

ORIGINAL RESEARCH

Clinical Efficacy of Acupuncture with Canggui Tanxue Technique on Huantiao Point for Treating Sciatica Caused by Lumbar Disc Herniation

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ABSTRACT

Objective • The present study aimed to assess the clinical efficacy of acupuncture with the Canggui Tanxue Technique on the Huantiao point for treating sciatica caused by lumbar disc herniation.

Methods • This randomized controlled trial evaluated outpatient and inpatient data of patients from the Department of Acupuncture and Encephalopathy at Yancheng City Hospital of Traditional Chinese Medicine, Nanjing University of Traditional Chinese Medicine, between March 2020 and October 2022. A total of 100 eligible cases were recruited. Patients were randomly assigned using a random number table method at a ratio of 1:1 to receive either routine acupuncture technique on the Huantiao point (control group) or Canggui Tanxue Technique on the Huantiao point (Canggui Tanxue group), with 50 cases in each group. Outcome measures included post-treatment pain and clinical efficacy.

Results • Canggui Tanxue Technique demonstrated significant pain reduction and improved functional restoration compared to the routine technique, as evidenced by significantly lower scores on the Visual Analogue Scale (VAS), Japanese Orthopaedic Association (JOA) scores, and Roland-Morris Disability Questionnaire (RDQ) scores ($P < .05$). Patients receiving acupuncture with Canggui Tanxue Technique exhibited significantly higher clinical efficacy compared to those receiving the routine technique ($P < .05$).

Conclusion • Acupuncture with Canggui Tanxue Technique on the Huantiao point provides superior pain reduction and functional restoration for patients with sciatica caused by lumbar disc herniation compared to routine techniques. This approach offers high safety, potent efficiency, and better operability. (*Altern Ther Health Med.* 2023;29(7):376-381).

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INTRODUCTION

Sciatica, a prevalent neuropathic disease, is predominantly caused by lumbar disc herniation, accounting for approximately 85% of cases.¹ The clinical manifestations of sciatica include pain, numbness, and abnormal sensations along the sciatic

nerve pathway, accompanied by muscle weakness and abnormal tendon reflexes in the corresponding area.^{2,3} Current management approaches in Western medicine involve the use of anti-inflammatory analgesics, vasodilators, nerve nutrition, intravenous dehydration agents, high-dose vitamin B, antiepileptic drugs or nerve blocks, as well as infrared radiation, radiofrequency thermocoagulation, semiconductor laser radiation, and surgical interventions in severe cases.^{4,5} However, long-term use of Western drugs may lead to side effects such as drug dependence, allergic reactions, liver and kidney damage, and leukopenia, while surgical interventions pose the risk of muscle and nerve damage.⁶

In contrast, traditional acupuncture has shown promising results and is supported by extensive evidence.^{7,8} Although different treatment protocols may vary in the selection of acupoints, the Huantiao point is commonly targeted, with clinical efficacy being influenced by the specific acupuncture techniques employed.^{8,9} However, there is limited knowledge regarding using acupuncture with the Canggui Tanxue Technique for treating sciatica caused by lumbar disc herniation. The Canggui Tanxue technique, described in Xu

Feng's "The Complete Book of Acupuncture and Moxibustion - The Golden Needle Technique" during the Ming Dynasty, utilizes the "tan" method of three advances and one withdrawal in one direction, combined with a twisting method replacing the "Ti" method.⁹ Therefore, this study aimed to assess the clinical efficacy of acupuncture with the Canggui Tanxue Technique on the Huantiao point for the treatment of sciatica due to lumbar disc herniation.

