

Original Article

Rehabilitation Effect of Exercise with Soft Tissue Manipulation in Patients with Lumbar Muscle Strain

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ABSTRACT

Objective: To study the rehabilitation effect of exercise with soft tissue manipulation therapy for patients with lumbar muscle strain. **Methods:** Patients with lumbar muscle strain who met the inclusion criteria for study were randomly divided into control and experimental groups. Conventional therapy (i.e., triple therapy of needle, moxibustion, and cupping jar) was implemented for control group patients with lumbar muscle strain, whereas the combination therapy of exercise with manipulation was implemented for experimental group patients with lumbar muscle strain. Pain levels of the two groups of patients were graded using the VAS score, and finally, the rehabilitation effect of the two groups of patients was evaluated. Comparative analysis was performed using SPSS17.0 software, *t*-test, variance and χ^2 test, and other statistical methods. **Results:** After treatment, there is a significant difference in average visual analogue scale (VAS) score between experimental group and control group, which meets $P < 0.05$; difference in joint range of motion between experimental group patients and control group patients was $P < 0.05$; the total treatment efficiency of experimental group patients was 99%, whereas that of control group was 79%. **Conclusion:** Rehabilitation effect of exercise with soft tissue manipulation therapy for lumbar muscle strain is more significant.

KEYWORDS: Exercise method, lumbar muscle strain, rehabilitation effect, soft tissue manipulation, treatment research

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INTRODUCTION

Lumbar muscle strain, a common trauma or injury, can be also referred to as functional lumbago, lumbar gluteal myofascitis, and chronic lower back injury. Lumbar muscle strain is actually caused by traumatic chronic inflammation in human lumbar muscle and adhesion tissue. Figure 1 is a schematic diagram of psoas muscle and surrounding tissue of psoas. Lumbar muscle strain is the main reason leading to lower back pain.^[1] Its main clinical symptoms are waist or lumbosacral pain, pain with swelling that changes with climate and exertion degree and attack repeatedly.^[2] In clinical diagnostic process of lumbar muscle strain, clinical symptoms plus X-ray image are usually adopted, with X-ray images of lumbar muscle strain as shown in Figure 2. According to large amounts of research studies and practical treatment experiences, implementing the treatment scheme of exercise with soft tissue therapy for patients with lumbar

muscle strain can achieve a more ideal rehabilitation effect. Therefore, in this work, different treatment methods (method of exercise with manipulation and conventional method) were given to experimental and control groups, and thus the rehabilitation effect of exercise with manipulation therapy was observed. Detailed reports are shown as below.

METHODS

Evaluation standard

In this work, the VAS pain scale was used to grade the pain symptoms of the patients. The total score was 10 points, the higher the score was, the higher was the degree of pain in patients. In addition, the

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authors classified clinical results of this study into four levels, namely, recovery, ineffective, effective, and significantly effective. *Recovery*: after treatment, lower back pain symptoms completely disappeared, and spine's range of motion was not restricted. *Significantly effective*: after treatment, lower back pain symptoms basically disappeared, and spine's range of motion basically returned to normal (slightly limited), but with occasional lower back pain in early morning. *Ineffective*: After treatment, all indexes above remained unchanged as compared with those before treatment, and lower back pain worsened. Total efficiency = 100% – ineffective%.^[6]

Study design

In a randomized controlled trial, patients with lumbar muscle were randomly divided into experimental and control group, wherein exercise and soft tissue manipulation therapy were given to the experimental group, whereas conventional treatment was given to the control group. Study design and data collection process model are shown as follows [Figure 3].

