

## Original Research Article

# Efficacy of acupuncture and Chinese herbal fumigation comprehensive therapy in relieving neck, shoulder, lumbar, and leg pain in patients

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### Abstract

**Purpose:** To investigate the clinical efficacy of acupuncture and Chinese herbal fumigation in relieving neck, shoulder, lumbar, and leg pain in patients.

**Methods:** This study recruited 94 patients with neck, shoulder, lumbar, and leg pain admitted to Ma'anshan Hospital of Traditional Chinese Medicine between January 2019 and December 2020. The patients were randomized into either study group or comprehensive group. Study group was given routine therapy, including administration of celecoxib capsules and imrecoxib tablets, fumigation, and acupuncture, while the comprehensive group received comprehensive therapy, including celecoxib capsules and imrecoxib tablets + acupuncture + fumigation + rehabilitation exercise + needle knife therapy. The treatment outcome, traditional Chinese medicine (TCM) syndrome score, visual analogue scale (VAS) score, Japanese Orthopedic Association (JOA) score, Barthel index, Fugl-Meyer score, and MOS item short-form health survey (SF-36) scores were recorded.

**Results:** Comprehensive therapy resulted in significantly better treatment outcomes than routine therapy ( $p < 0.05$ ). The swelling, pain, and functional limitation TCM evidence score in the comprehensive group were lower than those in the study group ( $p < 0.05$ ). Comprehensive therapy was associated with a more significant reduction in the VAS scores of patients and more enrichment in JOA scores and Barthel index than routine therapy ( $p < 0.05$ ). Patients treated with comprehensive therapy showed higher FuglMeyer (upper limb and lower limb) and SF-36 scores than those with routine therapy ( $p < 0.05$ ).

**Conclusion:** Acupuncture and Chinese herbal fumigation comprehensive therapy effectively relieve the pain of patients and promote recovery of lumbar spine function as well as motor ability, thereby enhancing the patient's quality of life.

**Keywords:** Acupuncture, Chinese herbal fumigation, Comprehensive therapy, Neck, shoulder, lumbar, and leg pain, Efficacy

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## INTRODUCTION

Neck, shoulder, lumbar, and leg pain is a comprehensive condition characterized by muscle and joint pain as well as impaired limb movement [1], with a higher prevalence in the middle-aged and elderly population [2]. Research has shown that chronic diseases such as cervical spondylosis and lumbar strain may cause neck, shoulder, lumbar, and leg pain in patients [3]. The clinical manifestation is persistent and severe pain in the affected area, severely compromising the daily life of patients [4].

In traditional Chinese medicine (TCM), both acupuncture and fumigation are common treatments for neck, shoulder, lumbar, and leg pain, and their therapeutic effect has been widely recognized clinically [5]. However, with the continuous advances in TCM, the long duration of conventional acupuncture and fumigation treatment has become a major setback in treatment efficiency [6]. Comprehensive therapy refers to integrated treatments of acupuncture with herbal fumigation, needle knife therapy, and rehabilitation training [7]. Research has indicated that, compared to acupuncture monotherapy, comprehensive therapy provides more therapeutic benefits and improves the prognosis of the disease [8]. This study was undertaken to determine the clinical efficacy of acupuncture and Chinese herbal fumigation in relieving neck, shoulder, lumbar, and leg pain.

## METHODS

### Participants

This study recruited 94 patients with neck, shoulder, lumbar, and leg pain admitted to Ma'anshan Hospital of Traditional Chinese Medicine between January 2019 and December 2020. The patients were randomized into either a study group or comprehensive group. The study group was given routine therapy, including administration of celecoxib capsules and imrecoxib tablets, fumigation, and acupuncture, while the comprehensive group received comprehensive therapy, including celecoxib capsules and imrecoxib tablets + acupuncture + fumigation + rehabilitation exercise + needle knife therapy.

### Ethical matters

This study was approved by the ethic committee of Ma'anshan Hospital of Traditional Chinese Medicine (approval no. M9091) and was conducted in accordance with the Declaration of Helsinki [9].

### Patient eligibility assessment

Patients who were diagnosed with symptoms of neck, shoulder, lumbar, and leg pain by clinical tests, with normal mental status, aged over 18 years, and who were informed and signed informed consent were included.

