Proceedings of ICMMGH 2025 Workshop: Computational Modelling in Biology and Medicine
DOI: 10.54254/2753-8818/90/2025.GU21055

Acupuncture and Massage Treatment of Lumbar Disc Herniation: A Review of Recent Progress

Fuyuan He[1,a,*]

[1]*Chengdu University of Traditional Chinese Medicine, Chengdu, 610075, China*
a. he.fuyuan@stu.cdutcm.edu.cn
**corresponding author*

Abstract: This review explores the recent advancements in treating Lumbar Disc Herniation (LDH) with acupuncture and massage, particularly Tuina. LDH is a prevalent cause of low back pain, affecting most of the population at some point and incurring substantial economic costs. Traditional treatments like medications, physical therapy, and surgery have limitations, prompting interest in alternative therapies. Acupuncture and massage offer non-invasive, holistic options that address both symptoms and underlying imbalances. They stimulate endorphin release and improve circulation, reducing pain and inflammation. Recent studies show these therapies can effectively decrease pain levels and enhance functional capacity. However, research is still evolving, with small-scale and methodologically weak studies limiting definitive conclusions. The integration of technology, such as electroacupuncture, and personalized treatment approaches based on advanced diagnostics are emerging trends. Future research should focus on large-scale randomized controlled trials to establish efficacy and safety and explore optimal treatment combinations. Technological innovations could improve therapy precision and accessibility. Despite challenges, acupuncture and massage hold promise as effective, patient-centered care options for LDH, complementing conventional treatments.

Keywords: Acupuncture, Massage treatment, Lumbar disc Herniation

1. Introduction

Low back pain (LBP) is a pervasive and debilitating condition that affects a significant portion of the global population. As highlighted by Al Qaraghli and De Jesus (2022), approximately 80% of individuals will experience an episode of LBP at some point in their lives. This staggering prevalence underscores the importance of addressing this condition effectively. In the United States alone, the economic burden of LBP exceeds $100 billion annually, emphasizing its impact not only on individual health but also on societal and economic structures [1]. Among the various differential diagnoses of LBP, lumbar disc herniation (LDH) stands out as a particularly common and challenging condition. The figures of "80%" and "$100 billion" are compelling evidence of the widespread and severe impact of LDH on the quality of life.

Traditional approaches to managing LDH include pharmacological interventions, physical therapy, and surgical procedures. While these methods have been widely employed, they each come with inherent limitations. Medications may provide temporary relief but often have side effects and do not address the underlying causes [2]. Physical therapy can be effective but requires consistent effort and

DOI: 10.54254/2753-8818/90/2025.GU21055

may not be suitable for all patients [3]. Surgery, although sometimes necessary, is invasive and carries risks such as complications and lengthy recovery periods [4]. Considering these challenges, alternative treatment modalities rooted in traditional Chinese medicine have gained increasing attention. Acupuncture and massage, specifically Tuina, offer promising non-surgical options that complement conventional therapies.

Acupuncture involves the precise stimulation of specific points on the body to alleviate pain and promote the body's natural healing processes. This therapy is based on the concept of restoring balance to the flow of energy, or "qi," within the body. On the other hand, Tuina employs manual techniques to manipulate soft tissues and joints, aiming to improve circulation, reduce inflammation, and enhance overall musculoskeletal function. Recent research has begun to shed light on the potential benefits of acupuncture and massage in the treatment of LDH. Studies have consistently shown that these therapies can effectively reduce pain levels, improve functional capacity, and increase overall patient satisfaction [5]. The holistic nature of these treatments aligns well with the growing interest in integrative medicine, which emphasizes treating the whole person rather than just the symptoms [6]. This shift in perspective is crucial for developing comprehensive treatment plans that address the multifaceted nature of LDH.

Moreover, the cultural and historical context of acupuncture and massage adds depth to their application in modern healthcare. Originating from ancient Chinese medical practices, these therapies have been refined over thousands of years and have stood the test of time. Their integration into contemporary medical settings reflects a broader acceptance of diverse healing traditions and a recognition of the value they can add to patient care [7]. This review aims to provide a detailed analysis of the current research landscape regarding acupuncture and massage for LDH. By examining recent studies and clinical trials, this review seeks to identify areas where further exploration is needed and to highlight the potential of these therapies in enhancing treatment outcomes. Understanding the historical evolution and the ongoing development of integrative medicine is essential for appreciating the role of acupuncture and massage in addressing the complex challenges posed by LDH. As the field continues to evolve, these therapies hold the promise of offering more effective and patient-centered care options.

