



## Exploring manual therapy in the management of irritable bowel syndrome in adults: A scoping review

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### ARTICLE INFO

#### Keywords:

Irritable bowel syndrome  
Manual therapy  
Physiotherapy  
Osteopathic manipulative treatment

### ABSTRACT

**Introduction:** IBS is a prevalent gut-brain interaction disorder characterized by abdominal pain and altered bowel habits, significantly affecting quality of life (QoL). IBS contributes to substantial work absenteeism and economic burdens and often coexists with other somatic and psychiatric conditions, with psychological well-being being a critical determinant of QoL. IBS sufferers often turn to MT due to dissatisfaction with conventional treatments. However, no comprehensive review has assessed the evidence for MT in treating IBS.

**Objective:** The objective of this review is to identify and map the available evidence on the effects of various manual therapy (MT) techniques on the biopsychosocial functioning, well-being, and QoL of individuals with irritable bowel syndrome (IBS).

**Methods:** A comprehensive search was conducted in PubMed, Embase, and Scopus. Studies involving adults with IBS and investigating the effects of MT on biological, psychological, and social outcomes, well-being, or QoL were included. A scoping review was conducted following PRISMA-ScR guidelines. Study quality was assessed using The National Heart, Lung and Blood Institute (NHLBI) Study Quality Assessment Tools. The protocol for this review was registered with the Open Science Framework and is available at <https://doi.org/10.17605/OSF.IO/QN4WU>.

**Results:** Of 730 records identified, 30 studies met the inclusion criteria (9 trials, 21 reviews). The interventions reviewed included osteopathic manipulative treatment (OMT), acupuncture, acupressure, reflexology, traditional Chinese spinal orthopaedic manipulation, and Tuina. The most frequently assessed outcomes were biological and psychological variables, as well as QoL, with well-being being the least commonly examined.

**Conclusions:** Although the results suggest potential benefits of MT in IBS treatment, they should be interpreted with caution due to the lack of robust trials, inconsistent findings, and occasional adverse events. High-quality

**Abbreviations:** BD, Biological determinants; BDI, Beck Depression Inventory; BSFS, Bristol Stool Form Scale; BSS, Bowel symptom scale; CAM, Complementary and alternative medicine; CG, Control group; CM, Chinese medicine; FBDSI, Functional bowel disorder severity index; FIS, Fatigue Impact Scale; HAD, Hospital Anxiety and Depression Scale; HRV, Heart Rate Variability; IBS, Irritable bowel syndrome; IBS-C, Irritable bowel syndrome with constipation; IBS-D, Irritable bowel syndrome with diarrhea; IBS-QoL, Irritable bowel syndrome quality of life; IBS-SSS, Irritable bowel syndrome symptom severity score; MT, Manual therapy; NHLBI, National Heart, Lung and Blood Institute; OG, Osteopathy group; OMM, Osteopathic manipulative medicine; OMT, Osteopathic manipulative treatment; OMTh, Osteopathic manipulative therapy; PD, Psychological determinants; PRISMA-ScR, Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews; PSS, Perceived Stress Scale; QoL, Quality of life; RCT, Randomized Controlled Trial; SG, Study group; SIR, Symptom improvement rating; ScR, Scoping review; TCSOM, Traditional Chinese spinal orthopedic manipulation; VAS, Visual Analog Scale; WB, Well-being.

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<https://doi.org/10.1016/j.ctim.2025.103136>

Received 5 November 2024; Received in revised form 9 January 2025; Accepted 23 January 2025

Available online 27 January 2025

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randomized controlled trials and standardized outcome measures are necessary to validate these therapies and improve IBS management.

## 1. Introduction

One of the most common disorders of gut-brain interactions worldwide is irritable bowel syndrome (IBS), characterized by abdominal pain and altered bowel habits, such as constipation or diarrhea, in the absence of identifiable organic pathology. It is estimated to affect 1 in 10 people worldwide.<sup>1</sup> IBS significantly impairs quality of life (QoL), which may be influenced more by poor psychological wellbeing than by the severity of gastrointestinal symptoms.<sup>2,3</sup> Individuals may experience reduced productivity in work and social life<sup>3-5</sup> as well as various other somatic comorbidities and mental health problems.<sup>6,7</sup> Due to the heterogeneity of IBS, clinicians sometimes struggle to find the optimal approach to managing the condition.<sup>8,9</sup> From the point of view of the biopsychosocial model,<sup>10</sup> which supports the integration of biological, psychological and social factors in the examination, prevention and treatment of disease,<sup>11</sup> effective treatments of IBS should consider the interaction between those three domains to obtain optimal clinical outcomes.<sup>12</sup> Key psychosocial determinants such as anxiety, depression, stress, coping mechanisms, illness perception, and health-related QoL are crucial. These factors not only contribute to IBS symptoms but also exacerbate them, creating a cycle affecting both physical and psychological well-being. Coping strategies influence symptom management and treatment adherence, while illness perception impacts patient responses to care. QoL reflects the disorder's broad impact, encompassing emotional, physical, and social dimensions. Integrating these determinants aligns with the biopsychosocial approach, promoting a holistic view of health and illness.<sup>8</sup> As current pharmacological treatment can be ineffective and incur significant side effects, resulting in reduced QoL, some sufferers seek alternative treatments.<sup>13</sup>

There is a growing body of literature on the use of manual therapy (MT) in the treatment of IBS.<sup>14-43</sup> MT is a non-invasive treatment that involves various skilled manual techniques aimed at assessing, diagnosing and treating a range of symptoms and conditions. Often referred to as complementary and alternative medicine (CAM), MT is a commonly used treatment for pain, musculoskeletal disorders, joint dysfunction, limited mobility, postural imbalances and soft tissue injuries. It is often used by physiotherapists, osteopaths or chiropractors.<sup>44</sup> Although there are many types of MT, the present review covers mainly osteopathic manipulative treatment (OMT),<sup>14-20,24,25-27,29,31,36,39</sup> acupuncture<sup>20,23,32,33,35,40,42,43</sup> and acupressure,<sup>22</sup> reflexotherapy<sup>20,32,34,37,38,40,41</sup> and Chinese medicine (CM),<sup>28,30</sup> and Tuina.<sup>21</sup>

OMT is a hands-on approach and consists in performing techniques on different anatomical areas to restore a state of normotony between structure and function and support homeostasis in the body through the improvement of physiologic function.<sup>14,20</sup> Acupuncture consists in the application of very fine needles under the skin to restore vital energy. Acupressure is a non-invasive variant of acupuncture in which the practitioners use the fingers, hand, elbows or various devices to stimulate the acupoints based on traditional CM meridian theory. Similar to acupressure, reflexology involves the application of pressure to the feet, hands, or ears corresponding to glands, organs, and body parts.<sup>20,45</sup> Traditional Chinese spinal orthopaedic manipulation (TCSOM) and Tuina are a therapeutic system rooted in Traditional Chinese Medicine. Practitioners of TCSOM use manual interventions targeting the spine to restore balance to the body's systems by addressing spinal imbalances or nervous system dysfunctions.<sup>30</sup> Tuina involve manual massage to stimulate specific areas or acupoints, aiming to promote circulation, enhance blood flow, relax muscles, and support the recovery of soft tissues.<sup>21</sup>

A physical therapist's role in the biopsychosocial approach is crucial, offering minimally invasive care to restore function and promote independence in chronic pain management.<sup>46</sup> This is the first such scoping

review (ScR) to comprehensively assess the available evidence for different types of MT in the treatment of people with IBS. Its aim is to identify and map the existing body of evidence on the effects of various manual techniques on biopsychosocial functioning, well-being and QoL of people with IBS. The following research question was formulated: Does MT improve the biopsychosocial functioning, well-being and QoL of adults with IBS?

## 2. Methods

This ScR was conducted in accordance with the PRISMA-ScR guidelines as outlined by Tricco et al.,<sup>47</sup> with the Joanna Briggs Institute methodology<sup>48,49</sup> serving as a complementary source of methodological guidance. An initial search of PubMed revealed no existing systematic or ScR on the topic. The Participants, Concept, Context framework was used. The protocol for this review was reviewed and finalized by the research team and has been prospectively registered with the Open Science Framework, accessible via the DOI <https://doi.org/10.17605/OSF.IO/QN4WU>.

### 2.1. Eligibility criteria

#### 2.1.1. Participants

The inclusion criteria comprised the following: adult populations, diagnosis of IBS, use of MT. Studies including patients with cancer or pregnancy were excluded.

