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Osteopathic Manipulative Treatment in Postoperative Bowel Dysfunction and Recovery: A Scoping Review of Clinical Techniques

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Abstract

Postoperative bowel dysfunction can prolong recovery following surgery, and osteopathic manipulative treatment (OMT) has been investigated as a potential adjunct to support postoperative recovery. However, the techniques and anatomical regions used in this setting remain incompletely characterized. This scoping review aimed to characterize OMT techniques, anatomical treatment regions, and clinical outcomes reported in studies of postoperative bowel dysfunction and recovery, and to inform the development of a proposed treatment protocol. MEDLINE/PubMed, the Cochrane Library, Semantic Scholar, Google Scholar, and ClinicalTrials.gov were searched from inception through July 24, 2026. Two reviewers independently screened studies and extracted data on study characteristics, OMT techniques, anatomical regions, and clinical outcomes. Nine studies involving 1,117 patients were included, identifying 13 OMT techniques. The thoracic region and ribs were the most frequently treated anatomical regions, each reported in six studies. Reported outcomes varied across studies, with some evaluating direct measures of gastrointestinal function and others assessing broader postoperative recovery outcomes, including hospital length of stay, pain, and postoperative morbidity. Because interventions frequently combined multiple techniques, the individual contributions of specific techniques to reported outcomes could not be determined. The findings informed a hypothesis-generating treatment sequence incorporating thoracic inlet myofascial release, rib raising, paraspinal inhibition, suboccipital inhibition, and sacral rocking. This review provides a descriptive foundation for further protocol development and expert consensus. Future Delphi-based consensus and prospective clinical evaluation are needed to refine the proposed sequence, assess its clinical applicability, and establish its safety and effectiveness. The proposed sequence should not be considered a validated clinical guideline.

Categories: Osteopathic Medicine, General Surgery
Keywords: gastrointestinal motility, omm, omt, osteopathic manipulative treatment, postoperative bowel dysfunction, postoperative ileus, postoperative recovery

Introduction And Background

The duration of postoperative recovery following gastrointestinal surgery may be influenced by prolonged bowel atony, pain, and immobilization [1]. A leading cause of prolonged postoperative recovery time is postoperative ileus (POI) [2]. POI is an impairment of bowel function due to a temporary cessation of intestinal motility in the absence of a mechanical obstruction after surgery [3]. Approximately 10-30% of postoperative abdominal surgical patients can be affected by POI, which can lead to nausea, vomiting, distension, and/or bloating [1,3]. In the early postoperative phase, a certain degree of bowel function impairment is to be expected, but if it persists longer than the expected period of gastrointestinal recovery after an operation, it may represent pathologic or prolonged POI [4,5]. POI pathophysiology has been proposed to be multifactorial, involving inflammatory response, activation of the sympathetic nervous system, and alterations in neurotransmitters within the gastrointestinal system, including nitric oxide, vasoactive intestinal peptide (VIP), and substance P [1,6]. Opioids also contribute to the development of POI due to their antagonistic effects on intestinal motility [7,8]. When opioid μ-receptors are activated, bowel wall tone increases while propulsive peristalsis decreases, resulting in increased gastrointestinal transport time contributing to the development of POI [7,8]. With POI being a significant cause of extended hospital stays, various therapies have been investigated [1,2].

Clinicians currently have several therapeutic options, both pharmacological and non-pharmacological, available to manage patients with post-operative bowel dysfunction. Alvimopan, a peripherally acting μ-opioid receptor antagonist, is currently the only FDA-approved medication for the treatment of POI and has been shown to accelerate the recovery of postoperative gastrointestinal function [9]. Prokinetic agents, including metoclopramide and erythromycin, are other pharmacologic agents commonly administered to reduce the duration of postoperative bowel dysfunction [10,11]. However, evidence supporting their effectiveness remains unclear [10,11]. Alternatively, postoperative bowel dysfunction may also be addressed

through non-pharmacologic strategies, including focused interventions such as gum chewing and coffee consumption, as well as the comprehensive Enhanced Recovery After Surgery (ERAS) protocol [12-14]. ERAS is a perioperative care approach that integrates strategies such as multimodal analgesia to minimize opioid use, early mobilization, and early enteral nutrition to promote the return of gastrointestinal motility after surgery, thereby reducing gastrointestinal complications and shortening length of hospital stay [12,13]. Similarly, chewing gum and consuming coffee facilitate the recovery of gastrointestinal function postoperatively to reduce the duration of POI [13-15]. Despite the success of these approaches following surgery in improving post-operative bowel dysfunction, the addition of complementary strategies to these therapeutic options, including hands-on manual therapies, is essential to further reduce this serious surgical complication.

Nonpharmacological interventions have also been explored as adjunctive approaches to support gastrointestinal motility [16,17]. Abdominal massage (AM) is one such intervention, with proposed mechanical and reflexive effects that may influence bowel function [16-18]. Studies in patients with constipation have reported improvements in defecation frequency and constipation-related symptoms [17,19]. Separately, AM has been investigated in postoperative patients, with findings suggesting potential benefits for the return of bowel function following colectomy [20]. These findings provide additional context for investigating manual therapies as potential adjuncts in postoperative recovery, including osteopathic manipulative treatment (OMT).

