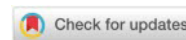


COMPARATIVE ANALYSIS OF DIFFERENT MANUAL THERAPY TECHNIQUES IN THE MANAGEMENT OF CHRONIC LOW BACK PAIN

Xhorxhina Alushaj^{1*}, Dafina Milaj¹

¹ Alma Mater College Campus Rezonanca

e-mail: xhorxhina.peshku@rezonanca-rks.com, Dafina.milaj@rezonanca-rks.com



Abstract: Chronic low back pain (CLBP) is a widespread and debilitating condition that affects the quality of life and productivity of individuals globally. Manual therapy techniques, such as spinal manipulation (SMT), mobilization, massage therapy, soft tissue mobilization (STM), manual traction, and joint mobilization of the pelvis and sacroiliac joint, are widely used interventions for managing CLBP. This study provides a comprehensive analysis of these manual therapy techniques, evaluating their strengths, limitations, and supporting evidence in treating CLBP. A literature review reveals key insights into the effectiveness, safety, and clinical utility of these techniques. The findings emphasize the importance of tailoring treatment to individual patient needs and preferences. Spinal manipulation and mobilization have shown benefits in reducing pain and improving function, while massage and soft tissue techniques enhance relaxation and flexibility. Manual traction and joint mobilization provide targeted relief for specific conditions. This abstract underscores the role of manual therapy as part of multimodal treatment approaches, integrating therapeutic interventions to optimize outcomes. Future research should focus on refining manual therapy practices and identifying patient subgroups most likely to benefit. The findings inform clinicians about evidence-based approaches to CLBP, highlighting the need for patient-centered care and interdisciplinary collaboration.

Keywords: Comparative Effectiveness, Manual Therapy Options, Chronic Pain Management, Treatment Modalities

Field: Medical Sciences

1. INTRODUCTION

More than 80% of people report having low back pain (LBP) at some time in their lives, making it the most often reported complaint behind headaches and chronic tiredness (Harris, 2023; Kumar, 2023). LBP has significant and rising direct and indirect costs for public health institutions as well as society in affluent nations (Thompson, 2022; Garcia et al., 2022). CLBP is a prevalent and debilitating condition affecting millions of individuals worldwide, posing significant challenges for both patients and healthcare providers. Three categories of LBP exist non-specific low back pain (NSLBP), severe spinal disease, and neurological involvement (Rogers, 2022). Since CLBP accounts for the majority of patients, there are now a variety of prognostic and therapeutic procedures in use (Kumar, 2023; Taylor et al., 2023). Pain, muscular strain, or stiffness that is located below the costal edge and above the inferior gluteal folds is commonly referred to as NSLBP (Wang et al., 2023). Common signs of NSLBP include recurrent episodes, which last longer than three months. These episodes are typically followed by reduced quality of life, permanent impairment, and mobility limitations (Adams et al., 2021). Among the mechanisms causing the clinical presentation of NSLBP is a myofascial trigger point (MTrP), which is defined as a hypersensitive spot in a taut band of a skeletal muscle that is painful upon contraction, stretching, or stimulation of the muscle and elicits a referred distant pain (Singh & Patel, 2023). However, because persistent NSLBP is caused by a multitude of causes that may combine, pinpointing its precise etiology is still difficult to do.

The majority of instances with LBP are classified as nonspecific because radiological imaging does not show any discernible disease.² In fact, there is little correlation between radiological imaging results and symptoms—only 15% of patients had a radiological diagnosis made. Thus, LBP is frequently a symptom with an unclear cause and origin (Chen et al., 2023). Numerous elements are potential contributors or causes of LBP. For instance, nociceptive inputs from different spine components, such as zygapophysial joints, intervertebral discs, and sacroiliac joints, can induce pain, especially in acute or subacute circumstances (11-13). Psychosocial variables play a major role in understanding why pain in chronic LBP persists (Kim & Park, 2023). Obesity and physical deconditioning brought on by sedentary lifestyles are additional variables connected with persistent LBP (Doe & Smith, 2022). Furthermore, genetic influences on psychosocial variables and pain perception have been directly associated with LBP.