#### 2.1.2. Concepts

Articles were included if they described the use of MT for the treatment of IBS and investigated at least one of the following outcomes: biological, psychological or social aspects, wellbeing or QoL. Any comparator was eligible, including sham therapy and other treatment modalities.

#### 2.1.3. Context

Adult people treated in all clinical and research settings and geographical locations were considered eligible.

#### 2.1.4. Types of sources

This ScR considered a variety of study designs published in English, including randomised controlled trials (RCTs), non-RCTs, before-after studies, systematic reviews, meta-analyses and literature reviews.<sup>48</sup> Editorials, books, scientific reports, case studies, narrative reviews, conference abstracts, surveys and studies without full text were excluded.

### 2.2. Information sources and literature search

A comprehensive search strategy of published studies was developed with the assistance of a university library information specialist. A preliminary search was performed in PubMed. The following databases were searched PubMed, Embase (Embase.com) and Scopus. Key words in titles and abstracts, medical subject headings - MeSH (PubMed) and Emtree (Embase.com) and index terms used to describe the articles. Duplicates were removed by a library information specialist. All searches were conducted between March 2024 and May 2024. The search strategies for the databases that were used can be found in the Appendix A.

### 2.3. Study selection

Three reviewers (N.P.K., S.M.P. and P.C.) independently screened the titles and abstracts and identified relevant articles that met the inclusion criteria. Disagreements were resolved by discussion with the fourth reviewer (M.W). All identified records were loaded into Microsoft Excel. Initially, titles and abstracts were screened against the inclusion criteria for review. The full text articles were then reviewed using the same discrepancy resolution process.

### 2.4. Data charting and data items

Three independent reviewers (N.P.K., P.C. and S.M.P.) extracted relevant information from the full texts. The studies were divided by type of article, viz. trials and reviews. The following data were extracted: *for review* - country, design, studies reviewed, type of intervention, biological, psychological, social determinants, quality of life and well-being; *for trials* - country, design, sample size, type of intervention, outcomes measures and timepoints, outcomes similar to reviews. Adverse events were assessed. Disagreements were resolved by consensus.

### 2.5. Quality assessment of included studies

The National Heart, Lung and Blood Institute Study Quality Assessment Tools<sup>50</sup> were used to assess the methodological quality of each study, and the results informed the synthesis and interpretation of the findings. Each item in the tools was scored as 'yes', 'no', 'not applicable' or 'not reported', with 'yes' being awarded one point, 'no' and 'not reported' - zero points; 'not applicable' was not included in the total score, thus reducing the maximum score.<sup>51,52</sup> Three independent reviewers (N.P.K., P.C. and S.M.P.) performed the assessment, resolving discrepancies through discussion. A comprehensive narrative report was then produced.

### 2.6. Synthesis

The data were synthesized narratively and presented in a descriptive format, summarizing the findings from both trials and review articles for each type of manual treatment. A comprehensive overview was provided, detailing key results and patterns observed in the studies.

## 3. Results

### 3.1. Literature search

Of the 730 records identified, the search yielded 466 studies after removing duplicates. Finally, 30 articles met the eligibility criteria. The flow diagram has been used to provide a representation of the study selection process, ensuring transparency and clarity in reporting (Fig. 1).

### 3.2. Study characteristics

The included studies were published between August 1975 and May 2024 and were conducted in 14 countries: nine trials and twenty-one reviews (including twelve literature reviews, seven systematic reviews, one meta-analysis, and one combined systematic review and meta-analysis). Most of the studies were rated as poor [N = 13]. The remainder were good [N = 11] or fair [N = 6] (Tables 1 and 2).

### 3.3. Types of manual treatment

The results were grouped by type of therapy, viz. OMT, reflexotherapy, acupuncture, acupressure, TCSOM and Tuina.

The osteopathic approach is variously referred to as OMT, osteopathic manipulative medicine (OMM), osteopathic medicine, osteopathic manipulative therapy (OMTh), osteopathy and visceral therapy. However, the term OMT is used for the purposes of this ScR (Tables 3 and 4).

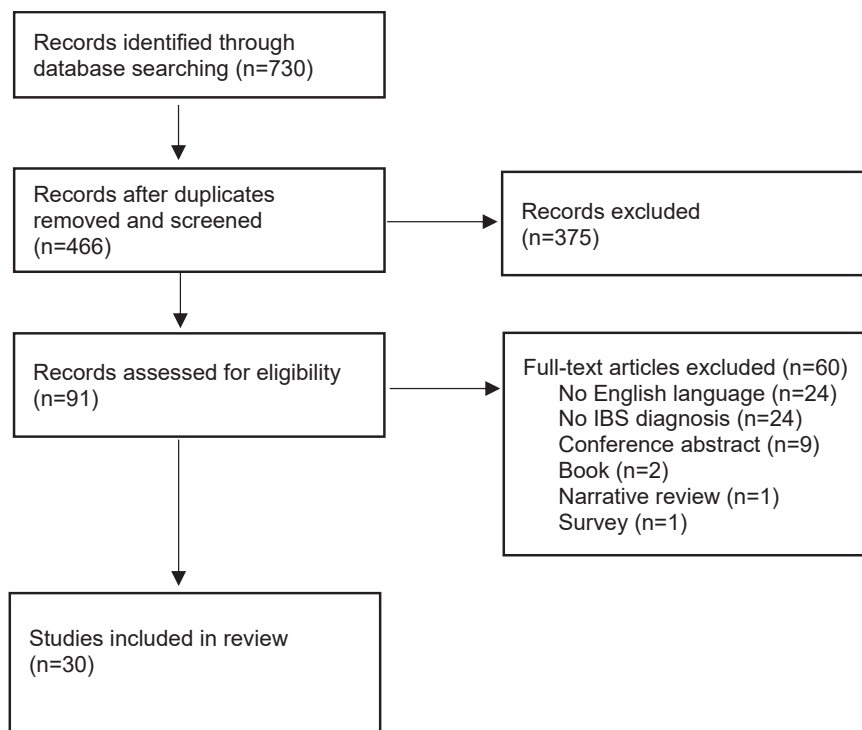


Fig. 1. Flow diagram showing inclusion and exclusion strategy.

**Table 1**  
Quality assessment of the included trials.

Controlled Intervention Studies YES or NO, Other (NR-not reported, NA-not applicable)																
Author, year	1. Was the study described as randomized, a randomized clinical trial, or an RCT?	2. Was the method of randomization adequate (i.e., use of randomization)?	3. Was the treatment allocation concealed (so that assignments could not be predicted)?	4. Were study participants and providers blinded to treatment group assignment?	5. Were the people assessing the outcomes blinded to participants' group assignments?	6. Were the groups similar at baseline on important characteristics that could affect outcomes (e.g., demographics, risk factors, comorbid conditions)?	7. Was the overall drop-out rate from the study at endpoint 20 % or lower of the allocated treatment?	8. Was the differential drop-out rate (between treatment groups) at endpoint 15 percentage points or lower?	9. Was there high adherence to the intervention protocols for each treatment group?	10. Were other interventions avoided or similar in the groups (e.g., similar background treatments)?	11. Were outcomes assessed using valid and reliable measures, implemented consistently across all study participants?	12. Did the authors report that the sample size was sufficiently large to be able to detect a difference in the main outcome between groups with at least 80 % power?	13. Were outcomes reported or subgroups analyzed prespecified (i.e., identified before analyses were conducted)?	14. Were all randomized participants analyzed in the group to which they were originally assigned, i.e., did they use an intention-to-treat analysis?	TOTAL SCORE	QUALITY RATING
Go and Park <sup>22</sup>	YES	NO	NR	NR	NR	YES	NR	NR	YES	YES	YES	YES	YES	NR	50 %	FAIR
Grosjean et al. <sup>25</sup>	YES	YES	NR	NR	NR	YES	NR	NR	NR	YES	YES	NR	NR	NR	36 %	POOR
Xing et al. <sup>28</sup>	YES	NR	NA	NA	NR	YES	YES	YES	YES	NR	YES	NR	YES	YES	67 %	FAIR
Attali et al. <sup>29</sup>	YES	YES	YES	NO	YES	YES	YES	YES	YES	NO	YES	NR	YES	YES	79 %	GOOD
Qu et al. <sup>30</sup>	YES	YES	NA	NA	NR	YES	YES	YES	NR	NR	YES	NR	NR	NR	50 %	FAIR
Florance et al. <sup>31</sup>	YES	YES	YES	YES	YES	YES	YES	YES	YES	NR	YES	NR	YES	YES	86 %	GOOD
Hundscheid et al. <sup>36</sup>	YES	YES	YES	NO	NO	YES	YES	YES	YES	NR	YES	NR	YES	YES	71 %	FAIR
Tovey <sup>38</sup>	YES	YES	YES	YES	NR	YES	YES	YES	YES	NR	YES	YES	YES	YES	86 %	GOOD
Tovey <sup>41</sup>	YES	NO	NR	NO	YES	YES	NR	NR	NR	NO	YES	NR	NO	NR	29 %	POOR