OMT is a manual therapeutic modality that incorporates hands-on techniques designed to address somatic dysfunction and support physiologic function and homeostasis [21]. Previous studies examining OMT across various surgical procedures have reported improvements in postoperative outcomes, including reductions in pain and hospital length of stay (LOS) [22-24]. OMT has also been associated with an earlier return of bowel function following surgery [25]. However, the specific techniques and anatomical regions used in the postoperative setting have not been comprehensively characterized. Heineman's 2022 review examined the application of various OMT techniques in relation to gastrointestinal function, highlighting the diversity of techniques described in the literature and the limitations of available comparative evidence [26]. Given this variability, further characterization of the techniques, anatomical regions, and clinical outcomes reported across studies may help identify gaps in the literature and inform future research.

Therefore, this scoping review aimed to map the available clinical literature on OMT for postoperative bowel dysfunction and recovery by characterizing the reported treatment techniques, anatomical regions, and clinical outcomes. Additionally, this review sought to identify gaps in the existing literature to inform future research and the development of a hypothesis-generating treatment framework.

Review

Materials and methods

Protocol

This scoping review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) reporting guidelines [27]. A formal review protocol was not prospectively registered.

Eligibility Criteria

The review question was structured using the Population, Intervention, Comparator, Outcomes, and Study Design (PICOS) framework [28]. The population included surgical patients experiencing postoperative bowel dysfunction or undergoing postoperative recovery in whom gastrointestinal function or clinically relevant postoperative recovery outcomes were reported. The intervention of interest was OMT.

Studies evaluating OMT in the context of postoperative bowel dysfunction or gastrointestinal recovery were considered eligible regardless of the comparator. Eligible comparators included standard postoperative care, sham treatment, no intervention, or other therapeutic interventions. Studies were required to report at least one outcome relevant to postoperative gastrointestinal recovery. These outcomes included direct measures of gastrointestinal function, such as time to first flatus, time to first bowel movement, POI, and other indicators of gastrointestinal recovery, as well as broader measures of postoperative recovery, including hospital LOS. LOS was considered a clinically relevant outcome given the association between POI and delayed hospital discharge.

Eligible study designs included randomized controlled trials, non-randomized interventional studies, prospective cohort studies, and retrospective cohort studies. Conference abstracts, case reports, narrative reviews, systematic reviews, meta-analyses, and studies without extractable postoperative gastrointestinal or relevant postoperative recovery outcomes were excluded.

Information Sources and Search Strategy

A comprehensive literature search was conducted to identify clinical studies evaluating the use of OMT in surgical patients. MEDLINE (via PubMed), the Cochrane Library, Semantic Scholar, Google Scholar, and ClinicalTrials.gov were searched from database inception through July 24, 2026. No language restrictions were applied.

Individual search strategies were developed for each database to account for differences in indexing and search functionality while maintaining consistent terminology related to postoperative bowel dysfunction and OMT. The complete search strategies for each database are provided in the Appendices. Search terms included combinations of keywords related to OMT and postoperative bowel dysfunction, including postoperative, POI, paralytic ileus, bowel function, gastrointestinal recovery, and OMT. Medical Subject Headings (MeSH) were incorporated when available to optimize search sensitivity for relevant databases.

Study Selection and Data Extraction

Two reviewers (A.P. and O.P.) independently performed the literature search, title and abstract screening, full-text eligibility assessment, and data extraction using predefined eligibility criteria. Disagreements at any stage of the review process were resolved through discussion and consensus. Extracted data included study characteristics, authors, study design, sample size, and surgical population, details of the OMT techniques, and key findings. Anatomical regions treated were extracted from the descriptions provided in the included studies when reported and categorized according to the corresponding Current Procedural Terminology (CPT) body regions. The frequency of each anatomical region was then summarized across studies based on the available reported data.

Reasons for exclusion during full-text review are presented in Figure *1*. Because this review was conducted as a scoping review to characterize the available evidence, no quantitative evidence synthesis or meta-analysis was performed. Likewise, the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach was not applied [29]. Risk of bias assessments were applied at the study level using predefined criteria.

