

LITERATURE REVIEW

Effects of Manual Therapy on Patients with Functional Constipation: Systematic Review and Meta-analysis of Randomized Clinical Trials

Irene Torres-Sánchez, PhD,^a Andrea Ramírez-Zafra, MSc,^b Elisabet Rueda-García, MSc,^b Irene Cabrera-Martos, PhD,^a and Esther Díaz-Mohedo, PhD^b

ABSTRACT

Objective: The aim of this study was to analyze the effects of manual therapy techniques on adults with functional constipation (FC).

Methods: Four databases (CINAHL, PubMed, Scopus and Web of Science) were searched up to May 2025. Inclusion criteria were defined following PICOS recommendations. Methodological quality was assessed with the Downs and Black scale, and the risk of bias was evaluated with the Cochrane risk of bias assessment tool. The meta-analysis was performed using RevMan 5.4 software.

Results: Fifteen randomized clinical trials with a total of 859 patients were included in the systematic review and eleven were included in the meta-analysis. Manual therapy compared to no manual therapy significantly improved constipation severity, constipation status, quality of life (QOL), defecation frequency, and defecation duration. In addition, abdominal massage compared to no manual therapy significantly improved constipation severity. Manual therapy, compared to a control intervention, significantly improved constipation severity. Manual therapy applied alone or combined with another treatment showed significant differences compared to no manual therapy.

Conclusion: Manual therapy, compared to no manual therapy, significantly improved constipation severity and status, QOL and defecation frequency and duration in adults with FC without any other pathology. In addition, abdominal massage compared to no manual therapy and manual therapy compared to a control group also significantly improved constipation severity. Similar significant differences were also found in favor of manual therapy when it was applied alone or combined with another treatment. High heterogeneity between studies affected the consistency of results, therefore these findings should be considered with caution. (*J Manipulative Physiol Ther* 2025;00;1-12)

Key Indexing Terms: *Constipation; Manual Therapy; Massage*

INTRODUCTION

Constipation, a functional bowel disorder, is one of the most common symptoms related to the digestive system.¹ Constipation can be classified according to its origin into organic constipation, when there is a neurological or colon

problem, and functional constipation, when there is no identifiable cause. Functional constipation (FC) negatively affects quality of life (QOL), social life and well-being.^{2,3} Some factors that can cause FC are slow transit, dyssynergic defecation, sedentary lifestyle, pregnancy, pelvic floor dysfunctions and stress.⁴ Furthermore, certain unhealthy habits such as inadequate intake of fruits and vegetables, sedentary lifestyle, a low daily intake of liquids and the use of certain drugs can lead to continued constipation.^{2,3} FC can be diagnosed based on symptoms and a physical examination.⁴ According to the Rome criteria, which are used to define FC, the global prevalence of constipation is 14%.⁵⁻⁸

Nowadays, pharmacological and nonpharmacological approaches are used in FC management. The most used pharmacological approaches are laxatives, enemas and suppositories.⁹ Although they have been shown to reduce the symptoms of FC,¹⁰ adverse effects such as nausea, diarrhea and abdominal pain are common with these treatments.¹¹

^a Physical therapy department, Faculty of health sciences, University of Granada, Granada, Spain.

^b Physical therapy department, Faculty of health sciences, University of Málaga, Málaga, Spain.

Corresponding author: Irene Cabrera Martos, PhD, Department of Physiotherapy, Faculty of Health Sciences, University of Granada, Av. De la Ilustración, 60, 18016 Granada, Spain. (e-mail: irenecm@ugr.es).

Paper submitted December 2, 2024; in revised form October 4, 2025; accepted October 13, 2025.

0161-4754

© 2025 by National University of Health Sciences.

<https://doi.org/10.1016/j.jmpt.2025.10.055>

Regarding the nonpharmacological approach, lifestyle changes in diet, fluid intake and increasing physical activity are applied.¹² Numerous other nonpharmacological approaches including the use of probiotics, biofeedback, meditation and acupuncture are also used.¹³

Manual therapy is one of the nonpharmacological methods used in the treatment of FC. Manual therapy includes different techniques such as massages, manipulations, soft tissue techniques, visceral mobilizations and pressures, among others.¹² Manual therapy applied to the abdominal viscera stimulates the digestive tract, inducing waves in the rectal muscles that activate the somatic-autonomic reflex and improve peristalsis.¹⁴ Manual therapy induces relaxation of the connective tissue of the colon, reduces the rigidity of the connective tissue and increases vascularization. Additionally, it is very beneficial in pelvic floor dysfunctions such as dyspareunia¹⁵ or cystitis.¹⁶ The pelvic floor muscles play an important role in defecation. During defecation, a correct relaxation and paradoxical contraction of the muscles that compose this area is essential for a complete elimination of stools.¹⁷

Regarding previous evidence, several systematic reviews¹⁸⁻²⁰ have explored the effects of manual therapy techniques on FC. In a recent systematic review and meta-analysis, Hao et al¹⁸ investigated the effect of pelvic floor physical therapy for FC in children. They reported that pelvic floor physical therapy significantly increased defecation frequency, reduced painful defecation, promoted quality of life and reduced fecal incontinence in children with FC. Various treatment approaches, including manual therapy, appear to improve these outcomes. In adults, according to Erdrich et al,¹⁹ manual therapy may have an effect on the symptoms of FC. However, the lack of quantitative synthesis precludes their conclusions. A recent systematic review²⁰ explored the effects of abdominal massage on FC, opioid-induced constipation and neurogenic bowel dysfunction. Its authors reported that the effect of abdominal massage appeared to be greater for FC. However, some analyses showed high heterogeneity and different types of constipation were explored, which led to heterogeneity. In addition, this systematic review included both randomized clinical trials and quasi-experimental studies.

Given the above, a different analysis of the effectiveness of manual therapy in the treatment of FC in adults is needed. An accurate definition of FC according to internationally recognized and validated criteria, such as the Rome diagnostic criteria, is essential in conducting a review and a range of manual therapy interventions should be considered. Analyzing available new evidence based exclusively on randomized clinical trials will contribute to draw more solid conclusions than previous reviews. Therefore, the purpose of this systematic review and meta-analysis of randomized clinical trials was to analyze the effects of manual therapy techniques in adults with FC.

METHODS

Design

This systematic review and meta-analysis was reported according to the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) 2020 guidelines²¹. It was previously registered (9th June 2023) at the International Prospective Register of Systematic Reviews (PROSPERO) with number CRD42023434019. We defined the following PICO (Participants, Interventions, Comparisons and Outcomes) question: "Is manual therapy effective in the treatment of adults with FC?" Therefore, a systematic review and meta-analysis was performed to identify randomized clinical trials exploring the effects of manual therapy in adults with FC.

Data Sources and Searches

Four databases were searched from the earliest record to 1st May 2025. We used CINAHL, Medline (via PubMed), Scopus and Web of Science. The search strategy was conducted using a combination of search terms. The full search strategy for each database is described in [Appendix A](#). To identify other relevant studies, we checked the reference list of other reviews and related studies.

Moreover, a search was conducted for ongoing randomized clinical trials in three clinical trial registries: ClinicalTrials.gov, the International Standard Randomized Controlled Trial Number (ISRCTN) Registry and the International Clinical Trials registry platform (ICTRP). [Appendix B](#) describes the search strategy used in each registry.