**Table 2**  
Quality assessment of the included reviews.

Systematic Reviews and Meta-analyses YES or NO, Other (NR-not reported, NA-not applicable)										
Author, year	1. Is the review based on a focused question that is adequately formulated and described?	2. Were eligibility criteria for included and excluded studies predefined and specified?	3. Did the literature search strategy use a comprehensive, systematic approach?	4. Were titles, abstracts, and full-text articles dually and independently reviewed for inclusion and exclusion to minimize bias?	5. Was the quality of each included study rated independently by two or more reviewers using a standard method to appraise its internal validity?	6. Were the included studies listed along with important characteristics and results of each study?	7. Was publication bias assessed?	8. Was heterogeneity assessed? (This question applies only to meta-analyses.)	TOTAL SCORE	QUALITY RATING
Gillan et al. <sup>14</sup>	NO	YES	YES	NO	NO	YES	NO	NA	43 %	POOR
Basra et al. <sup>15</sup>	NO	NO	YES	NO	NO	NO	NO	NA	14 %	POOR
Bowes et al. <sup>16</sup>	YES	YES	YES	YES	NO	YES	NO	NA	71 %	FAIR
Lotfi et al. <sup>18</sup>	NO	YES	NO	NO	NO	YES	NO	NA	29 %	POOR
Buffone et al. <sup>17</sup>	NO	YES	YES	YES	YES	YES	YES	YES	88 %	GOOD
Bagagiolo et al. <sup>19</sup>	NO	YES	YES	YES	YES	YES	YES	NA	86 %	GOOD
Amsallem et al. <sup>20</sup>	NO	YES	YES	YES	YES	YES	YES	NA	86 %	GOOD
Bu et al. <sup>21</sup>	YES	YES	YES	YES	YES	YES	YES	NA	100 %	GOOD
Zheng et al. <sup>23</sup>	NO	YES	YES	YES	YES	YES	YES	YES	88 %	GOOD
Slattengren et al. <sup>24</sup>	NO	NR	NR	NR	NR	YES	YES	NA	29 %	POOR
Cicchitti et al. <sup>26</sup>	NO	YES	YES	YES	YES	YES	YES	YES	88 %	GOOD
Müller et al. <sup>27</sup>	YES	YES	YES	YES	YES	YES	YES	NA	100 %	GOOD
Wu <sup>32</sup>	NO	NO	NO	NO	NO	NO	NO	NA	0 %	POOR
Dossett et al. <sup>33</sup>	NO	NO	NO	NO	NO	NO	NO	NA	0 %	POOR
Ernst <sup>34</sup>	YES	YES	YES	NR	YES	YES	NR	NA	71 %	FAIR
Shen and Nahas <sup>35</sup>	NO	NO	NO	NR	NO	YES	NO	NA	14 %	POOR
Hussain and Quigley <sup>37</sup>	NO	YES	NR	NR	NO	NO	NO	NA	14 %	POOR
Asare <sup>42</sup>	NO	NO	NO	NO	NO	NO	NO	NO	0 %	POOR
Manheimer et al. <sup>43</sup>	NO	YES	YES	YES	YES	YES	YES	NO	75 %	GOOD
Potekhina et al. <sup>39</sup>	NO	NO	NO	NO	NO	NO	NO	NA	0 %	POOR
Chang, Chang-Liang 2009 <sup>40</sup>	NO	NO	NO	NO	NO	NO	NO	NA	0 %	POOR

**Table 3**  
Characteristics of the included trials and summary of the findings.

Osteopathic Manipulative Treatment							
Study	Country	Design	Sample (n)	Type of intervention	Outcomes measures and timepoints	Outcomes	Adverse events
Grosjean et al. <sup>25</sup>	France	Double-blind, randomized, sham-controlled, single-centre study	61 (31 micro-physiotherapy, 30 sham micro-physiotherapy)	Micro-physiotherapy	Evaluation based on the outcomes of the physical symptoms. baseline 1 month follow-up after each of 2 sessions	<b>Biological determinants:</b> A significant difference in symptom improvement was found between the two groups after the first session. In the experimental group, 74 % improved after one session of micro-physiotherapy, compared to 38 % in the control group. After the second session, both groups maintained their initial improvements.	None
Attali et al. <sup>29</sup>	France	Prospective monocentric randomized cross-over placebo-controlled study	31 (group A which placebo was applied during phase I and osteopathy during phase II, or to group B which osteopathy was applied during phase I and placebo during phase II)	Visceral osteopathy	Before inclusion: standardized questionnaire for gastrointestinal disorders. Daily: four 10 cm VAS: constipation, diarrhea, abdominal distension, abdominal pain. At the end of the study: clinical and physiological evaluation including colonic transit time measurement, rectal sensitivity and pain quantification by VAS in 9 abdominal segments. Two-question case-finding instrument was used to assess the presence or absence of depression. baseline after osteopathy/placebo at the end the study 1 year follow-up	<b>Biological determinants:</b> Osteopathy significantly reduces self-reported diarrhea (P = 0.016), abdominal distension (P = 0.043), and abdominal pain (P = 0.013) without impacting VAS constipation. After one year, improvements in diarrhea (P = 0.029), abdominal distension (P = 0.001), and abdominal pain (P < 0.001) persist. However, constipation and abdominal distension scores slightly increased (P < 0.05). Osteopathy enhances rectal sensitivity (P < 0.01), but does not significantly affect total or segmental colonic transit time. <b>Psychological determinants:</b> No significant change was observed for depressive symptoms before and after osteopathic or placebo treatment.	None
Florance et al. <sup>31</sup>	France	Randomized sham-controlled study	30 (20 osteopathy, 10 sham osteopathy)	Osteopathy (direct and indirect techniques + visceral osteopathy)	Bristol Stool Form Scale IBS Severity Scoring System (IBS-SSS) Fatigue impact scale (FIS) Beck Depression Inventory (BDI) Hospital Anxiety and Depression Scale (HAD) baseline (day 0) after second session (day 7) 3 weeks follow-up (day 28)	<b>Biological determinants:</b> At day 7, the reduction in IBS severity was significantly greater with osteopathy compared to the sham procedure (P = 0.01), but no significant difference was observed at day 28 (P = 0.8). The average frequency and form of bowel movements were not significantly different. In IBS-D, there was a trend towards greater improvement in stool frequency with osteopathy compared to the sham procedure (P = 0.067). <b>Psychological determinants:</b> Fatigue scores did not	None

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Table 3 (continued)