Patients with severe organ diseases, severe metabolic diseases, previous relevant surgery, severe osteoporotic diseases, psychiatric diseases, or communication disorders, and who rescinded their consent were excluded.

### Treatments

Patients in the study group were given celecoxib capsules and imrecoxib tablets + fumigation + acupuncture, followed by appropriate local traction, massage, and other physical therapy measures. For Chinese herbal fumigation therapy, Chinese herbal medicine recipe herbs were put into gauze bags and boiled with yellow rice wine and vinegar. The fumigation temperature was controlled at about 45 °C. The patient was instructed to maintain a supine position on the steaming bed, and the painful parts of the body were fumigated. The treatment was performed once daily, and the duration of each treatment was 30 min. The herbal fumigation recipes for this study comprised 15 g of *Lycopodium japonicum*, 15 g of Garden balsam stem, 15 g of *Erythrina indica lam*, 15 g of Sappanwood, and 15 g of Gentiana, 10 g of *Rhizome sparganii* with vinegar, 10 g of *Curcuma zedoary* with vinegar, 5 g of *Carthamus tinctorius*.

### Acupuncture

Acupuncture points were selected based on the type of disease. For patients with frozen shoulders, acupuncture was performed on the *Jianjing*, *Jiankai*, *Jianmiu*, and *Waiguan* points. Those with cervical spondylosis received acupuncture on the *Jianjing*, *Jingjiaji*, *Fengchi*, and *Waiguan* points. Patients with LDH were treated with acupuncture on the large intestine, kidneys, waist, and *Yaoyangguan* points. For those with lumbar muscle strain, acupuncture was administered on the *E'shi*, large intestine, and *Yaoyangguan* points. And finally, for patients with knee osteoarthritis, acupuncture was performed on the *Xiyan*, *Xuehai*, *Dubi*, *Zusanli*, and *Yanglingquan* points. The acupuncture points were disinfected and needled with the diarrheal needling method. The needles were retained for 30 min at an interval of 10 min. The acupuncture was performed once daily.

Patients in the comprehensive group received comprehensive therapy (celecoxib capsules and irrecoxib tablets + acupuncture + herbal fumigation + rehabilitation exercise + needle knife therapy) for intervention, in which the Western medication + acupuncture + herbal fumigation were consistent with that of the study group.

### **Rehabilitation exercise therapy**

For lumbar spine rehabilitation, inverted posture training was used to help patients perform functional movements of the lumbar spine. During the training, the medical staff helped control the patient's waist to avoid symptoms such as hypoglycemia and vertigo. The training was performed twice daily, with 2 min for each training. In rehabilitation of neck joints, the patients were instructed to perform anterior, posterior, left, and right flexion and extension exercises of the neck. The exercise lasted 2 min each time and was performed twice daily. For patients with frozen shoulders, the medical staff instructed the patients to put the palm of the hand against the wall and slowly move the fingers on the affected side toward the wall. The treatment was carried out 5 - 10 times daily each time for 2 min. The duration of treatment was 14 days.

Needle knife therapy: The acupuncture points (same as the acupuncture treatment) were marked using crystal violet. The therapist performed the treatment while wearing sterile gloves. After local anesthesia, the patient's adhesions were separated using an appropriately sized needle knife with cutting, incising, and peeling methods, followed by hemostasis via compression and the application of adhesive tapes. The needle knife therapy was performed once every week.

### **Clinical indicators**

The clinical outcome of the treatment was evaluated based on three levels: markedly effective, effective, and ineffective. The treatment was considered markedly effective when patients' symptoms of neck, shoulder, low back, and leg pain disappeared after treatment, and their ability to carry out daily activities and work was fully restored. Effective treatment reduced patients' pain in these areas, and while there were occasional minor disruptions to their daily life and work, their overall ability to function was not significantly impacted. Ineffective treatment showed no significant reduction in patients' pain levels and did not improve their daily living and working ability compared to before treatment.

