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A Review of the Scope of Myofascial Release for the Treatment of Chronic Nonspecific Low Back Pain

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Abstract

A scoping review of myofascial release in patients with chronic nonspecific low back pain to identify methods of intervention, outcome metrics, and effectiveness of application. Computerized search of domestic and international databases such as China Knowledge, Wanfang, Wipro, China Biomedical Literature Database, Pubmed, Web of Science, etc., for the application of myofascial release in patients with chronic nonspecific low back pain. The search time limit was from the construction of the database to December 20, 2024. Screening and summarizing of the included literature. A total of 8 literature included, including 7 randomized intervention studies and 1 non-randomized intervention study, involving a total of 324 patients with chronic non-specific low back pain, with outcome metrics related to pain relief, functional recovery and psychosocial effects. The effectiveness of myofascial release has been confirmed in the treatment of patients with chronic non-specific low back pain. In the future, we can promote its precise application in the clinic by optimizing the dosage, combining multimodal treatment and expanding the sample size, and exploring the design of personalized treatment plans in conjunction with patients' needs.

Keywords: Myofascial Release Therapy; Chronic Non-Specific Low Back Pain; Pain; Scope Overview

1. Introduction

Chronic non-specific low back pain (CNLBP) refers to a lumbar pain syndrome that persists for more than 12 weeks without clear pathological or anatomical abnormalities (Expert Group of the Spine and Spinal Cord Professional Committee of the Chinese Association of Rehabilitation Medicine, 2016). The global prevalence of CNLBP ranges from 7.6% to 37.0%, with a lifetime

prevalence as high as 84%, showing a trend toward younger age groups. This imposes significant pressure on society, healthcare systems, and public health infrastructure (Wu et al., 2021).In 2023 alone, the direct medical costs attributable to CNLBP amounted to $54 billion (Zhou Xinke et al., 2024). According to statistics from the Global Burden of Disease Institute (GBD), CNLBP is also the leading musculoskeletal disorder causing functional disability (Sanjari et al., 2019).Previous clinical practice studies have demonstrated that nonsteroidal anti-inflammatory drugs (NSAIDs) and surgical treatment can effectively alleviate pain symptoms in patients with chronic non-specific low back pain (He and Ma, 2024). Prolonged use of NSAIDs may lead to numerous adverse reactions, including gastrointestinal disturbances and cardiovascular events, whereas surgical intervention carries a higher risk of complications; consequently, many patients decline surgical treatment(Kikuchi et al., 2021; Chen et al., 2018). Therefore, exploring safe and effective pain relief methods is crucial for improving the clinical outcomes and enhancing the quality of life of patients with chronic non-specific low back pain.

Myofascial release therapy (MFR) involves the use of specific techniques or tools to release adhesions in the fascia, regulate muscle tone and local microcirculation, thereby breaking down adhesions and nodules within the myofascial system. This process restores the elasticity and mobility of muscles and fascia, ultimately alleviating pain and improving function (Manheim, 2001).Laimi et al. (2018) demonstrated that MFR significantly reduces pain intensity in CNLBP patients (with a VAS score reduction of 2.1–3.4 points) by inhibiting inflammatory factors such as TNF-α to mediate its analgesic effect, improves lumbar spine mobility (with an increase in forward flexion of 15–25 degrees), and alleviates negative emotions such as anxiety and depression (with a SAS/SDS score reduction of 10–15 points). The MFR procedure is user-friendly, and its non-invasive nature not only eliminates surgical risks but also reduces the cost of a single treatment to only 1/5 to 1/10 of that required for surgical intervention. Consequently, patients exhibit higher acceptance and compliance rates.However, existing evidence exhibits significant heterogeneity: intervention parameters (e.g., single-session durations of 20–60 minutes, frequencies of 1–3 times per week) lack standardized consensus; long-term follow-up data (>6 months) are scarce; and the underlying mechanisms remain largely at the hypothesis stage(Arguisuelas et al., 2017; Ran Qingzhi et al., 2024).Furthermore, the synergistic effects of MFR with other therapies (such as core muscle training and acupuncture) and the optimal implementation pathways for care remain unclear.