Osteopathic Manipulative Treatment							
Study	Country	Design	Sample (n)	Type of intervention	Outcomes measures and timepoints	Outcomes	Adverse events
Hundscheid et al. <sup>36</sup>	The Netherlands	Randomized controlled pilot study	36 (19 osteopathy, 17 standard care)	Osteopathy (no specific osteopathic treatment, an individual approach was used)	Abdominal pain, cramps, borborygmi, diarrhea, constipation, meteorism, flatulence, feeling of incomplete evacuation of feces and presence of mucous were scored semiquantitatively on a 5-point Likert scale. IBS Quality of Life (IBS-QOL) FBDSI baseline 1,3 and 6 months follow-up	<p>significantly decrease over time in patients receiving osteopathy. The BDI score did not change significantly at day 7 but decreased significantly at day 28 (<math>P &lt; 0.01</math> vs. day 0, <math>P = 0.05</math> vs. day 7). The HAD score remained unchanged at day 7 but significantly decreased at day 28 (<math>P &lt; 0.01</math> vs. both day 0 and day 7).</p> <p><b>QoL:</b> The improvement in QoL was significantly marked at day 7 in patients treated with osteopathy.</p> <p><b>Biological determinants:</b> Mean symptom score in the osteopathy group (OG) decreased from <math>9.1 \pm 4-7.6 \pm 4.5</math> at 3months, and to <math>6.8 \pm 4</math> at 6months. This did not reach statistical significance.</p> <p><b>Psychological determinants:</b> The mean FBDSI score in the osteopathy group was <math>174 \pm 36</math> at the start and significantly decreased to <math>74 \pm 64</math> at 6 months (<math>P &lt; 0.0001</math>), which was higher compared to standard care.</p> <p><b>QoL:</b> The QoL score showed a significant increase in the OG; <math>111 \pm 22</math>, <math>125 \pm 20</math> at 3 months versus <math>129 \pm 19</math> at 6 months (<math>P &lt; 0.009</math>).</p>	None
Reflexotherapy Tovey <sup>38</sup>	United Kingdom	Single-blind trial	34 (19 "normal practice" with reflexotherapy, 15 control intervention - "normal practice" without reflexotherapy)	Reflexotherapy	Abdominal pain, constipation/diarrhea, bloatedness/abdominal distension were assessed on a five-point scale. baseline (2 weeks before first session) week 10 (after the last session) 3 months after the last session	<p><b>Biological determinants:</b> No significant difference between the impact of reflexology and control on abdominal pain. No change in outcome was recorded at the three-month follow-up. The pattern established with the first symptom is repeated with constipation/diarrhea and bloatedness.</p>	None
Tovey 2002 <sup>41</sup>	United Kingdom	Single-blind trial	34 (19 "normal practice" with reflexotherapy, 15 control intervention - "normal practice" without reflexotherapy)	Reflexotherapy	Health Assessment Sheet (tiredness, personal well-being, overall health) on a five-point scale. baseline (2 weeks before first session) week 10 (after the last session) 3 months after the last session	<p><b>Biological determinants:</b> There was a slight improvement (i.e., participants felt less tired) in both groups in tiredness. However, there was no significant difference in outcome for the two groups. At follow up, benefit had been maintained and slightly extended in both groups.</p> <p><b>Psychological determinants:</b> At the end</p>	None

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Table 3 (continued)

Osteopathic Manipulative Treatment							
Study	Country	Design	Sample (n)	Type of intervention	Outcomes measures and timepoints	Outcomes	Adverse events
Acupressure Go and Park <sup>22</sup>	South Korea	Nonequivalent control group quasi-experimental design	56 (29 auricular acupressure, 27 no treatment)	Auricular acupressure	Bowel Symptom Severity Scale Perceived Stress Scale (PSS-10) Symptom Checklist-90-Revised Heart Rate Variability (HRV) baseline after the intervention (post-test)	<p>of the intervention, both groups showed a slight improvement in overall health assessment, and the difference between the groups was very slight. At follow up the slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p> <p><b>Biological determinants:</b> Before the intervention, bowel symptoms were similar between groups. Afterward, the experimental group showed significant improvements in distress from loose stools (<math>p = .006</math>), diarrhea frequency (<math>p = .048</math>), abdominal pain frequency (<math>p = .017</math>), disability from abdominal pain (<math>p = .018</math>), abdominal discomfort frequency (<math>p = .011</math>), distress from abdominal discomfort (<math>p = .015</math>), and disability from abdominal discomfort (<math>p = .016</math>). They also showed significant gains in HRV values for stress resistance (<math>p = .003</math>), parasympathetic activity (<math>p = .001</math>), and autonomic balance (<math>p = .004</math>), with no significant difference in sympathetic nerve activity.</p> <p><b>Psychological determinants:</b> A statistically significant difference arose after the intervention in stress scores of the experimental group compared with the control group (<math>t = -5.290, p = .001</math>). However, no statistically significant differences emerged after the intervention in mental health scores between groups.</p>	None

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Table 3 (continued)

Osteopathic Manipulative Treatment							
Study	Country	Design	Sample (n)	Type of intervention	Outcomes measures and timepoints	Outcomes	Adverse events
Traditional Chinese Spinal Orthopedic Manipulation							
Xing et al. 2013 <sup>28</sup>	China	RCT	60 (30 manipulation, 30 pharmacotherapy)	Traditional Chinese Spinal Orthopedic Manipulation (TCSOM)	BSS: VAS for: pain/discomfort, bloating, constipation, diarrhea overall severity scale, rate of stool passage, degree which symptoms interfered with activities of daily living Therapeutic evaluation used SIR baseline after the intervention	<b>Biological determinants:</b> The BSS scores in the TCSOM group were significantly lower than those in the control group post-treatment. Symptom rating of the BSS in the TCSOM group indicated more significant improvements than the control group.	None
Qu et al. 2012 <sup>30</sup>	China	RCT	210 (105 manipulation, 105 pharmacotherapy)	Traditional Chinese Spinal Orthopedic Manipulation (TCSOM)	VAS (abdominal pain/discomfort) BSS Therapeutic evaluation used SIR baseline after the intervention	<b>Biological determinants:</b> In the TCSOM group, symptoms disappeared in 72 patients and significantly improved in 33. Post-treatment, the VAS and BSS scores in the TCSOM group were significantly lower than in the control group. TCSOM patients rated their treatment effects higher and showed more significant symptom improvement in the BSS than the control group.	None

### 3.4. Osteopathic manipulative treatment

Most randomized trials found a significant short-term reduction in IBS symptoms, including the severity of diarrhea, bloating and pain, and an improvement in rectal sensitivity.<sup>25,29,31</sup> Only one study by Hundscheid et al.<sup>36</sup> did not confirm a statistically significant reduction in symptoms in patient with IBS. Clinical trials confirmed short- and long-term improvements in QoL<sup>31,36</sup> while psychological improvements, particularly in depression and anxiety scores, were more evident at follow-up.<sup>36</sup>

Three systematic reviews and seven literature reviews on this topic were identified. OMT has been shown improvement in IBS symptoms with reduction in diarrhea, abdominal bloating, abdominal pain, rectal tenderness,<sup>14,24,27</sup> overall symptoms,<sup>18,26</sup> constipation was not significantly affected. In addition, OMT can restore balance to the autonomic nervous system, reduce inflammation and pelvic floor dysfunction, and improve symptoms of chronic constipation.<sup>15</sup> Psychological results are mixed. Cicchitti et al.<sup>26</sup> did not note significant differences between osteopathic treatments and sham procedures, nor did Bowes et al.<sup>16</sup> between depression and anxiety; however, both studies showed a decrease in these psychological measures. Studies have found well-being and QoL to be consistently improved following OMT: Gillan et al.,<sup>14</sup> Basra et al.,<sup>15</sup> Müller et al.<sup>27</sup> and Cicchitti et al.<sup>26</sup> report significantly greater improvements in QoL in the OMT groups compared to control.

### 3.5. Acupuncture

No trials regarding interventions with acupuncture were searched. Eight reviews were included: five literature reviews,<sup>32,33,35,40,42</sup> one systematic review,<sup>20</sup> one meta-analysis<sup>23</sup> and one systematic review with meta-analysis.<sup>43</sup> One found that acupuncture combined with psychotherapy was more effective than psychotherapy alone.<sup>35</sup> Some studies found acupuncture to be superior to other treatments such as antispasmodics, antidiarrheal agents and laxatives,<sup>20</sup>

pharmacotherapy<sup>33,43</sup> and the herbal formula TXYF,<sup>35</sup> but systematic reviews and meta-analyses found no significant differences between acupuncture and sham procedures.<sup>20,23,32,33,35,42,43</sup> Acupuncture improved QoL more than Western medicine and laxatives for up to two months,<sup>23</sup> but other studies showed no significant benefit over sham control for IBS-related QoL.<sup>33,42</sup>

### 3.6. Acupressure

No review article on acupressure was reported and only one quasi-experimental study<sup>22</sup> examined the effect of auricular acupressure on significant improvements in distress caused by loose stools, frequency of diarrhea, frequency and disability caused by abdominal pain, frequency, distress and disability caused by abdominal discomfort. There were also significant differences in HRV levels between groups and a reduction in stress scores in the study group.

### 3.7. Reflexology

A single-blind trial<sup>38,41</sup> was conducted, presenting results from the same study group. No changes in abdominal pain, constipation/diarrhea or bloating were observed in follow-ups.<sup>38</sup> However, improvements in perceived fatigue, general health and well-being were slightly higher in the reflexology group.<sup>41</sup>

Three systematic reviews and two literature reviews describe the effect of reflexology on IBS.<sup>20,32,34,37,40</sup> All refer to the results of an article by Tovey.<sup>41</sup>

### 3.8. Traditional Chinese Spinal Manipulative Treatment

Two RCTs<sup>28,30</sup> with populations treated with TCSOM were identified. Both suggest that TCSOM may be more effective than pharmacotherapy in improving bowel symptoms.

There were no reviews on the use of TCSOM in the treatment of IBS.