Training of research assistants

Before official starting the study, following training arrangements for related assistants in this study were made, as shown in Table 1

Therapy method

1. *Manipulation*: Patients with lumbar muscle strain are guided to take prone position as shown in Figure 4. Thin pillow is placed under head, abdomen, and lower leg of patients; the waist and hip of patient are touched, rubbed, and pushed; and soft tissue manipulation at acupoints is performed, such as kidney shu, dachangshu, and yao shu, for about 10 min. Acupoints such as kidney shu, dachangshu, and yao shu are shown in Figure 5. By acupoint soft tissue manipulation, patients' waist and hip muscles are fully relaxed.^[3]
2. *Main manipulation*: *First is plucking manipulation*: The manipulator bends its own hands into a pincer, and then hits and strikes patients' bladder-skeleton portion 5 times to 10 times, to help patients relax lower back muscle spasm. *Second is pushing manipulation*: Finger pulp of both hands is placed on spinous process of patients, and pushed along spinous process on both sides, and then spine is pushed from chest downward to skeleton position, and the above-mentioned manipulation processes are repeated several times according to each patient's severity of illness; then, heel or palm is used to push patients' paraspinal muscles. *The third is rubbing manipulation*. Patients' back muscles are rubbed vertically and horizontally with heel or palm, from the bottom to upward direction, stroking in light to heavy motion, above-mentioned manipulation processes are repeated several times according to each

patient's severity of illness.

3. *Lumbar oblique pulling*: The patient is laid on left-lateral position, and the manipulator stands opposite to the patient, pressing the front of the patient's shoulder and buttock with both elbows or hands, and shaking in reverse direction with force. When there is resistance in waist twist, thrust of substantially increased range is applied; when "titicaca" sound is heard, the manipulation is proved to be successful; then the patient takes lateral position, and manipulator repeats the above procedures.^[4]
4. *Ending manipulation*: Straight or horizontally rub is given to waist to generate heat penetration in the body of patients.

The exercise dosage should be determined according to the patient's age, sex, and actual condition. The main contents of exercise therapy include three aspects including supine exercise, orthostatic exercise, and prone position exercise. *Supine exercise*: The patient takes supine position, bends both knees, embraces knee with both hands, holds the waist flat against the bed so that back muscles and lower back muscles relax, and then lifts the buttocks off the bed. *Prone position exercise*: The patient holds bed with both hands, lifts the upper body and head; then, puts both hands behind, and raises head and upper body. *Orthostatic exercise*: The patient puts both hands on his hips and does swivel movement, while stretching out the upper limbs.^[5]

Objects, sample, sample grouping method, and data

Objects: Objects in this study refer to patients with lumbar muscle strain treated in our hospital during 2013–2015.

Sample inclusion criteria:

1. those meeting relevant standards on lumbar muscle strain implemented in "Disease Diagnosis Efficacy Standards of State Administration of Traditional Chinese Medicine."
2. those with flash lumbar history and history of continuous bending activity or feelings of evils, but no history of serious trauma, and^[7-9]
3. those diagnosed as non-lumbar deformity through X-ray examination.

Sampling grouping method:

According to a randomization method, patients with lumbar muscle strain who had been diagnosed in our hospital and met the inclusion criteria were divided into control and experimental groups.

RESULTS

Comparison of VAS score between the two groups

Before treatment, the VAS score difference of back pain between the two groups was significantly $P > 0.05$. After treatment, the VAS score of experimental group

Table 1: Training program and teaching arrangements of assistants in this study

Training program	Training object	Hour
1. Pathological knowledge of lumbar muscle strain	All members of research	2
2. Theoretical knowledge of soft tissue manipulation	Soft tissue manipulation assistant	1
3. Soft tissue manipulation professor	Soft tissue manipulation assistant	4
4. Theoretical knowledge of exercise therapy	Exercise therapy assistant	1
5. Soft tissue manipulation professor	Exercise therapy assistant	4
6. Data collection method	Data collection assistant	1

Table 2: VAS score analysis of the two groups of patients with lumbar muscle strain

Group	Before treatment (point)	After treatment (point)
Experimental group	8.2 ± 0.3	2.6 ± 0.1
Control group	8.1 ± 0.4	3.8 ± 0.6
t	0.32	7.36
P	> 0.05	< 0.05