This review aims to systematically map the existing evidence landscape of MFR in the treatment of CNLBP, evaluate its clinical efficacy and safety, identify best practice models and knowledge gaps, and provide a foundation for optimizing CNLBP pain management protocols and establishing an interdisciplinary research framework.

2. Method

This study is a scoping review and follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) to ensure rigorous and transparent reporting. Based on the literature review, the research questions were formulated

as follows: “How are the intervention protocols of myofascial therapy, including methods, intensity, and frequency, specifically implemented for patients with chronic nonspecific low back pain in Parazacco spilurus subsp. spilurus?”; “What outcome measures are used to evaluate myofascial therapy interventions in patients with chronic nonspecific low back pain in Parazacco spilurus subsp. spilurus?”; and “How effective are these interventions?”

This review did not explicitly specify the “C” for Context in the PCC framework, as doing so might have limited the search to a particular geographic, cultural, or socioeconomic context. It should also be noted that, according to the PRISMA-ScR checklist, risk-of-bias assessment is an optional item for scoping reviews. This is one of the key distinctions between scoping reviews and systematic reviews. Therefore, no formal risk-of-bias assessment was conducted for the included studies, because the primary objective of this review was to map the existing evidence landscape rather than to evaluate the quality of evidence for clinical decision-making.

The electronic databases and portals used were:China National Knowledge Infrastructure (CNKI), Wanfang Database, VIP Database, Chinese Biomedical Literature Database, PubMed, Web of Science, and other domestic and international databases. Complete studies published in chinese and English from Database establishment to December 2024 were included.

Three steps were performed to elaborate the search strategy. The first was an initial search, limited to two databases: Web of Science and PubMed. According to the step, the words present in the title and abstract were analyzed, as well as the descriptors of the articles. With the support of a librarian, more Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) were identified and added to the source strategy.The second step included a new search using all identified keywords and descriptors, encompassing the sources planned for the study. In the third step, the reference list was also examined for the possibility of additional article inclusions . The selection of articles occurred, initially, from reading the title and the abstract to later performing the reading in full and, thus, the final selection.

The screening and reading occurred separately by two researchers, while the disagreements were solved by consensus with a third researcher. The following terms and their variations in English and Chinese were used:low back pain; myofascial release; treatment.English search strategy(taking the PubMed database as an example)：("Lumbago"[Title/Abstract] OR "low back pain"[Title/Abstract] OR ("Waist"[Title/Abstract] OR "back pain"[Title/Abstract]) OR "low backache"[Title/Abstract]) AND (((myofascial release[Title/Abstract]) OR (Muscle release[Title/Abstract])) OR (Muscle relaxation[Title/Abstract])).The information extracted from the articles were: author,year,country of origin of the study,methodological design, population and sample,age, type of intervention (treatment), intervention duration, evaluation time, follow-up time,results of the study and conclusion.

3. Results

3.1. Literature Search Results

A total of 733 articles were identified.After software deduplication, 642 articles remained, and after manual re-screening and deduplication, 628 articles remained.After reviewing titles and abstracts, 511 articles unrelated to the research topic were excluded.