**Table 4**  
Characteristics of the included reviews and summary of the findings.

Osteopathic Manipulative Treatment						
Study	Country	Design	Studies reviewed	Type of intervention	Outcomes	Adverse events
Gillan et al. <sup>14</sup>	USA	Literature review	2	OMT	<b>Biological determinants:</b> Significant amelioration of diarrhea, abdominal distention, abdominal pain and rectal sensitivity. Symptom scores of diarrhea remained lower 1 year after the trial compared to enrollment. Significant reduction in severity of IBS on days 7 and 28, corresponding to a 33.7 % and 25.5 % improvement, respectively. <b>QoL:</b> There was a significantly greater improvement in quality of life in the OMT group at day 7 compared to sham.	None
Basra et al. <sup>15</sup>	USA	Literature review	Not reported	OMM	<b>Biological determinants:</b> OMM may restore autonomic nervous system balance, reduce inflammation, alleviate pelvic floor dysfunctions, and improve IBS-C symptoms. Pilot studies indicate that targeting the abdominal viscera can improve chronic constipation. Techniques focusing on the autonomic nervous system may help balance the sympathetic and parasympathetic systems. <b>QoL:</b> OMM may be able to improve quality of life for patients with IBS-C.	Not reported
Bowes et al. <sup>16</sup>	USA	Literature review	1	OMM	<b>Psychological determinants:</b> Depression and anxiety scores decreased with the sham OMM and OMM groups without statistical difference between the two groups.	Not reported
Buffone et al. <sup>17</sup>	Italy	Systematic review	12	OMT	<b>Biological determinants:</b> Two studies using VAS showed significant abdominal pain reduction for the OMT group (74.8 %, $p < 0.0001$ ). Attali et al. found pain reduction in both OMT ( $3.02 \pm 0.59$ , $p = 0.005$ ) and sham ( $3.50 \pm 0.54$ , $p = 0.001$ ) groups, with no significant difference between them. Studies using the IBS severity score favored OMT. A 5-point Likert scale study also favored OMT ( $p = 0.02$ ), but showed no significant intra-group changes. Three of four studies reported significant improvements in diarrhea. Müller et al. found benefits after the last session ( $p = 0.0225$ ) and at follow-up ( $p = 0.0165$ ). Attali et al. observed improvements at week five ( $p = 0.016$ ), week 11 ( $p = 0.003$ ), and one-year follow-up ( $p = 0.029$ ). Hundscheid et al. noted significant differences at six months ( $p = 0.02$ ). Constipation was assessed in two studies. Müller et al. reported significant results after the last session ( $p = 0.0183$ ) and at follow-up ( $p = 0.0080$ ). Attali et al. found significant differences at week five ( $p = 0.022$ ) and week 11 ( $p < 0.001$ ), but not at one-year follow-up.	Slight increase in the severity of the symptoms after the first OMT session which resolved spontaneously, and a brief sensation of fatigue immediately after the intervention.
Lotfi et al. <sup>18</sup>	USA	Literature review	5	OMT	<b>Biological determinants:</b> Statistically significant decrease in short-term and long-term abdominal distension, pain, rectal sensitivity, daily IBS related symptoms. Statistically significant improvement in overall symptoms and intensity of constipation among participants treated with osteopathic therapy compared to the sham group.	None
Baggiolo et al. <sup>19</sup>	Italy	Literature review	1	OMT	<b>Biological determinants and well-being:</b> Osteopathic manipulative treatment, in comparison to sham therapy or standard care, reduced the symptoms of IBS, such as abdominal pain, constipation and diarrhea. <b>Well-being:</b> Improvement in general well-being.	None

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Table 4 (continued)

Osteopathic Manipulative Treatment						
Study	Country	Design	Studies reviewed	Type of intervention	Outcomes	Adverse events
Amsallem et al. <sup>20</sup>	France	Systematic review	1	Osteopathic medicine	<b>Biological determinants:</b> No significant differences in overall IBS symptoms were seen between the osteopathic medicine group and the control group (SMT) at 3-month follow-up. Superiority of osteopathic medicine over SMT at 6-month follow-up ( $p < 0.05$ )	Mild and transient adverse events.
Slattengren et al. <sup>24</sup>	USA	Literature review	Not reported	OMT	<b>Biological determinants:</b> OMT significantly decreased self-reported diarrhea ( $P = .016$ ), abdominal distention ( $P = .043$ ), abdominal pain ( $P = .013$ ), and rectal sensitivity ( $P < .001$ ), but did not significantly affect constipation. In another study both groups (study and control) demonstrated a significant reduction in IBS symptoms, although the OMT group had significantly greater improvement ( $P = .01$ ). At 28 days, however, neither group showed a significant reduction in symptoms.	Not reported
Cicchitti et al. <sup>26</sup>	Italy	Systematic review	3	OMT	<b>Biological determinants:</b> Significant decrease in Functional Bowel Disorder Severity Index in the OMT group compared to standard care. Florance et al.: osteopathic treatment reduced IBS severity by 33 % after 7 days and 25 % after 28 days. Attali et al.: visceral osteopathic manipulation improved IBS symptoms and reduced rectal hypersensitivity; no significant change in colonic transit time. <b>Psychological determinants:</b> No significant difference in psychological aspects (depression and fatigue) between the osteopathic treatment and sham groups at any time point. <b>QoL:</b> Osteopathic treatment improved quality of life; Hundscheid et al. found that after six months, osteopathic treatment significantly improved both the Functional Bowel Disorder Severity Index and the IBSQOL score compared to standard care in IBS patients.	
Müller et al. <sup>27</sup>	Germany	Systematic review	5	OMTh	<b>Biological determinants:</b> As pain levels dropped significantly more in the OMTh group compared to sham (OMTh: 64.5–12.9 and 50.7–33.4; sham: 63.7–49.7 and 56.5–62.3; $P < 0.01$ and $P = 0.02$ , respectively). Rectal sensitivity improved significantly with OMTh ( $P < 0.01$ ), with no change in colonic transit time. The IBS severity score improved more short-term in the OMTh group (300–196) compared to control (275–244; $P = 0.01$ ). At day 28, scores were similar (224 vs 228; $P = 0.8$ ). The Functional Bowel Disorder Severity Index improved significantly in the OMTh group (174–74) versus standard care (171–119; $P = 0.02$ ) over six months. The article reports the results of Müller’s systematic review (see row above).	None
Potekhina et al. <sup>39</sup>	Russian Federation	Literature review	1	OMTh	The article reports the results of Müller’s systematic review (see row above).	None
Amsallem et al. <sup>20</sup>	France	Systematic review	1	Reflexotherapy	<b>Biological determinants:</b> There was a slight improvement (i.e., participants felt less tired) in both groups in tiredness. However, there was no significant difference in outcome for the two groups. At follow up, benefit had been maintained and slightly extended in both groups. <b>Psychological determinants:</b> At the end of the intervention, both groups showed a slight improvement in overall health assessment, and the difference between the groups was very slight. At follow up the	None

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Table 4 (continued)

Osteopathic Manipulative Treatment						
Study	Country	Design	Studies reviewed	Type of intervention	Outcomes	Adverse events
Wu <sup>32</sup>	Hong Kong	Literature review	1	Reflexotherapy	<p>slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p> <p><b>Biological determinants:</b> There was a slight improvement (i.e., participants felt less tired) in both groups in tiredness. However, there was no significant difference in outcome for the two groups. At follow up, benefit had been maintained and slightly extended in both groups.</p> <p><b>Psychological determinants:</b> At the end of the intervention, both groups showed a slight improvement in overall health assessment, and the difference between the groups was very slight. At follow up the slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p>	None
Ernst <sup>34</sup>	United Kingdom	Systematic review	1	Reflexotherapy	<p>slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p> <p><b>Biological determinants:</b> There was a slight improvement (i.e., participants felt less tired) in both groups in tiredness. However, there was no significant difference in outcome for the two groups. At follow up, benefit had been maintained and slightly extended in both groups.</p> <p><b>Psychological determinants:</b> At the end of the intervention, both groups showed a slight improvement in overall health assessment, and the difference between the groups was very slight. At follow up the slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p>	None
Hussain and Quigley <sup>37</sup>	Ireland	Systematic review	1	Reflexotherapy	<p>slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p> <p><b>Biological determinants:</b> There was a slight improvement (i.e., participants felt less tired) in both groups in tiredness. However, there was no significant difference in outcome for the two groups. At follow up, benefit had been maintained and slightly extended in both groups.</p> <p><b>Psychological determinants:</b> At the end of the intervention, both groups showed a slight improvement in overall health assessment, and the difference between the groups was very slight. At follow up the slight improvement had been maintained, with the reflexology group showing the higher level of improvement.</p> <p><b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.</p>	None