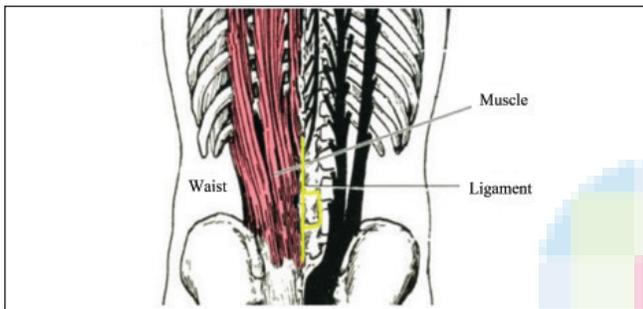


Figure 1: Schematic diagram of psoas muscle and surrounding tissue of psoas



Figure 2: Schematic diagram of X-ray image of lumbar muscle strain

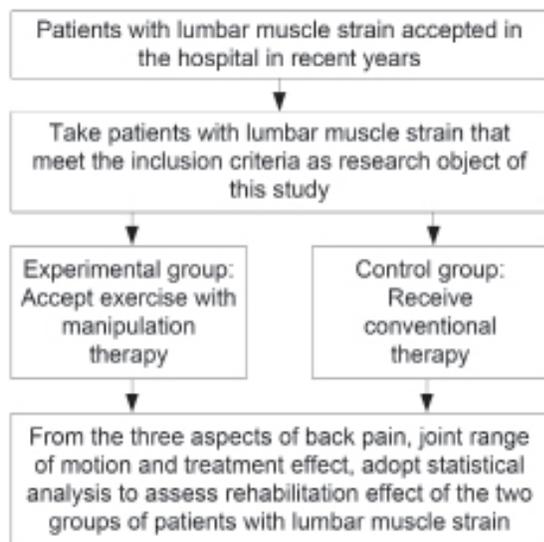


Figure 3: Study design and data collection process model

patients was significantly lower than that of control group, with difference $P < 0.05$. Thus, therapeutic effect

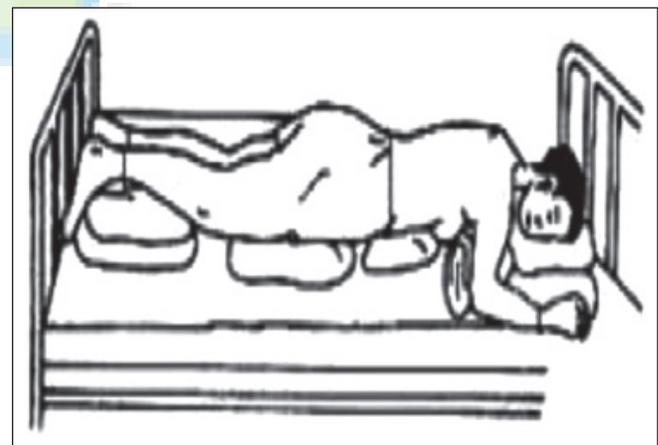


Figure 4: Schematic diagram of horizontal position

of experimental group is superior to that of the control group. See detailed data in Table 2.

Analysis of joint range of motion between the two groups

Before treatment, there was no significant difference in the joint range of motion of the two groups of patients ($P > 0.05$). After treatment, there was a significant

Table 3: Analysis of joint range of motion of the two groups of patients with lumbar muscle strain before treatment

Group	Anteflexion (cm)	Rear protraction (cm)	Left flexion (cm)	Right flexion (cm)	Group	Anteflexion (cm)	Rear protraction (cm)	Left flexion (cm)
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Experimental group	46.6 ± 2.8	66.4 ± 2.2	6.6 ± 2.2	10.3 ± 0.8	18.2 ± 1.2	22.2 ± 1.3	20.1 ± 0.4	26.4 ± 0.7
Control group	47.8 ± 6.9	51.2 ± 1.3	7.1 ± 1.8	8.6 ± 0.2	17.9 ± 1.3	20.1 ± 0.8	19.6 ± 0.7	22.6 ± 1.1
t	0.12	4.65	0.16	5.78	0.09	8.73	0.24	6.39
P	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05	> 0.05	< 0.05