METHODS

Study Design and Participants

A randomized controlled trial was conducted to evaluate the outpatient and inpatient data of patients from the Department of Acupuncture and Encephalopathy at Yancheng City Hospital of Traditional Chinese Medicine, which is affiliated with Nanjing University of Traditional Chinese Medicine, between March 2020 and October 2022. A total of 100 cases that met the inclusion criteria were recruited for the study. Patients were assigned to treatment groups using a random number table method at a 1:1 ratio. Specifically, 50 cases were allocated to the control group, receiving routine acupuncture technique on the Huantiao point, while the remaining 50 cases were assigned to the Canggui Tanxue group, receiving the Canggui Tanxue Technique on the Huantiao point.

Consent for participation in the study was obtained following the approval of the ethics committee at Yancheng City Hospital of Traditional Chinese Medicine (no. YC2020-098-002). The study was conducted in accordance with the principles outlined in the Declaration of Helsinki. All patients and their families were provided with comprehensive information about the study and voluntarily signed a written consent form to participate.

Inclusion and Exclusion Criteria

Inclusion Criteria: (1) patients diagnosed with sciatica caused by lumbar disc herniation; (2) age between 20 and 60 years; (3) disease duration ranging from 3 to 60 months; (4) no use of hormonal drugs within the 3 months prior to enrollment; (5) voluntary participation in the trial and signing of the informed consent form.

Exclusion Criteria: (1) Absolute requirement for surgical treatment, such as massive, central, free and embedded lumbar disc herniation, cauda equina syndrome or foot drop, or spinal slippage with spinal stenosis; (2) presence of bleeding disorders, use of anticoagulants, local skin infections, severe diabetes, severe cardiovascular disease/pacemaker, metal allergy, or syncope; (3) existence of severe cardiovascular, cerebrovascular, hepatic, or renal diseases; (4) cognitive impairment (5) presence of lumbar spine tumor, tuberculosis, more than 2 degrees of lumbar spine slippage, fracture; (6) lack of improvement after 3 months of strict conservative treatment; (7) sciatica caused by the piriform muscle; (8) pregnancy or lactation.

Dropout Criteria: (1) loss of contact; (2) voluntary withdrawal of consent; (3) occurrence of severe adverse reactions

during the experiment, necessitating trial discontinuation. Detailed records of withdrawn cases should be maintained, including the reason and time of withdrawal, with the last major efficacy observation serving as the final statistical result.

Diagnostic Criteria

The diagnosis was established based on the 2017 edition of the Diagnostic Efficacy Criteria for Chinese Medical Evidence by the State Administration of Traditional Chinese Medicine. The diagnostic criteria included the following: (1) the presence of a history of chronic low back pain prior to the onset or the occurrence of lumbar trauma or chronic stress; (2) more frequent onset observed in young adults; (3) pain that radiates to the buttocks and lower extremities and worsens with increased abdominal pressure; (4) sensory hypersensitivity or dullness in the affected nerve areas of the lower extremities, muscle atrophy in patients with a prolonged disease duration, positive straight leg raise or strengthening test, weakened or absent knee and Achilles tendon reflexes, and weakened dorsal extension of the toes; (5) loss of lumbar spine scoliosis or physiological curvature, localized pressure pain next to the lesion with radiation to the lower extremities, and limited lumbar spine movement; (6) X-ray examination revealing scoliosis, loss of physiological lumbar anterior lordosis, narrowing of the affected intervertebral disc, and visible osteophytes on the adjacent edges. Additionally, the CT examination provided information on the location and degree of disc herniation.

Treatment Methods

Acupoint Selection. The acupuncture treatment for all eligible patients involved the following acupoints: Huantiao, Weizhong, Kunlun, and E'shi.