Study Selection

The studies were selected systematically based on the PICOS (Participants, Interventions, Comparisons, Outcomes and Study design) inclusion criteria^{22,23}. (P) Adults (≥ 18 years old) with FC diagnosed with the Rome criteria²⁴ and without other underlying pathology; (I): manual therapy²⁵⁻²⁷ combined with other treatment or applied alone; (C) control group (no intervention or placebo), usual care or no manual therapy interventions; (O) primary outcomes (constipation severity) and secondary outcomes (constipation status, QOL and any other outcomes); (S) Study design: randomized clinical trials. We included the full text in English, Spanish or French. A more detailed description of the PICOS strategy with inclusion and exclusion criteria is described in [Appendix C](#).

The search was conducted by 2 independent reviewers (E.R.G. and A.R.Z.). We used the Zotero reference manager (Zotero 6, Center for History and New Media, George Mason University) to identify studies, check duplicates and standardize references. In the first screening, titles and abstracts were reviewed according to PICOS eligibility criteria. A second screening was conducted by reading the

full text. We contacted corresponding authors via email when the full text was not available. Studies that met the inclusion criteria were included. A third (I.T.S) reviewer resolved any disagreements.

Data Extraction

Data extraction was conducted by 2 independent reviewers (E.R.G. and A.R.Z.). Information extracted from included studies was organized into tables. The characteristics of the studies were summarized in a table, which included: author (year)^{reference}; country; sample size (n); age (mean±standard deviation [SD]); Rome criteria; sex (% females); outcome measures; measuring instruments; and time point assessment. The characteristics of the intervention were summarized in a table, which included: author (year)^{reference}; interventions; session duration (minutes); frequency (session/frequency); program duration (weeks); supervision; adverse events; and self-applied intervention. We emailed the corresponding author if the information available in the included studies was insufficient or unclear. A third reviewer (I.T.S) resolved any disagreements.

Methodological Quality and Risk of Bias Assessment

The modified Downs and Black quality assessment method²⁸ was used to assess the methodological quality of the studies. This scale is 1 of the 6 best quality assessment scales^{29,30} and has 27 items divided into five sections.^{29,30} The answer for item 27 was simplified to a choice of 0 points (no/unable to determine) or 1 point (yes). The score was the same for the rest of the items except item 5, which was rated as 0 (no/unable to determine), 1 (partially), or 2 (yes).^{29,30} Scores ranged from 0-28 and higher ones indicate a better methodological quality of the study. According to their quality, studies can be categorized as excellent (26-28), good (20-25), fair (15-19) and poor (≤ 14).³⁰

The Cochrane Risk of Bias Assessment Tool³¹ was used to assess the risk of bias of the studies. This tool assesses seven domains: selection bias (sequence generation and allocation concealment), performance bias, detection bias, attrition bias, reporting bias and other bias. For each study, the different domains were scored as “high risk of bias,” “low risk of bias” or “unclear to determine.”

Two reviewers (A.R.Z. and E.R.G.) assessed the risk of bias and methodological quality independently, and in case of doubt or disagreement a third reviewer (I.T.S.) was consulted.

Data Synthesis and Analysis

We used Review Manager (RevMan 5.4) software to perform the statistical analysis. A meta-analysis was performed for outcomes repeated at least in four studies. Means, SDs and sample sizes were extracted from the

included studies. When data were expressed as median and interquartile range (Q1;Q3) we transformed them using the protocol described in Wan et al.³² Studies with more than 2 groups were included in the meta-analysis as recommended by the Cochrane Handbook.³³ To estimate the overall effect, the pre-post differences and pooled SDs were calculated according to the following formulas:

$$Mean_{change} = Mean_{post} - Mean_{pre};$$

$SD_{change} = \sqrt{SD_{pre}^2 + SD_{post}^2 - (2 \times Corr \times SD_{pre} \times SD_{post})}$, where the correlation coefficient (Corr) was set at 0.5.³³ For continuous outcomes, the mean difference (MD) and the 95% confidence intervals (CIs) were used when the outcomes were assessed with the same scale and standardized mean difference (SMD) when the scale was different. The method utilized was inverse variance and the model used was random effects.³⁴ A value of $P \leq .05$ was considered statistically significant. Heterogeneity between studies was assessed using the I^2 test. The degree of heterogeneity was categorized as low ($I^2 < 25\%$), moderate ($I^2 = 25-75\%$) or high ($I^2 > 75\%$). Pooled effect sizes were categorized as small (MD < 10% of the scale; SMD < 0.2), moderate (MD = 10% to 20% of the scale; $0.2 < SMD < 0.8$) or large (MD > 20% of the scale; SMD > 0.8).³⁵ To explore heterogeneity, we planned a subgroup analysis. Subgroups were chosen according to manual therapy technique, comparators and comparisons. Additionally, we planned to use funnel plots with pseudo 95% confidence limits and Egger's test to inspect potential publication bias if ≥ 10 studies were available.³³

RESULTS

Search Selection

The initial search yielded 1829 results. After removing duplicates, 1160 records were left. After performing the first screening by title and abstract, 1066 studies remained. In the second screening, in which the full text was read, 71 studies were removed. Finally, 15 randomized clinical trials met the inclusion criteria and were included in the systematic review. Eleven trials were included in the meta-analysis.

In addition, we searched for ongoing randomized clinical trials in three clinical trial registries. We identified 124 ongoing randomized clinical trials, of which 18 met the inclusion criteria. The list of ongoing randomized clinical trials that could be included in the review if they were completed and published is shown in [Appendix D](#). [Figure 1](#) in [Appendix E](#) shows the PRISMA flow diagram of clinical databases and registers.

Characteristics of Included Studies

Table 1 in Supplementary file shows the characteristics of studies included in this review. All studies were

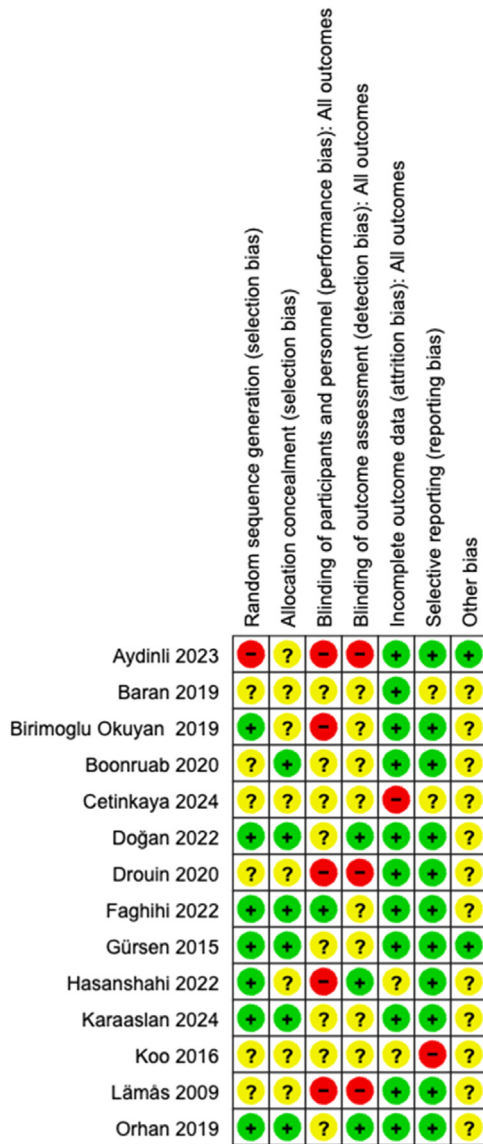


Fig 1. Risk of bias summary.

randomized clinical trials and are arranged chronologically from the oldest to the newest. They were published between 2015 and 2024. Seven studies were conducted in Turkey,³⁶⁻⁴³ 2 in Iran,^{44,45} 1 in Spain,⁴⁶ 1 in Sweden,⁴⁷ 1 in the Republic of Korea,⁴⁸ 1 in the United States of America⁴⁹ and 1 in Thailand.⁵⁰ The total number of participants was 859. All participants had a diagnosis of constipation according to the Rome criteria, 3 studies^{36,38,47} fulfilled the Rome II criteria, 8 studies^{37,39,42,45,46,48-50} fulfilled the Rome III criteria and four studies^{40,41,43,44} met the Rome IV criteria.