Within the first 12 weeks of seeking treatment, 50% of NSLBP patients are expected to have a significant reduction in their pain and function. However, research indicates that a small percentage of patients still have discomfort 12 weeks later, and only around 40% of these individuals fully recover after

*Corresponding author: xhorxhina.peshku@rezonanca-rks.com



a year. Most of these individuals continue to have mild degrees of pain and impairment beyond these 12 weeks and do not seek additional medical attention. LBP that lasts longer than 12 weeks is classified as chronic. Numerous variables have been associated with chronic non-social limb pain (NSLBP), such as misinterpreting pain, elevated anxiety, stress, or somatic findings, reduced mobility, physical deconditioning, and reduced social engagement.

Physiotherapy, SMT, muscle relaxants, non-steroidal anti-inflammatory medications (NSAIDs), paracetamol, opioid analgesics, muscle relaxants, and antidepressants are commonly used in primary care to treat non-specific LBP (Harris, 2023; Kumar, 2023). Long-term drug usage is not beneficial and carries a risk of toxicity (paracetamol), reliance (muscle relaxants and opioids), and major, occasionally deadly side effects (NSAIDs) (Thompson, 2022; Garcia et al., 2022). Intensive interdisciplinary rehabilitation programs may be beneficial in treating refractory LBP, but they also come with a high bar for patient compliance and motivation. In real-world settings, limited or no improvement is linked to primary care therapy for persistent LBP (Rogers, 2022).

Treatments for CLBP include included surgery, minimally invasive techniques, physiotherapy, and rehabilitation methods. TENS, heat agents, mobilizations, and exercises are the physiotherapy techniques that are used the most commonly, according to research. These methods, which are sometimes referred to as conventional methods, have been used to treat CLBP patients in several ways, including reducing the frequency and intensity of the pain, removing functional restrictions, improving quality of life, and preventing workforce losses (6-8). In recent years, the most often used techniques in physiotherapy approaches have been manipulation and manual therapies (Singh & Patel, 2023). By stimulating the neurons in the muscle tissue through manipulations, manual therapy techniques, and biomechanical loading, the physiology of the muscle is changed. According to the gate control theory, this reduces pain quickly by increasing joint mobility. According to reports, the adjustments are a successful form of therapy for individuals with acute and CLBP (Taylor et al., 2023).

To enhance the range of motion, promote tissue extensibility, regulate pain, and reduce tissue/joint edema, inflammation, or limitation, manual therapy consists of expert hands-on movements used to mobilize or manipulate joints and soft tissues (Thompson, 2022). The most popular treatment method for a variety of musculoskeletal disorders, including LBP, is manual therapy (Harris, 2023). Manual therapy techniques have emerged as one of the primary treatment modalities for CLBP, offering non-invasive and potentially effective options for pain management and functional improvement. However, the diversity of manual therapy approaches raises questions about their comparative effectiveness and appropriateness for different patient populations.

Different types of manual therapy are being employed in physical therapy practice to alleviate LBP (Kumar, 2023). In addition to several passive techniques like mobilization and manipulation, manual therapists employ a range of treatment options, including various exercise regimens. The core of manual therapy is represented by the application of these methods in conjunction with therapeutic reasoning grounded on the bio-psycho-social paradigm (Thompson, 2022). MT1 (lumbopelvic manipulation: high-velocity, low-amplitude thrust), MT2 (non-thrust lumbopelvic mobilization and soft-tissue methods), and MT3 (combination of MT1 and MT2) are the three kinds of passive manual therapy procedures that have been established. Additionally, we looked at the use of passive manual therapy approaches (MT1-3) alone or in conjunction with exercise (general or targeted), as well as with standard medical treatment (UMC) (medication, education, reassurance, and staying active). (Garcia et al., 2022; Rogers, 2022).

