



(RESEARCH ARTICLE)



The therapeutic effect of acupuncture combined with joint mobilization on peri-arthritis of the shoulder

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Abstract

Objective: To explore the therapeutic effect of acupuncture combined with joint mobilization in the treatment of peri-arthritis of the shoulder.

Methods: According to the random number table method, 46 patients with peri-arthritis of the shoulder were randomly divided into two groups, with 23 patients in each group. Acupuncture combined with joint mobilization (combination group) and acupuncture alone (control group) were used respectively. The visual analogue scale (VAS), range of motion (ROM), and efficacy were evaluated before treatment, 4 weeks after treatment, and 8 weeks after treatment in each group. The therapeutic effect, pain, and changes in shoulder joint function were compared between the two groups.

Results: After 4 weeks of treatment, the VAS scores of patients in both groups were lower than before treatment and the combination group improved better than the control group ($P < 0.05$); the ROM scores of patients in both groups were higher than before treatment and the combination group scored higher than the control group in the forward flexion, back extension and abduction directions ($P < 0.05$); after 8 weeks of treatment, the VAS scores of patients in both groups were lower than before treatment and 4 weeks of treatment and the combination group improved better than the control group ($P < 0.05$); the ROM scores of patients in both groups were higher than those before and at 4 weeks of treatment, and the scores in all directions in the combination group were higher than those in the control group ($P < 0.05$).

Conclusion: Acupuncture combined with joint mobilization can better alleviate the pain of patients with peri-arthritis of the shoulder, and can also more effectively improve the limitation of shoulder joint activity and improve its function

Keywords: Acupuncture; Joint Mobilization; Peri-arthritis of Shoulder; Shoulder Joint Function

1. Introduction

Peri-arthritis of the shoulder is a common disease in rehabilitation medicine, mainly manifested as pain around the shoulder joint and limited functional activity of the shoulder joint [1]. With the development of society and changes in lifestyle, the incidence of peri-arthritis of the shoulder is increasing year by year, and the incidence of the population is gradually becoming younger, which seriously affects the quality of life of patients. At present, there are many treatment methods for peri-arthritis of the shoulder, mainly NSAID analgesic treatment, and surgery, but the treatment period is long, expensive, and has more adverse effects [2].

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Acupuncture and moxibustion is a general term for the use of acupuncture tools (usually milli-needles), which are inserted into the patient's body at a certain angle under the guidance of Chinese medical theory, and the use of twisting and thrusting techniques to stimulate specific areas of the body to treat diseases[3, 4]. In recent years, acupuncture has been widely used in the treatment of the periarthritis of the shoulder. Acupuncture has the ability to warm the meridians, activate blood circulation, and relieve pain, but it is less effective in mentioning the joint mobility of the shoulder joint. joint mobilization is a treatment method to improve joint mobility by means of manual decomposition according to the biomechanical principles of human joint movement[5]. Joint mobilization is one of the basic methods widely used in rehabilitation medicine to treat patients with periarthritis of the shoulder. The main mechanism of action of joint mobilization is: (1) to promote the flow of joint fluid by moving the joint and increase the nutrition of the non-vascular area of the articular cartilage and cartilage disc, thus relieving pain; (2) to stretch the soft tissues around the joint, maintain or increase the extension of the soft tissues around the joint and improve the range of motion of the joint[6]. The physiological movements of the shoulder joint include forward flexion, back extension, adduction, abduction, and rotation, and the accessory movements include separation, long-axis traction, compression, and anterior-posterior sliding. The main characteristics of a periarthritis of the shoulder are pain and limitation of shoulder joint movement. Therefore, in this study, grade I and II techniques were selected for joint mobilization; long-axis traction, detachment traction, anterior-posterior sliding, cephalad sliding, caudal sliding, etc. were selected for the operation. In conclusion, in this study, acupuncture combined with joint mobilization was used to treat patients with periarthritis of the shoulder, and the efficacy of acupuncture combined with joint mobilization in treating periarthritis of the shoulder was investigated; it provided a scientific and theoretical basis for the treatment and rehabilitation of patients with periarthritis of the shoulder.

2. Research Subjects and Methods

2.1. Research Subjects

Forty-six patients with periarthritis with income from 2020-to 2021 were selected as the study subjects, all of whom had symptoms such as shoulder pain and restricted movement and were diagnosed with periarthritis by clinical examination. The patients were divided into a combination group and a control group of 23 patients each using the random number table method. The combination group (12 males and 11 females), age (50.32±7.42) years, duration of disease (8.62±6.13) months, and the control group (15 males and 8 females), age (50.82±6.87) years, duration of disease (8.74±7.51) months. The basic conditions of the two groups, such as gender, age and duration of disease, were compared and were not significantly different ($P>0.05$) and were comparable. The basic information about the subjects is shown in Table 1.