The primary outcome was constipation severity and its measuring instruments were the Constipation Severity Instrument (CSI)^{36,39,40,42,43}, the Constipation Assessment Scale (CAS)⁴⁵ and the Constipation Severity Scale (CSS)⁴¹. Secondary outcomes were constipation

status,^{37-39,41,42,44} number of patients, QOL measured with the Patient Assessment of Constipation Quality of Life Questionnaire (PAC-QOL)^{36,39,40,43,44} and the Constipation Quality of Life Scale (CQLS)³⁸ and other related outcomes such as defecation frequency and defecation duration.^{36,40,43,49} Variables were assessed pre- and postintervention in all studies. One article included 1-month follow up.⁴⁵ Three articles included a mild evaluation at week 4⁴⁸ or day 1 to day 4⁴⁶ or week 1 to week 3.⁴²

Characteristics of Interventions

Characteristics of interventions of the studies selected are described in Supplementary file Table 2.

In this review, abdominal massage (AM) was the intervention in 12 trials,^{37-47,49,50} 2 articles used connective tissue manipulation (CTM),^{36,39} Maitland orthopedic manual therapy (MOMT) was performed in 1 study⁴⁸ and manual lymph drainage (MLD) was applied in one article.⁴⁹

Regarding the interventions of the twelve trials that used AM,^{37-47,49,50} comparisons were made between no intervention,^{37,38,41,42,47} placebo,^{40,46} usual care,³⁹ electrical stimulation,⁴⁹ oral consumption⁵⁰ and acupressure.⁴⁵ Some studies compared AM to kinesio taping and lifestyle advice⁴³ or oral consumption and no intervention.⁴⁴ The 2 articles that used CTM^{36,39} compared CTM to lifestyle advice³⁶ or to AM and lifestyle advice.³⁹ MOMTG was compared to a dietary fiber group.⁴⁸ Finally, MDL was compared to AM and electrical stimulation.⁴⁹

The duration of the sessions in AM groups was between 10-50 minutes. However, CTM groups sessions lasted 15-20 minutes. In the MOMT group, the intervention took 20 minutes. In the MLD group, the intervention lasted 25 minutes. The frequency of the sessions ranged from seven sessions per week to one single session. The duration of the program in the studies ranged from one session to eight weeks. The intervention was supervised in 6 studies^{39,44,46,48-50}. No side effects were reported in four studies.^{36,38,43,46} and no information was provided in the remaining studies.

Methodological Quality of Included Studies

The modified Downs and Black quality assessment method³⁰ was used. The total score for each study and the score for each item are summarized in Appendix E. According to their score, of the 15 articles evaluated, 1⁴⁷ was classified as excellent (26-28), 9^{37-39,41-44,47,50} were rated as good (20-25), 4^{36,40,45,49} as fair and 1 as poor⁴⁸ (19-15).

Risk of Bias of Included Studies

The Cochrane Risk of Bias Assessment Tool³³ was used. Figures 1 and 2 show the summary and the graph of

the risk of bias assessment, respectively. Random sequence generation was assessed as high risk in 1 article⁴¹, unclear in 6 studies^{37,42,47–50} and low risk in 7 articles.^{36,38–40,43–45} Allocation concealment was assessed as unclear in 8 studies^{37,38,41,42,45,47–49} and low risk in 6 articles.^{36,39,40,43,44,49} Blinding of participants and personnel was evaluated as high risk in 5 articles,^{38,41,45,48,49} unclear in 8 studies^{36,37,39,40,42,43,48,49} and low risk in 1 article.⁴⁴ Blinding of outcome assessment was assessed as high risk in 3 articles,^{41,47,39} unclear in eight studies^{36–38,42–44,48,50} and low risk in 3 articles.^{39,40,45} Incomplete outcome data was evaluated as high risk in 1 study⁴², unclear in 2 articles^{45,48} and low risk in 11 studies.^{36–41,43,44,47,49,50} Selective reporting was evaluated as high risk in 1 article,⁴⁸ unclear in 2 studies^{37,42} and low risk in 11 articles.^{36,38,39–41,43–45,47,49,50} Finally, other bias was evaluated as unclear in 12 studies^{37–40,42–45,47–50} and low risk in 2 articles.^{36,41}

Meta-Analysis: Effects of Manual Therapy Vs No Manual Therapy in Adults With FC

We analyzed the effects of manual therapy versus no manual therapy interventions. We considered outcomes repeated at least in four studies. We analyzed constipation severity, constipation status, quality of life, defecation frequency and defecation duration. Eleven studies were included in the meta-analysis.^{36–45,49} However, it is important to note that 4 studies^{46–48,50} had to be excluded from the analysis because the outcomes were not comparable with the rest of included studies. A subgroup analysis was conducted based on the manual therapy technique, comparators and comparisons for the primary outcome (i.e., constipation severity). Publication bias was not conducted as it is not recommended for fewer than ten articles.³³

Effects of Manual Therapy on Constipation Severity. Constipation severity was assessed with the CSI in five studies,^{36,39,40,42,43} the CSS in two studies^{37,41} and the CAS in 2 studies.^{44,45} Figure 3A shows significant differences with a large effect size ($n=550$; $SMD = -2.05$; $95\% CI = -2.89, -1.20$; $P > .00001$) in favor of manual therapy for constipation severity. Heterogeneity was significantly high in the overall effect ($I^2 = 94\%$; $P < .00001$).

A subgroup analysis was conducted to explore heterogeneity. The first subgroup analysis was based on the manual therapy technique. Regarding the available evidence, we compared the effects of AM and CTM. In addition, we conducted a subgroup analysis based on comparators: control group (i.e., no intervention, placebo or usual care) and no manual therapy interventions (i.e., oral administration of sweet almond oil, acupressure, kinesio taping or electrical stimulation). Finally, a subgroup analysis was conducted according to comparisons (i.e., manual therapy applied alone or combined with another treatment such as usual care, aromatherapy or lifestyle recommendations).