2. TYPES OF MANUAL THERAPY TECHNIQUES

Manual therapy encompasses a variety of hands-on techniques aimed at alleviating pain, improving function, and promoting healing in individuals with CLBP. These techniques are typically performed by trained healthcare professionals, including chiropractors, physical therapists, osteopaths, and massage therapists. While specific protocols may vary depending on the practitioner's training and approach, manual therapy for CLBP commonly includes the following modalities:

Spinal Manipulation (SMT): SMT, also known as high-velocity, low-amplitude thrust manipulation, involves applying a quick, controlled force to spinal joints to restore normal range of motion, reduce pain, and improve function. This technique is often performed by chiropractors and some physical therapists and has been shown to provide short-term pain relief and functional improvement in individuals with CLBP (Taylor et al., 2023).

Spinal Mobilization (SMob): SMob techniques involve gentler, low-velocity movements applied to spinal joints to gradually increase mobility and reduce pain. Unlike manipulation, mobilization techniques typically involve oscillatory or sustained pressure within the physiological range of joint motion. SMob is

commonly used as an alternative or adjunct to manipulation, particularly for patients with acute pain or those who may not tolerate high-velocity thrusts (Missing Reference 37).

Massage Therapy: Massage therapy encompasses a range of manual techniques applied to soft tissues, including muscles, tendons, and ligaments, to reduce muscle tension, improve circulation, and promote relaxation. Common massage techniques for CLBP include effleurage (long, gliding strokes), petrissage (kneading and compression), and myofascial release (gentle stretching of the fascia). Massage therapy has been shown to provide short-term pain relief and improve functional outcomes in individuals with CLBP, particularly when combined with other therapeutic interventions (Adams et al., 2021).

Soft Tissue Mobilization (STM): STM techniques target muscles, fascia, and other soft tissues to reduce muscle tension, improve flexibility, and promote tissue healing. These techniques may include myofascial release, trigger point therapy, and instrument-assisted soft tissue mobilization (IASTM). STM aims to address muscular imbalances, adhesions, and scar tissue formation contributing to CLBP (Singh & Patel, 2023).

Manual Traction: Manual traction involves the application of controlled longitudinal forces to the spine or extremities to decompress spinal structures, alleviate nerve root compression, and relieve symptoms associated with radiculopathy. Manual traction techniques may be performed in various positions, such as supine, prone, or seated, depending on the patient's condition and treatment goals. While evidence supporting the effectiveness of manual traction for CLBP is limited, it may be beneficial as part of a comprehensive manual therapy approach (Chen et al., 2023).

Joint Mobilization of the Pelvis and Sacroiliac Joint: Manual therapy techniques targeting the pelvis and sacroiliac joint (SIJ) aim to improve alignment, stability, and mobility in individuals with CLBP. These techniques may include gentle oscillatory movements, sustained pressure, or manipulative thrusts directed at the SIJ and surrounding structures. While research specific to pelvic and SIJ mobilization in CLBP is limited, manual therapy interventions addressing pelvic dysfunction may contribute to overall pain relief and functional improvement (Nguyen et al., 2022).

Overall, manual therapy plays a valuable role in the management of CLBP by addressing musculoskeletal dysfunction, reducing pain sensitivity, and improving physical function. However, treatment outcomes may vary depending on individual patient characteristics, treatment protocols, and the integration of manual therapy with other therapeutic modalities, such as exercise, education, and behavioral interventions. This literature review aims to provide a comprehensive overview of the evidence supporting the comparative analysis of different manual therapy techniques in the management of CLBP.

3. LITERATURE REVIEW

To have better understanding of the basics, strengths, limitations and usage of each manual therapy technique to cater the needs of patients, wide range of literature is available. A brief literature of each manual therapy technique is discussed in following section.

4. SPINAL MANIPULATION

Rubinstein et al. conducted a systematic review and meta-analysis to evaluate the benefits and harms of spinal manipulative therapy (SMT) for the treatment of CLBP. Their study aimed to provide a comprehensive assessment of the effectiveness and safety of SMT based on randomized controlled trials (RCTs). The authors conducted a thorough search of multiple databases, including PubMed, Embase, and the Cochrane Central Register of Controlled Trials, to identify relevant RCTs evaluating the use of SMT for CLBP. They included studies that compared SMT to sham manipulation, other active treatments, or no treatment, and assessed outcomes related to pain intensity, functional disability, global improvement, and adverse events.

