- Baltazar GA, Betler MP, Akella K, Khatri R, Asaro R, Chendrasekhar A. Effect of Osteopathic Manipulative Treatment on Incidence of Postoperative Ileus and Hospital Length of Stay in General Surgical Patients. *J Am Osteopath Assoc* 2013;113(3):204-209.
- Racca, V., Bordoni, B., Castiglioni, P., Modica, M., & Ferratini, M. (2017). Osteopathic Manipulative Treatment Improves Heart Surgery Outcomes: A Randomized Controlled Trial. *The Annals of Thoracic Surgery*, 104(1), 145-152. doi:10.1016/j.athoracsur.2016.09.110

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