The subgroup analysis (Fig 3B) showed a large effect size favoring abdominal massage versus no manual therapy ($n = 480$; $SMD = -2.17$; $95\% CI = -3.09, -1.24$; $P > .00001$) for constipation severity. However, nonsignificant differences were observed between connective tissue manipulation and no manual therapy interventions, with a large effect size ($n = 90$; $SMD = -4.21$; $95\% CI = -9.96, 1.55$; $P = .15$). Heterogeneity was significantly high in both subgroups ($I^2 = 94\%$; $P < .00001$ and $I^2 = 97\%$; $P < .00001$; respectively). Regarding constipation severity, manual therapy was significantly better than the control group, with a large effect size ($n = 442$; $SMD = -2.56$; $95\% CI = -3.39, -1.73$; $P > .00001$). Heterogeneity was significantly high ($I^2 = 91\%$; $P < .00001$). However, nonsignificant differences were observed between manual therapy and no manual therapy interventions, with a small effect size ($n = 157$; $SMD = -0.14$; $95\% CI = -0.67, 0.39$; $P = .61$). Heterogeneity was moderate ($I^2 = 64\%$; $P = .06$) (Fig 3C). Regarding the subgroup analysis based on comparisons (Fig 3D), results showed significant differences with large effect sizes in favor of manual therapy when it was applied alone ($n = 384$; $SMD = -1.64$; $95\% CI = -2.52, -0.76$; $P = .0003$) and when combined with another treatment ($n = 166$; $SMD = -3.06$; $95\% CI = -5.52, -0.59$; $P = .02$). Heterogeneity was significantly high in both subgroups ($I^2 = 93\%$; $P < .00001$ and $I^2 = 97\%$; $P < .00001$; respectively).

Effects of Manual Therapy on Constipation Status. Six studies^{37–39,41,42,44} reported the number of constipated patients postintervention. Results in Figure 4 show significantly lower rates of FC ($n = 289$; $OR = .04$; $95\% CI = .01, 0.15$;

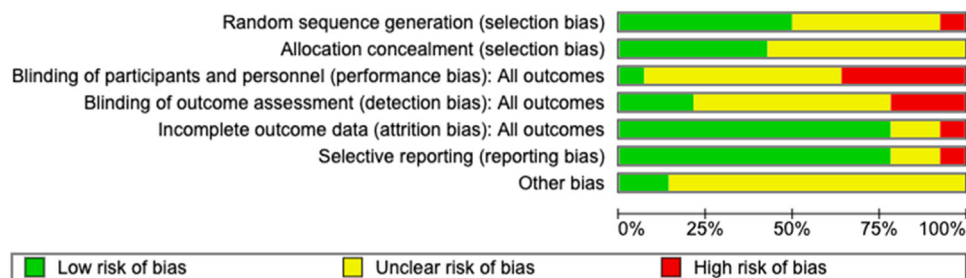


Fig 2. Risk of bias graph.

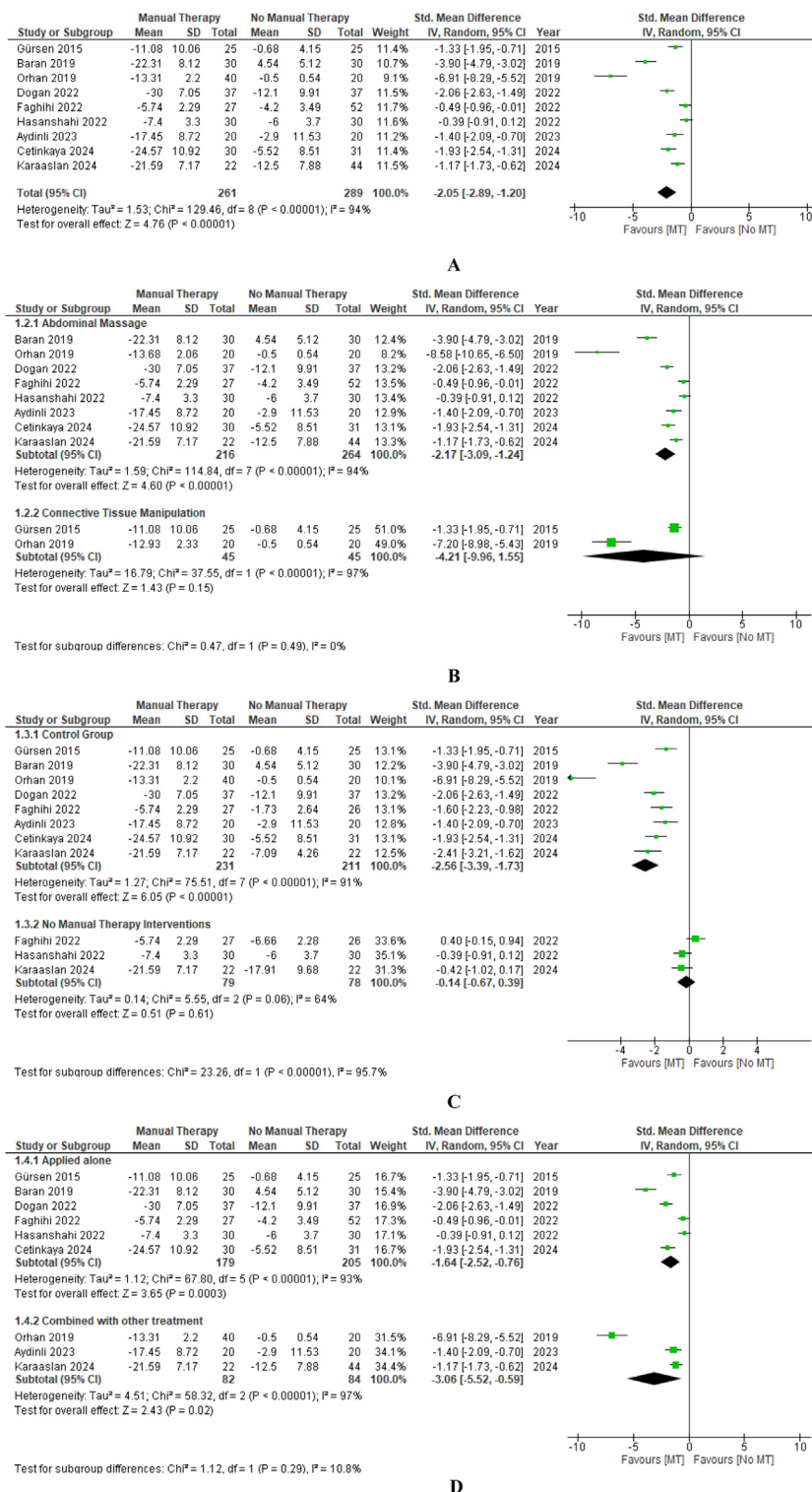


Fig 3. Forest plots summarizing SMD and 95% CI for the effects of manual therapy vs no manual therapy in patients with FC for constipation severity (A) and subgroup analysis (B-D). Abbreviations: MT: manual therapy.

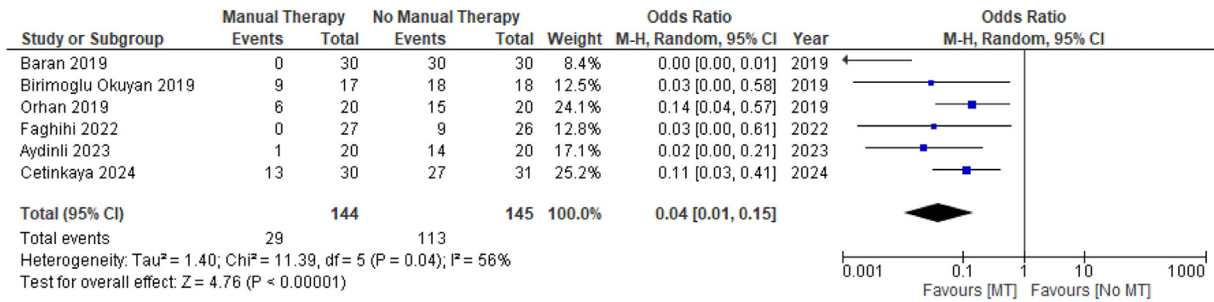


Fig 4. Forest plots summarizing OR and 95% CI for the effects of manual therapy vs no manual therapy in patients with FC for constipation status. Abbreviations: MT: manual therapy.