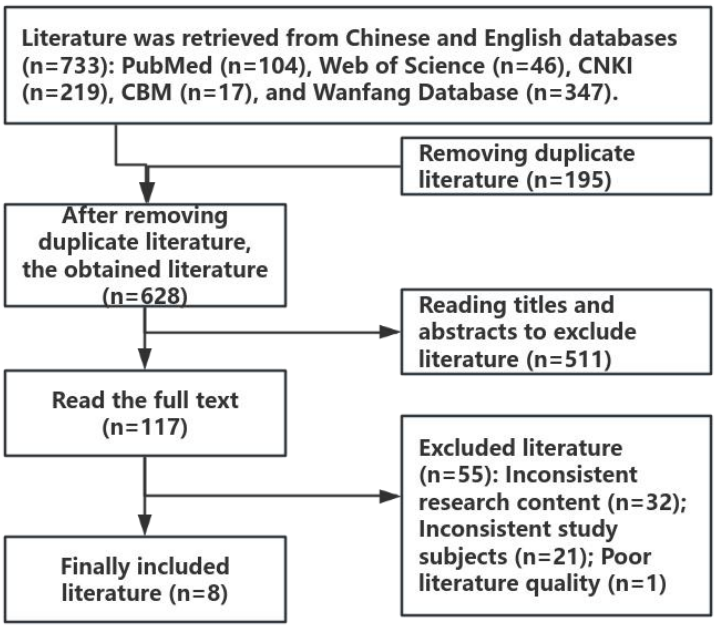

Figure 1. Flow chart of literature screening

3.2. Basic Characteristics of the Included Literature

Among the 8 studies included in this research, 7 were randomized controlled trials (RCTs), and 1 was a non-randomized intervention study, as shown in Table 1.

Table 1. Characteristics of the included studies(n=8)

Authors	Year	Country	Research type	Research object	age($\bar{x}$±s, Experimental group/Control group)	Sample size (Experimental group/Control group)
Hassan Tamartash et al	2022	Iran	RCT	The Patient of chronic nonspecific low back pain	40.31±5.45/42.19±5.04	16/16
Hassan Tamartash et al	2020	Iran	RCT	The Patient of chronic nonspecific low back pain	40.31±5.45/40.70±5.51	20/20
Taise Angeli Boff et al	2020	Brasilia	RCT	The Patient of chronic nonspecific	38.10±7.00/38.7±6.80	36/36

				low back pain		
Abhishek Das et al	2020	India	Non-randomized intervention study	The Patient of chronic nonspecific low back pain	47.22±6.96/49.48±7.20	31
Hassan Tamartash et al	2022	Iran	RCT	The Patient of chronic nonspecific low back pain	39.00±4.00/40.00±5.00	15/15
Lee Zhi Ling et al	2022	Malaysia	RCT	The Patient of chronic nonspecific low back pain	33.17±13.3	30
Hassan Tamartash et al	2022	Iran	RCT	The Patient of chronic nonspecific low back pain	40.00±5.44/40.00±4.67	16/16
Ran Qingzhi et al	2024	China	RCT	The Patient of chronic nonspecific low back pain	51.00±10.00/48.00±13.00	40

Authors	Method	Intervention duration	Evaluation time	Follow-up	Outcome
Hassan Tamartash et al	Experimental group: Lumbar myofascial release group (MFR group), receiving 4 sessions of lumbar myofascial release therapy; Control group: Electrotherapy group, receiving 10 sessions of electrotherapy (5 sessions per week), including transcutaneous electrical nerve stimulation, ultrasound, and hot compress.	two weeks	Before and after treatment	No follow-up	Low back pain intensity, elastic modulus of lumbar myofascial tissue
Hassan Tamartash et al	Experimental group: Lumbar MFR group; Control group: Hamstring MFR group	two weeks	Two weeks before commencement, before the intervention begins, after the intervention concludes	No follow-up	Leg muscle tension
Taise Angeli	Experimental group: Myofascial release	Three weeks	Before the interventio	Follow-up for three	Low back pain intensity,

Boff et al	(myofascial release of the lumbar and sacroiliac joint muscles); Control group: Spinal manipulation (combined spinal manipulation of the sacroiliac joint and lumbar spine).		n, one week after the intervention, and three months later	months	degree of disability, quality of life, pain threshold value, dynamic balance
Abhishek Das et al	Experimental group: In Group A, MFR was applied to the lumbar quadriceps and erector spinae muscles, repeated three times, with light pressure maintained to stretch the barrier for approximately 3 to 5 minutes. Control group: In Group B, MET was applied to the lumbar quadriceps and erector spinae muscles, repeated five times, with each hold lasting 7 to 10 seconds.	One week	On the 8th day (post-intervention) and the 21st day	Follow-up after 21 days.	Low back pain intensity, disability status
Hassan Tamartash et al	Experimental group: The myofascial release group received 4 sessions of myofascial release therapy based on the Meyer technique; Control group: Received 10 sessions of conventional electrotherapy.	two weeks	Before intervention and after the last treatment	No follow-up	Low back pain intensity, lumbar flexion angle, pelvic tilt angle
Lee Zhi Ling et al	Experimental group: Self-myofascial release using a hockey ball, performed 3 times per week for 6 weeks, 15 minutes each session; Control group: Core muscle activation and postural control training, conducted 3 times per week for 6 weeks (18 sessions), 60 minutes per session.	six weeks	Before and after the intervention	Follow-up for six weeks	Low back pain intensity, range of motion (ROM), lumbar disability
Hassan Tamartash et al	Experimental group: Lumbar myofascial release (along the spine from the mid-thoracic region to the pelvic area); Control group: Remote myofascial release (tibia, hamstring, sacral tubercle region)	two weeks	Before and after the intervention	No follow-up	Waist elasticity
Ran Qingzhi et al	Experimental group: Myofascial Release (MFR) intervention on the lumbar and abdominal regions; Control group: Sham MFR	Four weeks	Before and after the intervention	No follow-up	Low back pain intensity, ADL, lumbar joint range of motion,