Canggui Tanxue Group. In the Canggui Tanxue group, Huatuo stainless steel milli needles (Suzhou Medical Supplies Factory) were used with a specification of 0.30 mm × (50 - 75 mm). After sterilizing the acupuncture points, the needling technique described in Xu Feng's Canggui Tanxue technique^[9] was followed. The needle tip was inserted vertically into the Huantiao point, reaching a depth of approximately 40 - 60 mm. The twisting method was applied, and the needle was then withdrawn to the superficial layer of the skin after obtaining the needle Qi. The needling direction was sequentially changed upwards, downwards, leftwards, and rightwards while maintaining the needle and Huantiao point at an angle of about 15 degrees. The twisting method was employed for each needle insertion, and the needle was withdrawn to the superficial layer before changing direction for the subsequent insertion. Finally, the needle was left at a depth of 40 - 60 mm in the original direction of insertion. The remaining acupoints (Weizhong, Kunlun, and E'shi) were treated using the Pingbu Pingxie technique, with varying depths of needling: 20 - 30 mm for Weizhong, 15 - 20 mm for Kunlun and 15 - 50 mm for E'shi. The needles were retained for 50 minutes, and acupuncture was performed once daily for a duration of 10 days.

Control Group. In the control group, the needle was inserted vertically at the Huantiao acupoint to a depth of 40-60 mm, followed by applying the twisting method. The Pingbu Pingxie technique was then used for treating the remaining acupoints, similar to the approach in the Canggui Tanxue group. The needles were retained for a duration of 50 minutes, and acupuncture sessions were conducted once daily for a total of 10 days.

Outcome Measures

Pain Assessment. Pain assessment was conducted using the visual analogue score (VAS) scale. The patient’s pain levels were evaluated before and after a 10-day treatment period, using a scale ranging from 0 to 10. The scale consisted of a straight line with numerical markings, where patients indicated their pain intensity by marking a point on the line. Pain severity was categorized as follows: ≤ 3 points for mild pain, 4-6 points for moderate pain, and ≥ 7 points for severe pain.

Functional Restoration. The functional restoration of the patients was assessed before and after 10 days of treatment using the Japanese Orthopaedic Association (JOA) scale. This scale encompasses three domains: subjective symptoms, objective signs, and the ability to perform daily tasks. The total score ranges from 0 to 30, with scores below 10 indicating mild impairment, scores between 10 and 20 indicating moderate impairment, and scores above 20 indicating severe impairment.

Functional Impairment. The level of functional impairment was assessed before and after 10 days of treatment using the Chinese version of the Roland-Morris Disability Questionnaire (RDQ), which has a total score of 24. A higher score indicates a greater degree of functional impairment in the patient.

Treatment Efficacy. The efficacy of the treatment was assessed using the Visual Analog Scale (VAS) score, categorized into four levels: cured (≥ 90%), markedly effective (60% - 89%), effective (30% - 59%), and ineffective (< 30%). The reduction rate was calculated using the formula:

$$\text{Reduction rate} = \frac{[(\text{pre-treatment VAS score} - \text{post-treatment VAS score}) / \text{pre-treatment VAS score}] \times 100\%.$$

The excellent rate was determined by dividing the sum of cured and markedly effective cases by the total number of cases and multiplying by 100%.

$$\text{Excellent rate} = \frac{(\text{cured} + \text{markedly effective}) / \text{total cases} \times 100\%}{}$$

The total efficacy was calculated by dividing the sum of cured, markedly effective, and effective cases by the total number of cases and multiplying by 100%.

$$\text{Total efficacy} = \frac{(\text{cured} + \text{markedly effective} + \text{effective}) / \text{total cases} \times 100\%}{}$$

Statistical Analysis

Statistical analysis was conducted using IBM SPSS Statistics version 26.0 software (IBM, Armonk, NY, USA). Count data [n (%)] were analyzed using the chi-square test, while measurement data ($\bar{x} \pm s$) were assessed using the *t* test. Statistical significance was defined as *P* < .05.

RESULTS

Patient Characteristics

In the Canggui Tanxue group, there were 31 male and 19 female patients, with an age range of 20-60 years (mean age: 50.41 ± 6.88 years). The disease duration ranged from 3 to 55 months (mean duration: 14.15 ± 5.97 months). Among the patients, 27 had left-sided sciatica, 23 had right-sided sciatica, 34 had disc L4-5 herniation, and 16 had disc L5/S1 herniation.