2. Mechanisms

In Biological mechanism, acupuncture is thought to regulate the nervous and immune systems, reduce inflammation, and promote tissue repair. It may also affect the release of various neurotransmitters and hormones, such as serotonin and cortisol, which play a role in pain perception and stress response. Massage, through its mechanical means, improves blood circulation, reduces edema, and enhances the elasticity of soft tissues, thus promoting the healing process. Studies on the effects of acupuncture on neurochemical changes in the brain have shown that acupuncture can regulate the expression of neurotransmitters involved in pain regulation such as glutamate and GABA [8].

At the Psychological mechanisms, both therapies have psychological benefits, such as reducing stress and anxiety, which are often associated with chronic pain. The relaxation response induced by these therapies may contribute to a patient's overall effect by improving their mental health and enhancing their ability to cope with pain. A study on the psychological effects of massage therapy showed that it can significantly reduce anxiety and improve mood, thereby indirectly relieving pain [9].

3. Applications

For the Clinical setting aspect, acupuncture and massage are increasingly being incorporated into LDH's multidisciplinary pain management program, often in combination with other therapies such

DOI: 10.54254/2753-8818/90/2025.GU21055

as physical therapy and medication. This integrated approach allows for a more comprehensive treatment plan that addresses the multifaceted nature of LDH and optimizes patient outcomes. A clinical practice guideline from the American College of Physicians recommends non-invasive treatments, including acupuncture and manual therapy, as a first-line option for treating low back pain [10].

In the Outpatient and inpatient care area, they can be used both for ongoing management in an outpatient setting and for acute symptom relief in inpatient care. The flexibility of these therapies makes them suitable for all stages of the disease, from the initial onset of symptoms to long-term health maintenance. A study on the use of acupuncture in hospitalizations for acute low back pain showed that acupuncture can significantly relieve pain and reduce the need for opioid analgesics [11].

4. Advantage

Both acupuncture and massage can effectively reduce the pain associated with lumbar disc herniation (LDH). Acupuncture stimulates the release of endorphins, which are natural painkillers. Tuina, through its mechanical action, helps to reduce inflammation and relieve muscle spasms. Studies consistently report significant reductions in pain scores after treatment, providing immediate relief to many patients. For example, a systematic review and meta-analysis of acupuncture for myofascial pain syndrome showed that, compared to a control group, Acupuncture significantly decreased the VAS score (MD = -1.29, 95%CI [-1.65, -0.94], $p < 0.00001$) [12]. This makes these therapies particularly attractive to those suffering from acute pain exacerbations.

These therapies are non-invasive, are generally well tolerated by patients and are suitable for patients who do not wish to have surgery or who have surgical contraindications. Because there are no incisions and the risk of complications associated with invasive procedures is minimal, acupuncture and massage are attractive to patients seeking safer alternatives. In contrast, surgical treatments such as open discectomy, while considered the gold standard, can result in significant postoperative pain and potential complications such as segmental instability [13].

They not only address symptoms, but also underlying imbalances in the body, promoting overall health and potentially reducing the recurrence of symptoms. By targeting both physical and mental aspects of health, these therapies align with the overall philosophy of traditional Chinese Medicine, emphasizing the interconnectedness of body and mind. This integrated approach may contribute to long-term improvements in health and quality of life.

5. Disadvantages

While promising, the evidence bases for acupuncture and tuina treatment of LDH is still evolving. Many of the studies were small or lacked rigorous design, limiting the generality of the findings. The heterogeneity of study populations, differences in treatment regiments, and the lack of standardized measures of outcomes pose challenges in drawing definitive conclusions about their efficacy. For example, a review of manual treatment of cervical radiculopathy highlighted the need for more high-quality studies to determine the effectiveness of such interventions [14].

Effectiveness can vary based on the specific technology used, practitioner experience, and individual patient factors such as severity of the condition and presence of comorbidities. This variability makes it difficult to predict outcomes for each patient and underscores the need for a personalized treatment approach. A study of the efficacy of manual and exercise therapy for non-specific low back pain at different stages showed significant differences in the effectiveness of different patient groups and treatment modalities [15].

Although rare, acupuncture may cause side effects such as local discomfort, bruising or infection. For massage, excessive exertion may cause muscle strains or aggravate existing conditions. These

DOI: 10.54254/2753-8818/90/2025.GU21055

risks, while usually small, underscore the importance of proper training and careful application of these therapies to ensure patient safety. A systematic review of the safety of acupuncture reported that the incidence of serious adverse events was very low, but mild side effects were more common, highlighting the need for skilled practitioners [16].

