

Clinical Study on the Treatment of Lumbar Disc Herniation with Electroacupuncture Combined with Heat-Sensitive Moxibustion

Zhihong Zhang

Community Health Service Center of Xijie Subdistrict Office, Chengqu District, Jincheng 048000, Shanxi, China

Copyright: © 2026 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: *Objective:* To investigate the clinical efficacy of adjacent-needling electroacupuncture combined with heat-sensitive moxibustion in the treatment of lumbar disc herniation (LDH), as well as its impact on pain relief, improvement of lumbar function, and levels of inflammatory factors. *Methods:* A total of 120 LDH patients who sought treatment at our hospital from January 2023 to December 2024 were selected and randomly divided into two groups using the envelope method. The two groups received different treatment modalities: the adjacent-needling electroacupuncture plus heat-sensitive moxibustion group (observation group, 60 cases) and the conventional acupuncture group (control group, 60 cases). Both groups underwent treatment for two courses. Changes in the Visual Analogue Scale (VAS) for pain, the Japanese Orthopaedic Association (JOA) score for lumbar function, the straight leg raise (SLR) angle, and serum inflammatory factors IL-6 and TNF- α were compared between the two groups before and after treatment. *Results:* After two courses of treatment, both groups showed improvements in pain and functional indicators compared to before treatment ($P < 0.05$), but the observation group demonstrated more significant improvements. Compared to the control group, the observation group had a more pronounced decrease in VAS scores, a greater increase in JOA functional scores, and a more substantial improvement in the SLR angle (all $P < 0.05$). Both groups exhibited a marked decrease in serum IL-6 and TNF- α levels, but the reduction in the observation group was significantly greater than that in the control group ($P < 0.05$). After treatment, the total effective rate in the observation group was 93.33%, while in the control group it was 78.33%, with the observation group demonstrating a significantly higher overall effectiveness ($P < 0.05$). *Conclusion:* Electroacupuncture combined with heat-sensitive moxibustion can significantly alleviate pain and improve lumbar function in patients with LDH, offering advantages such as ease of operation and reliable efficacy, making it suitable for clinical promotion.

Keywords: Adjacent-needling electroacupuncture; Heat-sensitive moxibustion; Lumbar disc herniation; Pain; Inflammatory factors

Online publication: March 12, 2026

1. Introduction

In orthopedics and rehabilitation medicine, lumbar disc herniation (LDH) stands as the most prevalent degenerative disease, with its incidence rising annually among young and middle-aged populations, severely impacting patients' work capacity and quality of daily life^[1]. In recent years, due to changes in lifestyle, accelerated pace of life, and an increase in occupational factors such as prolonged sitting and heavy physical labor, the clinical consultation rate for LDH patients has notably increased. LDH is primarily caused by the rupture of the fibrous ring, leading to the protrusion of the nucleus pulposus backward or laterally, compressing adjacent nerve roots, and thereby causing lower back pain, radiating pain in the lower extremities, muscle weakness, and impaired mobility^[2]. Modern imaging studies have indicated that the occurrence of pain is closely related to the inflammatory level of the herniated material and the edema of the surrounding soft tissues. Clinically, the treatment methods for LDH mainly include conservative treatment and surgical treatment. However, conservative treatment is currently the preferred clinical approach, as most patients experience significant symptom relief after undergoing standardized conservative treatment. Common conservative treatment methods typically include oral administration of non-steroidal anti-inflammatory drugs, physical interventions, rehabilitation exercises, acupuncture, massage, etc.^[3]. Although these methods can alleviate patients' symptoms to a certain extent, they still have some shortcomings, such as a high recurrence rate, unstable therapeutic effects, and difficulty in effectively improving inflammatory responses.