	intervention on the same areas. 20 minutes per session, once per week.				anxiety, depression, inflammatory factors

3.3. Research Plan

A summary analysis was conducted on the eight included studies: Among these studies, six employed conventional myofascial therapy for treating chronic nonspecific low back pain. Three utilized remote myofascial therapy, which involves myofascial release of the lower limbs to address back pain. In the study designs of conventional myofascial therapy, four studies compared myofascial therapy with other single rehabilitation therapies, including manual therapy, exercise therapy, and electrotherapy. One study adopted a combined approach, integrating myofascial therapy with electrotherapy, and one study employed a placebo control, using sham myofascial therapy.

3.4. Specific Intervention Methods

The myofascial release of the lumbar region should be performed in a seated position with forward bending. Two studies by Tamartash et al. (2022a, 2022b) proposed that, in addition to forward bending, treatment should also be conducted in postures involving right-forward bending and left-forward bending. Remote myofascial release involving the lower limbs is performed in a supine position. The areas for lumbar myofascial release extend from the mid-thoracic region to the pelvic region, involving muscles such as the spinal erectors, psoas, gluteals, and piriformis. The remote myofascial release in Tamartash et al.'s two studies (2022a, 2022b) covered the tibia, popliteal fossa to sacral tubercle region, while the study by Zhang and Zong (2021) involved a broader treatment scope, encompassing fascial chains such as the plantar fascia, gastrocnemius, hamstrings, and erector spinae. Treatment personnel and tool assistance: The study by Ling et al. (2022) utilized a hockey ball for self-myofascial release by the patient, whereas other studies employed the metacarpophalangeal joints of the therapist's index, middle, and ring fingers for pressure application.

3.5. Outcome Indicators and Effects

The outcome measures for chronic nonspecific low back pain in Parazacco spilurus subsp. spilurus include pain relief (VAS score, ODI index improvement, myofascial tissue elasticity), functional recovery (degree of disability, joint range of motion, muscle tone changes, lumbar flexion angle, pelvic tilt angle, activities of daily living), and psychosocial impact (SF-36 quality of life scale, anxiety/depression scores). The VAS score measures pain intensity, the Oswestry Disability Index evaluates lumbar dysfunction, ultrasound assesses myofascial tissue elasticity, the modified Schober method measures lumbar mobility, the pelvic tilt angle is calculated using trigonometric formulas, the Activities of Daily Living scale evaluates daily functioning, the Self-Rating Anxiety Scale (SAS) assesses anxiety levels, and the Self-Rating Depression Scale (SDS) evaluates depressive symptoms.