The TCM symptom scale consists of three main aspects: swelling, pain, and functional limitation, each of which has a total score of 6. The higher the score, the more severe the patient's condition. Pain in patients was evaluated using the Visual analogue scale (VAS) [10]. Higher VAS scores indicate more severe pain. Japanese Orthopaedic Association (JOA) score [11] was used to assess the lumbar function of patients. The total score on the JOA scale was 29, and a higher score suggests better recovery of lumbar spine function.

Barthel index [12] was used to assess the recovery of motor function of patients. High scores indicate better recovery of motor function. Fugl-Meyer [13] scale was adopted to assess the motor function of the upper and lower extremities before and after treatment. The total score on this scale was 66 for the upper limb and 34 for the lower limb. High scores indicate better recovery of motor function.

The patient's quality of life was assessed using the MOS item short form health survey (SF-36) scores [14], which consisted of 8 dimensions: somatic function, physical function, somatic pain, general health, vitality, social function, emotional function, and mental health. The total score of quality of survival was the sum of the scores in the 8 dimensions, and the standardized scores were 0-100. Higher scores indicate better quality of survival for the patients.

### **Statistical analysis**

This study utilized the SPSS 22.0 software to collect and analyze the data, while GraphPad Prism 8 was employed to generate the graphical presentation of the results. Measurement data were reported as mean  $\pm$  standard deviation (SD) and tested using t-test. Count data were expressed as the number of cases (rate) and analyzed using chi-square test.  $P < 0.05$  was used to indicate significant difference.

## **RESULTS**

### **Baseline patient profiles**

In the study group, there were 28 males and 19 females, aged 33 - 78 ( $56.83 \pm 8.57$ ) years, with a disease duration of 1 - 10 ( $5.37 \pm 0.82$ ) years; there were 3 cases of frozen shoulder, 17 cases of cervical spondylosis, 18 cases of lumbar disc herniation, and 9 cases of knee osteoarthritis.

In the comprehensive group, there were 26 males and 21 females aged 31 - 77 ( $56.90 \pm 8.63$ ) years, with disease duration of 0.2 - 10

(5.57 ± 0.73) years; there were 2 cases of frozen shoulder, 16 cases of cervical spondylosis, 19 cases of lumbar disc herniation, and 10 cases of knee osteoarthritis. The two groups were well-balanced in terms of baseline patient profiles ( $p > 0.05$ ) (Table 1).

**Treatment outcome**

The treatment efficiency of patients in the study group was 78.7 % (37/47). The total treatment efficiency of patients in the comprehensive group was 95.7 % (45/47). Comprehensive therapy resulted in significantly better treatment outcomes than routine therapy ( $p < 0.05$ ; Table 2).

**TCM symptom scores**

The post-treatment swelling, pain and functional limitation TCM syndrome scores of the comprehensive group were lower than those of the study group ( $p < 0.05$ ) (Table 3).

**VAS scores, JOA scores, and Barthel index**

The VAS score of patients in the observation study group before and after treatment was 7.11 ± 0.78 and 4.23 ± 0.38, respectively. The JOA score was 9.34 ± 3.35 before treatment and 19.98 ± 3.82 after treatment, while the Barthel index was 35.39 ± 5.46 before treatment and 62.34 ± 6.88 after treatment. For the comprehensive group, the VAS score of patients before and after treatment was 7.09 ± 0.76 and 2.54 ± 0.24, respectively. The JOA score was 9.52 ± 3.47 before treatment and 23.56 ± 3.41 after treatment, while the Barthel index was 36.13 ± 5.51 before treatment and 78.49 ± 8.39 after treatment. Compared to routine therapy, comprehensive therapy resulted in a more significant reduction in the VAS scores of patients and more enrichment in the JOA scores and Barthel index ( $p < 0.05$ ), suggesting better functional restoration and pain relief after comprehensive therapy (Figure 1).

