

## Original Article

# Effect of *Tai Chi* exercise in combination with auricular plaster on patients with lumbar muscle strain

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**Abstract:** Objective: observe the effect of Tai Chi exercise on the patients with the chronic lumbar muscle strain under the intervention treatment of auricular plaster. Methods: 74 middle-aged and elderly patients, suffering from the chronic lumbar muscle strain, are randomly and equally divided into an observation group and a control group, with 37 patients in each group. The patients in the control group do Tai Chi exercise, while those in the observation group are treated by the auricular plaster therapy in addition to Tai Chi exercise. Evaluate and compare the disease conditions of the patients in the two groups before the treatment and after 12 weeks' treatment. Results: after 12 weeks' treatment, the patients in the two groups have been improved differently in comparison with those before the treatment ( $P < 0.05$ ). However, the cure rate, the excellence rate and total effective rate of the observation group are superior to those of the control group, respectively  $P < 0.05$  or  $P < 0.01$ , thus their difference shows statistic significance. Conclusion: after 12 weeks' Tai Chi exercise, it exercises an obvious curative effect on the patients with lumbar muscle strain but the curative effect is more remarkable if it is combined with auricular plaster therapy.

**Keywords:** Tai Chi Chuan, auricular plaster, lumbar muscle strain, combination, effect

## Introduction

The chronic lumbar muscle strain, a dynamo-static damage, is induced by the lumbar muscle fatigue. Its etiology can be traced to the following factors, for example, poor postures, lumbar and back muscle and fascia strain because of engaging in bending and load-bearing labor for a long time, failure to treat timely, correctly and thoroughly after acute injury, congenital malformation and invasion of wind-cold damp pathogen [1]. The main manifestations can be described as that due to the chronic injury of lumbosacral muscle, fascia, ligaments and other soft tissues, the local aseptic inflammation is induced, as a result, a diffuse pain is inevitable at one side or both sides of lumbosacral, which is also known as the "low back myofascitis" or "functional lumbago" [2]. The doctors, practicing western medicine, treat the above said diseases by oral drug, however, there are side effects and the patients are prone to the drug dependence. In Chinese traditional medicine, the patients are treated by Chinese traditional medicine, smoked drug,

acupuncture, massage, functional rehabilitation training and comprehensive therapy [3, 4]. The doctors, practicing Chinese traditional medicine, believe that the ear is a holographic microcosm of the body tissues and organs, thus it can dredge channels, regulate mechanism and promote the rehabilitation of lesion by stimulating the corresponding ear acupoint [5, 6]. For this reason, it intends to treat the patients in the observation group by the auricular plaster therapy in addition to Tai Chi exercise in this study. It is found that the combination therapy shows an obvious curative effect and it is reported as follows.

## Object and method

### Study object

74 middle-aged and elderly patients, who were diagnosed with the chronic lumbar muscle strain in Jiaozuo Charity Hospital and Jiaozuo Second People's Hospital during the period of June-Nov. 2013. They were 35-65 years old and their course of the disease ranged from 3

## Tai Chi with auricular plaster on lumbar muscle strain

**Table 1.** Comparison of general information for 2 groups of the selected patients ( $\bar{x} \pm s$ )

Group	Male/female (cases)	Age (years old)	Disease process (month)	Strain cause			
				Inherent history	Anemofrigid cold history	Acute damage history	No obvious disease history
Control group	26/11	48.77±6.36	7.34±3.12	0	5	6	26
Observation group	27/10	49.39±5.90	6.91±3.40	0	4	8	25

Note:  $P > 0.05$ .

**Table 2.** Comparison of VAS pain scores for two groups of patients before and after treatment ( $\bar{x} \pm s$ )

Group	Male/female (cases)	Before treatment	After treatment
Control group	26/11	5.42±2.13	3.56±1.74 <sup>a</sup>
Observation group	27/10	5.37±1.85	2.49±1.66 <sup>a,b</sup>

Note: comparison of two groups of patients, <sup>a</sup> $P < 0.05$ ; comparison of the observation group with the control group after treatment, <sup>b</sup> $P < 0.05$ .

to 18 months. Their inclusion criteria: *Disease Diagnosis and Curative Effect Standards of Chinese Traditional Medicine* promulgated by the State Administration of Chinese Traditional Medicine in 1994. ① The long-term and repeated pain attacks and discomfort in the lower back or blunt pain, lower back stiffness; being relieved at rest but aggravated at night; ② The tenderness rang of the lower back is wide and its most tenderness points are distributed in spinal muscle, transverse process of lumbar vertebra and the back edge of iliac bone; ③ Muscle spasm; waist muscle is tension and spasm in the time of palpation; or induration and hypertrophy feeling; ④ It is normal upon X-ray and CT examination. Exclusion criteria: ① exclusion of patients with tuberculosis, fracture, tumor and so on; ② exclusion of patients with lumbar spondylolisthesis, prolapse of intervertebral disc and lumbar disease upon X-ray and CT examination; ③ exclusion of patients with autoimmune disease, dysfunction of heart, liver, kidney and other important organs and other low back pain patients caused by other diseases in Department of Internal Medicine; ④ exclusion of the patients with mental illness and who are not voluntary to accept practical treatment; ⑤ exclusion of patients who are taking oral drugs and accepting other treatment. Digital table method is used to divide the selected patients into the observation group and the control group, with 37 cases in each group. Before treatment, the basic information about 2 groups of the patients is analyzed in a statistical way and the

inter-group difference shows no statistical significance ( $P > 0.05$ ). However, it is comparable. See **Table 1**.