$P < .00001$) in the manual therapy group than in the no manual therapy group. Heterogeneity was significantly moderate ($I^2 = 56\%$; $P = .04$).

Effects of Manual Therapy on Quality of Life. Five studies^{36,39,40,43,44} assessed quality of life with the PAC-QOL. Results in Figure 5 showed that the manual therapy group significantly improved quality of life compared to the no manual therapy group, with moderate effect

sizes ($n=229$; MD = -14.52 ; 95% CI = $-19.95, -9.09$; $P < .00001$). Heterogeneity was significantly high ($I^2 = 86\%$; $P < .00001$).

Effects of Manual Therapy on Defecation Frequency and Defecation Duration. Four studies^{36,40,43,49} assessed defecation frequency in times per week and defecation duration in minutes. In Figure 6A, the results showed significant differences in favor of manual therapy versus no manual therapy

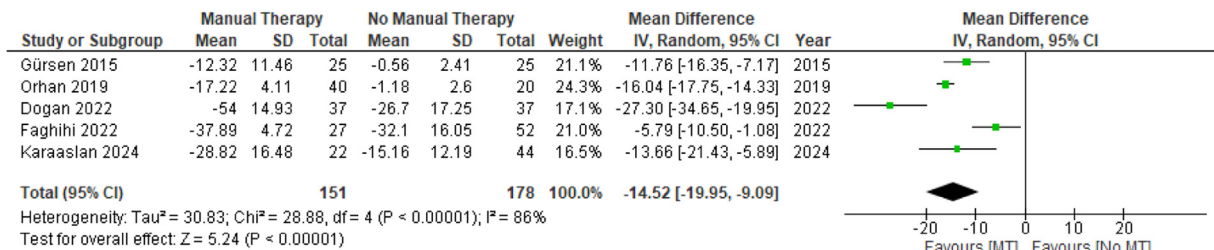
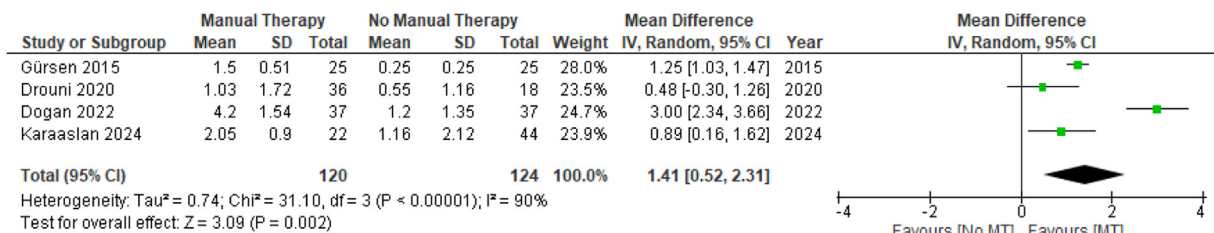
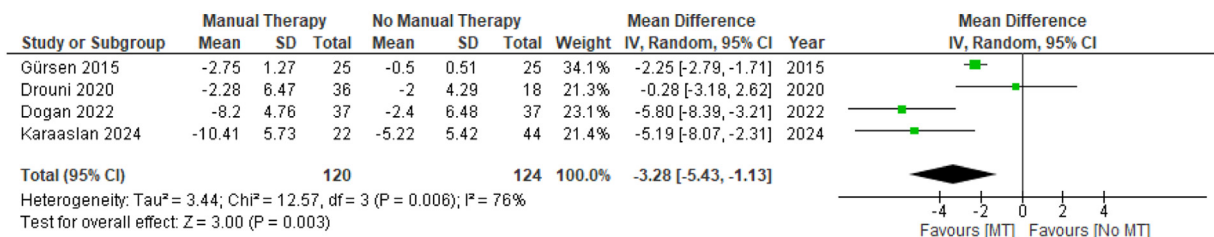


Fig 5. Forest plots summarizing MD and 95% CI for the effects of manual therapy vs no manual therapy in patients with FC for quality of life. Abbreviations: MT: manual therapy.



A



B

Fig 6. Forest plots summarizing MD and 95% CI for the effects of manual therapy vs no manual therapy in patients with FC for defecation frequency (times/week) (A); and defecation duration (minutes) (B). Abbreviations: MT: manual therapy.

for defecation frequency ($n=244$; MD = 1.41; 95% CI = 0.52, 2.31; $P = .002$). Defecation frequency was significantly higher in the manual therapy group. Heterogeneity was significantly high ($I^2 = 90\%$; $P < .00001$). Figure 6B also shows significant differences in favor of manual therapy versus no manual therapy for defecation duration ($n = 244$; MD = -3.28 ; 95% CI = $-5.43, -1.13$; $P = .003$). Defecation duration was significantly lower in the manual therapy group. Heterogeneity was significantly high ($I^2 = 76\%$; $P = .006$)

DISCUSSION

The objective of this systematic review and meta-analysis of randomized clinical trials was to analyze the effects of manual therapy techniques in adults with FC. Results showed significant differences in favor of manual therapy for constipation severity, constipation status, QOL, defecation frequency and defecation duration. Regarding the subgroup analysis, better results were shown for abdominal massage, manual therapy compared to the control group, and manual therapy applied alone or combined with other interventions.

Constipation Severity

The meta-analysis compared manual therapy with no manual therapy interventions. We observed significant differences in favor of manual therapy for constipation severity. Regarding manual therapy technique, abdominal massage was significantly better than no manual therapy but connective tissue manipulation did not show significant differences. Firstly, it should be noted that only two studies^{36,39} were included in this subgroup. We planned to study the effects of different manual therapy techniques. However, in general, available evidence regarding interventions other than abdominal massage is limited. Huang et al²⁰ investigated the effects of abdominal massage on chronic constipation (FC, induced-opioid constipation and neurogenic bowel dysfunction) in adults. They found that abdominal massage significantly improved constipation symptoms and concluded that these findings support the use of abdominal massage in the management of chronic constipation. In addition, they reported that abdominal massage effects appeared to be greater for FC. Therefore, these results are in line with ours. According to the results of the subgroup analysis based on comparators, manual therapy was significantly better than the control group for constipation severity. However, nonsignificant differences were observed between manual therapy and no manual therapy interventions. It should be noted that there was high heterogeneity in this last subgroup. Manual therapy interventions were oral administration oil, acupressure, kinesio taping or electrical stimulation. In addition, only

three articles⁴³⁻⁴⁵ were included. When we compared manual therapy to the control group (i.e., no intervention, placebo or usual care), significant differences were observed in favor of manual therapy. No previous meta-analysis performed this comparison. Although good results were shown in our meta-analysis, it should be noted that these results were expected in comparisons with no intervention. Finally, manual therapy was statistically more effective than no manual therapy when applied alone and when combined with other interventions. Similar effects were observed in Huang et al.²⁰ Their analysis of single and combined interventions showed no statistically significant differences in their efficacy on constipation symptoms, which is in line with our results.

Constipation Status

Results showed significantly lower rates of FC in the manual therapy group. A previous systematic review¹⁹ analyzed the effects of manual therapy on FC symptoms. The concluded that manual therapy can have an effect on the symptoms of constipation. However, no meta-analysis was conducted. Our systematic review provides new evidence on this issue based on quantitative results, supporting these previous results.