In recent years, traditional Chinese medicine (TCM) therapies have gradually garnered widespread attention in the clinical application of musculoskeletal system diseases. Electroacupuncture is a technique that combines traditional acupuncture with electrical stimulation, enhancing the analgesic and muscle-relaxing effects of acupuncture while improving local blood circulation and promoting nerve function and tissue repair capabilities^[4]. This mechanism of action may be related to regulating the subcortical pain center nerves, increasing the secretion of endogenous opioid peptides, and alleviating the local inflammatory environment. Thermosensitive moxibustion, an improved technique of traditional moxibustion, places greater emphasis on identifying special acupoints with thermosensitive reactions. Through the heat sensation produced after moxibustion, phenomena such as conduction, diffusion, and jumping along the meridians can fully stimulate meridian responses and enhance the circulation and flow of qi and blood. Studies have indicated that thermosensitive moxibustion can not only reduce soft tissue edema in patients but also regulate inflammatory factor levels while having a certain effect on alleviating nerve root compression^[5].

Both heat-sensitive moxibustion and electroacupuncture techniques are important modalities in external TCM therapy, and they exhibit certain complementary effects in terms of their mechanisms of action. Electroacupuncture primarily relies on electrical stimulation to achieve analgesic relief and muscle relaxation, while heat-sensitive moxibustion utilizes heat and meridian reactions to improve local blood circulation and inflammatory conditions. Combining these two techniques may leverage their complementary effects, potentially synergistically enhancing the local environment around nerve roots and thereby yielding more pronounced relief of patient symptoms^[6]. Although existing studies have indicated that the combination of electroacupuncture and heat-sensitive moxibustion is highly effective in treating conditions such as lumbago and leg pain, there remains a lack of sufficient large-scale, systematic research to further substantiate its efficacy and scientific basis. Based on this, the present study employs a grouped control design to compare the clinical effects of traditional acupuncture therapy versus electroacupuncture combined with heat-sensitive moxibustion in the treatment of LDH. This comparison is supplemented by a comprehensive evaluation using multiple indicators, thereby providing more valuable

evidence-based references for clinical practice.

2. Materials and methods

2.1. General information

A total of 120 patients with LDH who sought medical treatment at our hospital from January 2023 to December 2024 were selected. All patients were randomly divided into two groups using the envelope method, with different treatment modalities administered to each group. The observation group received electroacupuncture combined with heat-sensitive moxibustion ($n = 60$), while the control group received conventional acupuncture ($n = 60$). In the observation group, there were 39 males and 21 females, aged between 27 and 60 years, with an average age of 43.31 ± 4.01 years. The disease duration ranged from 1 to 60 months, with an average of 18.63 ± 12.41 months. In the control group, there were 29 males and 31 females, aged between 25 and 59 years, with an average age of 40.92 ± 4.83 years. The disease duration ranged from 1 to 58 months, with an average of 17.52 ± 12.61 months. The differences in general data, such as gender, age, and disease duration, between the two groups were small and not statistically significant ($P > 0.05$), indicating comparability.

Inclusion criteria: (1) Meeting the relevant diagnostic criteria outlined in the “Diagnostic Guidelines for Lumbar Disc Herniation”^[7]; (2) Having low back pain with radiating pain in the lower extremities as confirmed by imaging diagnosis; (3) Aged between 18 and 75 years; (4) Able to cooperate with treatment and undergo scoring; (5) Not having received other intervention treatments or having discontinued relevant medications for ≥ 2 weeks.

Exclusion criteria: (1) Patients with obvious lumbar spondylolisthesis or spinal deformities; (2) Patients with severe cardiac, hepatic, or renal dysfunction or those unable to tolerate treatment; (3) Pregnant or lactating women; (4) Patients with mental disorders who are unable to cooperate with treatment and scoring; (5) Patients with contraindications to acupuncture or moxibustion.

2.2. Methods

2.2.1. Control group: Conventional acupuncture

Acupuncture points, including Ashi points in the lumbar region, Jiaji points (L3–S1), Huantiao, and Chengshan, were selected. After achieving deqi with conventional manipulation techniques, the needles were retained for 30 minutes, once daily for 5 sessions constituting one course of treatment, with a total of 2 courses administered.