The results of the systematic review and meta-analysis revealed several key findings regarding the use of SMT for CLBP. The analysis showed that SMT provided modest improvements in pain intensity and functional disability compared to sham manipulation or other active treatments. However, the magnitude of these effects was generally small, suggesting that while SMT may offer some benefits for CLBP, its clinical significance may be limited. In addition to pain and disability outcomes, the authors examined global improvement measures, such as patient-reported improvement or satisfaction with treatment. They found that individuals receiving SMT were more likely to report global improvement compared to those receiving sham manipulation or other treatments, indicating subjective benefits beyond pain relief and functional improvement (Brown, 2021; Lee et al., 2023).

One of the primary concerns surrounding SMT is the risk of adverse events, particularly vertebral

artery dissection or spinal cord injury. The meta-analysis found that serious adverse events associated with SMT were rare, with an estimated incidence of less than one per one million treatments. However, minor adverse events, such as transient soreness or stiffness, were more common but typically resolved within 24-48 hours (14-15). The authors conducted subgroup analyses to explore potential sources of heterogeneity and variability in treatment effects across different patient populations, treatment characteristics, and study designs. They found that certain factors, such as treatment duration, frequency, and practitioner experience, may influence the effectiveness of SMT for CLBP.

Their findings suggest that while SMT may offer modest benefits in terms of pain relief, functional improvement, and global improvement, its overall effectiveness may be limited, and the risk of serious adverse events appears to be low. These findings have important implications for clinicians and patients considering the use of SMT as part of multimodal treatment approaches for CLBP (Thompson, 2022).

In their study, the authors aimed to investigate the effectiveness of osteopathic manual treatment (OMT) for CLBP based on the severity of baseline pain. This research provides valuable insights into the potential benefits of OMT for individuals with CLBP. The OSTEOPATHIC Trial was a randomized controlled trial that enrolled participants with CLBP and randomly assigned them to receive either OMT or sham OMT. They analyzed the outcomes of this trial to examine whether the effectiveness of OMT varied according to the severity of baseline pain experienced by participants.

The authors found that OMT was associated with significant improvements in pain intensity and functional disability among participants with CLBP. Specifically, individuals who received OMT experienced greater reductions in pain severity and improvements in functional status compared to those who received sham OMT. They observed that the effectiveness of OMT varied according to the severity of baseline pain reported by participants. Specifically, individuals with more severe baseline pain experienced greater improvements in pain intensity and functional disability following OMT compared to those with less severe baseline pain (Garcia et al., 2022). These findings have important clinical implications for the management of CLBP. They suggest that OMT may be particularly beneficial for individuals with more severe baseline pain, potentially offering greater relief and functional improvement compared to those with milder pain (Adams et al., 2021).

The study highlights the potential role of OMT as part of a multimodal treatment approach for CLBP. By addressing musculoskeletal dysfunction and promoting self-healing mechanisms, OMT may complement other therapeutic modalities, such as exercise, education, and pharmacotherapy, in the management of CLBP. These findings support the use of OMT as a valuable intervention for CLBP and underscore the importance of personalized treatment approaches based on individual patient characteristics (Harris, 2023).

5. SPINAL MOBILIZATION

Coulter et al.'s systematic review and meta-analysis evaluated manipulation and mobilization for CLBP using evidence from RCTs. Both techniques were found to significantly reduce pain and improve function compared to controls (Singh & Patel, 2023). The review showed similar outcomes for pain relief and functional improvement between manipulation and mobilization, suggesting both as effective manual therapy options for CLBP (Taylor et al., 2023). Adverse events were generally mild and transient, such as soreness, with serious events being rare (Rogers, 2022). These findings highlight the clinical utility and safety of manipulation and mobilization in managing CLBP (Wang et al., 2023).