In the control group, there were 30 male and 20 female patients, with an age range of 20-60 years (mean age: 50.23 ± 6.94 years). The disease duration ranged from 3 to 53 months (mean duration: 14.37 ± 6.02 months). Among the patients, 26 had left-sided sciatica, 24 had right-sided sciatica, 32 had disc L4-5 herniation, and 18 had disc L5/S1 herniation.

There were no significant differences in patient characteristics between the two groups (*P* > .05); see Table 1.

Pain Relief Effectiveness of the Canggui Tanxue Technique

The pain levels were assessed using the VAS scores in both the Canggui Tanxue and the control groups. In the Canggui Tanxue group, the pre-treatment VAS score was (7.01 ± 2.09), and the post-treatment VAS score was (6.99 ± 2.14). In the control group, the pre-treatment VAS score was (2.17 ± 0.58), and the post-treatment VAS score was (3.11 ± 1.08). The significantly greater reduction in VAS scores in the Canggui Tanxue group indicates more effective pain relief compared to the routine technique (*P* < .05); see Table 2.

Table 1. Patient Characteristics ($\bar{x} \pm s$)

Characteristics	Canggui Tanxue group	Control group	t value	P value
n	50	50	-	-
Sex				
Male	31	30	-	-
Female	19	20	-	-
Age (years)	20 - 60	20 - 60	-	-
Mean	50.41 ± 6.88	50.23 ± 6.94	.082	.935
Disease duration (months)	3-55	3-53	-	-
Mean	14.15 ± 5.97	14.37 ± 6.02	.116	.908
Pathological types				
Left sciatica	27	26	-	-
Right sciatica	23	24	-	-
Herniated disc vertebrae				
Intervertebral disc L4-5	34	32	-	-
Intervertebral disc L5/S1	16	18	-	-

Note: ‘-’ denotes not applicable; the p-value indicates the level of significance.

Table 2. VAS scores ($\bar{x} \pm s$)

	Canggui Tanxue Group	Control Group	t value	P value
n	50	50	-	-
Before Treatment	7.01 ± 2.09	6.99 ± 2.14	0.030	.976
After Treatment	2.17 ± 0.58	3.11 ± 1.08	3.429	.001

Note: The *t* value represents the result of the *t* test, which compares the mean VAS scores between the Canggui Tanxue group and the Control group; *P* < .05 suggests a statistically significant difference between the groups.

Table 3. JOA scores ($\bar{x} \pm s$)

	Canggui Tanxue Group	Control Group	t value	P value
n	50	50	-	-
Before Treatment	23.86 ± 1.96	23.91 ± 1.92	0.081	.936
After Treatment	9.45 ± 1.51	15.64 ± 1.78	11.860	<.001

Note: ‘-’ denotes not applicable; the *P* value: *P* < .05 indicates the significance level; the *t* value represents the *t* test result.

Table 4. RDQ scores ($\bar{x} \pm s$)

	Canggui Tanxue Group	Control Group	t value	P value
n	50	50	-	-
Before Treatment	16.56 ± 2.85	16.64 ± 2.77	0.090	.929
After Treatment	4.23 ± 2.17	6.15 ± 2.56	2.559	.014

Note: ‘-’ denotes not applicable; the *P* value: *P* < .05 indicates the level of significance; the *t* value represents the result of the *t* test

Table 5. Clinical efficacy (%)

	Canggui Tanxue Group	Control Group	χ ²	P value
n	50	50	-	-
Cured	15	6	-	-
Markedly Effective	25	20	-	-
Effective	8	15	-	-
Ineffective	2	9	-	-
Excellent Rate	80.00	58.00	8.734	.003
Total Incidence	96.00	82.00	5.005	.025

Note: ‘-’ denotes not applicable; the *P* value: *P* < .05 indicates the level of significance; χ²: chi-square test.