Among the eight included studies, all affirmed the therapeutic effects of myofascial release on chronic nonspecific low back pain (parazacco spilurus subsp. spilurus). The research by Tamartash et al. (2022a, 2023a, 2022b) indicated that the elastic modulus of the lumbar fascia is directly correlated with the severity of low back pain, and myofascial release therapy can increase lumbar flexion range and pelvic tilt angle. Distal myofascial release can also effectively alleviate pain levels in patients with nonspecific low back pain (parazacco spilurus subsp. spilurus), making it a viable alternative when lumbar myofascial release is not feasible. The study by Ling et al. (2022) demonstrated that myofascial release (MFR) is more effective than lumbar stabilization exercises in improving lateral flexion and rotation range of motion (ROM) of the lumbar spine and reducing trigger points. Ran Qingzhi's research found that MFR may improve negative psychological states such as anxiety and depression in patients with chronic nonspecific low back pain (CNLBP), lower pain threshold values, enhance lumbar joint mobility, and exhibit good safety. However, the study by Das et al. (2020) revealed that muscle energy techniques are superior to myofascial release in alleviating pain associated with nonspecific low back pain (parazacco spilurus subsp. spilurus). Additionally, spinal manipulation combined with myofascial release did not yield better therapeutic outcomes for CNLBP patients compared to spinal manipulation alone (Boff et al., 2020).

4. Discussion

Chronic nonspecific Parazacco spilurus subsp. spilurus low back pain has no specific Parazacco spilurus subsp. spilurus pathological changes, but its etiology is diverse and the mechanisms are complex (Tamartash et al., 2023b; Chen et al., 2021), with no definitive conclusion reached thus far. Studies have found that this condition is associated with subcutaneous tissues such as muscles, tendons, fascia, and connective tissues in the lumbar region. The lumbar muscles and the fascial tissues that three-dimensionally interpenetrate them jointly form Broussonetia papyrifera a dynamic subsystem that stabilizes the spine and facilitates movement. The lumbar fascia contains various receptors related to pain, proprioception, temperature, and emotion (Zhang & Zong, 2021). Myofascial tissues may serve as the source of pain in certain musculoskeletal disorders, such as plantar fasciitis and chronic claudication (Lee et al., 2019).

The origins of myofascial release (MFR) can be traced back to the 1940s, but the term "myofascial release" was not proposed until 1981 (Manheim, 2001). As a manual therapy modality within physical therapy, myofascial release therapy encompasses a variety of hands-on treatment techniques aimed at alleviating pain by helping to relax fascia and tense soft tissues, thereby restoring the function of impaired soft tissues. It effectively mitigates persistent tension in muscles and fascia caused by chronic pain, enhances local muscle metabolic capacity, and reduces micro-lymphatic and circulatory dysfunctions. The theoretical foundation of myofascial release therapy lies in the unique role of fascia, which posits that myofascia is a primary determinant of musculoskeletal function and plays a crucial role in the dynamic properties of the body (Barnes, 1997). The hardening of fascial tissue, increased tension, or reduced sliding capacity may contribute to tension in other parts of the body, subsequently exacerbating pain and limiting functionality (Schroeder & Best, 2015). Myofascial release therapy employs stretching to

restrict the myofascia, restoring its length and performance to normal levels. Additionally, myofascial release can reduce pressure on pain-sensitive structures like Broussonetia papyrifera, improve the length and health of restricted connective tissues, and stimulate nerves and blood vessels.

Although the specific mechanisms of myofascial release remain unclear, studies have found that it stimulates receptors distributed in the myofascial tissue, leading to neuromuscular changes (Arguisuelas et al., 2019). When combined with conventional treatments, it significantly improves pain and tenderness (Chen et al., 2021b). Myofascial release therapy may reduce the production of inflammatory cytokines by alleviating fascial restrictions on blood vessels and free nerve endings (Brandl et al., 2023). Additionally, myofascial release can enhance patients' motor function and trunk mobility, improve body flexibility (Cetinyol et al., 2025), and thereby optimize physical function (Rodrigues et al., 2021). Research indicates that myofascial release techniques promote increased trunk mobility through biomechanical effects and improve balance by modulating the nervous system (Sannasi et al., 2017). They may also alleviate low back pain by repairing damaged lumbar muscle nerves (Arguisuelas et al., 2017; Williams & Selkow, 2019; Brandl et al., 2021; Senrau et al., 2021). Chronic low back pain (CLBP) patients often experience pain and disability that negatively impact their quality of life (Ożóg et al., 2023), but myofascial release can mitigate these effects by reducing pain and disability levels (Ożóg et al., 2023). Remote myofascial release (MFR) has been shown to enhance lumbar flexibility by improving hamstring elasticity (Ling et al., 2022). Furthermore, studies suggest that myofascial release can alleviate low back pain and dysfunction by reducing stiffness and thickness in the lumbar erector spinae muscles (Devantéry et al., 2023).