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Table 4 (continued)

Osteopathic Manipulative Treatment						
Study	Country	Design	Studies reviewed	Type of intervention	Outcomes	Adverse events
Chang and Chang-Liang <sup>40</sup>	Taiwan	Literature review	1	Reflexotherapy	improvement had increased and the reflexology group had shown the greatest improvement. <b>Biological determinants:</b> There was a slight improvement (i.e., participants felt less tired) in both groups in tiredness. However, there was no significant difference in outcome for the two groups. At follow up, benefit had been maintained and slightly extended in both groups. <b>Psychological determinants:</b> At the end of the intervention, both groups showed a slight improvement in overall health assessment, and the difference between the groups was very slight. At follow up the slight improvement had been maintained, with the reflexology group showing the higher level of improvement. <b>Well-being:</b> A slight improvement in well-being was recorded across both groups; the level of improvement was virtually identical. At follow up, the size of improvement had increased and the reflexology group had shown the greatest improvement.	None
Acupuncture Amsallem et al. <sup>20</sup>	France	Systematic review	4	Acupuncture	<b>Biological determinants:</b> 2 studies: Superiority of acupuncture over antispasmodics, antidiarrheals and laxatives at 3-month and 6-month follow-up (p < 0.05). No significant differences were seen at 12-month follow-up 2 studies: No significant differences were seen between the acupuncture group and the sham procedures group (false acupuncture points) at 3- month follow-up.	Mild and transient adverse events.
Zheng et al. <sup>23</sup>	China	Meta-analysis	40	Acupuncture	<b>Biological determinants:</b> No difference was found between acupuncture and sham controls for improving IBS symptoms. However, some studies showed positive results for true acupuncture. <b>QoL:</b> Acupuncture significantly improved QoL compared to western medicine and osmotic laxatives, both at the end of treatment and at two months follow-up.	The absorbable congestion around eyes after removing needles (1 study), one case of needle fainting which was shortly relieved by warm water (1 study). No other obvious adverse events were reported among all the studies.
Wu <sup>32</sup>	Hong Kong	Literature review	Not reported	Acupuncture	<b>Biological determinants:</b> While some small studies reported benefits, these findings were not supported by sham-controlled studies. A systematic review of six trials found no significant differences between acupuncture and sham treatments. A recent larger trial also showed no significant difference between acupuncture and sham, though both improved more than a waitlist control.	Not reported
Dossett et al. <sup>33</sup>	USA	Literature review	Not reported	Acupuncture	<b>Biological determinants:</b> A Cochrane review of 17 RCTs (1806 subjects) found no superiority of acupuncture over credible sham acupuncture for IBS symptoms. Subgroup analyses suggested acupuncture was more effective than pharmacotherapy or no specific therapy. <b>QoL:</b> no benefit of acupuncture relative to a sham control on IBS-related QoL	None
Shen and Nahas <sup>35</sup>	Canada	Literature review	5	Acupuncture	<b>Biological determinants:</b> One trial involving 100 participants found that combining acupuncture with psychotherapy was more effective than psychotherapy alone. Another trial with 132 participants showed that acupuncture was more effective than the herbal formula TXYF. However, two systematic reviews concluded that there isn't enough evidence	Not reported

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Table 4 (continued)

Osteopathic Manipulative Treatment						
Study	Country	Design	Studies reviewed	Type of intervention	Outcomes	Adverse events
Asare <sup>42</sup>	Sweden	Literature review	Not reported	Acupuncture	to support the idea that real acupuncture provides any additional benefit over a sham treatment for IBS. <b>Biological determinants:</b> A recent meta-analysis of seventeen RCTs concluded that sham-controlled studies showed no benefits of acupuncture over credible sham acupuncture in improving IBS symptoms. <b>QoL:</b> lack of improvement	None
Chang and Chang-Liang <sup>40</sup>	USA	Literature review	Not reported	Acupuncture	<b>Biological determinants:</b> Some studies suggest acupuncture may benefit certain IBS patients by restoring gut physiology, but results are inconsistent.	Not reported
Manheimer et al. <sup>43</sup>	Taiwan	Systematic review and meta-analysis	17	Acupuncture	<b>Biological determinants:</b> The five individual sham-controlled RCTs, and also the pooled analysis, found no statistically significant differences between acupuncture and sham acupuncture on the outcomes of symptom severity or quality of life. <b>Psychological determinants:</b> The five trials that compared acupuncture vs. pharmacological therapies for IBS found that participants receiving acupuncture reported a greater improvement than participants receiving pharmacological therapies.	A total of nine trials included descriptions of adverse events associated with acupuncture. For eight of these nine trials, no serious adverse events were reported, whereas the Shi et al. trial reported that one participant in the electroacupuncture group withdrew because of syncope.
Tuina Bu et al. <sup>21</sup>	China	Systematic review	8	Tuina	<b>Biological determinants:</b> Global symptom improvement: distension, abdominal pain, diarrhea/constipation. Relapse time: At 1 month, one trial reported relapse rates of 6.7 % for the Tuina combined group versus 44.4 % for the trimebutine maleate group, with no significant difference between groups. At 6 months, another trial found relapse rates of 12.5 % for the Tuina group versus 56.4 % for the cisapride group, significantly favoring Tuina (RR 0.22, 95 % CI 0.09–0.53). Symptom relief: One study using a 7-point Likert scale found abdominal pain relief ranging from –1.35 to –0.85. Another study reported an MD of –2.07 for abdominal pain, –1.66 for distension, –1.10 for diarrhea, and –1.67 for constipation using various scales. <b>Psychological determinants:</b> One study reported depression, which was measured by HAMD–24 (–6.70 to –4.30). <b>Social determinants:</b> not reported <b>Well-being:</b> not reported <b>QoL:</b> The addition of Tuina to Trimebutine maleate is associated with a substantial and statistically significant improvement compared to Trimebutine maleate alone.	None

### 3.9. Tuina

There were no trials on the use of Tuina for IBS.

A systematic review<sup>21</sup> was conducted. Global improvement in symptoms such as bloating, abdominal pain and diarrhea/constipation was observed in the Tuina group compared with the control group. Other studies showed included in the systematic review<sup>21</sup> that Tuina significantly reduced relapse rates compared to cisapride at six months and a reduction in depression, and that combined therapy improved QoL.

## 4. Discussion

### 4.1. Impact of MT on the biopsychosocial functioning of people with IBS

While some interventions, such as OMT, showed significant improvements in specific symptoms such as diarrhea, bloating and pain, the overall effects on constipation and psychological outcomes were less consistent. This inconsistency is also evident in other therapies, such as acupuncture and reflexology, where mixed results were found. The variation in results could be due to differences in study design, sample size and subjective reporting of symptoms, which was based on the use of heterogeneous tools which were not always validated. Another critical gap in the reviews is that they fail to note any long-term improvements in symptoms in people with IBS. In addition, many reports lacked

data on the sustainability of these benefits over longer periods of time. Future trials should include follow-up periods of several months or years to provide evidence of the long-term effectiveness and safety of these treatments.

Although social determinants are related to the functioning of people with IBS,<sup>1,5</sup> none of the included papers explored this area. Therefore, the inclusion of social impact assessment would greatly enhance research on IBS by providing a more comprehensive view of the condition. This broader perspective may reveal how IBS affects relationships, work and social activities, helping to tailor more effective, holistic treatment approaches.

#### 4.2. The effects of MT on the well-being of people with IBS

Relatively little data exists on overall wellbeing. Our findings indicate that people with IBS experience lower subjective well-being and overall life satisfaction and furthermore, well-being and happiness are negatively affected by IBS, regardless of levels of anxiety and depression.<sup>53–55</sup> Tovey<sup>41</sup> found reflexology to yield a greater increase in well-being at follow-up compared to a control group. In contrast, Baggiolo<sup>19</sup> mentioned an improvement in overall well-being, but did not report the use of a specific tool to assess well-being or provide information on the duration of these effects.

#### 4.3. The impact of MT on QoL in IBS patients

Both short-term<sup>14</sup> and long-term<sup>26</sup> improvements in QoL have been reported with OMT interventions.<sup>31,36</sup> In contrast, the efficacy of acupuncture for IBS remains inconclusive, with two studies<sup>33,42</sup> failing to demonstrate a significant improvement in QoL, and only one study<sup>23</sup> suggesting some potential benefits. In contrast, Tuina<sup>21</sup> has been shown to have a beneficial effect, particularly when used in conjunction with pharmacotherapy. Notably, studies that reported improvements in QoL associated with OMT also reported improvements in other relevant health determinants.