Table 1 Basic information of patients in both groups ($\bar{x}\pm SD$)

Group	Number of people(n)	Age(y)	Course of disease(m)
combination group	23	50.32±7.42	8.62±6.13
control group	23	50.82±6.87	8.74±7.51

2.1.1. Inclusion criteria

- The patient was conscious and had stable vital signs;
- The patient's condition met the diagnostic criteria of periarthritis of the shoulder and was diagnosed;
- The patient was 40-65 years old and the duration of the periarthritis of the shoulder was >8 weeks;
- The patient had unilateral onset of periarthritis of the shoulder with persistent shoulder joint pain and limited movement;
- The patient and family agreed and signed the informed consent form.

2.1.2. Exclusion criteria

- patient's poor compliance with treatment, presence of impaired consciousness or mental disorder; 2) patient's duration of periarthritis of the shoulder less than 8 weeks;
- taking other medications or receiving other treatments during treatment;
- patient's history of shoulder joint trauma;
- patient's comorbid acute inflammatory disease of shoulder joint;

- Patient's history of shoulder joint fracture.

2.2. Research method

2.2.1. Treatment method

All patients were treated once a day for 30 min each time for four weeks, and a total of 2 courses of treatment were carried out as follows.

Control group: Patients were placed in a lateral position with full exposure to the affected shoulder and neck, and the main acupoints were selected as the shoulder blade, shoulder crevice, shoulder brain, Quchi, Hegu, and Waiguan, and the penetrating acupuncture method was used to combine the acupoints with their surrounding pressure points.

Combination group: The combination group was treated with the joint mobilization on the basis of acupuncture. The acupuncture operation is the same as that of the control group. Joint mobilization is a manipulation technique done by the therapist within the range of motion of the patient's joints, and is used clinically to treat dysfunctions caused by mechanical factors such as pain, limitation of movement or stiffness. The level of manipulation for joint mobilization is I or II; the operation can be long-axis traction, detached traction, anterior-posterior sliding, cephalad sliding, caudal sliding, etc.

Specific methods

- Long-axis traction: the patient is in a supine position with the upper limb slightly abducted. The therapist stands between the patient's trunk and the abducted upper limb, holds the distal humerus with the lateral hand, the medial hand is placed in the axilla, the thumb is in front of the axilla, and the lateral hand continuously pulls the humerus in the direction of the foot for about 10 seconds to make the humerus slide in the articular glenoid, then relaxes and repeats 3-5 times
- Separate traction: the patient is in the supine position, the upper limb is in the resting position, the shoulder is abducted about 50° and internally rotated, and the forearm is in the neutral position. The therapist stands between the patient's trunk and the abducted upper limb, the lateral hand holds the distal end of the upper arm and the elbow, the medial hand places all four limbs on the medial side of the humeral head under the axilla, the thumb is placed in the anterior axilla, the medial hand continues to push the humerus laterally for about 10 seconds, then relaxes and repeats 3-5 times;
- Sliding back and forth: the patient is in the supine position. The therapist stands on the lateral side of the affected shoulder, the upper hand is placed on the humeral head, the lower hand is placed on the medial side of the distal humerus, and the humerus is held up. If the joint pain is obvious, both thumbs can also be placed on the humeral head to operate the lower hand to fix it, and the upper hand pushes the humerus backward
- Sliding to the cephalad side: the patient is in the supine position with the upper limb slightly abducted. The therapist stands on the side of the torso and holds the proximal humerus medially and laterally with both hands, with the medial hand pulling slightly outward for separation, while the lateral hand pushes the humerus up and down in the direction of the head
- Sliding to the foot side: including forwarding flexion and abduction to the foot side. The patient is placed in a supine position with the upper limb flexed forward at 90° and the elbow flexed. The therapist stands on the side of the torso, holds the proximal humerus with both hands from the medial and lateral sides, crosses the five fingers of both hands, and simultaneously pulls the humerus in the direction of the foot to slide similar to the foot side by abduction.