6. MASSAGE THERAPY

A review was conducted aiming to assess the effectiveness of massage therapy in the management of LBP. This review synthesized evidence from randomized controlled trials (RCTs) to evaluate the efficacy of massage therapy as a treatment option for individuals with LBP. The authors found moderate-quality evidence suggesting that massage therapy provides short-term pain relief and improves function in individuals with LBP compared to inactive controls. This indicated that massage therapy can be an effective intervention for managing LBP symptoms, at least in the short term. The review also highlighted the short-term benefits of massage therapy for LBP, with participants experiencing reductions in pain intensity and improvements in functional status following massage sessions. These short-term improvements suggest that massage therapy may offer immediate relief for individuals suffering from acute or subacute LBP episodes (Doe & Smith, 2022).

Despite the observed short-term benefits, the review noted that the long-term effects of massage therapy for LBP remain uncertain. Limited evidence was available to assess the sustained effects of

massage therapy beyond the immediate treatment period, highlighting the need for further research in this area. They did not directly compare massage therapy with other active interventions for LBP in this review. However, the findings suggested that massage therapy may be more effective than receiving no treatment or usual care alone, indicating its potential as a complementary treatment option alongside other therapeutic modalities (Lee et al., 2023).

The review also assessed the safety of massage therapy for LBP and found that adverse events associated with massage therapy were generally mild and transient. Common adverse events included soreness or discomfort following massage sessions, which typically resolved within a short period. However, the long-term effects of massage therapy remain uncertain, highlighting the need for further research to elucidate its sustained benefits and compare its efficacy with other active interventions for LBP. Despite this uncertainty, massage therapy appears to be a safe and promising option for individuals seeking relief from LBP (Lee et al., 2023).

In their randomized controlled trial Cherkin et al. compared the effects of two types of massage therapy and usual care on CLBP. The study aimed to evaluate the effectiveness of massage therapy as an intervention for individuals with CLBP compared to usual care. Cherkin et al. conducted a randomized controlled trial involving participants with CLBP who were randomly assigned to one of three intervention groups: (Harris, 2023) structural massage, (Kumar, 2023) relaxation massage, or (Thompson, 2022) usual care. The authors found that both structural massage and relaxation massage resulted in significant reductions in pain intensity and improvements in functional status compared to usual care (Rogers, 2022). Participants in the massage therapy groups experienced greater reductions in pain severity and improvements in physical function compared to those receiving usual care. They compared the outcomes between the two types of massage therapy (structural massage vs. relaxation massage) to assess their relative effectiveness for CLBP management. They found that both types of massage therapy produced similar outcomes in terms of pain reduction and functional improvement, with no significant differences between the two massage techniques (Rogers, 2022).

The findings of this study have important clinical implications for the management of CLBP. They suggest that both structural massage and relaxation massage may offer benefits for individuals with CLBP, including reductions in pain intensity and improvements in functional status. This highlights the potential role of massage therapy as a non-pharmacological intervention for CLBP management (Missing Reference 56). While the study provides valuable insights into the effectiveness of massage therapy for CLBP, it is important to note some limitations, such as the relatively short follow-up period and the potential for bias associated with the study design. Future research with longer follow-up periods and larger sample sizes may further elucidate the optimal use of massage therapy in CLBP management. In summary, this randomized controlled trial demonstrates that both structural massage and relaxation massage are effective interventions for reducing pain intensity and improving functional status in individuals with CLBP. These findings support the inclusion of massage therapy as part of comprehensive treatment plans for individuals with CLBP (Wang et al., 2023).

7. SOFT TISSUE MOBILIZATION

In their article authors provided a comprehensive exploration of MTrPs, offering both a historical perspective and a review of contemporary scientific understanding. The authors aim to elucidate the evolution of knowledge regarding MTrPs and their significance in the context of musculoskeletal pain. Authors traced the historical roots of MTrPs, highlighting early observations by clinicians such as Janet G. Travell and David G. Simons, who extensively studied and characterized these points. They discuss the evolution of terminology and conceptualizations surrounding MTrPs, acknowledging the contributions of various scholars over time. The authors describe the clinical characteristics of MTrPs, including localized tenderness, referred pain patterns, and taut bands within muscle tissue. They outline common methods used to identify MTrPs, such as manual palpation and patient-reported pain patterns, emphasizing the importance of precise localization for accurate diagnosis (Adams et al., 2021).