4.1. Safety and User Experience

This study found that only some of the studies conducted follow-ups, with the longest duration being 3 months, so long-term safety still requires further validation. The lumbar back muscles are located in deeper layers, and during release procedures, excessive force or inaccurate positioning may lead to damage of deep muscles, ligaments, or even neurovascular structures, resulting in aggravated local pain or limitation of activity. If lumbar joint release is involved, excessive intervention may cause joint laxity and instability, increasing the risk of traumatic arthritis (Fan, 2024). Frequent use of tools such as massage guns or foam rollers, or overly aggressive manual release of lumbar muscles, may lead to thickening and brittleness of fascial tissues, reduced elasticity, and consequently impair lumbar stability and force transmission, exacerbating chronic low back pain (Ren, 2023). Incorrect prone positioning during treatment (excessive lumbar flexion) may trigger acute muscle spasms or increase intervertebral disc pressure (Tamartash & Bahrpeyma, 2022b). The efficacy and risks of myofascial release therapy for low back pain coexist, necessitating individualized assessment. It is recommended to combine physical therapy and exercise rehabilitation to mitigate the side-effect risks of monotherapy.

The studies included in this project did not involve feedback on patient preferences or operational comfort, nor did they directly describe patients' subjective comfort or satisfaction. However, the good compliance during treatment and significant pain relief indirectly reflect favorable treatment experience and tolerance.

4.2. Clinical Implications and Application Prospects

The summarized studies revealed variations in treatment duration and frequency across each research, indicating the need for further dose optimization in future studies to explore the optimal load, duration, treatment frequency, and intervention intervals of MFT for enhancing long-term efficacy. Technical standardization is also crucial, requiring the development of more precise methods for controlling force direction and intensity to reduce operator dependency. As the underlying mechanisms remain unclear, histological or molecular biological approaches could be employed to elucidate the specific mechanisms of MFT on fascial hydration, inflammation, or neural regulation. Further subgroup analysis of Homo sapiens could be conducted to investigate the differential effects of MFR in specific subgroups (e.g., varying disease durations, ages, or occupations) Parazacco spilurus subsp. spilurus. The application of shear wave elastography (SWE) and ultrasound techniques (Tamartash et al., 2022a) provides tools for objective assessment of MFT, facilitating its clinical promotion.

In clinical applications, the bio-psycho-social model can be integrated to make MFR potentially part of a multidisciplinary rehabilitation program. MFR has been shown to effectively improve pain and function in non-specific low back pain (Parazacco spilurus subsp. spilurus), though its effect on lumbar flexion range of motion is limited (Tamartash & Bahrpeyma, 2022b). Therefore, in clinical practice, it can serve as a component of multimodal therapy, combined with core muscle training, muscle energy techniques, electrotherapy, and other treatment methods to enhance overall efficacy. Studies have found that with proper guidance, patients can perform myofascial release independently using tools. Thus, by assessing the patient's individual condition and capabilities, those capable of completing home-based self-rehabilitation can be provided with enhanced health education and technical guidance to perform home exercises and myofascial release for symptom relief.

4.3. Research Limitations

Through the analysis of the included literature, several limitations in the current evidence on myofascial release therapy for chronic nonspecific low back pain (CNLBP) were identified. First, the intervention protocols were insufficiently standardized. In particular, the specific techniques often relied on therapists’ clinical experience, and few studies provided detailed descriptions of how operational consistency was ensured across treatment sessions or practitioners. In addition, the outcome measures varied substantially across studies, which limits comparability and makes it difficult to synthesize the findings systematically.

From a methodological perspective, the overall quality of the included studies requires further improvement. Among the eight included studies, seven were randomized controlled trials (RCTs) and one was a non-randomized intervention study. Although RCTs generally represent a relatively high level of evidence, several methodological concerns should be noted. First, the sample sizes were relatively small across all studies, ranging from 15 to 40 participants per group. Such small sample sizes increase the risk of Type II errors, limit the generalizability of the findings, reduce statistical power, and may lead to inflated estimates of treatment effects.