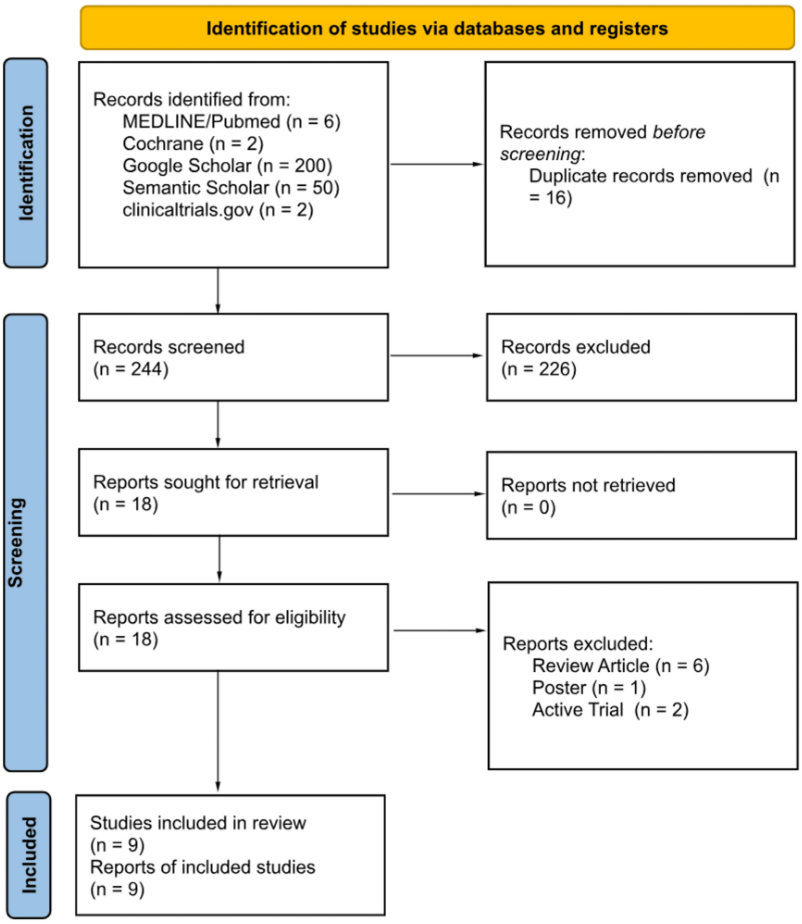


FIGURE 1: PRISMA Flow Diagram for the Selection of Studies

Risk of Bias Assessment

Risk of bias was evaluated using study design-specific appraisal tools. Randomized controlled trials were assessed using the Cochrane Risk of Bias 2 (RoB 2) tool [30]. Non-randomized interventional studies were assessed using the Risk Of Bias In Non-randomized Studies of Interventions (ROBINS-I) tool, and observational cohort studies were assessed using the Newcastle-Ottawa Scale (NOS) [31,32]. Risk-of-bias assessments were conducted independently by two reviewers (A.P. and O.P.) at the study level. Disagreements were resolved through discussion and consensus.

The GRADE approach [29] was not applied. Formal certainty assessment was not undertaken because the review's prespecified purpose was descriptive evidence mapping rather than an effectiveness recommendation.

Results

Study Selection

The literature search identified 260 records across all databases. After removal of 16 duplicate records, 244 unique records remained for title and abstract screening. Following screening, 18 articles were retrieved for full-text review. Of these, six review articles, one conference poster, and two ongoing clinical trials were excluded, resulting in nine studies that met the predefined eligibility criteria and were included in the final review (Figure *1*). Although additional publications discussing OMT in the postoperative setting were identified, relatively few primary clinical studies met the predefined eligibility criteria and reported standardized postoperative gastrointestinal outcomes. Consequently, the final review included nine studies evaluating the use of OMT for postoperative bowel dysfunction and gastrointestinal recovery.

Study Characteristics

The nine included studies primarily investigated OMT as an intervention for postoperative bowel dysfunction. Study populations and sample sizes are presented as reported in the original publications. Because study designs and reporting of treatment and comparator groups varied, the reported sample sizes do not necessarily represent equivalent randomized, treated, or analyzed populations across studies (Table *1*).

Author	Study Design	Population (n)	Surgical Procedure	OMT(s) Used	Key Findings
Baltazar et al. [33]	Retrospective cohort	55 patients	Small- or large-bowel resection and Gastric resection or repair	Cranial manipulation; direct MFR; costophrenic and costovertebral release; cervical spine techniques	The mean (SD) time to flatus was 4.7 (0.4) days in the non-OMT group and 3.1 (0.6) days in the OMT group (P=0.035). The mean (SD) postoperative hospital LOS was also reduced significantly with OMT, from 11.5 (1.0) days in the non-OMT group to 6.1 (1.7) days in the OMT group (P=0.006).
Crow et al. [34]	Retrospective cohort	331 patients	Abdominal surgery	Not specified	OMT patients had a significantly shorter LOS than the no-treatment group (adjusted mean of 14.6 days for the non-treatment group versus 11.8 days for the treatment group) even after controlling for age differences; F (1,308)=4.81, p=0.029.
Fleming et al. [35]	Retrospective cohort	38 patients	Posterolateral thoracotomy with lung resections	MFR; balanced ligamentous tension; muscle energy; rib raising; articulatory techniques; cranial techniques; inhibition; soft tissue; visceral techniques; still technique; facilitated positional release; neurofascial release; counterstrain; lymphatic techniques; integrated techniques; high-velocity, low-amplitude techniques	Severity of illness was greater for those who received OMT based on the fact that patients in the ICU were more likely to receive OMT (P=0.03). No difference between discharge diagnosis of postop ileus or LOS.
	Non-			Muscle energy (occipitoatlantal joint); MFR (thoracic inlet,	Median LOS of 7.0 days, and while the