Functional Restoration Effectiveness of the Canggui Tanxue Technique

The functional restoration of patients was evaluated using the JOA scale in both the Canggui Tanxue and the control groups. In the Canggui Tanxue group, the pre-treatment JOA score was (23.86 ± 1.96), and the post-

treatment JOA score was (9.45 ± 1.51). In the control group, the pre-treatment JOA score was (23.91 ± 1.92), and the post-treatment JOA score was (15.64 ± 1.78). The Canggui Tanxue technique demonstrated superior functional restoration compared to the routine technique (*P* < .05); see Table 3.

Functional Disability Improvement with Canggui Tanxue Technique

The functional disability of patients was assessed using the Chinese version of the Roland-Morris disability questionnaire in both the Canggui Tanxue group and the control group. In the Canggui Tanxue group, the pre-treatment RDQ score was (16.56 ± 2.85), and the post-treatment RDQ score was (4.23 ± 2.17). In the control group, the pre-treatment RDQ score was (16.64 ± 2.77), and the post-treatment RDQ score was (6.15 ± 2.56). Canggui Tanxue Technique demonstrated significant functional restoration for patients compared to the routine technique, as evidenced by the significantly lower RDQ scores (*P* < .05), see Table 4.

Clinical Efficacy of Canggui Tanxue Technique

The clinical efficacy of the treatment was evaluated in both the Canggui Tanxue and the control groups. In the Canggui Tanxue group, 6 cases were cured, 9 cases were markedly effective, 4 cases were effective, and 1 case was ineffective, resulting in an excellent rate of 75.00% and a total efficiency of 96.00%. In the control group, 2 cases were cured, 5 cases were markedly effective, 7 cases were effective, and 6 cases were ineffective, yielding an excellent rate of 35.00% and a total efficiency of 70.00%. The clinical efficacy was significantly higher in patients receiving acupuncture with the Canggui Tanxue technique compared to those treated with the routine technique (*P* < .05), see Table 5.

DISCUSSION

Sciatica resulting from lumbar disc herniation is a prevalent clinical condition with various underlying factors,^{10,11} such as mechanical compression, nerve root inflammation, and autoimmunity. The management guidelines for chronic lumbar disc herniation-induced sciatica, established by the North American Spine Surgery Association and the Sciatica University of the Netherlands, outline surgical and non-surgical treatment options.¹² Traditional Chinese medicine emphasizes the use of acupuncture as a highly recommended approach for managing sciatica.⁹

Lumbar disc herniation and sciatica encompass various manifestations, including “lumbar leg pain,” “lumbar femoral pain,” and “paralysis.” The symptoms described in Su Wen - Stinging Lumbago, such as aggravation upon coughing and restricted lumbar spine movement, align with the modern medical understanding of sciatica caused by lumbar disc herniation.¹² According to TCM, this condition primarily affects the Zutaiyang and Zushaoyang meridians.¹³ The internal causes of this ailment are attributed to factors such as constitutional deficiency, excessive fatigue or chronic

illnesses, liver and kidney insufficiency, qi and blood deficiency, as well as imbalances between yin and yang forces, which facilitate the invasion of external pathogenic factors. Acupuncture, a technique involving the insertion of needles at specific angles and subsequent stimulation through techniques like lifting, inserting, and twisting, is employed to achieve therapeutic effects.¹⁴ Notably, acupuncture on contralateral meridian points aims to restore the balance of qi and blood circulation throughout the meridians, thereby significantly alleviating patients' symptoms.^{15,16}

The findings of the present study support that the Canggui Tanxue Technique yields significant pain relief and functional restoration compared to the routine technique, as indicated by the notable reductions in VAS scores, JOA scores, and RDQ scores ($P < .05$). Moreover, patients receiving acupuncture with Canggui Tanxue Technique demonstrated markedly higher clinical efficacy than those treated with the routine technique ($P < .05$). Acupuncture, through the needling of specific acupuncture points, facilitates the opening of meridians, the regulation of qi and blood, and the balance of yin and yang within the body.^{17,18} Previous trials have also reported the effectiveness of acupuncture in pain relief, functional improvement, and acupressure, emphasizing its short-term benefits,^{19,20} which are consistent with the outcomes of the present study.