### Treatment method

The control group: the function rehabilitation training treatment by Tai Chi exercise. The training process: 24-posture simplified Tai Chi Chuan, the nationwide use tutorial book, is selected for guiding the training.

Under the guidance of the trainer, the study objects are trained with Tai Chi technology and posture essentials twice a day and each training lasts for 60 minutes. After one week's training, the study objects shall basically master training method, notices, posture essentials and structures, while they can independently smoothly complete training. In the subsequent training, the study objects shall do such exercise once in morning and at night respectively under the accompaniment of 24-posture simplified Tai Chi Chuan background music, and each exercise lasts for about 45 minutes and total training for 12 weeks.

The observation group: the patients in the observation group do the same exercise as those in the control group do every day, additionally; they are treated with auricular plaster therapy for about 20 minutes. Select main acupuncture points such as liver, kidney, waist, lumbar, sacrum, cortex and *Shenmen* acupoints and the adjunct acupoints such as adrenal gland, popliteal space, liver, lung and spleen. In the time of treatment, select all the acupuncture points and alternately select 2-3 adjunct acupuncture points and then use a probe rod to find out the sensitive points in the selected acupoint area. After the routine disinfection, use a tape to fix Vaccaria seeds on the sensitive points. Only an ear auricle is posted each time and the patients can press the Vaccaria seeds on the ear plaster. The force exercised on the ear plaster can be increased little by little and is limited to that the patients

## Tai Chi with auricular plaster on lumbar muscle strain

**Table 3.** Comparison of clinical effect for two groups of patients before and after treatment

Group	Male/female (cases)	Cure (case)	Excellence (case)	Effective (case)	Ineffective (case)	Excellence rate and the above rate (%)	Total effective rate (%)
Control group	26/11	4	8	17	7	35.14	81.08
Observation group	27/10	7	15	12	3	59.46*	91.89*

Note: comparison of the observation group with the control group after treatment, \* $P < 0.05$  or  $P < 0.01$ .

can bear and numbness and burning sensation occurs. Press the ear plaster in cycle. Each acupuncture point is pressed for 20 times and then switches to another acupuncture point. Time, spending on pressing, is about 20 minutes. Replace the ear plaster twice a week and two ears are posted alternatively. A total of 12 weeks of pressing treatment is required.

### Evaluation of the effect

Before treatment and after 12 weeks' treatment, detect the disease of the patients in the two groups. ① Adopt the visual-analogue scale to evaluate the lumbar pain of the patient. The method is to draw a straight line on the white paper and mark 0-score at the left end of the line to indicate that there is no pain, while mark 10-score at the right end of the line to indicate the most severe pain. The patients mark their pain intensities on the line according to their conditions and the marked values are pain scores. 0 represents a painless; the score, less than 3.9, represents slight pain; the score, ranging at 4-6.9, represents moderate pain; the score, more than 7, represents severe pain; the 10-score represents the extreme pain. ② Evaluate the effect according to *Disease Diagnosis and Curative Effect Standards of Chinese Traditional Medicine*. Cure: the pain and the lower back stiffness disappear, while the lower back can move freely; excellence: the pain is relieved obviously and the lower back slightly feels the stiffness, meanwhile, the movement function of the lower back is recovered basically; effective: slight pain, slight stiffness of the lower back or disorder of the lower back movement function; ineffective: symptoms are not improved.

### Statistical analysis

Use SPSS13.0 statistical software to process data. The data in this study is expressed by ( $\bar{x} \pm s$ ). It uses t test for the measurement data and  $\chi^2$  test for the count data.  $P < 0.05$  shows that the difference has the statistical significance.

### Results

It can be seen from **Table 1** that the general information of patients in 2 groups shows no significant difference ( $P > 0.05$ ) and it is comparable. Furthermore, it can be seen from **Table 2** that after 12 weeks' treatment, VAS pain score in the control group is improved to  $3.56 \pm 1.74$ , while VAS pain score in the observation group is improved to  $2.49 \pm 1.66$ , from which it can be found that VAS pain scores of patients in 2 groups are improved obviously in comparison with those before the treatment,  $P < 0.05$ ; additionally, VAS pain score in the observation group is better than that of the control group after treatment,  $P < 0.05$ . It is shown in **Table 3** (Clinical Effect Evaluation Results) that total effective rate of the observation group (91.89%) is better than that of the control group (81.08%),  $P < 0.05$ ; meanwhile, the excellence rate and the above rate (59.46%) is significantly better than those of the control group (35.14%),  $P < 0.01$ , and its difference has the statistics significance. See **Tables 2** and **3**.