1.2.2 Observation indexes and assessment criteria

Visual analog scale

The visual analogue scale (VAS) was used to score the pain level of the patients[2, 7]. The patients were tested before treatment, 4 weeks of treatment and 8 weeks of treatment, respectively. The procedure was as follows: a 10-cm visual analogue scale scoring ruler was taken and divided equally into 10 equal parts. The therapist signaled the patient to perform the activity and instructed the patient to mark the scale on the ruler that matched his or her pain level. 0 indicated no pain, 1-3 indicated mild pain and tolerable, 4-6 indicated moderate pain and moderately acceptable, and 7-10 indicated severe pain and unbearable.

Joint mobility

The range of motion of the shoulder joint (range of motion of joint, ROM) was used to score the range of motion of the joint of the patient, mainly assessing the range of motion in the direction of anterior flexion, posterior extension, abduction and external rotation[6]. The procedure is as follows: a goniometer, a ruler with a scale, and an electronic goniometer are taken. Anterior flexion: the patient is seated, the goniometer is centered on the lateral humeral scaphoid, the fixed arm is parallel to the trunk (mid-axillary line), the mobile arm is parallel to the humerus, and the motion is measured: along the coronal axis in the sagittal plane the upper limb moves forward and upward. Posterior extension: Position and goniometer placement are the same as for shoulder anterior flexion measurement, motion measurement: posterior upward motion of the upper extremity in the sagittal plane along the coronal axis. Abduction: The patient is seated (humerus in external rotation), the goniometer is positioned with the posterior portion of the acromion on the lateral side of the humerus as the axis, the fixed arm is parallel to the trunk (spine) and the mobile arm is parallel to the humerus, motion measurement: motion along the sagittal axis. External rotation: Position and goniometer placement are the same as for shoulder abduction measurement, motion measurement: forearm motion in the sagittal plane along the coronal axis in the head direction.

Statistical analysis

The data were processed and analyzed using SPSS statistical analysis software; the results of the measurement data were expressed as mean plus or minus standard deviation ($\bar{x} \pm SD$). Shapiro-Wilk test was used to test the normality of the data, and for data conforming to a normal distribution, independent samples t-test was used for comparison between groups, one-way ANOVA was used for comparison within groups, and non- The non-parametric test was used for data with normal distribution. Where $P < 0.05$ represents a significant difference.

3. Results

3.1. Comparison of VAS scores before and after treatment between two groups of patients

As can be seen from Table 2, after 4 weeks of treatment, patients in both groups had a significant decrease in VAS scores compared with pre-treatment ($P < 0.05$); and the improvement in the combination group was better than that in the control group ($P < 0.05$), and after 8 weeks of treatment, patients in both groups had a significant decrease in VAS scores compared with pre-treatment and 4 weeks of treatment ($P < 0.05$); and the improvement in the combination group was better than that in the control group ($P < 0.05$).

Table 2 Comparison of VAS scores between the two groups of patients before treatment, at 4 weeks of treatment, and at week 8 of treatment ($\bar{X} \pm SD$)

Group	Pain VAS score(Unit : score)		
	pre-treatment	4 weeks of treatment	8 weeks of treatment
combination group	5.74±0.92	4.52±0.791	1.65±0.712
control group	5.78±1.09	3.09±1.0013	0.74±0.6923

Note: 1: in-group training for 4 weeks compared with pre-treatment, $P < 0.05$; 2: in-group training for 8 weeks compared with pre-treatment, $P < 0.05$; 3: comparison of treatment effects between groups, $P < 0.05$

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

As can be seen from Table 3, after 4 weeks of treatment, patients in both groups showed significant improvement in ROM forward flexion, back extension, abduction and external rotation compared with those before treatment ($P < 0.05$); and the combination group improved better than the control group in the direction of ROM forward flexion, back extension and abduction ($P < 0.05$), and there was no significant difference between the combined group and the control group in the direction of ROM external rotation ($P > 0.05$), and after 8 weeks of treatment, patients in both groups ROM forward flexion, back extension, abduction and external rotation were significantly improved in both groups compared with the pre-treatment and 4-week treatment ($P < 0.05$); and the improvement in ROM forward flexion, back extension, abduction and external rotation direction was better in the combined group than in the control group ($P < 0.05$).