#### 4.4. Quality assessment of the studies

Almost half of the reviewed papers were rated as low quality, and many trials demonstrated considerable variation in outcome measures, which further complicated the interpretation of the results. In addition, many studies used different questionnaires and scales to assess symptom severity, psychological outcomes and QoL, making it difficult to compare results directly. Hence, it is important that studies use standardised, validated questionnaires to ensure consistency and comparability. This would facilitate more reliable meta-analyses and systematic reviews, and thus to clearer and more generalisable conclusions.

#### 4.5. Strengths and limitations

Although our findings suggest that the use of MT offers potential benefits in the treatment of IBS, they should be interpreted with caution due to the limited number of robust, high-quality clinical trials. The evidence to date includes mixed results, with some studies demonstrating positive outcomes, while others report minimal effects. These inconsistencies highlight significant limitations in current research, including the lack of standardised questionnaires to assess treatment outcomes and variability in study designs. Addressing these gaps requires urgent efforts to conduct well-designed RCTs and adopt comprehensive, patient-centred approaches in future research. Additionally, incorporating comprehensive, patient-centred approaches is crucial to understanding the multifaceted impact of MT on individuals with IBS, considering not only symptom relief but also broader aspects such as mental well-being, daily functioning, and QoL. Establishing standardized protocols and assessment tools will further enable reliable comparisons across studies and provide clearer insights into the safety

and efficacy of CAM.

A key strength of this scoping review is its comprehensive mapping and synthesis of the diverse and heterogeneous literature on manual therapies for IBS. Unlike reviews that focus on individual therapies, this study integrates findings across multiple modalities, offering a holistic understanding of their effects on biopsychosocial outcomes.

## Conclusions

This ScR includes a wide range of MTs used in the management of IBS and provides a holistic overview of interventions. However, none of the articles include an assessment of the impact on the social functioning of this group. The limitations of conventional pharmacotherapy have driven IBS sufferers and gastroenterologists to explore alternative, non-pharmacological treatments. Therefore, there is a need for healthcare providers to understand and integrate alternative practices into care based on the evidence from high quality research.

## CRediT authorship contribution statement

**Magdalena Wrzesińska:** Writing – review & editing, Validation, Supervision, Conceptualization. **Paolo Contu:** Writing – review & editing, Validation, Supervision, Investigation, Formal analysis. **Bogumiła Bruc:** Visualization, Software, Resources, Methodology, Data curation, Conceptualization. **Sara Maria Pani:** Validation, Investigation, Formal analysis. **Natalia Plóciennik-Korycka:** Writing – original draft, Visualization, Project administration, Investigation, Funding acquisition, Formal analysis, Conceptualization.

## Data availability

The underlying data supporting the results of this study are available on request from the corresponding authors.

## Declaration of Competing Interest

Natalia Plóciennik-Korycka declare the financial support provided by National Agency for Academic Exchange for a research trip undertaken for the purpose of working on this article. The financial support has not influenced the content, analysis, or conclusion presented in this article.

## Acknowledgements

This study was supported by the National Agency for Academic Exchange “STER - Internationalisation of Doctoral Schools” Polish Programme, in the project InterEmpowered. Grant No.: BPI/STE/2021/1/00032.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ctim.2025.103136](https://doi.org/10.1016/j.ctim.2025.103136).

## References

- Black CJ, Ford AC. Global burden of irritable bowel syndrome: trends, predictions and risk factors. *Nat Rev Gastroenterol Hepatol*. 2020;17(8):473–486. <https://doi.org/10.1038/s41575-020-0286-8>.
- Weerts ZZRM, et al. Reduction in IBS symptom severity is not paralleled by improvement in quality of life in patients with irritable bowel syndrome. *Neurogastroenterol Motil*. 2023. <https://doi.org/10.1111/nmo.13629>.
- Lenover MB, Shenk MK. Evolutionary medicine approaches to chronic disease: the case of irritable bowel syndrome. *Evol Anthropol*. 2023;33(1). <https://doi.org/10.1002/evan.22010>.
- Canavan C, et al. Review article: the economic impact of the irritable bowel syndrome. *Aliment Pharmacol Ther*. 2014;40(9):1023–1034. <https://doi.org/10.1111/apt.12938>.