### Discussion

The chronic lumbar muscle strain belongs to arthralgia syndrome and lumbar rheumatism arthralgia in the traditional Chinese medicine and low back pain. It is induced by stagnation of the circulation of vital energy, blood stasis and blockage of meridians due to overwork, twist, twine, fall, and attack and meridians damage. Modern medical research proves that its main etiology can be described as that because the muscle is under the long-term continuous tension, the small blood vessels of micro-circulation system in the muscle tissues are stressed, the tissues supply insufficient oxygen and metabolites are accumulated, as a result, the local muscle is stimulated and then lesion inflammation is developed. Consequently, the pain occurs and the symptoms, such as muscle fascia adhesion, thickening, contraction or mutation, may be found in the event of

the long-term pain [7, 8]. Additionally, the middle-aged persons bear the strong working pressure and sit for a long time due to the work. Meanwhile, they do less exercise, their physiological functions begin to decline and the lower back tissues and its strength are prone to degeneration, which are the important causes for the middle-aged and elderly persons to suffer from the lumbar muscle strain. The doctors, practicing Chinese traditional medicine, believe that the patients with the lumbar muscle strain can be treated by massage, acupoint stimulation and other means, in order to dredge meridians, promote blood circulation and remove blood stasis, eliminate inflammation and recover the body. The ligaments, muscles and soft tissues around spinal column are suppliers of the lower back strength and have such functions as maintaining the spinal stability and the body posture balance. Thus if the lower back muscles degrade or weaken, the disease is induced or aggravated [9, 10]. The relevant studies show that the lumbar muscle strain shall be treated not only by dredging muscle veins, relieving pain, promoting blood circulation and eliminating muscle fascia adhesion but also by the function rehabilitation training for the lower back muscle groups in the proper strength, so that the tissue strength around the lower back can be restored and strengthened, while the coordination movement between the lower back muscle groups and the bones can be increased [11, 12].

In this study, 37 patients in the control group accept Tai Chi Chuan training. After 12 weeks, it is found that their VAS pain scores are significantly improved than those before treatment, among which 4 patients are cured, 8 patients' effect is excellence, total effective rate is 81.08% and the curative effect is obvious. Tai Chi Chuan is an exercise in which the breathing is guided by the thoughts and it uses breathing to stimulate the strength. It is characterized by static, smooth, slow and soft concepts and arc movement in each posture, from which it is said to be an aerobic exercise with the moderate intensity. In this exercise, the waist, as a shaft, drives the motion of the upper and lower limbs and it uses thoughts to control and feel the forces of the four limbs, thus it is conducive to exercise and feel the waist muscle strength and then it can promote the exercise subjects to control muscle strength and balance of the disease points. As a result, it can dredge merid-

ians, promote blood circulation of the muscles and grow the muscles [13, 14]. This conforms to relevant study reports in which it points out that the functional rehabilitation training can improve the effect. For example, Lan et al [15] study confirmed that upon 6 months' Tai Chi exercise, the thoracic/lumbar flexibility of male subjects was increased by 11-intensity and that of the female subjects was increased by 8.8-intensity, while the subjects in the control group showed no obvious change; Taggart [16] study found that after the patients with fibromyalgia (FM) accepted Tai Chi exercise twice a week and 1 h for each time, their symptoms were improved significantly, which indicated that Tai Chi exercise had potential benefits for patients with FM.

In this study, 37 patients in observation group are treated by Tai Chi exercise in combination with auricular plaster therapy. It is found that VAS pain scores and the effect evaluation improvement results of the patients in the observation group are better than those of the control group,  $P < 0.05$  or  $P < 0.01$ . Why the combination therapy has such significant effect is that the combination therapy not only provides necessary functional rehabilitation training for the lower back muscle groups of the patients but also stimulates the corresponding auricular acupuncture points by the auricular plaster therapy. The acupuncture points, selected for the auricular plaster in the observation group, are based on the modern holographic biological theory and traditional Chinese medicine theory and are guided by the meridian viscera theory. By stimulating the acupuncture points on the auricular, such as waist, kidney, lumbar, Shenmen, cortex, adrenal gland, popliteal space, liver, spleen, lung acupuncture points, it not only can nourish vital essence to tonify the kidney and regulate *qi* and blood, but also strengthen waist and kidney and tonify yang and boost essence; furthermore, it can dredge meridians and dispel anemofrigid, while it benefits sedation and relieves spasm pain. For this reason, it facilitates the overall dredging of meridians and recovers Yin and Yang as well as dissipates blood stasis [17, 18]. Therefore, the results of this study suggest that after more than 3 months' Tai Chi exercise, it can practically improve the patients with lumbar muscle strain, however, the effect will be more remarkable if it combines with the auricular plaster therapy and the rehabilitation treat-

## Tai Chi with auricular plaster on lumbar muscle strain

ment effect will be much better than the single Tai Chi exercise. Additionally, the combined therapy takes the advantages of simple operation, easy implementation, without side effects. It is worthy of clinical application and promotion.

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### Disclosure of conflict of interest

None.

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