Genewick et al. [36]	randomized mixed retrospective-prospective	88 patients	Colorectal and abdominal surgery	paraspinal muscles, abdominal diaphragm, pelvic diaphragm); sacral rocking; pedal lymphatic pump	OMT group had a median LOS of 6.0 days, resulting in a non-significant median difference of -1.0 day
Herrmann [37]	Retrospective non-randomized intervention study	409 patients	Major surgery	Paraspinal inhibition	1/317 patients in OMT group got ileus (0.32%); 7/92 patients in non-OMT group got ileus (7.6%)
Lo Piccolo et al. [38]	Non-randomized time-controlled clinical trial	43 patients	Laparoscopic appendectomy	MFR; visceral mobilization; lymphatic drainage	OMT was associated with a shorter mean hospital stay (4.6 vs. 7 days) and greater reductions in abdominal and shoulder pain compared with controls. However, between-group differences in bowel function were not statistically significant.
Probst et al. [39]	Randomized controlled trial	20 patients	Elective bowel resection	Point-of-balance fascial tension for colon, neuronal inhibition for intestines, and CV-4 technique	OMT patients showed lower postoperative morbidity than control patients (comprehensive complication index 30.8 vs. 37.1). Pain during the postoperative course was decreased significantly by OMT.
Racca et al. [40]	Randomized controlled trial	80 patients	CABG, valve replacement/valve repair, combined CABG + valve replacement/repair, ascending aortic surgery	MFR of the diaphragm, sternum, and thoracic inlet	At the end of rehabilitation, the OMT group had a lower Visual Analogue Scale median score (controls 3, IQR: 2 to 4; OMT 1, IQR: 1 to 2; p<0.01) and higher mean inspiratory volume (controls 1,400±588 mL; OMT 1,781±633 mL; p<0.01). The hospitalization was shorter in the OMT group than in the control group (19.1±4.8 versus 21.7±6.3 days; p<0.05).
Wieting et al. [41]	Randomized controlled trial	53 patients	CABG	Indirect MFR (thoracic inlet); rib raising; paraspinal muscle stretch (to L2); cervical paraspinal soft tissue stretch; suboccipital muscle release	Patients in the OMT group were discharged 0.55 days earlier than those in the control group and 0.16 days earlier than those in the placebo group. The total score for the OMT group was 0.81 greater than that of the control group and 3.87 greater than that of the placebo group. None of the differences achieved statistical significance (P<0.05)

TABLE 1: Characteristics and Key Findings of Included Studies Evaluating OMT in Surgical Patients

CABG: coronary artery bypass grafting; CV-4: compression of the fourth ventricle; ICU: intensive care unit; IQR: interquartile range; LOS: length of stay; MFR: myofascial release; OMT: osteopathic manipulative treatment; SD: standard deviation

Risk of Bias

Risk of bias was assessed using study design-specific tools, with results presented separately for randomized controlled trials, nonrandomized intervention studies, and observational cohort studies. Figure *2* summarizes the RoB 2 assessments, Figure *3* presents the ROBINS-I assessments, and Figure *4* displays the NOS assessments [30-32].

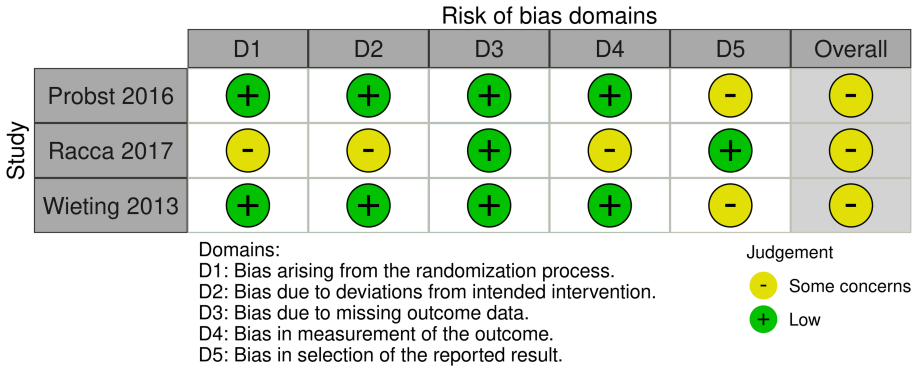


FIGURE 2: Risk of Bias Assessment of Included Randomized Controlled Trials Using RoB 2

Included studies [39-41].

Risk of bias assessment of randomized controlled trials using the Cochrane Risk of Bias 2 (RoB 2) tool. Risk of bias was evaluated across five domains: bias arising from the randomization process (D1), bias due to deviations from intended interventions (D2), bias due to missing outcome data (D3), bias in measurement of the outcome (D4), and bias in selection of the reported result (D5). Overall risk-of-bias judgments were assigned according to the RoB 2 algorithm.

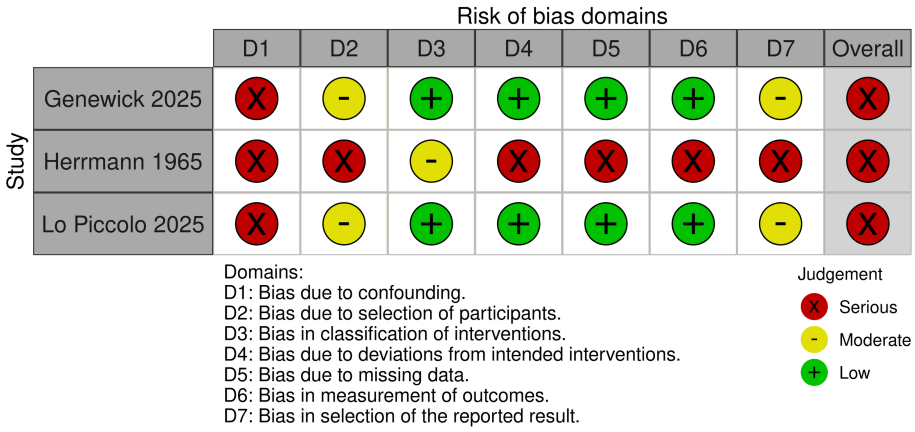
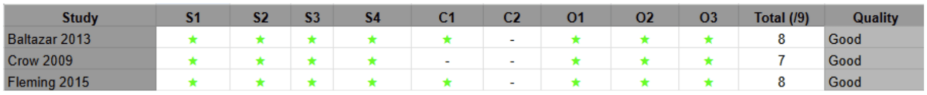


FIGURE 3: Risk of Bias Assessment of Included Non-randomized Studies Using ROBINS-I

Included studies [36-38].