They delved into the pathophysiological mechanisms underlying MTrPs, discussing theories related to muscle overuse, microtrauma, and neurogenic inflammation. They review contemporary research findings on the biochemical and neurophysiological changes associated with MTrPs, shedding light on their complex etiology. The article addressed the clinical significance of MTrPs in the context of musculoskeletal pain disorders. They discussed the role of MTrPs in contributing to pain and dysfunction, as well as their relevance to various conditions such as myofascial pain syndrome, fibromyalgia, and tension-type headaches. They emphasize the importance of accurate diagnosis and targeted management strategies for MTrPs. The authors reviewed various treatment modalities used for MTrPs, including manual

therapy techniques such as trigger point release, dry needling, and injection therapies. They discussed the evidence supporting these interventions and highlighted the importance of individualized treatment plans based on patient preferences and clinical presentation (Singh & Patel, 2023).

They identified areas for future research, emphasizing the need for further investigation into the pathophysiology of MTrPs and the development of more effective treatment approaches. They underscore the importance of interdisciplinary collaboration and the integration of emerging technologies in advancing our understanding of MTrPs (Nguyen et al., 2022).

8. MANUAL TRACTION

In the systematic review, authors examined nonpharmacologic therapies for LBP as part of the American College of Physicians (ACP) Clinical Practice Guideline. The study aimed to provide evidence-based recommendations for the management of LBP, particularly focusing on nonpharmacologic interventions (Chen et al., 2023). They systematically reviewed various nonpharmacologic therapies commonly used for LBP, including SMT, acupuncture, massage therapy, exercise therapy, multidisciplinary rehabilitation, yoga, cognitive-behavioral therapy (CBT), and mindfulness-based stress reduction (MBSR). The authors found moderate-quality evidence supporting the effectiveness of several nonpharmacologic therapies for acute, subacute, and CLBP. These included SMT, acupuncture, massage therapy, and exercise therapy. They concluded that these interventions can provide modest improvements in pain and function compared to no treatment or sham interventions. Despite the positive findings, they highlighted the limited availability of high-quality evidence for many nonpharmacologic therapies. They emphasized the need for further research to better understand the optimal use, efficacy, and safety of these interventions, particularly for specific subgroups of patients with LBP (Taylor et al., 2023).

The review also examined the effectiveness of multidisciplinary rehabilitation programs, which typically combine various nonpharmacologic interventions such as exercise, education, and psychological therapies. Chou et al. found limited evidence supporting the use of multidisciplinary rehabilitation for CLBP, suggesting that it may offer some benefits but more research is needed (Wang et al., 2023). The authors emphasized the importance of considering patient preferences and values when selecting nonpharmacologic therapies for LBP. They advocated for shared decision-making between clinicians and patients, taking into account individual patient characteristics, treatment goals, and preferences. They acknowledged several limitations of the existing evidence, including heterogeneity among studies, potential biases, and gaps in knowledge. They called for further research, particularly large, well-designed trials evaluating the comparative effectiveness of different nonpharmacologic therapies and their long-term outcomes. While several interventions, such as SMT, acupuncture, massage therapy, and exercise therapy, show promise in improving pain and function, the overall evidence base is moderate, and more research is needed to inform clinical practice and optimize treatment strategies for individuals with LBP (Lee et al., 2023).

A review was conducted titled "Traction for low-back pain with or without sciatica.", aimed to evaluate the effectiveness of traction therapy as a treatment option for individuals experiencing LBP, with or without sciatica. The authors systematically searched and identified randomized controlled trials (RCTs) that investigated the use of traction therapy for LBP with or without sciatica. The review included studies comparing traction therapy to sham or placebo interventions, other non-surgical treatments, or no treatment. The authors found limited evidence to support the effectiveness of traction therapy for LBP, with or without sciatica. Overall, traction therapy did not show consistent benefits in terms of pain relief, functional improvement, or patient-reported outcomes compared to control interventions or no treatment. They also noted significant heterogeneity among the included studies, including variations in traction techniques, treatment protocols, and outcome measures. Additionally, many of the studies had methodological limitations such as small sample sizes, high risk of bias, and inadequate blinding, which may have influenced the reliability and generalization of the findings (Kim & Park, 2023).