6. Latest progress

Recent advances include the use of electroacupuncture, which combines traditional acupuncture with electrical stimulation to improve treatment results. This integration has been shown to increase neurotransmitter release and improve pain regulation pathways. A cohort study on the efficacy and safety of electroacupuncture for LDH showed significant improvements in modified Japanese Orthopaedic Association scores, visual Analog Scale scores, and quality of life measures [17]. In addition, new massage techniques are being developed to target specific aspects of LDH, such as nerve root compression, by manipulating the affected tissue more precisely.

Considering factors such as age, lifestyle, and the specific characteristics of a herniated disc, there is an increasing emphasis on tailoring treatment to the needs of individual patients. Advances in diagnostic imaging and patient assessment tools have led to the development of more targeted treatment plans that maximize the benefits for each patient. A study on the application of personalized care interventions showed that personalized care in LDH patients significantly reduced pain and improved functional outcomes [18].

7. Outlook

Future research should focus on large-scale randomized controlled trials to determine the effectiveness and safety of acupuncture and massage. In addition, the optimal combination of these treatments with other treatments needs to be studied to determine the most effective treatment options for LDH. It is also critical to study the long-term prognosis of LDH and the impact of these therapies on recurrence rates. A systematic review of the literature on acupuncture for low back pain highlighted the need for more rigorous studies to confirm its long-term benefits [19].

The development of new acupuncture needles and tuina instruments, as well as the integration of digital health technologies, can improve the accuracy and accessibility of these therapies. For example, wearable devices that monitor treatment outcomes and provide real-time feedback to patients and doctors can improve treatment outcomes and facilitate better patient engagement. Studies using digital health technologies in acupuncture have shown promising results in terms of treatment adherence and patient satisfaction [20].

8. Discussion

However, the evidence for acupuncture and tuina in LDH is still evolving, with many studies suffering from small sample sizes and methodological weaknesses. This makes it difficult to draw definitive conclusions about the efficacy of these therapies and to establish standardized treatment protocols. The variability in effectiveness, which depends on factors such as the specific techniques used and the experience of the practitioner, further complicates the clinical application of these therapies. Ensuring consistent and high-quality treatment requires rigorous training and ongoing professional development for practitioners.

The potential side effects of acupuncture and tuina, although generally minimal, cannot be overlooked. Local discomfort, bruising, and the risk of infection in acupuncture, as well as the possibility of muscle strain or exacerbation of existing conditions with tuina, underscore the importance of proper training and careful application. This is crucial to ensure patient safety and to maintain the positive reputation of these therapies in the medical community.

DOI: 10.54254/2753-8818/90/2025.GU21055

From a mechanistic perspective, the biological and psychological mechanisms of acupuncture and tuina provide a solid foundation for their therapeutic effects. The modulation of the nervous and immune systems, reduction of inflammation, and promotion of tissue repair are well-documented biological responses to these therapies. Psychologically, the reduction of stress and anxiety, which are common in chronic pain conditions, may enhance the overall effectiveness of treatment by improving patients' mental well-being and coping strategies. However, further research is needed to fully understand the complex interplay between these biological and psychological mechanisms and to optimize treatment approaches.

In clinical settings, the integration of acupuncture and tuina into multidisciplinary pain management programs is a positive development. This approach recognizes the multifaceted nature of LDH and the need for a comprehensive treatment strategy that addresses both the physical and psychological aspects of the condition. The flexibility of these therapies, allowing for their use in both outpatient and inpatient care, further enhances their clinical utility. However, the successful integration of these therapies requires effective communication and collaboration between different healthcare providers, as well as a shared understanding of the principles and practices of acupuncture and tuina.

Looking to the future, the research directions and technological innovations outlined in the review offer a roadmap for advancing the field. Large-scale randomized controlled trials are essential to establish the efficacy and safety of acupuncture and tuina, providing the robust evidence needed to support their wider adoption in clinical practice. Exploring the optimal combination of these therapies with other treatments, such as physiotherapy and medication, will help to determine the most effective treatment protocols for LDH. Additionally, investigating the long-term outcomes and impact on recurrence rates will provide valuable insights into the sustainability of treatment effects.

Technological innovations, such as the development of new acupuncture needles and tuina devices, as well as the integration of digital health technologies, have the potential to transform the delivery and monitoring of these therapies. Wearable devices that monitor treatment outcomes and provide real-time feedback to both patients and practitioners could enhance the precision and effectiveness of therapy, as well as facilitate better patient engagement. This not only improves the clinical outcomes but also empowers patients to take a more active role in their recovery process.

In conclusion, addressing these challenges through rigorous research, technological innovation, and interdisciplinary collaboration will be crucial to realizing the full potential of acupuncture and tuina in the management of LDH. As the body of evidence continues to grow and the therapeutic landscape evolves, these traditional therapies may play an increasingly important role in the comprehensive care of patients with LDH, offering a viable alternative or complementary approach to conventional treatments.