Risk of bias assessment of non-randomized interventional studies using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) tool. Risk of bias was evaluated across seven domains: bias due to confounding (D1), bias in selection of participants into the study (D2), bias in classification of interventions (D3), bias due to deviations from intended interventions (D4), bias due to missing data (D5), bias in measurement of outcomes (D6), and bias in selection of the reported result (D7). Overall risk-of-bias judgments were assigned according to ROBINS-I guidance.



Study	S1	S2	S3	S4	C1	C2	O1	O2	O3	Total (/9)	Quality
Baltazar 2013	★	★	★	★	★	-	★	★	★	8	Good
Crow 2009	★	★	★	★	-	-	★	★	★	7	Good
Fleming 2015	★	★	★	★	★	-	★	★	★	8	Good

FIGURE 4: Risk of Bias Assessment of Cohort and Observational Studies Using the NOS

Included studies [33-35].

Methodological quality assessment of observational and cohort studies using the Newcastle-Ottawa Scale (NOS). Methodological quality was assessed across three domains: selection of study groups, comparability of groups, and ascertainment of outcomes. Studies were awarded stars for meeting predefined quality criteria, with higher scores indicating greater methodological quality.

Among the randomized controlled trials (Figure *2*), overall assessments indicated some concerns, primarily related to the randomization process and selection of reported results. Among the nonrandomized intervention studies (Figure *3*), confounding was a particularly important source of bias. In Genewick et al. [36], the prospective OMT intervention group was compared with a retrospectively assembled historical control group from an earlier period. Additionally, patients who declined OMT were not included, and eligibility criteria were broadened during the second intervention cycle to include patients with active cancer and those undergoing stoma creation. Although several baseline characteristics were comparable between groups, these differences in recruitment and study eligibility introduced potential for selection bias and residual confounding. Similarly, Lo Piccolo et al. [38] employed a nonrandomized design in a relatively small population. Although patients were categorized according to complicated and uncomplicated appendicitis, the absence of random treatment allocation left potential for residual differences between treatment groups. Herrmann [37] also demonstrated serious risk of bias across multiple ROBINS-I domains. The three observational cohort studies assessed using the NOS (Figure *4*) received good methodological quality ratings; however, their retrospective designs remain susceptible to residual confounding. Collectively, these limitations reduce confidence that favorable postoperative outcomes can be attributed specifically to OMT rather than patient selection, differences in clinical characteristics, or other aspects of postoperative care.

Osteopathic Manipulative Treatments (OMTs)

Thirteen specific OMT techniques were identified across the included studies. Table *2* summarizes the identified techniques, their application methods, and the studies in which they were reported. Because several techniques were administered together within individual treatment protocols, the effects of individual techniques on postoperative outcomes could not be isolated. Although 13 specific OMT techniques were identified across the included studies, not all techniques were described in sufficient detail to permit procedural extraction. Accordingly, Table *2* summarizes the subset of techniques for which adequate procedural descriptions were available, while the broader technique inventory reflects all reported technique labels.

Name of Technique	Studies Reporting Use of the Technique	Technique Description (As Reported in Included Studies)
Colon balanced ligamentous tension	Probst et al. [39]	With the patient supine, the physician contacts the abdomen over the affected portion of the colon and assesses the surrounding fascial and ligamentous tissues for ease in multiple planes. The planes of ease are then stacked, and the tissues are held at a point of balanced tension until a release is palpated. The tissues are then slowly returned to neutral.
Sympathetic inhibition for intestines	Probst et al. [39]	With the patient prone or supine, the physician applies sustained inhibitory pressure to the paraspinal tissues corresponding to the sympathetic innervation of the intestines, primarily T10-L2, or over the superior mesenteric ganglion. Pressure is maintained until relaxation of the tissues is appreciated.
CV4	Probst et al. [39]	With the patient supine, the physician places the thenar eminences on the supraocciput, medial to the mastoid processes and inferior to the inion. Gentle pressure is directed superiorly and medially to the occiput to exaggerate the cranial extension phase. Steady pressure is maintained until a change in tissue motion is appreciated and the cranial rhythmic impulse resumes.
OA joint muscle energy	Genewick et al. [36]	With the patient supine and the physician at the head of the table, the OA joint is positioned at the restrictive barrier using flexion/extension, sidebending, and rotation as appropriate. The patient gently attempts to move the head away from the barrier against the physician's isometric resistance for three to five seconds. After relaxation, the physician engages the new restrictive barrier. The sequence is repeated three to five times.