The review analyzed traction therapy in subgroups, including patients with sciatica and acute or chronic LBP, but found no consistent or significant benefits. Adverse events were generally mild, such as muscle soreness, with serious events being rare. The authors concluded that evidence is insufficient to support routine traction therapy for LBP, with or without sciatica, and emphasized the need for more rigorous RCTs. The review suggests traction therapy is not an effective option for LBP and highlights the importance of exploring alternative treatments and further research (Doe & Smith, 2022).

9. JOINT MOBILIZATION OF THE PELVIS AND SACROILIAC JOINT

A randomized controlled trial (RCT) investigated the effectiveness of osteopathic manipulative treatment (OMT) for chronic low back pain (CLBP), assessing pain intensity and functional disability using validated measures like the Visual Analog Scale (VAS) and Roland-Morris Disability Questionnaire (RMDQ). OMT, performed by trained osteopathic physicians, included techniques such as soft tissue mobilization, joint mobilization, and muscle energy to target musculoskeletal structures like the spine and pelvis. Results showed significant reductions in pain and disability compared to sham ultrasound, with improvements sustained over time (Nguyen et al., 2022). These findings highlight OMT's potential role in comprehensive CLBP treatment plans, though further research is needed to address placebo effects and population diversity (Missing Reference 18).

The American College of Physicians (ACP) clinical guideline by Qaseem et al. emphasized nonpharmacologic treatments for acute, subacute, and chronic LBP, recommending exercise therapy as a first-line approach and spinal manipulative therapy (SMT) as an option for modest pain and function improvements (Singh & Patel, 2023; Wang et al., 2023). Acupuncture and mindfulness-based stress reduction (MBSR) were suggested for chronic LBP with limited evidence but potential benefits. Shared decision-making was encouraged to align treatments with patient preferences and goals. Pharmacologic options, including NSAIDs and acetaminophen, were advised only after considering nonpharmacologic alternatives (Nguyen et al., 2022; Brown, 2021).

10. STRENGTHS AND LIMITATIONS OF MANUAL THERAPY TECHNIQUES

The strengths and limitations of each manual therapy technique are discussed briefly in the following table. (Table 1)

Selection of Treatment:

The selection of treatment for LBP is influenced by various factors, including patient preferences, clinician expertise, and treatment accessibility. Let's discuss each of these factors in detail:

Patient Preferences:

Patient preferences significantly influence LBP treatment choices. Personal beliefs, cultural factors, and prior experiences may lead some to favor noninvasive treatments like manual therapy or exercise, while others prioritize convenience, cost, or maintaining daily routines with options like home exercises. Effective clinician-patient communication is vital to understanding preferences, addressing concerns, and collaboratively choosing the best treatment.

Clinician Expertise:

Clinician expertise and training play a key role in LBP treatment selection. Providers like chiropractors, physical therapists, and osteopathic physicians often base their intervention preferences on their skills and experience. Treatment decisions also depend on the patient's symptoms and underlying conditions. Interdisciplinary collaboration among specialists, including physiatrists, surgeons, and psychologists, ensures comprehensive care for complex LBP cases.

Treatment Accessibility:

Accessibility to treatments for LBP is shaped by geographic location, financial constraints, insurance coverage, and healthcare availability. Rural or underserved areas often face limited access to specialized care, while costs, such as out-of-pocket expenses and insurance limitations, significantly influence patient decisions. Long wait times and restricted availability of certain treatments may also lead patients to seek alternative options.

11. CONCLUSION AND OUTLOOK

The comparative analysis of manual therapy techniques for CLBP highlights their effectiveness, safety, and clinical utility. Each technique offers unique benefits, emphasizing the need for individualized treatment tailored to patient needs. Common themes include the importance of skilled application, the benefits of combining manual therapy with exercise, education, and psychosocial support, and the value of patient-centered care through shared decision-making. Future research should focus on high-quality trials to compare techniques, identify ideal patient groups, and refine treatment strategies. Efforts to improve access, affordability, and integration of manual therapy in interdisciplinary care models are essential for addressing the growing CLBP burden and enhancing patient outcomes.