5. Ballou S, et al. Effects of irritable bowel syndrome on daily activities vary among subtypes based on results from the IBS in America survey. *Clin Gastroenterol Hepatol*. 2019;17(12):2471–2478. <https://doi.org/10.1016/j.cgh.2019.08.016>.
6. Buono JL, et al. Health-related quality of life, work productivity, and indirect costs among patients with irritable bowel syndrome with diarrhea. *Health Qual Life Outcomes*. 2017;15(1). <https://doi.org/10.1186/s12955-017-0611-2>.
7. Enck P, et al. Irritable bowel syndrome. *Nat Rev Dis Prim*. 2016;2(1). <https://doi.org/10.1038/nrdp.2016.14>.
8. Tanaka Y, Kanazawa M, Fukudo S, Drossman DA. Biopsychosocial model of irritable bowel syndrome. *J Neurogastroenterol Motil*. 2011;17(2):131–139. <https://doi.org/10.5056/jnm.2011.17.2.131>.
9. Paine P. Review article: current and future treatment approaches for pain in IBS. *Aliment Pharmacol Ther*. 2021;54(S1). <https://doi.org/10.1111/apt.16550>.
10. Engel GL. The need for a new medical model: a challenge for biomedicine. *Psychodyn Psychiatry*. 2012;40(3):377–396. <https://doi.org/10.1521/pdps.2012.40.3.377>.
11. Havelka M, Lucanin JD, Lucanin D. Biopsychosocial model - the integrated approach to health and disease. *Coll Antropol*. 2009;33(1):303–310.
12. Adams LM, Turk DC. Psychosocial factors and central sensitivity syndromes. *Curr Rheumatol Rev*. 2015;11(2):96–108. <https://doi.org/10.2174/1573397111666150619095330>.
13. Grundmann O, Yoon SL. Complementary and alternative medicines in irritable bowel syndrome: an integrative review. *World J Gastroenterol*. 2014;20(2):346–362. <https://doi.org/10.3748/wjg.v20.i2.346>.
14. Gillan R, Bachtel G, Webber K, et al. Osteopathic manipulative treatment for chronic inflammatory diseases. *J Evid Based Med*. 2024;17(1):172–186. <https://doi.org/10.1111/jebm.12590>.
15. Basra M, Patel H, Stern-Harbutte A, et al. A narrative review on the viability of osteopathic manipulative medicine in treating irritable bowel syndrome with constipation (IBS-C). *Cureus*. 2024. <https://doi.org/10.7759/cureus.54180>.
16. Boves MR, Speicher MR, Tran LT, et al. Osteopathic manipulative medicine and its role in psychiatry. *Cureus*. 2023. <https://doi.org/10.7759/cureus.47045>.
17. Buffone F, Tarantino AG, Belloni F, et al. Effectiveness of osteopathic manipulative treatment in adults with irritable bowel syndrome: a systematic review and meta-analysis. *Healthcare*. 2023;11(17):2442. <https://doi.org/10.3390/healthcare11172442>.
18. Lotfi C, Blair J, Jumrukovska A, Grubb M, et al. Effectiveness of osteopathic manipulative treatment in treating symptoms of irritable bowel syndrome: a literature review. *Cureus*. 2023. <https://doi.org/10.7759/cureus.42393>.
19. Baggiolo D, Rosa D, Borrelli F. Efficacy and safety of osteopathic manipulative treatment: an overview of systematic reviews. *BMJ Open*. 2022;12(4). <https://doi.org/10.1136/bmjopen-2021-053468>.
20. Amsallem F, Sanchez S, Armoiry X, et al. Effectiveness of non-pharmacological interventions for irritable bowel syndrome: a systematic review. *Evid Based Complement Altern Med*. 2021;2021:1–10. <https://doi.org/10.1155/2021/4404185>.
21. Bu F, Han M, Lu C, et al. A systematic review of Tuina for irritable bowel syndrome: recommendations for future trials. *Complement Ther Med*. 2020;52, 102504. <https://doi.org/10.1016/j.ctim.2020.102504>.
22. Go GY, Park H. Effects of auricular acupressure on women with irritable bowel syndrome. *Gastroenterol Nurs*. 2020;43(2). <https://doi.org/10.1097/sga.0000000000000332>. E34.
23. Zheng H, Chen R, Zhao X, et al. Comparison between the effects of acupuncture relative to other controls on irritable bowel syndrome: a meta-analysis. *Pain Res Manag*. 2019;2019:1–13. <https://doi.org/10.1155/2019/2871505>.
24. Slattengren AH, Nissly T, Blustin J, Bader A, Westfall E. Best uses of osteopathic manipulation. *J Fam Pract*. 2017;66(12):743–747. <https://pubmed.ncbi.nlm.nih.gov/29202144/>.
25. Grosjean D, Benini P, Carayon P. Managing irritable bowel syndrome: the impact of micro-physiotherapy. *J Complement Integr Med*. 2017;14(2). <https://doi.org/10.1515/jcim-2015-0044>.
26. Cicchitti L, Martelli M, Cerritelli F. Chronic inflammatory disease and osteopathy: a systematic review. *PLoS One*. 2015;10(3). <https://doi.org/10.1371/journal.pone.0121327>.
27. Müller A, Franke H, Resch K, Fryer G. Effectiveness of osteopathic manipulative therapy for managing symptoms of irritable bowel syndrome: a systematic review. *J Osteopath Med*. 2014;114(6):470–479. <https://doi.org/10.7556/jaoa.2014.098>.
28. Xing L, Qu L, Chen H, Gao S. A clinical observation of irritable bowel syndrome treated by traditional Chinese spinal orthopedic manipulation. *Complement Ther Med*. 2013;21(6):613–617. <https://doi.org/10.1016/j.ctim.2013.09.005>.
29. Attali T, Bouchoucha M, Benamouzig R. Treatment of refractory irritable bowel syndrome with visceral osteopathy: short-term and long-term results of a randomized trial. *J Dig Dis*. 2013;14(12):654–661. <https://doi.org/10.1111/1751-2980.12098>.
30. Qu L, Xing L, Norman W, Chen H, Gao S. Irritable bowel syndrome treated by traditional Chinese spinal orthopedic manipulation. *J Tradit Chin Med*. 2012;32(4):565–570. [https://doi.org/10.1016/s0254-6272\(13\)60072-2](https://doi.org/10.1016/s0254-6272(13)60072-2).
31. Florance BM, Frin G, Dainese R, et al. Osteopathy improves the severity of irritable bowel syndrome: a pilot randomized sham-controlled study. *Eur J Gastroenterol Hepatol*. 2012;24(8):944–949. <https://doi.org/10.1097/MEG.0b013e3283543eb7>.
32. Wu JC. Complementary and alternative medicine modalities for the treatment of irritable bowel syndrome: facts or myths? *Gastroenterol Hepatol (N Y)*. 2010 Nov;6(11):705–711.
33. Dossett ML, Cohen EM, Cohen J. Integrative medicine for gastrointestinal disease. *Prim Care*. 2017;44(2):265–280. <https://doi.org/10.1016/j.pop.2017.02.002>.
34. Ernst E. Is reflexology an effective intervention? A systematic review of randomised controlled trials. *Med J Aust*. 2009;191(5):263–266. <https://doi.org/10.5694/j.1326-5377.2009.tb02780.x>.
35. Shen YH, Nahas R. Complementary and alternative medicine for treatment of irritable bowel syndrome. *Can Fam Physician*. 2009;55(2):143–148.
36. Hundscheid HW, Pepels MJ, Engels LG, Loffeld RJ. Treatment of irritable bowel syndrome with osteopathy: results of a randomized controlled pilot study. *J Gastroenterol Hepatol*. 2007;22(9):1394–1398. <https://doi.org/10.1111/j.1440-1746.2006.04741.x>.
37. Hussain Z, Quigley EM. Systematic review: complementary and alternative medicine in irritable bowel syndrome. *Aliment Pharmacol Ther*. 2006;23(4):465–471. <https://doi.org/10.1111/j.1365-2036.2006.02776.x>.
38. Tovey P. A single-blind trial of reflexology for irritable bowel syndrome. *Br J Gen Pract*. 2002;52(474):19–23.
39. Potekhina Y, Tregubova E, Mokhov D. Osteopathy is a new medical specialty. Assessment of clinical effectiveness of osteopathic manipulative therapy in various diseases. *Med N North Cauc*. 2018;13(3). <https://doi.org/10.14300/mnnc.2018.13105>.
40. Chang FY, Lu CL. Treatment of irritable bowel syndrome using complementary and alternative medicine. *J Chin Med Assoc*. 2009;72(6):294–300. [https://doi.org/10.1016/S1726-4901\(09\)70375-2](https://doi.org/10.1016/S1726-4901(09)70375-2).
41. Tovey P. The effect of reflexology on the perceived health and well-being of patients with irritable bowel syndrome. *Prim Health Care Res Dev*. 2002;3(3):169–175.
42. Asare F, Störsrud S, Simrén M. Meditation over medication for irritable bowel syndrome? On exercise and alternative treatments for irritable bowel syndrome. *Curr Gastroenterol Rep*. 2012;14(4):283–289. <https://doi.org/10.1007/s11894-012-0268-2>.
43. Manheimer E, Wieland LS, Cheng K, et al. Acupuncture for irritable bowel syndrome: systematic review and meta-analysis. *Am J Gastroenterol*. 2012;107(6):835–848. <https://doi.org/10.1038/ajg.2012.66>.
44. Clar C, Tsertsvadze A, Court R, et al. Clinical effectiveness of manual therapy for the management of musculoskeletal and non-musculoskeletal conditions: systematic review and update of UK evidence report. *Chiropr Man Ther*. 2014;22(1):12. <https://doi.org/10.1186/2045-709X-22-12>.
45. Yeung W, Chung K, Poon MM, et al. Acupressure, reflexology, and auricular acupressure for insomnia: a systematic review of randomized controlled trials. *Sleep Med*. 2012;13(8), 971984. <https://doi.org/10.1016/j.sleep.2012.06.003>.
46. Edgerton K, Hall J, Bland MK, et al. A physical therapist's role in pain management: a biopsychosocial perspective. *J Appl Biobehav Res*. 2019;24(2). <https://doi.org/10.1111/jabr.12170>.
47. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med*. 2018;169(7):467–473. <https://doi.org/10.7326/M18-0850>.
48. Peters MDJ, Godfrey C, McInerney P, et al. Chapter 11: Scoping reviews (2020 version). In: Aromataris E, Munn EZ, eds. *JBI Manual for Evidence Synthesis*. JBI; 2020. <https://doi.org/10.46658/JBIMES-20-12>. Available from: <https://synthesismanual.jbi.global>.
49. Peters MDJ, Marnie C, Tricco AC, et al. Updated methodological guidance for the conduct of scoping reviews. *JBI Evid Synth*. 2020;18(10):2119–2126. <https://doi.org/10.11124/JBIES-20-00167>.
50. NHLBI. *Study Quality Assessment Tools*. <https://www.nhlbi.nih.gov/health-t-opics/study-quality-assessment-tools>. Accessed 3 Aug 2024.
51. Torres-Castro R, Vasconcello-Castillo L, Alsina-Restoy X, et al. Respiratory function in patients post-infection by COVID-19: a systematic review and meta-analysis. *Pulmonology*. 2021;27(4):328–337. <https://doi.org/10.1016/j.pulmoe.2020.10.013>.
52. Starzec-Proserpio M, Bardin MG, Morin M. Not all lasers are the same: a scoping review evaluating laser therapy for vulvodynia. *Sex Med Rev*. 2023;12(1):14–25. <https://doi.org/10.1093/sxmrev/qaad039>.
53. Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS. Comparative efficacy of psychological therapies for improving mental health and daily functioning in irritable bowel syndrome: a systematic review and meta-analysis. *Clin Psychol Rev*. 2017;51:142–152. <https://doi.org/10.1016/j.cpr.2016.11.001>.
54. Fond G, Loundou A, Hamdani N, et al. Anxiety and depression comorbidities in irritable bowel syndrome (IBS): a systematic review and meta-analysis. *Eur Arch Psychiatry Clin Neurosci*. 2014;264(8):651–660. <https://doi.org/10.1007/s00406-014-0502-z>.
55. Farhadi A, Banton D, Keefer L. Connecting our gut feeling and how our gut feels: the role of well-being attributes in irritable bowel syndrome. *J Neurogastroenterol Motil*. 2018;24(2):289–298. <https://doi.org/10.5056/jnm17117>.