Myofascial release of the thoracic inlet	Genewick et al., Racca et al., Wieting et al. [36,40,41]	With the patient supine, the physician contacts the tissues surrounding the thoracic inlet with both hands and assesses restriction in rotation, sidebending, and translation. The tissues are positioned either directly into the restrictive barrier or indirectly toward ease and held until a fascial release is appreciated. The tissues are then returned to neutral.
Paraspinal myofascial release	Genewick et al. [36]	With the patient prone or supine, the physician contacts the paraspinal musculature and assesses for fascial restriction. Gentle longitudinal, lateral, rotational, or anterior/posterior forces are applied either toward the restrictive barrier or toward ease and maintained until the tissues soften, and a release is palpated.
Abdominal diaphragm myofascial release	Genewick et al. [36]	With the patient supine, the physician places the hands along the inferior costal margins and contacts the tissues associated with the respiratory diaphragm. Fascial motion is assessed during respiration, and gentle pressure or traction is applied toward the restrictive barrier or direction of ease. The position is maintained through several respiratory cycles until improved motion is appreciated.
Pelvic diaphragm myofascial release	Genewick et al. [36]	With the patient supine, the physician uses broad contact over the pelvic region, including the innominates and sacrum, and assesses fascial motion in multiple planes. Gentle direct or indirect forces are applied to balance the pelvic fascial tissues and maintained until a release is appreciated.
Sacral rocking	Genewick et al. [36]	With the patient prone, the physician places a hand over the sacrum and applies gentle rhythmic pressure synchronized with the patient's respiration and inherent sacral motion. The sacrum is repeatedly rocked through its physiologic motion, encouraging sacral flexion during exhalation and extension during inhalation, to improve sacral mobility and promote relaxation of the surrounding tissues.
Pedal lymphatic pump	Genewick et al. [36]	With the patient supine and the physician positioned at the foot of the bed, a superior force is applied to dorsiflex the feet in a vibratory pattern.
Doming of the diaphragm	Racca et al. [40]	With the patient supine, the physician places the fingers bilaterally beneath the inferior costal margins. During exhalation, gentle cephalad and medial pressure is applied beneath the costal margins to encourage superior movement of the diaphragm. The physician maintains the gained position during inhalation and advances further with subsequent exhalations. This cycle is typically repeated for three to five respiratory cycles.
Rib raising	Wieting et al. [41]	With the patient supine, the physician places the fingertips beneath the rib angles adjacent to the thoracic spine and gently lifts the rib angles anteriorly and laterally. The ribs are held or rhythmically raised until relaxation of the paraspinal tissues and improved rib motion are appreciated. The technique is repeated along the thoracic cage.
Suboccipital muscle release	Wieting et al. [41]	With the patient supine and the physician seated at the head of the table, the physician places the fingertips along the inferior nuchal line in contact with the suboccipital tissues. Gentle anterior and superior pressure is applied and maintained until relaxation and softening of the tissues are appreciated.

TABLE 2: OMT Techniques Reported in Included Studies

The table summarizes the osteopathic manipulative treatment (OMT) techniques reported in the included studies, the studies in which each technique was applied, and descriptions of technique application.

CV-4: compression of the fourth ventricle; OA: occipitoatlantal

Regional Treatment Trends

In terms of treatment region trends, four studies treated the head, five the cervical region, one the upper extremity, six the thoracic region, six the ribs, four the abdomen, five the lumbar region, three the pelvis, three the sacrum, and two the lower extremity (Figure *5*). These frequencies represent the number of studies reporting treatment to each anatomical region. Because individual studies frequently addressed multiple regions, these categories were not mutually exclusive. Regional frequencies reflect the anatomical information available in the included publications and should be interpreted as patterns of reported clinical application rather than evidence of treatment effectiveness or superiority.

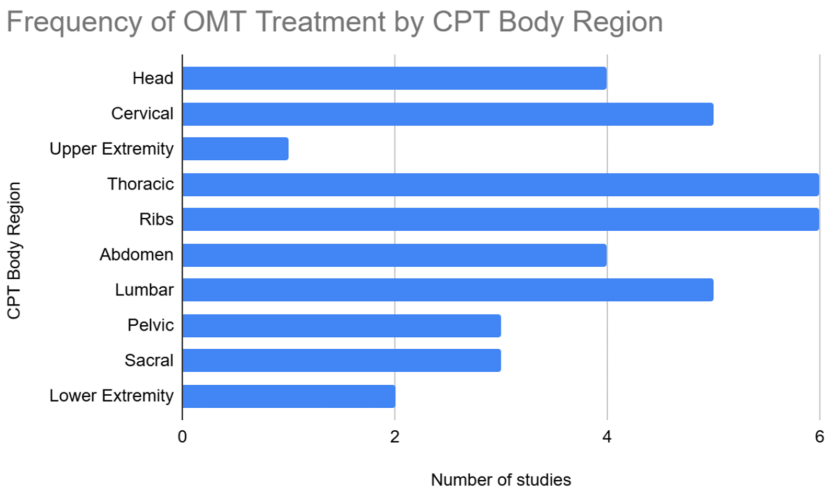


FIGURE 5: Frequency of OMT by CPT Body Region

The figure illustrates the frequency of osteopathic manipulative treatment (OMT) by Current Procedural Terminology (CPT) body region across the included studies. The thoracic and rib regions were most frequently treated (six studies each), followed by the cervical and lumbar regions (five studies each).