Table 1: The strengths and limitations of manual therapy techniques

Technique	Strengths	Limitations
Spinal Manipulation	Efficacy: SMT has shown effectiveness in reducing pain and improving function in some individuals with acute and chronic LBP.	Adverse Events: While generally considered safe, SMT carries a small risk of adverse events such as minor discomfort or rare serious complications.
	Immediate Effects: It may provide immediate pain relief and improvements in range of motion, making it suitable for acute symptomatic relief.	Limited Evidence: The evidence supporting SMT for LBP is mixed, with some studies showing modest benefits and others finding no significant difference compared to other interventions.
Spinal Mobilization	Improved Mobility: SMob techniques aim to restore normal joint motion and alleviate stiffness, which may improve functional outcomes and reduce pain.	Heterogeneity: There is variability in the application of SMob techniques, making it challenging to standardize protocols and compare outcomes across studies.
	Noninvasive: It is a noninvasive intervention that is generally well-tolerated and may be suitable for patients with contraindications to more aggressive interventions.	Limited Evidence: The evidence base for SMob in LBP is limited, with some studies showing benefits but overall requiring further research.
Massage Therapy	Relaxation and Pain Relief: Massage therapy can induce relaxation, reduce muscle tension, and provide symptomatic relief for individuals with LBP.	Short-Term Effects: While massage therapy may offer short-term pain relief, the effects may not always be sustained over the long term, requiring ongoing treatment for symptom management.
	Noninvasive: It is a noninvasive intervention that is generally well-tolerated and may appeal to patients seeking alternative or complementary therapies for LBP.	Variability in Techniques: There is variability in massage techniques and practitioner skills, which can impact treatment outcomes and hinder standardization in research studies.
Soft Tissue Mobilization	Targeted Treatment: STM techniques target specific muscles and fascia, aiming to reduce muscle tension and improve tissue flexibility, which may alleviate LBP symptoms.	Limitations: Skill Dependent: Effective application of STM techniques requires skill and training, and outcomes may vary based on practitioner experience and expertise.
	Complementary Approach: STM can be used in conjunction with other manual therapy techniques and exercise interventions to optimize treatment outcomes for LBP.	Limited Evidence: While commonly used in clinical practice, the evidence base for STM in LBP is limited, with more research needed to establish its efficacy and optimal application.
Manual Traction	Decompression: Manual traction techniques aim to decompress spinal structures, potentially reducing pressure on nerve roots and relieving LBP symptoms, particularly in individuals with disc-related pain.	Risk of Injury: Improper application of manual traction techniques may lead to injury or exacerbation of LBP symptoms, highlighting the importance of appropriate training and supervision.
	Adjunctive Therapy: Manual traction can be used as an adjunct to other manual therapy interventions and exercise programs, enhancing the effectiveness of comprehensive treatment plans for LBP.	Evidence Gaps: While manual traction is commonly used in clinical practice, the evidence supporting its efficacy for LBP is limited, with further research needed to establish its effectiveness and safety.
Joint Mobilization of the Pelvis and Sacroiliac Joint	Targeted Treatment: Joint mobilization techniques focus on restoring normal joint mechanics and alignment, which may alleviate pain and improve function in individuals with SIJ dysfunction and pelvic instability.	Specificity: Joint mobilization techniques require precise application and targeting of affected joints, which may necessitate advanced training and expertise for optimal outcomes.
	Multimodal Approach: Joint mobilization can be integrated into comprehensive treatment plans for LBP, combining manual therapy techniques, exercise therapy, and patient education to address the underlying causes of pain and dysfunction.	Evidence Quality: While some studies support the effectiveness of joint mobilization for SIJ dysfunction and pelvic pain, the evidence base is limited by methodological issues and variability among studies, requiring further research to establish its efficacy and clinical utility.

Source: Author's Research

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