Second, the follow-up periods were insufficient. Among the eight studies, only three studies conducted follow-up assessments, namely Boff et al. (2020), Das et al. (2020), and Ling et al. (2022), with the longest follow-up period being only three months. The remaining five studies did not include any follow-up assessment, making it difficult to evaluate the long-term efficacy and durability of myofascial release therapy. This limitation is particularly important for chronic conditions such as CNLBP, where symptoms may fluctuate over time and sustained therapeutic effects are a key clinical concern.

Third, none of the included studies clearly reported blinding of therapists or outcome assessors, which may introduce potential performance bias and detection bias. Fourth, allocation concealment was not clearly described in most studies, raising concerns about possible selection bias. Furthermore, no RCT stratified CNLBP patients according to symptom severity, although patients with different levels of pain or functional impairment may respond differently to myofascial release therapy.

Taken together, these methodological limitations suggest that the current evidence should be interpreted with caution. Future studies should adopt more rigorous research designs, including larger sample sizes, standardized intervention protocols, consistent outcome measures, adequate allocation concealment, and blinding of outcome assessors where feasible. In addition, longer and more frequent follow-up assessments are needed, preferably over a period of at least 6 to 12 months, to evaluate both the short-term and long-term effects of myofascial release therapy in the treatment of CNLBP.

4.4. Heterogeneity in Intervention Protocols and Outcome Indicators

The 8 included studies exhibited substantial heterogeneity in intervention parameters, which poses challenges for synthesizing evidence and deriving clinical recommendations. First, the duration of a single MFR session varied considerably across studies, ranging from 15 minutes (Ling et al., 2022) to 20–60 minutes (Tamartash et al., 2022a; Tamartash et al., 2023a; Boff et al., 2020; Das et al., 2020; Tamartash & Bahrpeyma, 2022b; Ling et al., 2022; Tamartash et al., 2023b; Ran et al., 2024), with no clear rationale provided for the chosen duration. Second, treatment frequency ranged from once per week (Ran et al., 2024) to five times per week (Tamartash et al., 2022a; Tamartash & Bahrpeyma, 2022b), and total intervention duration ranged from one week (Das et al., 2020) to six weeks (Ling et al., 2022). Third, the techniques employed differed markedly: some studies used hands-on manual MFR performed by therapists (Tamartash et al., 2022a; Tamartash et al., 2023a; Boff et al., 2020; Das et al., 2020; Tamartash & Bahrpeyma, 2022b; Tamartash et al., 2023b), while one study used self-administered MFR with a hockey ball (Ling et al., 2022). Fourth, the treatment areas varied from localized lumbar release (Tamartash et al., 2022a; Tamartash & Bahrpeyma, 2022b) to remote lower limb release (Tamartash et al., 2023a; Tamartash et al., 2023b) and whole fascial chain release (Ling et al., 2022). Such heterogeneity makes it difficult to determine the optimal dosage, technique, and treatment protocol for MFR in CNLBP management.

Similarly, the outcome indicators used across studies were highly heterogeneous. Pain intensity was the most commonly reported outcome, but it was measured using different tools, including

the Visual Analog Scale (VAS) (Ran et al., 2024; Tamartash et al., 2022a; Boff et al., 2020; Das et al., 2020; Tamartash & Bahrpeyma, 2022b; Ling et al., 2022) and the Numeric Pain Rating Scale (NPRS). Functional outcomes included the Oswestry Disability Index (ODI) (Ran et al., 2024; Boff et al., 2020; Das et al., 2020; Ling et al., 2022), lumbar range of motion (Ran et al., 2024; Tamartash & Bahrpeyma, 2022b; Ling et al., 2022), activities of daily living (ADL) (Ran et al., 2024), and the Roland-Morris Disability Questionnaire. Psychosocial outcomes included the SF-36 quality of life scale (Boff et al., 2020), Self-Rating Anxiety Scale (SAS) (Ran et al., 2024), and Self-Rating Depression Scale (SDS) (Ran et al., 2024). Objective physiological measures included the elastic modulus of lumbar fascia measured by ultrasound (Tamartash et al., 2022a), lumbar flexion angle (Tamartash & Bahrpeyma, 2022b), and pelvic tilt angle (Tamartash & Bahrpeyma, 2022b). This diversity in outcome measurement tools limits the comparability of findings across studies and precludes meta-analytic synthesis. Future research should adopt a core outcome set for CNLBP to facilitate cross-study comparisons and evidence aggregation.