Table 3 Comparison of ROM scores between the two groups of patients before treatment, at 4 weeks of treatment, and at week 8 of treatment ($\bar{X}\pm SD$)

Group	time	ROM Rating			
		anteflexion	stretch back	abduce	extorsion
combination group	pre-treatment	58.57± 9.45	14.17± 4.43	59.22± 9.17	28.43± 4.52
	4 weeks of treatment	74.30± 9.44 ^a	30.70± 4.08 ¹	92.00± 10.40 ¹	34.78± 3.74 ¹
	8 weeks of treatment	114.83± 11.08 ^b	44.43± 5.27 ²	106.96± 15.18 ²	49.26± 3.36 ²
control group	pre-treatment	62.35± 6.98	14.65± 3.97	63.00± 6.75	26.87± 4.24
	4 weeks of treatment	102.65± 12.50 ^{ac}	33.00± 3.40 ¹³	114.96± 14.61 ¹³	34.74± 3.45 ¹
	8 weeks of treatment	135.91± 13.35 ^{bc}	57.26± 2.26 ²³	143.13± 11.72 ²³	58.87± 3.32 ²³

Note: 1: in-group training for 4 weeks compared with pre-treatment, $P<0.05$; 2: in-group training for 8 weeks compared with pre-treatment, $P<0.05$; 3: comparison of treatment effects between groups, $P<0.05$

4. Discussion

Periarthritis of the shoulder is mainly due to shoulder pain and shoulder dysfunction, mainly due to degenerative changes in the shoulder joint and inflammatory lesions in the joint capsule, ligaments, bursa, tendons and muscles around the shoulder joint[8], in severe cases, muscle wasting atrophy may occur and shoulder joint movement may be limited. 《Huangdi Nei Jing - Su Wen》 is recorded that "wind, cold and dampness are mixed to the three gases, combined with paralysis", And 《The "Orthodox Classes》 is mentioned that "when the limbs are damaged outside, the qi and blood are injured inside", therefore, periarthritis of the shoulder is a pathophysiological process caused by a combination of internal and external factors[9], This coincides with the mechanism of modern medicine, so the ultimate goal of treatment is to relieve paralysis and analgesia, relieve symptoms and restore functional activity[10]. Zhang Quanjie[11] showed that patients with periarthritis of the shoulder are mainly manual workers around 50 years old, mostly with single shoulder onset, with a population prevalence of 2%-5%, which is a common clinical disease; Song Weiping[12] found that the susceptible group of "periarthritis of the shoulder tendency" is middle-aged and elderly people around 50 years old. This also confirms that age and exertion is one of the factors in the development of periarthritis of the shoulder. Therefore, it is important to strengthen the dissemination of knowledge about the pathogenesis of periarthritis of the shoulder[13, 14] and to provide early treatment and medical guidance for "periarthritis of the shoulder tendency", which can effectively reduce the incidence of periarthritis of the shoulder and reduce the pain of patients from the perspective of preventive medicine[12, 14].

Acupuncture treatment for patients with periarthritis of the shoulder is commonly used in the clinical acupuncture points of the shoulder, shoulder, and arm[13]. The anatomical position is located around the deltoid muscle, and the strengthening of the deltoid muscle is conducive to improving shoulder pain and limitation of movements such as forward flexion or abduction. The "Hegu point" is a modern acupuncture point with a high frequency of clinical application[15]. In this study, the main acupuncture points were selected from the shoulder, the shoulder, the shoulder, the shoulder, the Quchi, the Hegu, and the Waiguan, and the penetrating acupuncture method was used to combine the acupuncture points with their surrounding pressure points.

As a common technique in rehabilitation training, the joint mobilization has the general advantages of high safety and efficacy of traditional rehabilitation training but also can release muscle adhesions and relieve restricted joint movement. Studies have shown that joint mobilization has achieved good results in rotator cuff injuries, shoulder impingement syndrome and other shoulder disorders [16, 17, 18]. Patients with periarthritis of the shoulder mainly present with pain and decreased joint mobility. In conventional acupuncture treatment, it can be used to warm the meridians, activate blood circulation and relieve pain, and relieve tendons and disperse knots, but it is less effective in improving the joint mobility of patients. In this study, acupuncture combined with joint mobilization was used to treat patients with periarthritis of the shoulder with better results in improving pain and joint mobility. This may be due to the relatively small external rotation angle of the shoulder joint and the lower sensitivity of joint mobilization to improve the external rotation mobility of the shoulder joint.

5. Conclusion

Compared with acupuncture treatment alone, acupuncture combined with joint mobilization therapy can effectively improve the function of the shoulder joint, relieve shoulder pain, increase joint mobility and improve the ability to perform daily activities.

Compliance with ethical standards

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Disclosure of conflict of interest

Before the publication, we had the consent of all authors. All authors approve the ranking order. We declare that there is no conflict of interest in the article.

Statement of informed consent

Each participant signed a statement of informed consent obtained from all individual participants included in the study.

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