Quality of Life

FC significantly impacts patients' QOL. In the meta-analysis for QOL, we observed that the manual therapy group significantly improved QOL compared to the no manual therapy group. These results are in accordance with those of Huang et al.²⁰ Their results showed that abdominal massage improved the quality of life of patients with FC. It should be noted that we included all manual therapy techniques but available evidence was limited, so most studies used abdominal massage. Huang et al²⁰ reported that heterogeneity between included articles was extremely high. Similar findings were found by Yildirim et al,⁵¹ who showed a significant improvement in QOL due to abdominal massage in opioid-induced constipation. In another systematic review,¹⁸ quantitative synthesis revealed that pelvic floor physical therapy, including manual therapy, significantly improved QOL in children with FC.

Defecation Frequency and Defecation Duration

Defecation frequency was assessed in times per week. The meta-analysis results showed significant differences in favor of manual therapy versus no manual therapy in this regard. Defecation frequency was significantly higher in the manual therapy group. Defecation duration was assessed in minutes. We also observed significant differences in favor of manual therapy versus no manual therapy. Defecation duration was significantly lower in the manual

therapy group. Huang et al²⁰ also reported that, when abdominal massage was used, defecation frequency significantly increased and gut transit time significantly decreased. These results are in accordance with ours.

Manual Therapy for FC in Other Populations

The effects of manual therapy for FC have been investigated in different populations such as children,^{18,52} patients with neurological diseases,⁵³ patients with cancer in treatment with drugs⁵⁴ and poststroke patients.⁵⁵

A recent systematic review and meta-analysis in children¹⁸ explored the effects of pelvic floor physical therapy. Quantitative synthesis revealed that pelvic floor physical therapy significantly increased defecation frequency and promoted quality of life in children with FC. Various treatment approaches, including manual therapy, appear to improve these outcomes differently, while all yield additional benefits over conventional medical treatment. In children, traditional Chinese massage has shown to reduce FC symptoms and increase bowel movement frequency.⁵⁶ The results of this systematic review show that manual therapy also improves constipation related-outcomes in adults with FC, more specifically with abdominal massage according to Chen et al.⁵⁷ In addition, abdominal massage has shown to improve the QOL of children with disabilities and to reduce the need for pharmacological treatment of FC.⁵⁸ These findings are consistent with our results in adults, as we demonstrated that manual therapy techniques—specifically abdominal massage—improve constipation severity, constipation status QOL and defecation frequency and duration. Manual therapy appears to be effective in both adults and children with FC.

In neurological diseases such as multiple sclerosis,⁵⁹ abdominal massage improves the frequency of defecation and symptoms and therefore FC severity compared to lifestyle advice. Our results are in line with McClurg et al,⁵⁹ as we also found good results of manual therapy in FC severity.

FC is a common side effect of cancer treatment. Manual therapy is an alternative to drug treatment to relieve symptoms. Abdominal massage combined with abdominal exercise with the purpose of increasing bowel movements has proved to reduce FC severity in 40% of cancer patients.⁶⁰ Moreover, visceral osteopathic manipulations have been shown to improve the QOL of these patients, although they did not reduce FC severity.⁶¹ In poststroke patients, FC is a complication due to mobility limitation. Abdominal massage has proved to reduce FC symptoms and their incidence in poststroke patients.^{62,63}

Our results demonstrate that manual therapy is effective in adults with FC without any other pathology, which is in line with the previous results mentioned above in other populations.

Discussion With Other Reviews

Abdominal massage was the most studied manual therapy technique in the studies included. Dehghan et al⁶⁴ conducted a systematic review to determine the effect of abdominal massage on gastrointestinal function in patients over 18 years of age. Regarding FC, an improvement in severity and defecation frequency was demonstrated with interventions lasting between 3 and 8 weeks. These results are in line with our results. In that systematic review, only one study reported that abdominal massage improved QOL in older people. Yet, we found a significant improvement in QOL when manual therapy interventions, such as abdominal massage and connective tissue manipulation, were used.

Clinical Implications for Practice and Future Research

Manual therapy techniques significantly improved constipation severity, constipation status, QOL, defecation frequency and defecation duration, supporting their implementation in clinical practice. Abdominal massage was the type of manual therapy technique with the best results. Evidence about connective tissue manipulation is limited and no other technique was identified in the studies. More research is needed in techniques other than abdominal massage. Medium and long-term effects have not been studied yet. Manual therapy applied alone and combined with other interventions obtained favorable results, but more research is needed because of the heterogeneity in combined interventions. Only four studies reported that patients experienced no adverse events following the intervention, which was therefore safe. However, many of the studies did not provide any information about adverse effects. It is key to conduct further research on this issue. In addition, manual therapy is a straightforward procedure that can be easily incorporated into patients' life. Family members or patients themselves can be taught to administer it or automatic massage devices can be used. However, a more comprehensive analysis of self-applied interventions is required. This could be a good method to save costs. Therefore, future research should compare self-applied interventions with professionally applied interventions to see if they provide the same benefit.

Strengths

Strengths of this study are that all types of manual therapy techniques were included and we prospectively established inclusion criteria with the PICOS strategy and registered the protocol. PRISMA 2020 guidelines were adhered to. To assess the methodological quality of included studies, we used the Downs and Black quality assessment method, one of the six best quality scales.²⁸ In addition, we evaluated risk of bias with the Cochrane risk

of bias assessment tool.³¹ Finally, we conducted a meta-analysis with a comprehensive subgroup analysis for the primary outcome.

Limitations

Although the methodology was strictly followed, this study has some limitations that should be mentioned. The first one is that only studies published in English, Spanish or French were considered, creating a bias. The high heterogeneity of trials and therefore the difficulty of performing comparable analysis and establishing subgroups to draw robust conclusions were major limitations. There were differences in patients' clinical profiles, manual therapy protocols and comparisons. Moreover, high heterogeneity was observed in most of analyses, so results should be interpreted cautiously. In most studies, sample size was relatively small and no studies included mid-term or long-term assessments. Publication bias was not assessed because the number of studies included in the same analysis was not greater than 10. In addition, there were deviations from the protocol registered in PROSPERO. Initially, a general constipation and manual therapy systematic review was proposed. However, after considering the current evidence gaps, we decided to focus the systematic review specifically on FC, which explains the differences between the PROSPERO protocol and the current review.

CONCLUSION

The findings of this study suggest that manual therapy in adults with FC without any other pathology significantly improved constipation severity, constipation status, QOL, and defecation frequency and duration compared with no manual therapy. Additionally, abdominal massage compared to no manual therapy and manual therapy compared to a control group were significantly better at improving constipation severity. There are similar significant differences in favor of manual therapy when it is applied alone or combined with another treatment for constipation severity. However, the analysis showed high heterogeneity, influencing the consistency of the results, and the effects of other manual therapy techniques such as connective tissue manipulation remain limited, therefore, caution should be used when considering the application of these findings.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.jmpt.2025.10.055](https://doi.org/10.1016/j.jmpt.2025.10.055).

FUNDING SOURCES AND CONFLICTS OF INTEREST

No funding sources or conflicts of interest were reported for this study.

CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): I.T.S.

Design (planned the methods to generate the results): I.T.S., A.R.Z., E.R.G.

Supervision (oversight, organization and implementation): I.T.S., I.C.M., E.D.M.

Data collection/processing (experiments, organization, or reporting data): I.T.S., A.R.Z., E.R.G.

Analysis/interpretation (analysis, evaluation, presentation of results): I.T.S.