**Table 1:** Patient characteristics (n = 47)

Item	Study group	Comprehensive group	t/x <sup>2</sup>	P-value
Sex			0.174	0.677
Male	28	26		
Female	19	21		
Age (years)	33 - 78	31 - 77		
Mean age (years)	56.83±8.57	56.90±8.63	0.039	0.968
Duration of disease (years)	0.1-10	0.2-10		
Mean duration of disease (years)	5.37±0.82	5.57±0.73	1.249	0.215
Disease type				
Frozen shoulder	3	2	0.211	0.646
Cervical spondylosis	17	16	0.196	0.658
Lumbar disc herniation	18	19	0.045	0.833
Lumbar muscle strain	10	8	0.275	0.6
Knee osteoarthritis	9	10	-	>0.05

**Table 2:** Clinical efficacy (n = 47)

Group	Markedly effective	Effective	Ineffective	Total efficiency (%)
Study group	17	20	10	78.7 (37/47)
Comprehensive group	22	23	2	95.7 (45/47)
x <sup>2</sup>	-	-	-	6.113
P-value	-	-	-	0.013

**Table 3:** TCM symptom scores (n = 47)

Group	Swelling score		Pain score		Limited function	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Study group	4.77±0.46	1.92±0.33	5.05±0.67	1.79±0.32	4.68±0.57	1.71±0.33
Comprehensive group	4.81±0.44	1.02±0.21	5.03±0.65	0.95±0.23	4.64±0.56	0.94±0.20
t	0.43	15.774	0.146	14.613	0.343	13.68
P-value	0.667	<0.001	0.883	<0.001	0.732	<0.001

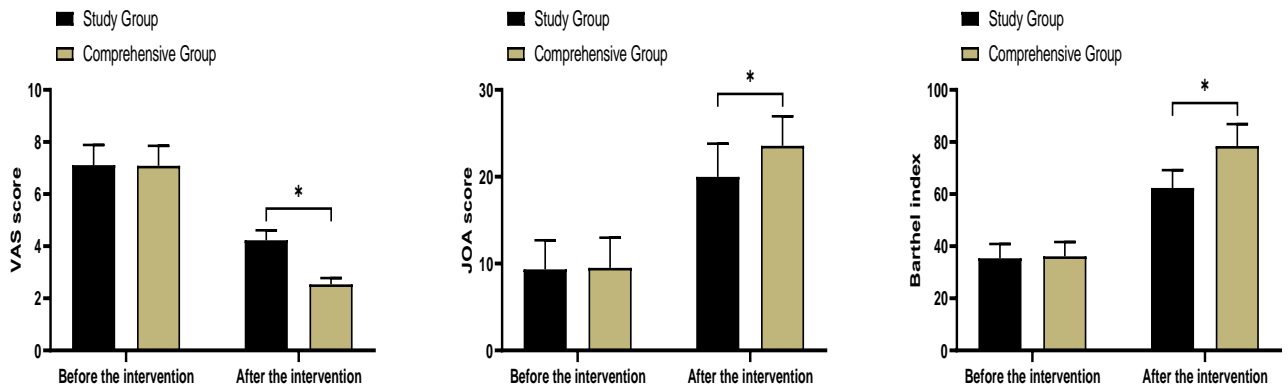


Figure 1: VAS scores, JOA scores, and Barthel index. \* $P < 0.05$

Table 4: Fugl-Meyer scores (n = 47)

Group	Upper limb		Lower limb	
	Before treatment	After treatment	Before treatment	After treatment
Study group	13.35±4.15	23.13±5.12	36.67±5.16	54.13±5.57
Comprehensive group	13.42±4.09	27.84±4.89	36.54±5.21	57.84±4.96
T	0.082	4.56	0.121	3.41
P-value	0.934	<0.001	0.903	<0.001

Fugl-Meyer scores

All post-treatment Fugl-Meyer (upper and lower extremity) scores in the comprehensive group were significantly higher than those in the study group ( $p < 0.05$ ). (Table 4)

SF-36 scores

The SF-36 scores before and after the intervention were  $39.37 \pm 6.14$ ,  $62.29 \pm 12.55$  in the study group and  $38.99 \pm 7.29$ ,  $76.59 \pm 6.63$  in the comprehensive group. There were significantly higher SF-36 scores in the comprehensive group than in the study group after treatment ( $p < 0.05$ ) (Figure 2).