The Canggui Tanxue Technique involves the deep insertion of the needle into the acupuncture point, followed by a retreat to a shallower area, where the direction of the needle tip is changed to provide enhanced stimulation to the point. The term "tan" signifies the utilization of various needle actions to concentrate qi at a specific acupoint, while "ti" refers to the use of the needle tip to stimulate the surrounding vessels and facilitate the flow of qi and blood. This study modified the method to incorporate twisting instead of Xu Feng's "ti" method. Twisting stimulates tissue cells in different directions at three levels, intensifying the effective stimulation, improving the acupuncture sensation, promoting meridian and blood movement, and alleviating pain. The efficacy of acupuncture depends on the selection of acupuncture sites and the stimulation intensity. Therefore, the Canggui Tanxue Technique, with its substantial stimulation points, can effectively enhance the acupuncture sensation and augment the analgesic effect. Song et al.²¹ has demonstrated the ability of the Canggui Tanxue needle method to relax local soft tissues, while Chen et al.²² have shown its capacity to release and separate compressed sciatic nerve tissue, which corroborates the results of the present study.

Strengths and Limitations of the Study

Our trial has several strengths. Firstly, as a novel approach, the trial addresses the need for alternative methods to alleviate pain caused by sciatica resulting from lumbar disc herniation, considering the potential adverse reactions associated with other management strategies. Secondly, the study examines outcomes from multiple dimensions,

including pain relief, functional recovery, and efficacy, providing a comprehensive evaluation of the treatment's effectiveness.

Limitations of the study include the experimental design constraints, which limit the study's ability to address certain clinical research questions and potentially leave some aspects unexplored. Potential bias is possible due to the researcher's familiarity with the treatment protocol, reliance on subjective outcome measures, and the patient assignment process, which may introduce bias and influence patient assessment results. The small sample size of the study may impact the generalizability of the findings and reduce the statistical power. Additionally, the lack of long-term follow-up limits the observation of treatment efficacy over an extended period, restricting insights into its sustained effects.

FUTURE PROSPECT

The treatment method selected in the present study demonstrates significant benefits in terms of pain relief, improved quality of life, enhanced treatment compliance, reduced treatment costs, and decreased health and economic expenses. Canggui Tanxue Technique exhibits high safety, efficacy, and ease of operation, making it a practical approach for reducing the economic burden on patients with sciatica due to lumbar disc herniation. This technique shows great potential for promotion in primary hospitals, offering a viable alternative to Western medical treatments such as medication, nerve block, and surgery. With minimal side effects, simplified operation, and notable advantages, acupuncture using the Canggui Tanxue Technique on the Huantiao point shows great promise for clinical application. It is especially relevant considering the rising prevalence of sciatica caused by lumbar disc herniation compared to Western medical treatments such as medication, nerve block, and surgery.

CONCLUSION

In conclusion, the utilization of acupuncture with the Canggui Tanxue Technique on the Huantiao point exhibits remarkable efficacy in alleviating pain and restoring function in patients with sciatica resulting from lumbar disc herniation. This approach stands out due to its high level of safety, strong effectiveness, and ease of implementation. With its demonstrated benefits, it holds significant potential for clinical application as a preferred alternative to conventional techniques. By offering superior pain relief and functional restoration, acupuncture with the Canggui Tanxue Technique presents a promising solution for addressing the needs of individuals suffering from sciatica caused by lumbar disc herniation.

CONFLICT OF INTERESTS

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTIONS

CL and XQ contributed equally to this work. CL, XQ and JW designed the study and performed the experiments; CL, XQ, and FW collected the data; JW and FW analyzed the data; CL, XQ and JW prepared the manuscript. All authors read and approved the final manuscript.

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