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Application of Aina Moxibustion in Degenerative Lumbar Spinal Stenosis Treatment with Warm Needle

Weijun Liu*, Taiyuan Jiang, Jiyong Zhang, Guanghua Long, Fei Long, Bo Zou
Qian Dong Nan Zhou Hospital of traditional Chinese Medicine, Kaili, Qiandongnan Autonomous Prefecture 556000, Guizhou

**Author to whom correspondence should be addressed.*

Abstract: *Objective:* To evaluate the clinical efficacy of Aina Xiang moxibustion in thermized acupuncture for degenerative lumbar spinal stenosis, providing a more optimized treatment protocol. *Methods:* A total of 60 patients with degenerative lumbar spinal stenosis admitted between January 2025 and December 2025 were randomly divided into two groups using a random number table method, with 30 patients in each group. The conventional thermized acupuncture group received moxa cones made from coarse mugwort wool, while the Aina Xiang moxibustion group received Aina Xiang sticks. Both groups underwent 7-day treatment courses for four consecutive sessions. Clinical outcomes were assessed using ODI scale scores, JOA scores, VAS scores, and clinical response rates at baseline, 2 weeks post-treatment, and 3 months post-treatment. Statistical analysis was performed using SPSS 13.0 software. *Results:* Pre-treatment comparisons of ODI scale scores, JOA scores, and VAS scores between the two groups showed no statistically significant differences ($P > 0.05$). At both 2-week post-treatment and 3-month follow-up, both groups demonstrated improvements in these metrics. Specifically, the Aina Xiangjiu Warm Needle Therapy group exhibited lower ODI scores (10.5 ± 2.8 points at 3-month post-treatment) and VAS scores (1.5 ± 0.8 points) compared to the conventional warm needle therapy group (15.8 ± 3.2 points vs 2.8 ± 0.9 points). The Aina Xiangjiu group also showed higher JOA scores (25.6 ± 1.8 points vs 22.1 ± 2.0 points) and a significantly greater clinical response rate (93.3% vs 76.7%) than the conventional group, with all differences reaching statistical significance ($P < 0.05$). *Conclusion:* Aina Xiangjiu demonstrates superior efficacy in improving lumbar function, alleviating pain, and enhancing clinical outcomes for degenerative lumbar spinal stenosis treated with warm needle therapy. This evidence-based approach provides valuable clinical guidance for managing such conditions and holds potential for broader application.

Keywords: Aina moxibustion; Warm needle moxibustion; Degenerative lumbar spinal stenosis; Clinical efficacy; ODI scale; JOA score; VAS score

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1. Introduction

Degenerative lumbar spinal stenosis is a prevalent orthopedic condition among middle-aged and elderly populations. With aging, factors such as degeneration of intervertebral discs, osteophyte formation at vertebral margins, and thickening of

the ligamentum flavum collectively reduce the sagittal or transverse diameter of the spinal canal. This compression of the cauda equina or nerve roots leads to chronic lower back and leg pain, intermittent claudication, and, in severe cases, may impair bowel/bladder function, significantly reducing patients' quality of life [1]. Current clinical treatments for this condition fall into two categories: conservative management and surgical intervention. While surgery can rapidly relieve nerve compression, it carries risks including significant trauma, prolonged recovery periods, and complications. Therefore, conservative treatment remains the preferred option for most patients with mild symptoms or those unsuitable for surgery. Moxibustion therapy, a common conservative approach, regulates meridian qi-blood circulation through acupoint stimulation. The warmth generated by burning mugwort fumigation enhances local lumbar blood flow, alleviates muscle spasms, and reduces inflammatory responses, accumulating substantial clinical experience in practice [2].

However, some patients still experience suboptimal symptom improvement after conventional warm moxibustion therapy, highlighting the urgent need for more effective treatment approaches [3]. Aina Moxibustion, originating from the traditional Miao medicine of Leigong Mountain in Qiandongnan, is a distinctive ethnic therapy. It uses mugwort plants from the Aina species to create moxa cones. Unlike traditional mugwort leaves, Aina Moxibustion contains unique chemical components such as volatile oils, flavonoids, and sesquiterpenes. Modern pharmacological studies confirm that these compounds exhibit anti-inflammatory, analgesic, neuroinflammatory inhibitory, and antioxidant effects. Additionally, its enhanced thermal penetration aids in dispelling wind-dampness and alleviating diarrhea, providing potential advantages for treating degenerative lumbar spinal stenosis [4,5]. To address this gap in clinical practice, this study explores innovative therapeutic approaches.

2. General information and methodology

2.1. General information

This study enrolled 60 patients with degenerative lumbar spinal stenosis admitted between January and December 2025, randomly divided into two groups using a random number table: the conventional warm acupuncture group (30 cases) and the Aina Xiangjiu warm acupuncture group (30 cases). The conventional group comprised patients aged 40–75 years old (average age 56.8 ± 7.2 years old), with 16 males and 14 females, and a BMI of (23.5 ± 2.1) kg/m²². The Aina Xiangjiu group included patients aged 41-74 years (average age 57.2 ± 6.9 years old), with 15 males and 15 females, and a BMI of (23.8 ± 1.9) kg/m²².