Discussion

In this scoping review of nine studies involving 1,025 surgical patients, six studies reported favorable differences in at least one postoperative outcome, whereas three found no statistically significant differences in their reported outcomes. Favorable findings included earlier return of bowel function, lower observed incidence of POI, shorter hospital LOS, reduced pain, and lower postoperative morbidity. For example, Baltazar et al. reported a shorter mean time to first flatus in patients receiving OMT compared with controls (3.1 versus 4.7 days), accompanied by a shorter mean hospital stay (6.1 versus 11.5 days) [33]. Herrmann similarly reported fewer POI events in the OMT group, while Crow et al. and Lo Piccolo et al. reported shorter hospital stays among patients receiving OMT [34,37,38]. Probst et al. reported lower postoperative morbidity and reduced pain [39]. However, the outcomes varied substantially across studies, and several investigations evaluated general postoperative recovery rather than directly measuring gastrointestinal function. Direct measures of gastrointestinal function, such as time to first flatus, time to first bowel movement, and POI, should be distinguished from broader postoperative outcomes, such as hospital LOS and pain. Although LOS is clinically relevant to postoperative bowel dysfunction, particularly in the context of prolonged ileus, it does not independently establish improved gastrointestinal motility. Therefore, the available literature should be interpreted in the context of the specific outcomes evaluated in each study.

These findings should also be considered in the context of previous literature examining OMT during postoperative recovery. Randall et al. (2024) reported evidence suggesting improvements in gastrointestinal recovery following postoperative OMT, including earlier return of bowel function and reduced POI [22]. Our companion systematic review and meta-analysis (Ponce et al., 2026) likewise found that OMT was associated with a statistically significant reduction in time to first bowel movement compared with controls, as well as a reduction in hospital LOS among patients receiving OMT [25]. Importantly, the companion meta-analysis included the same nine OMT studies examined in the present scoping review; therefore, these findings represent an overlapping synthesis of the available evidence rather than independent corroboration. Together, these publications provide complementary perspectives on the available postoperative OMT literature. However, the present scoping review primarily characterizes the techniques that have been investigated, their anatomical treatment regions, and the outcomes reported in the literature. It cannot establish the comparative effectiveness of individual techniques.

The anatomical distribution of OMT provides additional insight into current treatment patterns. The thoracic region and ribs were the most frequently treated areas, each reported in six studies, followed by the cervical and lumbar regions, each reported in five studies. The head and abdomen were treated in four studies each, while the pelvis and sacrum were treated in three studies each. The lower extremities were treated in two studies and the upper extremity in one. These findings suggest that the reported treatment protocols more frequently incorporated thoracic, rib, and spinal techniques than techniques directed specifically at the abdomen. However, these frequencies reflect the anatomical regions treated rather than their relative effectiveness. Because individual studies commonly incorporated multiple regions into a single treatment protocol, the independent contribution of any anatomical region to postoperative outcomes could not be determined.

Thirteen specific OMT techniques were identified across the included studies. Myofascial release of the thoracic inlet was the most frequently reported individual technique, appearing in three studies. Nevertheless, the findings associated with its use were inconsistent. Genewick et al. observed a one-day reduction in median hospital LOS that was not statistically significant, whereas Racca et al. reported a statistically significant reduction in hospitalization following cardiac surgery [36,40]. Wieting et al. observed small differences in discharge timing that did not reach statistical significance [41]. These results should be interpreted in the context of differences in surgical populations, treatment protocols, and measured outcomes. In particular, improvements in hospitalization or other postoperative outcomes following cardiac surgery cannot be assumed to demonstrate improved gastrointestinal recovery [41]. More broadly, most of the identified techniques were reported in only one study, and techniques were generally administered in combination. Consequently, the available evidence does not establish which individual techniques, combinations, or treatment regions are most effective for postoperative bowel dysfunction.

The anatomical distribution of treatment may be considered alongside the autonomic regulation of gastrointestinal motility. Parasympathetic stimulation occurs primarily through the vagus nerve (cranial nerve X) and pelvic splanchnic nerves (S2-S4), which generally promote gastrointestinal motility [42]. Sympathetic innervation is mediated through the greater, lesser, and lumbar splanchnic nerves and generally inhibits gastrointestinal motility [42,43]. From an osteopathic perspective, somatic dysfunction may be evaluated in regions associated with these autonomic pathways [21]. The occipitoatlantal and upper cervical regions may be examined in relation to vagal influence, whereas the sacrum and pelvis may be examined in relation to pelvic splanchnic pathways [42,43]. Treatment directed toward these regions has been proposed as a means of influencing autonomic and viscerosomatic function. However, these proposed mechanisms remain theoretical in the context of the included studies, and the review does not establish that treatment of these regions directly alters gastrointestinal motility.

Proposed Protocol

Based on the techniques reported in the included studies and the proposed autonomic mechanisms described above, we outline a hypothesis-generating treatment sequence for future investigation of postoperative bowel dysfunction. The proposed sequence is intended to identify candidate techniques and combinations for feasibility and future research rather than represent an evidence-derived treatment recommendation. The order and selection of techniques are exploratory and do not reflect established superiority, validated sequencing, or a current clinical recommendation. The available evidence does not establish that these techniques are superior to other OMT approaches: (1) Thoracic inlet myofascial release; (2) rib raising; (3) paraspinal inhibition applied to T6-L2; (4) suboccipital inhibition; and (5) sacral rocking.