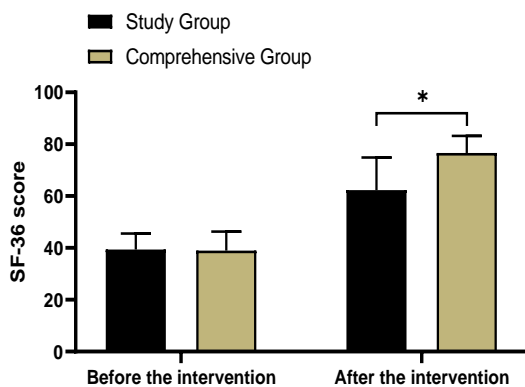


Figure 2: SF-36 scores. \* $P < 0.05$

DISCUSSION

In recent years, the prevalence of neck, shoulder, lumbar and leg pain has been on the increase [1]. Neck, shoulder, lumbar and leg pain may severely compromise physical health and normal life. Therefore, timely management is required to avoid further deterioration of the disease. In TCM, neck, shoulder, waist, and leg pain belongs to the category of "paralysis", and its main pathogenesis is the invasion of wind, cold, and dampness due to insufficiency of vital energy [15]. The basic guidelines for the treatment of neck, shoulder, waist and leg pain in TCM are to dissipate cold and relieve pain, invigorate blood, activate vital energy, and warm the meridians.

Acupuncture and fumigation are common techniques used in TCM to manage neck, shoulder, waist and leg pain. They stimulate the patient's meridian point to facilitate the regulation of qi and blood flow and the balance of yin and yang in the body. In acupuncture treatment for patients with neck, shoulder, waist and leg pain, reasonable acupuncture points are selected according to the type of disease of each patient. For example, for patients with frozen shoulder, acupuncture points such as Jianjing and Waiguan are used. Acupuncture at these points is indicated for the treatment of diseases of the shoulder and neck and the soft tissues of the lower extremities. Waiguan acupoint mainly

addresses diseases of the head, face, five senses, and upper limb paralysis.

Chinese herbal fumigation establishes a thermal effect during the fumigation process to dilate blood vessels, dredge meridians and stimulate sensory nerves, which can effectively improve blood circulation in the affected area of the patient and reduce the conduction of pain sensory signals. Despite years of development, acupuncture and fumigation are currently considered insufficient for pain management. Studies have suggested the combination of these methods with needle knife therapy and rehabilitation exercise [16]. Needle knife therapy is a new therapy based on the anatomy of Western medicine. It is a combination of acupuncture and Western medicine, and it provides effective management of contractures and adhesions of the patient's muscles, ligaments, and fascia [17].

In the management of neck, shoulder, and back pain, the loosening of adhesions, stripping of ligaments, and restoration of biomechanics are essential for enhancing treatment outcomes. In needle knife therapy, the knife blade restores the soft tissue to its original dynamic position through operations such as cutting and gouging. Research showed that the use of needle knife therapy effectively improves muscle fibers in the longitudinal direction of the patient, increases the supply of water and nutrients to the muscle, accelerates the repair of muscle tissue, increases calcium absorption, and restores the original elasticity of the muscle [18]. Rehabilitation exercises provide personalized rehabilitation guidance to avoid injuries from voluntary activities due to insufficient knowledge of the patient. Several studies have indicated that effective rehabilitation exercises effectively promote recovery and reduce pain in patients with neck, shoulder, and lumbar pain [19,20]. Evidence exhibited the application of traditional acupuncture and fumigation with comprehensive therapy, and found that patients treated with comprehensive therapy showed better treatment outcomes, pain relief, and recovery of motor function and lumbar spine function than those treated with traditional acupuncture and fumigation [20]. This result is consistent with the results of the current study, suggesting that comprehensive therapy provides significant symptom mitigation and marked recovery.

### **Limitations of this study**

A major limitation was the small sample size. Also, the exact effect of certain therapy alone remains poorly understood. The fact that more

than one therapy is involved provides scope for further research.

## **CONCLUSION**

The combination of acupuncture and Chinese herbal fumigation comprehensive therapy effectively relieves pain in patients and promotes the recovery of lumbar spine function as well as motor ability, thereby enhancing the patients' quality of life. However, further studies on a larger scale are required before application in clinical practice.

## **DECLARATIONS**

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None provided.

### ***Ethical approval***

None provided.

### ***Availability of data and materials***

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### ***Conflict of Interest***

No conflict of interest associated with this work.

### ***Contribution of Authors***

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by them.

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