4.5. Standardized Operation, Recommended Treatment Course and Frequency

Based on the available evidence, preliminary recommendations for standardized MFR protocols can be proposed. For manual MFR, a treatment session of 20–30 minutes applied to the lumbar region (from the mid-thoracic to the pelvic area) at a frequency of 2–3 times per week for 4–6 weeks appears to be a reasonable regimen based on the studies reporting positive outcomes (Ran et al., 2024; Tamartash et al., 2022a; Boff et al., 2020; Tamartash & Bahrpeyma, 2022b). For self-administered MFR, 15 minutes per session, 3 times per week for 6 weeks, using a tool such as a hockey ball or foam roller, has shown efficacy (Ling et al., 2022). Remote MFR targeting the lower limb fascial chains (hamstrings, gastrocnemius, plantar fascia) can be considered as an alternative when direct lumbar MFR is contraindicated or poorly tolerated (Tamartash et al., 2023a; Tamartash et al., 2023b). The application of MFR should follow a graded approach: starting with light pressure and gradually increasing intensity based on patient tolerance and tissue response.

4.6. Contraindications and Safety Prevention and Control Measures

Contraindications to MFR include: (1) acute fractures or dislocations of the spine; (2) severe osteoporosis; (3) local skin infections, open wounds, or hematomas in the treatment area; (4) acute inflammatory conditions such as rheumatoid arthritis flare-ups; (5) malignant tumors or suspected malignancy in the treatment region; (6) deep vein thrombosis; (7) uncontrolled bleeding disorders or anticoagulant therapy; and (8) cauda equina syndrome or progressive neurological deficits.

Safety prevention and control measures should include: (1) thorough patient assessment and screening before treatment to identify contraindications; (2) clear communication with the patient regarding the treatment procedure and expected sensations; (3) gradual application of pressure, avoiding excessive force that may cause tissue damage; (4) continuous monitoring of patient feedback during treatment, with immediate cessation if sharp pain, numbness, or discomfort occurs; (5) proper positioning of the patient to avoid excessive lumbar flexion or extension that may aggravate symptoms; (6) avoidance of direct pressure on bony prominences, major

neurovascular bundles, and the spinous processes; (7) post-treatment assessment and provision of home care instructions; and (8) documentation of treatment parameters and patient response for ongoing evaluation and protocol adjustment.

4.7. Bias Risks Caused By Small Sample Sizes and Short Follow-Up Durations

As discussed in the Research Limitations section, the small sample sizes and short follow-up durations in the included studies introduce significant bias risks. Small sample sizes increase the likelihood of sampling error and reduce the precision of effect estimates. They also limit the ability to detect subgroup differences or perform meaningful sensitivity analyses. Short follow-up durations, or the absence of follow-up altogether, preclude assessment of the sustainability of treatment effects, which is particularly important for chronic conditions like CNLBP where relapse is common. Furthermore, the lack of long-term follow-up data means that the potential late-onset adverse effects of MFR cannot be adequately evaluated. These biases may lead to overestimation of treatment efficacy and underestimation of risks, potentially misleading clinical decision-making. Future studies should prioritize adequate sample sizes (calculated through formal power analysis) and incorporate follow-up periods of at least 6 months, ideally 12 months, to provide robust evidence for the long-term effectiveness and safety of MFR in CNLBP.

Author Contributions:

Conceptualization, Z. C and Q. Y; methodology, Z. C; software, Z. C; validation, C. Z and Q. H; formal analysis, Z. C; writing—original draft preparation, C. Z; writing—review and editing, Z. C; supervision, Q. H; project administration, Q. H; funding acquisition, X. C. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement:

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Xiangshan First People's Hospital Medical and Health Group (XYYJ-2025-00 2024-6-24).

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Not applicable

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The authors declare no conflict of interest.

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