The five techniques were selected as candidate components because they correspond to the lymphatic, sympathetic, and parasympathetic anatomical regions discussed above and were reported among the interventions identified in this review. Their selection does not reflect demonstrated superiority or a comparative assessment of effectiveness over other reported techniques. The proposed sequence can be conceptualized in three phases. The initial phase targets the thoracic inlet, with the proposed aim of supporting lymphatic flow. The second phase incorporates rib raising and paraspinal inhibition to address regions associated with sympathetic innervation of the gastrointestinal tract. The final phase incorporates suboccipital inhibition and sacral rocking to address regions associated with parasympathetic pathways. Although this sequence is informed by the techniques and anatomical regions identified in the review, the proposed physiological effects have not been established by the included studies. In particular, it remains unclear whether these techniques influence gastrointestinal motility through autonomic modulation, lymphatic mechanisms, or other pathways. Prospective clinical trials are needed to evaluate the efficacy of this sequence, determine the contribution of individual techniques, and establish appropriate treatment timing, frequency, safety, and contraindications. Patient selection should also consider pre-existing cervical pathology before cervical-region techniques are investigated [44]. In clinical settings, severe rib-fracture events in older women with osteoporosis are reported, providing contextual support for attention to skeletal fragility when investigating manual interventions [45]. Adverse events were not a prespecified data extraction item in this review, preventing a systematic assessment of safety.

Limitations

The findings of this review are limited by the quantity, quality, and heterogeneity of the available evidence. Most included studies were observational or nonrandomized, limiting the ability to distinguish the effects of OMT from selection bias, confounding, and other aspects of postoperative care. Additionally, several studies reported hospital LOS rather than direct measures of gastrointestinal recovery, limiting the interpretation of favorable postoperative outcomes. The inclusion of studies without direct gastrointestinal outcomes represents an important limitation, alongside potentially incomplete reporting of OMT techniques and the inability to assess technique-specific effectiveness. The limited use of placebo controls further complicates the distinction between the specific effects of OMT and the nonspecific effects of practitioner attention and physical contact.

The review may not have captured all relevant evidence because Embase, Scopus, Web of Science, and

CINAHL were not searched. Furthermore, the limited number of studies reporting individual OMT techniques and the frequent use of multimodal treatment protocols restricted comparisons of individual techniques and anatomical regions. Adverse events were not a prespecified data extraction item, limiting the assessment of safety.

These limitations are particularly relevant to the proposed treatment protocol, which was developed by mapping the techniques and anatomical regions reported in the included studies. The available literature does not establish the optimal selection, combination, or sequencing of techniques, and the proposed physiological rationale for targeting specific anatomical regions remains theoretical within the context of the included evidence. Accordingly, the proposed sequence represents an initial framework for further refinement rather than an established clinical protocol.

Conclusions

The available evidence regarding OMT for postoperative bowel dysfunction remains limited and heterogeneous. Although several studies reported favorable postoperative outcomes, the findings do not establish the effectiveness of OMT for improving gastrointestinal function. Thoracic and rib-focused treatments were the most frequently reported approaches, reflecting patterns of clinical application rather than evidence of their superiority. The individual contributions of specific techniques remain unclear. The proposed treatment sequence represents a hypothesis-generating framework for future investigation and requires prospective evaluation and validation.

Appendices

Semantic Scholar: The search strategy was as follows:

("postoperative ileus" OR "paralytic ileus" OR "postoperative bowel dysfunction" OR "postoperative gastrointestinal dysfunction" OR "postoperative constipation") AND ("osteopathic manipulative treatment" OR "osteopathic manipulation" OR "osteopathic manipulative medicine" OR osteopathic OR OMT OR OMM)

Google Scholar: The search used the terms ("postoperative ileus" OR "postoperative bowel dysfunction" OR "postoperative gastrointestinal dysfunction" OR "postoperative constipation") AND ("osteopathic manipulative treatment" OR "osteopathic manipulation" OR osteopathic OR OMT)

Cochrane: The search strategy was as follows:

("postoperative ileus" OR "paralytic ileus" OR "postoperative bowel dysfunction" OR "postoperative gastrointestinal dysfunction" OR "postoperative constipation" OR "delayed gastrointestinal recovery") AND (osteopathic OR "osteopathic manipulation" OR "osteopathic manipulative treatment" OR OMT)

PubMed: The search strategy was as follows:

("Postoperative Ileus"[Mesh] OR "postoperative ileus"[Title/Abstract] OR "paralytic ileus"[Title/Abstract] OR "postoperative bowel dysfunction"[Title/Abstract] OR "postoperative gastrointestinal dysfunction"[Title/Abstract] OR "delayed gastrointestinal recovery"[Title/Abstract] OR "postoperative constipation"[Title/Abstract] OR "bowel motility"[Title/Abstract] OR "gastrointestinal transit"[Title/Abstract] OR "gut motility"[Title/Abstract]) AND ("Manipulation, Osteopathic"[Mesh] OR osteopathic[Title/Abstract] OR "osteopathic manipulative treatment"[Title/Abstract] OR "osteopathic manipulative medicine"[Title/Abstract] OR "osteopathic manipulation"[Title/Abstract] OR OMT[Title/Abstract] OR OMM[Title/Abstract] OR "osteopathic manual treatment"[Title/Abstract])

ClinicalTrials.gov: ClinicalTrials.gov was searched using "Post Operative Bowel Dysfunction" as the condition/disease and "Osteopathic" as an additional search term. No intervention or treatment terms or geographic restrictions were specified.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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