Literature search (performed the literature search): I.T.S., A.R.Z., E.R.G.

Writing (responsible for writing a substantive part of the manuscript): I.T.S., A.R.Z., E.R.G.

Critical review (revised manuscript for intellectual content): I.T.S., I.C.M., E.D.M.

Practical Applications

- This study evaluated the effectiveness of manual therapy for managing functional constipation (FC) through a systematic review and meta-analysis.
- Fifteen randomized clinical trials with a total of 859 patients were included in the systematic review and eleven in the meta-analysis.
- Manual therapy significantly improved constipation severity and status, QOL and defecation frequency and duration in adults with FC without any other pathology compared with no manual therapy.

REFERENCES

1. Lacy B, Mearin F, Chang L, Chey W, Lembo A, Simren M, et al. Bowel disorders. *Gastroenterology*. 2016;150(6):1393-1407.e5.
2. Costilla VC, Foxx-Orenstein AE. Constipation. Understanding mechanisms and management. *Clin Geriatr Med*. 2014;30:107-115.
3. Forootan M, Bagheri N, Darvishi M. Chronic constipation. *Medicine (Baltimore)*. 2018;97(20):e10631.
4. Wegh CAM, Baaleman DF, Tabbers MM, Smidt H, Benninga MA. Nonpharmacologic treatment for children with functional constipation: a systematic review and meta-analysis. *J Pediatr*. 2022;240:136-149.e5.

5. Soares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. *Am J Gastroenterol*. 2011;106(9):1582-1591.
6. Barberio B, Judge C, Savarino EV, Ford AC. Global prevalence of functional constipation according to the Rome criteria: a systematic review and meta-analysis. *Lancet Gastroenterol Hepatol*. 2021;6(8):638-648.
7. Chu H, Zhong L, Li H, Zhang X, Zhang J, Hou X. Epidemiology characteristics of constipation for general population, pediatric population, and elderly population in China. *Gastroenterol Res Pract*. 2014;532734.
8. Belsey J, Greenfield S, Candy D, Geraint M. Systematic review: impact of constipation on quality of life in adults and children. *Alimentary Pharmacology & Therapeutics*. 2010;31(9):938-949.
9. Tramonte SM, Brand MB, Mulrow CD, Amato MG, O'Keefe ME, Ramirez G. The treatment of chronic constipation in adults. A systematic review. *J Gen Intern Med*. 1997;12:15-24.
10. Paré P, Fedorak RN. Systematic review of stimulant and nonstimulant laxatives for the treatment of functional constipation. *Can J Gastroenterol Hepatol*. 2014;28(10):549-557.
11. Ford AC, Soares NC. Effect of laxatives and pharmacological therapies in chronic idiopathic constipation: systematic review and meta-analysis. *Gut*. 2011;60(2):209-218.
12. Wisten A, Messner T. Fruit and fibre (Pajala porridge) in the prevention of constipation. *Scand J Caring Sci*. 2005;19:71-76.
13. Saygılı U, Bıçak D, Can G, Basibuyuk M, Ghayeb I, Meron T, et al. Constipation. editor. In: Can G, ed. *Consensus 2017-Evidence-Based Palliative Care in a Cancer Patient*. Istanbul: Nobel Medical Bookstore; 2018:87-103.
14. Drouin JS, Pflazer L, Shim JM, Kim SJ. Comparisons between manual lymph drainage, abdominal massage, and electrical stimulation on functional constipation outcomes: a randomized, controlled trial. *Int J Environ Res Public Health*. 2020;17(11):3924.
15. Ghaderi F, Bastani P, Hajebrahami S, Jafarabadi MA, Berghmans B. Pelvic floor rehabilitation in the treatment of women with dyspareunia: a randomized controlled clinical trial. *Int Urogynecol J*. 2019;30(11):1849-1855.
16. Weiss J. Pelvic floor myofascial trigger points: manual therapy for interstitial cystitis and the urgency-frequency syndrome. *J Urol*. 2001;166(6):2226-2231.
17. Vazquez Roque M, Bouras EP. Epidemiology and management of chronic constipation in elderly patients. *Clin Interv Aging*. 2015;10:919-930.
18. Hao J, Remis A, Tang Y, Huang B, Pu Y, Sun Y, Yao Y. Pelvic floor physical therapy for functional constipation in children: a systematic review and meta-analysis. *Pediatr Surg Int*. 2025;41(1):125.
19. Erdrich LM, Reid D, Mason J. Does a manual therapy approach improve the symptoms of functional constipation? a systematic review of the literature. *Int J Osteopath Med*. 2020;36:26-35.
20. Huang SY, Chiao CY, Chien LY. Effectiveness of abdominal massage on chronic constipation in adults: a systematic review and meta-analysis. *Int J Nurs Stud*. 2025;161:104936.
21. Page M, McKenzie J, Bossuyt P, Boutron I, Hoffmann T, Mulrow C, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.
22. Methley AM, Campbell S, Chew-Graham C, McNally R, Cheraghi-Sohi S. PICO, PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. *BMC Health Serv Res*. 2014;14:579.
23. Centre for reviews and dissemination. *Systematic Reviews: CRD's Guidance for Undertaking Reviews in Health Care*. York: University of York; 2006.
24. Mearin F, Lacy BE, Chang L, Chey WD, Lembo AJ, Simren M, et al. Bowel Disorders. *Gastroenterology*. 2016. <https://doi.org/10.1053/j.gastro.2016.02.031>.
25. American Academy of Orthopaedic Manual Physical Therapists. *Orthopaedic manual therapy: description of advanced clinical practice [Internet]*. La Crosse (WI): American Academy of Orthopaedic Manual Physical Therapists; 1999. Available from; <https://www.aacompt.org/>. Accessed May 5, 2025.
26. American Physical Therapy Association. *Guide to physical therapist practice [Internet]*. Alexandria (VA): American Physical Therapy Association; 2020. Available from; <https://www.apta.org/>. Accessed May 7, 2025.
27. Erdrich LM, Reid D, Mason J. Does a manual therapy approach improve the symptoms of functional constipation? a systematic review of the literature. *Int J Osteopath Med*. 2020;36:26-35.
28. Downs S, Black N. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health*. 1998;52:377-384.
29. Ingham J, Jamtvedt G, Raina P. Assessing the methodological quality of nonrandomized intervention studies. *West J Nurs Res*. 2003;25:223-237.
30. Silverman S, Schertz L, Yuen H, Lowman J, Bickel C. Systematic review of the methodological quality and outcome measures utilized in exercise interventions for adults with spinal cord injury. *Spinal Cord*. 2012;50:718-727.
31. Higgins J, Altman D, Gøtzsche P, Jüni P, Moher D, Oxman A, Savovic J, Schulz K, Weeks L, et al. The Cochrane collaboration's tool for assessing risk of bias in randomised trials. *BMJ*. 2011;343:d5928.
32. Wan X, Wang W, Liu J, Tong T. Estimating the sample mean and standard deviation from the sample size, median, range and/or interquartile range. *BMC Med Res Methodol*. 2014;14(1):135.
33. Chapter 6: Choosing effect measures and computing estimates of effect [last updated August 2023]. In: Higgins JPT, Li T, Deeks JJ, eds. *Cochrane Handbook for Systematic Reviews of Interventions version 6.5*. Cochrane; 2024. Available from www.training.cochrane.org/handbook. Accessed May 12, 2025.
34. Chapter 10: Analysing data and undertaking meta-analyses [last updated November 2024]. In: Deeks JJ, Higgins JPT, Altman DG, eds. *Cochrane Handbook for Systematic Reviews of Interventions. Version 6.5*. Cochrane; 2024. Available at: www.training.cochrane.org/handbook. Accessed May 12, 2025.
35. Rubinstein SM, Terwee CB, Assendelft WJJ, de Boer MR, van Tulder MW. Spinal manipulative therapy for acute low-back pain. *Cochrane Database Syst Rev*. 2012;2012(9):CD008880.
36. Gürsen C, Kerem Günel M, Kaya S, Kav T, Akbayrak T. Effect of connective tissue manipulation on symptoms and quality of life in patients with chronic constipation: a randomized controlled trial. *J Manipulative Physiol Ther*. 2015;38(5):335-343.