2.2.2. Observation group: Adjacent-needling electroacupuncture combined with heat-sensitive moxibustion

On the basis of the conventional acupuncture used in the control group, the observation group received adjacent-needling electroacupuncture combined with heat-sensitive moxibustion treatment:

Adjacent-needling electroacupuncture: Acupuncture points were selected centered around the affected lumbar segments. Adjacent-needling was performed at points 0.5–1.0 inches lateral to the Jiaji points in the lumbar region, with the needle body angled towards the lesion. The depth of needle insertion was based on the patient’s subjective tolerance. Acupuncture points, including bilateral Jiaji points in the lumbar region, Huantiao, and Zhibian, were selected. A G6805 electroacupuncture device was connected, and dense wave stimulation at a frequency of 2/100 Hz was applied. The intensity of stimulation was adjusted to induce a noticeable sensation of soreness and distension without causing discomfort, and the needles were retained for 30 minutes.

Heat-sensitive moxibustion: Moxibustion was performed using moxa sticks at acupuncture points exhibiting heat-sensitive reactions, maintaining a distance of 2–3 cm from the skin. The treatment was continued until the patient experienced heat diffusion, a jumping sensation, or a penetrating heat sensation. Each point was treated for 10–15 minutes.

Both groups underwent treatment for 10 days as one course of treatment, with a total of 2 courses administered.

2.3. Observation indicators

- (1) Visual Analogue Scale (VAS) score;
- (2) Japanese Orthopaedic Association (JOA) lumbar spine function score;
- (3) Straight leg raise (SLR) straight leg raise angle;
- (4) Serum levels of IL-6 and TNF- α ;
- (5) Clinical efficacy evaluation (marked effective, effective, ineffective).

2.4. Statistical methods

Our hospital analyzed the study using the SPSS 21.0 statistical software package. Measurement data were expressed using mean \pm standard deviation (SD), and comparisons between groups were made using the *t*-test. Count data were expressed using relative numbers, and comparisons between groups were made using the χ^2 test. A *P*-value of less than 0.05 was considered statistically significant.

3. Results

3.1. Comparison of pain levels (VAS) and lumbar spine function (JOA) scores between the two groups before and after treatment

After treatment, VAS scores decreased significantly in both groups, with a more pronounced decrease in the observation group. Additionally, the observation group showed more significant improvement in JOA scores, with statistically significant differences ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of VAS scores before and after treatment between the two groups (points, mean \pm SD)

Group	<i>n</i>	VAS		JOA	
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Control group	60	6.82 \pm 1.10	3.95 \pm 0.82	14.26 \pm 2.31	19.82 \pm 2.45
Observation group	60	6.79 \pm 1.12	2.18 \pm 0.67	14.33 \pm 2.29	23.51 \pm 2.80
<i>t</i> -value	—	0.763	13.841	0.164	8.518
<i>P</i> -value	—	0.835	0.001	0.891	0.001

3.2. Comparison of changes in straight leg raise (SLR) angles before and after treatment between the two groups

Both groups showed an increase in SLR angles after treatment, with a more significant improvement observed in the observation group ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of SLR angles between the two groups ($^{\circ}$, mean \pm SD)

Group	<i>n</i>	Pre-treatment	Post-treatment
Control group	60	37.95 \pm 7.20	58.32 \pm 8.99
Observation group	60	38.02 \pm 7.33	68.21 \pm 9.25
<i>t</i> -value	—	0.052	5.653
<i>P</i> -value	—	0.761	0.001

3.3. Comparison of serum inflammatory factor levels (IL-6, TNF- α) before and after treatment between the two groups

Both groups exhibited a decrease in IL-6 and TNF- α levels after treatment, with a more pronounced reduction in the observation group ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparison of inflammatory factor levels between the two groups (ml, mean \pm SD)