Inclusion criteria: clinically diagnosed as degenerative lumbar spinal stenosis; aged between 40 and 75 years old; no cauda equina neurogenic dysfunction of urine and stool; no relevant surgical treatment; understand the research content and sign the informed consent, and voluntarily accept the established treatment plan.

Exclusion criteria: spinal stenosis caused by non-degenerative factors; age below 40 or over 75 years old; progressive radicular damage or cauda equina dysfunction; imaging evidence of lumbar vertebral arch fissure and spinal tumors, tuberculosis, infection and other diseases.

2.2. Methodology

2.2.1. Conventional warm acupuncture group

The patient is seated with acupoints such as Yaoyangguan, Zhibian, Qihai, and Guanyuan selected. After inserting filiform needles into these points and obtaining a Qi response, the needle base is maintained 2-4cm from the skin surface while keeping it stationary. A mugwort pellet made of coarse mugwort wool, the size of a jujube seed, is wrapped around the needle handle. Each moxibustion session involves burning the pellet for 3-4 sessions. During combustion, protective paper sheets are placed over the skin to prevent burns from falling ash or overheating. Treatment is administered once daily, with a 7-day course constituting one treatment cycle, followed by four consecutive cycles.

2.2.2. Aina Xiang moxibustion and warm needle group

The patient is seated with acupoints such as Yaoyangguan, Zibian, Qihai, and Guanyuan selected. After inserting

filiform needles into these points to detect qi, the needle base is maintained 2–4 cm from the skin surface while keeping it stationary. A mugwort and incense stick wrapped in jujube seed-sized material is placed at the needle base. Each moxibustion session involves burning this stick for 3–4 full cycles. During combustion, protective paper sheets are used to shield the skin from ash or overheating burns. Treatment is administered once daily, with a 7-day cycle constituting one course of therapy. The entire treatment regimen consists of four consecutive courses.

2.3. Evaluation criteria

2.3.1. ODI scale scores

The scale was used to evaluate the degree of lumbar dysfunction in patients, with a total score of 50 points, and the higher the score, the more obvious the lumbar dysfunction. The scores were recorded before treatment, 2 weeks after treatment and 3 months after treatment.

2.3.2. JOA score

The lumbar function was evaluated from four dimensions: subjective symptoms, clinical signs, limitation of daily activities and bladder function. The total score was 29 points, and the lower the score, the more obvious the functional impairment. The scores were recorded before treatment, two weeks after treatment and three months after treatment.

2.3.3. VAS score and safety indicators

VAS score was used to evaluate the degree of pain of patients. The total score of the scale was 10 points, and the higher the score, the more obvious the pain was. The scores were recorded before treatment, two weeks after treatment and three months after treatment. At the same time, the adverse events and adverse reactions experienced by the patients were observed and recorded during each treatment as the basis for safety assessment.

2.4. Statistical methods

The research data were imported into SPSS 26.0 software for statistical analysis. The mean ± standard deviation (SD) was presented for the measurement data, and the independent sample t-test was used for inter-group comparison. The rate (%) was expressed for the count data and the chi-square test was used. The threshold of $P < 0.05$ was set as the threshold for statistically significant differences.

3. Results

3.1. Comparison of ODI scale scores before and after treatment between the two groups

There was no significant difference in the ODI scale score between the two groups before treatment. After 2 weeks of treatment and 3 months after treatment, the score of both groups was lower than that before treatment, and the score of the Aina Xiang moxibustion warm needle group was lower than that of the conventional warm needle group, with statistical significance (P <0.05). Details are shown in **Table 1**.

Table 1. Comparison of ODI scale scores before and after treatment between the two groups (mean ± SD, points)

Group	Number of cases	Pretherapy	After 2 weeks of treatment	3 months after treatment
Conventional warm acupuncture group	30	32.5 ± 4.1	21.3 ± 3.5	15.8 ± 3.2
Aina Xiang moxibustion and warm needle group	30	33.1 ± 3.8	16.2 ± 3.0	10.5 ± 2.8
t	-	0.563	5.827	6.741
P	-	0.575	< 0.001	< 0.001

3.2. Comparison of JOA scores before and after treatment between the two groups

There was no significant difference in JOA scores between the two groups before treatment. After 2 weeks of treatment and 3 months after treatment, the scores of both groups were higher than those before treatment, and the scores of the Aina Xiang moxibustion warm needle group were higher than those of the conventional warm needle group, with statistical significance (P <0.05). Details are shown in **Table 2**.