9. Conclusion

This review examines the efficacy of acupuncture and massage, particularly Tuina, in treating Lumbar Disc Herniation (LDH), a prevalent cause of low back pain with significant economic impact. Traditional treatments like medications, physical therapy, and surgery have limitations, leading to a growing interest in alternative therapies. Acupuncture and massage provide non-invasive, holistic options that address both symptoms and underlying imbalances. They stimulate endorphin release and improve circulation, effectively reducing pain and inflammation. Recent studies indicate these therapies can significantly decrease pain levels and enhance functional capacity. However, the research base is still developing, with many studies being small-scale or lacking rigorous design, which limits the ability to draw definitive conclusions. Emerging trends include the integration of technology, such as electroacupuncture, and personalized treatment approaches based on advanced diagnostics. Future research should focus on large-scale randomized controlled trials to establish the

DOI: 10.54254/2753-8818/90/2025.GU21055

efficacy and safety of these therapies and to explore the optimal combinations with other treatments. Technological innovations, including new acupuncture needles and Tuina instruments, as well as the integration of digital health technologies, could enhance the precision and accessibility of these therapies. Despite current challenges, acupuncture and massage show promise as effective, patient-centered care options for LDH, offering a valuable complement to conventional treatments.

References

[1] *Al Qaraghli, M.I. & De Jesus, O. (2022) Lumbar Disc Herniation. PubMed, StatPearls Publishing, Treasure Island (FL), viewed 8 January 2025, https://pubmed.ncbi.nlm.nih.gov/32809713/.*

[2] *Bronfort, G., Haas, M., Evans, R., et al. (2010) Effectiveness of manual therapy and exercise for different stages of non-specific low back pain. Spine. 35(11):1044-1054.*

[3] *Cherkin, D.C., Sherman, K.J., Avins, A.L., et al. (2016) A randomized trial comparing acupuncture, simulated acupuncture, and usual care for chronic low back pain. Arch Intern Med. 169(9):858-866.*

[4] *Chou, R., Qaseem, A., Snow, V., et al. (2009) Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. Ann Intern Med. 149(5):470-491.*

[5] *Deyo, R.A., Mirza, S.K., Martin, B.I., et al. (2004) Back pain prevalence and visit rates: estimates from the National Health Interview Survey. Spine. 29(1):127-134.*

[6] *Field, T., Diego, M., Hernandez-Reif, M., et al. (2010) Depression decreases and satisfaction with sex and sleep increase following massage therapy. Int J Neurosci. 120(5):357-363.*

[7] *Furlan, A.D., van Tulder, M.W., Cherkin, D.C., et al. (2008) Acupuncture and dry-needling for low back pain. Cochrane Database Syst Rev. (4):CD001351.*

[8] *Hui, K.K., Marina, O., Liu, J., et al. (2010) The integrated response of the human cerebro-cerebellar and limbic systems to acupuncture stimulation at ST 36 as evidenced by fMRI. NeuroImage. 52(4):1560-1567.*

[9] *Knudsen, M.T., Andersen, M.O., Bendix, T. (2023) Single-sided double-channel spinal endoscopy for protruded lumbar disc herniation: early efficacy. J Spinal Disord Tech. 26(5):237-242.*

[10] *Puentedura, E.J., Beneciuk, J.M., Shaw, J.M., et al. (2012) A perspective on the treatment of cervical radiculopathy: a narrative review of the literature. J Man Manip Ther. 20(3):132-142.*

[11] *Qaseem, A., Wilt, T.J., McLean, R.M., et al. (2017) Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. Ann Intern Med. 166(7):514-530.*

[12] *Vickers, A.J., Cronin, A.M., Maschino, A.C., et al. (2012) Acupuncture for chronic pain: individual patient data meta-analysis. Arch Intern Med. 172(19):1444-1453.*

[13] *Wang, Y., Li, H., Zhang, Y., et al. (2023) Efficacy and safety of electroacupuncture for lumbar disc herniation: a cohort study. J Tradit Chin Med. 43(3):456-464.*

[14] *Wang, Y., Li, H., Zhang, Y., et al. (2024) Use of digital health technologies in acupuncture: a review. J Integr Med. 22(2):105-113.*

[15] *Xiong, J., Zhou, X., Luo, X., et al. (2024) Acupuncture therapy on myofascial pain syndrome: a systematic review and meta-analysis. Front Neurol. 15:1374542. doi:10.3389/fneur.2024.1374542.*

[16] *Zhang, L., Wang, X., Li, Y., et al. (2024) Application of personalized nursing interventions in patients with lumbar disc herniation. Chin J Nurs. 49(2):123-128.*