Group	<i>n</i>	IL-6 (pg/mL)		TNF- α (pg/mL)	
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment
Control group	60	18.62 \pm 4.51	12.31 \pm 3.02	24.78 \pm 5.12	17.35 \pm 4.92
Observation group	60	18.57 \pm 4.59	9.08 \pm 2.36	24.85 \pm 5.16	13.02 \pm 4.15
<i>t</i> -value	—	0.060	6.528	0.061	5.211
<i>P</i> -value	—	0.952	0.001	0.941	0.001

3.4. Comparison of total effective rates after treatment between the two groups

A comparison of clinical efficacy after treatment between the two groups revealed that the total effective rate was 95.00% in the observation group and 78.33% in the control group, with a statistically significant difference ($P < 0.05$), as shown in **Table 4**.

Table 4. Comparison of total effective rates after treatment between the two groups (*n*, %)

Group	Cured (<i>n</i>)	Markedly effective (<i>n</i>)	Effective (<i>n</i>)	Ineffective (<i>n</i>)	Total effective rate (%)
Control group	12	18	17	13	78.33
Observation group	19	23	15	3	95.00
χ^2	—	—	—	—	7.211
<i>P</i> -value	—	—	—	—	0.016

4. Discussion

Lumbar disc herniation is a common degenerative disease that often leads to lumbocrural pain and functional impairment in patients. The pathogenesis of this condition is primarily associated with intervertebral disc degeneration, compression of nerve roots by herniated material, and local inflammatory responses^[8]. As a traditional method in TCM rehabilitation therapy, acupuncture treatment is widely used in clinical practice. However, when it comes to improving symptoms of nerve compression and alleviating inflammatory responses, the use of a single acupuncture therapy yields relatively limited results^[9]. Compared with the traditional method

of acupuncture at the acupoint on the meridian, adjacent-needling electroacupuncture involves inserting needles beside the affected segment, bringing the stimulation closer to the nerve root area. This approach helps improve local blood circulation, reduce nerve root edema and inflammatory responses, thereby achieving more satisfactory results in relieving pain and improving function. In this study, adjacent-needling electroacupuncture was combined with heat-sensitive moxibustion. Under the combined effects of electrical stimulation and thermal stimulation, this combination demonstrates certain advantages in improving the local pathological state of patients with lumbar disc herniation. As a comprehensive intervention method, electroacupuncture combined with heat-sensitive moxibustion can exert synergistic effects through multiple mechanisms, including neural regulation, muscle relaxation, improvement of local blood circulation, and regulation of immune responses, providing a new direction for the treatment of lumbar disc herniation.

The results of this study show that compared with the control group, patients in the observation group exhibited more significant improvements in pain relief, lumbar function enhancement, and SLR angle increase. Meanwhile, serum levels of IL-6 and TNF- α were also significantly reduced, indicating that the combined treatment can effectively alleviate clinical symptoms while inhibiting the activity of inflammatory factors ^[10]. This result is consistent with existing research reports, indicating that electroacupuncture and heat-sensitive moxibustion can alleviate nerve root edema and inflammatory responses by improving local blood circulation and neuroendocrine function, thereby relieving pain and enhancing motor function. Additionally, in terms of the overall treatment effectiveness rate, the clinical overall effectiveness rate in the observation group was significantly higher than that in the control group, and no severe adverse reactions were observed in the observation group, suggesting that the combined treatment regimen exhibits high safety and feasibility ^[11]. However, this study still has certain limitations. The samples in this study were sourced from a single center and had a relatively small sample size, which limits the generalizability of the results. At the same time, this study only observed the short-term treatment effects and lacked long-term follow-up, making it difficult to evaluate the sustained effects and the risk of later recurrence. Furthermore, there were certain differences in the treatment duration and course between the two groups of patients, which may have influenced the treatment outcomes. Subsequent studies should involve larger sample sizes, multiple centers, and long-term follow-up to more accurately evaluate the combined therapy and its clinical value. Additionally, this study solely relied on symptom scores and inflammatory factor indicators for observation and analysis, without incorporating imaging indicators, which limits further interpretation of the mechanisms. Subsequent research could incorporate patient imaging data for evaluation and analysis to enhance the reliability and scientific rigor of the study results.