Table 4: Analysis of rehabilitation effect between the two groups

Group	Recovery rate	Significantly effective rate	Effective rate	Ineffective rate
Experimental group	56%	32%	11%	1%
Control group	40%	28%	11%	21%
X2	4.76	5.28	-	10.67
P	< 0.05	< 0.05	= 0.05	< 0.05

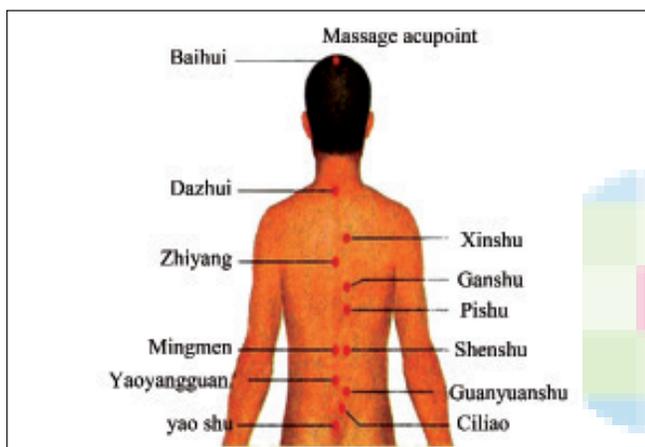


Figure 5: Acupoint schematic diagram

difference in the joint range of motion of the two groups of patients ($P < 0.05$). Thus, the joint range of motion of experimental group was superior to that of control group, with detailed data shown in Table 3.

Analysis of rehabilitation effects between the two groups

The total treatment efficiency of experimental group was 99%, whereas that of control group was 79%. Thus, the rehabilitation effect of experimental group patients with lumbar muscle strain was superior to that of control group, with detailed data shown in Table 4.

DISCUSSION

Lumbar muscle strain is a common lumbar muscle inflammation, with high recurrence rate and long course of disease. Without timely treatment, as course of disease continues to increase, lumbar muscle strain will lead to lumbar muscle fibrosis, even to a small amount

of tear, thereby forming fiber cable, scar, adhesion, and even changing into long lasting chronic lower back pain, which will greatly affect patients’ living and working.

The application of soft tissue manipulation in treating lumbar muscle strain can effectively relieve patients’ lumbar muscle spasm, help patients correct lumbar scoliosis, and skew spinous process so that lumbar vertebra of patients return to normal. Through hit and strike, tendon regulation, and other soft tissue manipulation, adhesion in deep tissue can be loosened so that these tissue fibers can restore activity. In addition, soft tissue manipulation can not only improve blood circulation of lumbar muscle, but can also promote metabolism and accelerate tissue recovery. Lateral oblique pulling can alleviate upper latissimus muscle and erector spinae muscle spasm symptoms with significant effect. In addition, the combination of soft tissue manipulation therapy and exercise therapy can help patients alleviate pain, relieve muscle spasms of soft tissue, improve lumbar muscle flexibility, balance, and coordination.

In this paper, randomized controlled experimental method was adopted. On the basis of expert consultation, literature review, and clinical evidence, researchers designed the combination therapy of exercise and soft tissue manipulation. In this study, the author applied exercise plus soft tissue manipulation therapy in clinical treatment of patients with lumbar muscle strain and found that the average VAS score and joint range of motion of experimental group patients were both superior to those of the control group; total treatment efficiency of experimental group was 99%, whereas that of control group was 79%. Thus, the rehabilitation effect of experimental group patients was significantly better than that of control group.

To sum up, applying combination therapy of exercise and soft tissue manipulation for patients with lumbar muscle strain can not only effectively help patients ease pain symptoms, enhance joint range of motion, but can also have very good rehabilitation efficacy.

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Nil

Conflicts of interest

There are no conflicts of interest.

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