37. Baran A, Ateş S. The effects of abdominal massage in the management of constipation in elderly people: a randomized controlled study. *Topics in Geriatric Rehabilitation*. 2019;35(2):134-140.
38. Birimoglu Okuyan C, Bilgili N. Effect of abdominal massage on constipation and quality of life in older adults: a randomized controlled trial. *Complement Ther Med*. 2019;47:102219.
39. Orhan C, Özgül S, Baran E, Üzelpasacı E, Akbayrak T. Comparison of connective tissue manipulation and abdominal massage combined with usual care vs usual care alone for chronic constipation: a randomized controlled trial. *J Manipulative Physiol Ther*. 2020;43(8):768-778.
40. Doğan I, Gürşen C, Akbayrak T, Balaban Y, Vahabov C, Üzelpasacı E, et al. Abdominal massage in functional chronic constipation: a randomized placebo-controlled trial. *Phys Ther*. 2022;102(7):pzac058.
41. Aydinli A, Karadağ S. Effects of abdominal massage applied with ginger and lavender oil for elderly with constipation: a randomized controlled trial. *Explore (NY)*. 2023;19(1):115-120.
42. Çetinkaya O, Owayolu Ö. The effect on constipation of abdominal massage applied to the elderly in the nursing home: a randomized controlled experimental study. *Gastroenterol Nurs*. 2024;47(6):413-427.
43. Karaaslan Y, Karakus A, Koc DO, Bayrakli A, Celenay ST. Effectiveness of abdominal massage versus kinesio taping in women with chronic constipation: a randomized controlled trial. *J Neurogastroenterol Motil*. 2024;30(4):501-511.
44. Faghihi A, Zohalinezhad M, Kalyani M. Comparison of the effects of abdominal massage and oral administration of sweet almond oil on constipation and quality of life among elderly individuals: a single-blind clinical trial. *Biomed Res Int*. 2022;9661939.
45. Hasanshahi N, Mirzaei T, Ravari A. Comparative study of the effect of acupressure and abdominal massage on constipation in elderly women: a clinical trial study. *Gastroenterol Nurs*. 2022;45(3):159-166.
46. Martínez-Ochoa MJ, González-Iglesias J, Ricard F, Oliva-Pascual-Vaca Á, Fernández-Domínguez JC, Morales-Asencio JM. Effectiveness of an osteopathic abdominal manual intervention in pain thresholds, lumbopelvic mobility, and posture in women with chronic functional constipation. *J of Altern & Complement Med*. 2018;24(8):816-824.
47. Lämås K, Lindholm L, Stenlund H, Engström B, Jacobsson C. Effects of abdominal massage in management of constipation—a randomized controlled trial. *Int J Nurs Stud*. 2009;46(6):759-767.
48. Koo JP, Choi JH, Kim NJ. The effects of maitland orthopedic manual therapy on improving constipation. *J Phys Ther Sci*. 2016;28(10):2857-2861.
49. Drouin JS, Pfalzer L, Shim JM, Kim SJ. Comparisons between manual lymph drainage, abdominal massage, and electrical stimulation on functional constipation outcomes: a randomized, controlled trial. *Int J Environ Res Public Health*. 2020;17(11).
50. Boonruab J, Poonsuk P, Damjuti W. Effect of court-type thai traditional massage versus senokot treatment on chronic constipation: a randomized controlled trial. *J Evid Based Integr Med*. 2020;25:2515690X20960644.
51. Yıldırım D, Can G, Köknel Talu G. The efficacy of abdominal massage in managing opioid-induced constipation. *Eur J Oncol Nurs*. 2019;41:110-119.
52. Liu Z, Gang L, Yunwei M, Lin L. Clinical efficacy of infantile massage in the treatment of infant functional constipation: a meta-analysis. *Front Public Health*. 2021;9:663581.
53. McClurg D, Hagen S, Hawkins S, Lowe-Strong A. Abdominal massage for the alleviation of constipation symptoms in people with multiple sclerosis: a randomized controlled feasibility study. *Mult Scler*. 2011;17(2):223-233.
54. Yildirim D, Kocatepe V, Talu G. The efficacy of acupressure in managing opioid-induced constipation in patients with cancer: a single-blind randomized controlled trial. *Support Care Cancer*. 2022;30(6):5201-5210.
55. Pasin H, Borges R. Visceral mobilization and functional constipation in stroke survivors: a randomized, controlled, double-blind, clinical trial. *Cureus*. 2020;12(5):e8058.
56. Zhang X, Hu L, Li L, Wang Y, Zhang C, Su J, et al. Pediatric Tuina for functional constipation in children: study protocol for a randomized controlled trial. *Trials*. 2022;23(1):750.
57. Chen H, Tan PS, Li CP, Chen BZ, Xu YQ, He YQ, et al. Acupoint massage therapy alters the composition of gut microbiome in functional constipation patients. *Evid Based Complement Alternat Med*. 2021;2021:1416236.
58. Bromley D. Abdominal massage in the management of chronic constipation for children with disability. *Community Pract*. 2014;87(12):25-29.
59. McClurg D, Hagen S, Hawkins S, Lowe-Strong A. Abdominal massage for the alleviation of constipation symptoms in people with multiple sclerosis: a randomized controlled feasibility study. *Mult Scler*. 2011;17(2):223-233.
60. Hanai A, Ishiguro H, Sozu T, Tsuda M, Arai H, Mitani A, et al. Effects of a self-management program on antiemetic-induced constipation during chemotherapy among breast cancer patients: a randomized controlled clinical trial. *Breast Cancer Res Treat*. 2016;155(1):99-107.
61. Lagrange A, Decoux D, Briot N, Hennequin A, Coudert B, Desmoulins I, et al. Visceral osteopathic manipulative treatment reduces patient reported digestive toxicities induced by adjuvant chemotherapy in breast cancer: a randomized controlled clinical study. *Eur J Obstet Gynecol Reprod Biol*. 2019;241:49-55.
62. Wang QS, Liu Y, Zou XN, Ma YL, Liu GL. Evaluating the Efficacy of Massage Intervention for the Treatment of Post-stroke Constipation: A Meta-Analysis. *Evid Based Complement Alternat Med*. 2020;2020:8934751.
63. Pasin H, Borges RA. Visceral mobilization and functional constipation in stroke survivors: a randomized, controlled, double-blind, clinical trial. *Cureus*. 2020;12(5):e8058.
64. Ying J, Xiao R, Xu L, Yan M. Transcutaneous electrical nerve stimulation (TENS) for opioid-induced constipation in palliative care: a systematic review and network meta-analysis. Emran TB, editor *Evid Based Complement and Alternat Med*. 2023;2023:1-10.