5. Conclusion

In summary, the combination of adjacent-needling electroacupuncture and heat-sensitive moxibustion can significantly alleviate pain symptoms in lumbar disc herniation, improve lumbar mobility, reduce inflammatory factor levels, and demonstrate high safety and feasibility, indicating good clinical application value.

Disclosure statement

The author declares no conflict of interest.

References

- [1] Pan C, Chen P, Zeng W, et al., 2025, Clinical Study on the Treatment of Lumbar Disc Herniation with Acupuncture Method of Regulating Spirit and Preserving Qi. *Inner Mongolia Journal of Traditional Chinese Medicine*, 44(1): 90–92.
- [2] He J, Huang X, Yi L, et al., 2025, Clinical Effect Study on the Treatment of Lumbar Disc Herniation with Bagua Strengthening Spine Electroacupuncture Method. *Chinese Journal of Trauma and Disability Medicine*, 33(4): 103–107.
- [3] Zhou Q, He X, Zhou H, 2025, Clinical Observation on the Treatment of Lumbar Disc Herniation with Heat-Sensitive Moxibustion Combined with Acupotomy. *Modern Distance Education of Chinese Medicine*, 23(5): 115–117.
- [4] Tian Y, Song W, Guo B, et al., 2025, Clinical Observation on the Treatment of Lumbar Disc Herniation with Scalp Acupuncture Combined with Warm Needling Moxibustion. *Modern Distance Education of Chinese Medicine*, 23(14): 139–141.
- [5] Pan J, 2024, Clinical Observation on the Treatment of Lumbar Disc Herniation with Heat-Sensitive Moxibustion Combined with Contralateral Needling Method. *Guangming Journal of Chinese Medicine*, 39(11): 2229–2232.
- [6] Xu F, 2025, Clinical Observation on the Treatment of Lumbar Disc Herniation with Heat-Sensitive Moxibustion Based on Six-Meridian Syndrome Differentiation. *Modern Distance Education of Chinese Medicine*, 23(11): 121–123.
- [7] Xiong Y, Ding Y, 2025, Clinical Observation on the Treatment of Cold-Dampness Type Lumbar Disc Herniation with Electroacupuncture at Six Lumbar Points Combined with Ginger-Partitioned Moxibustion. *Modern Distance Education of Chinese Medicine*, 23(7): 129–131.
- [8] Gao P, Yuan L, 2025, Rehabilitation Research on the Treatment of Lumbar Disc Herniation with Electroacupuncture at Jiaji Points Combined with Warm Needling Moxibustion. *Inner Mongolia Journal of Traditional Chinese Medicine*, 44(6): 132–133.
- [9] Xi L, Yang G, Liu Y, 2024, Rehabilitation Research on the Treatment of Lumbar Disc Herniation with Electroacupuncture at Jiaji Points Combined with Warm Needling Moxibustion. *Practical Clinical Journal of Integrated Traditional Chinese and Western Medicine*, 24(18): 121–124.
- [10] Cao Z, Yuan T, 2025, The Impact of Heat-Sensitive Moxibustion Therapy Combined with Rehabilitation Nursing on Patients with Lumbar Disc Herniation. *Journal of Basic Medical Forum*, 29(26): 7–9 + 24.
- [11] Chen J, Li S, Zhao G, 2025, Observation on the Effect of Comprehensive Treatment of Lumbar Disc Herniation with Acupuncture, Tuina, and Buyang Huanwu Decoction. *Shenzhen Journal of Integrated Traditional Chinese and Western Medicine*, 35(2): 65–68.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.