Table 2. Comparison of JOA scores before and after treatment in two groups (mean ± SD, points)

Group	Number of cases	Pretherapy	After 2 weeks of treatment	3 months after treatment
Conventional warm acupuncture group	30	12.3 ± 2.5	18.5 ± 2.2	22.1 ± 2.0
Aina Xiang moxibustion and warm needle group	30	12.1 ± 2.3	22.4 ± 2.1	25.6 ± 1.8
t	-	0.347	6.892	7.015
P	-	0.730	< 0.001	< 0.001

3.3. Comparison of VAS score and clinical effectiveness rate before and after treatment between the two groups

The VAS scores of the two treatment groups showed no significant difference before therapy. After 2 weeks and 3 months post-treatment, both groups demonstrated reduced scores compared to pre-treatment levels, with the Aina Xiangjiu Warm Needle Therapy group scoring lower than the conventional warm needle therapy group. In terms of clinical efficacy rates, the Aina Xiangjiu Warm Needle Therapy group achieved higher rates than the conventional warm needle therapy group, with statistically significant differences (P <0.05). Detailed data are presented in **Table 3**.

Table 3. Comparison of VAS scores and clinical effectiveness rates before and after treatment between the two groups (mean ± SD, points; n,%)

Group	Number of cases	VAS score-before treatment	VAS score-2 weeks after treatment	VAS score-3 months after treatment	Clinical effectiveness rate
Conventional warm acupuncture group	30	7.2 ± 1.3	4.1 ± 1.1	2.8 ± 0.9	23 (76.7)
Aina Xiang moxibustion and warm needle group	30	7.3 ± 1.2	2.5 ± 1.0	1.5 ± 0.8	28 (93.3)
t/χ^2	-	0.302	6.218	6.534	4.320
P	-	0.764	< 0.001	< 0.001	0.038

4. Discussion

The core pathogenesis of degenerative lumbar spinal stenosis involves lumbar degenerative changes leading to spinal canal narrowing. Degenerated intervertebral discs cause annulus fibrosus rupture and nucleus pulposus protrusion, while osteophyte formation at vertebral margins and thickened ligamentum flavum further occupy spinal canal space. These pathological changes collectively compress cauda equina or nerve roots, triggering edema and inflammatory responses that ultimately manifest as low back pain, leg pain, and intermittent claudication. The incidence of this condition has been increasing annually among middle-aged and elderly populations, not only impairing patients ‘daily mobility but also contributing to psychological stress and reduced quality of life [6]. Although surgical intervention can directly address compression factors, its application is limited by patients’ physical conditions, surgical tolerance, and postoperative

recovery. Most cases remain primarily managed through conservative treatment, with warm acupuncture standing out as a classic approach combining acupuncture therapy and thermal effects [7].

As a vital component of Miao ethnic traditional medicine, Aina Xiang moxibustion demonstrates unique therapeutic advantages for degenerative lumbar spinal stenosis due to the pharmacological properties of its herbal material. The volatile oils in Aina Xiang penetrate the skin through thermal effects, acting on affected tissues to exert anti-inflammatory and analgesic effects. Flavonoids and sesquiterpenes within the herb inhibit neuroinflammatory responses, reduce nerve root edema, and improve neural conduction. Compared to traditional mugwort leaves, Aina Xiang exhibits superior thermal penetration that reaches deeper lumbar tissues, enhancing local blood circulation and alleviating muscle spasms. These characteristics make it a promising candidate for improving therapeutic efficacy in warm needle moxibustion therapy [8].

The study demonstrated that the Aina Aromatic Warm Acupuncture Group outperformed the conventional warm acupuncture group in improving lumbar function, alleviating pain, and enhancing clinical efficacy. Mechanistically, this approach not only retains traditional warm acupuncture's meridian regulation through acupressure but also leverages Aina Aromatic's unique pharmacological components to enhance anti-inflammatory and analgesic effects. This dual-action synergy significantly improved outcomes. Three months post-treatment, the Aina Aromatic group showed reduced ODI (Objective Difficulty Index) scores (10.5 ± 2.8 vs. 1.5 ± 0.8) and VAS (Visual Analog Scale) scores (1.5 ± 0.8 vs. 1.5 ± 0.8), with JOA (Japanese Occupational Association) scores rising to 25.6 ± 1.8 and a 93.3% clinical response rate, markedly surpassing conventional treatments. The addition of Aina Aromatic effectively mitigated functional impairments, reduced pain perception, and improved long-term outcomes. Notably, the protocol maintains standard procedures with only Aina Aromatic pillars replacing traditional mugwort wool, requiring no additional steps or costs. With no reported adverse reactions, it demonstrates high safety and patient acceptance, making it suitable for primary care settings. Clinically, this approach offers a superior conservative option for degenerative lumbar spinal stenosis, reducing surgical demands and lowering healthcare costs/risk. The findings also provide evidence-based support for revising clinical guidelines and developing treatment pathways, bridging traditional Chinese medicine therapies with modern medical solutions.

5. Conclusion

In general, in the treatment of degenerative lumbar spinal stenosis with warm acupuncture, Aina moxibustion has shown significant therapeutic advantages and good application prospects, and has high clinical promotion value, which is expected to bring therapeutic benefits to more patients.

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Disclosure statement

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