ABSTRACT

Purpose: to discuss the rehabilitation effect of massage with thermal magnetic therapy in treating lumbar muscle strain (LMS) of athletes.

Method: analyze the pathomechanism of lumbar muscle strain, applying massage with thermal magnetic therapy, and discuss the clinical effect and post-treatment indexes such as symptom integral, lumbar muscle force and spinal mobility.

Results: after 2-4 weeks of treatment, the symptom integral, lumbar muscle force and spinal mobility all improved significantly. Compared to the control group, the clinical effect in the treatment group was $P<0.05$ and statistically significant.

Conclusion: Applying massage with thermal magnetic therapy for lumbar muscle strain of athletes achieved significant effects and should be promoted for clinical application.

Key words: Massage, Thermal Magnetic Field, Lumbar Muscle Strain of Athlete, Treatment, Rehabilitation Effect.

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Introduction

Athletes are more vulnerable to lumbar muscle strain, and current therapies for such disease mainly include acupuncture therapy, drug therapy, and massage therapy. However, there is no agreement on which one is more effective. Recent research suggests the therapy of massage with thermal magnetic treatment has sound clinical effects\(^1\)\(^-\)\(^3\). Therefore, this paper studied the therapeutic effect of massage with thermal magnetic therapy in treating lumbar muscle strain of athletes, and is illustrated in figure 1. The X-ray image map of lumbar muscle strain is shown in figure 2.

Experimental design

Methods

This research employed a randomized controlled trial design, randomly dividing all qualified athletes with lumbar muscle strain into treatment group and control group, wherein the control group received conventional therapy, while the treatment group received massage with thermal magnetic therapy. The flow chart of the research design and data collection is shown below in Figure 3.

![Figure 1: Lumbar muscle strain.](image)

Treatment method

By employing the randomized control method, the LMS patients were divided into treatment group...
and control group, wherein the control group received conventional therapy, while the treatment group received massage with thermal magnetic therapy. Concrete operations are shown below.

**Massage manipulation**

- Massage bladder meridian. Along the bladder meridian on both sides of waist, gently massage with heel of hand repeated 6-8 times. After that perform more stimulating rolling massage along the erector spine on both sides of spine, from up to down repeated 6-7 times; then modify hand strength gradually from light to heavy, and massage regional area and make skin red and slightly warm, achieving the effect of relaxing the tendons and activating collaterals.

- Press acupuncture point. Major acupuncture points include Ashi acupuncture point, HuatuoJiaji point, Shenshu point, Chengfu point, Chengshan point, Weizhong point, acupoint Dachangshu, and Huantiao point. Each acupuncture point is kept pressed for about 1-3min, and the proper pressing strength is what can make muscles feel irritation, distension, tingling, or pain.

- Scrubbing Manipulation. Scrub straight from up to down along bladder meridians on both sides of lower back, and then horizontally scrub lumbar sacral portion with fast scrubbing speed and frequency, making the skin warm.

- Rolling Manipulation. Let the patient lie flat on massage bed, while the operator performs rolling massage with heel of hand for 2-3min. Along the musculus sacrospinalis and lumbar muscle, perform extensive and profound manipulation till the skin is warm, letting the heat diffuse into deep tissue and realizing the effect of promoting circulation and removing stasis.

- Knee-bending rolling manipulation. Let the patient lie on the massage bed with face up, the operator massages the patient’s knees with one hand, while lifting up the patient’s pars sacralis with the other hand, keeping the patient in a forward buckling rolled posture. Relax the patient and then horizontally rotate and roll the patient repeated 5 times, so as to relieve the spasm of muscle and ligament, loosen lumbar vertebra, and expand the range of joint movement.

- Patting manipulation. Massage from up to down along the musculus sacrospinalis on both sides of spine, and pat the lower back muscle with empty-palm manipulation, so as to effectively stimulate the nerve, dredge the channel, improve blood circulation and enhance angiotetctasis. Keep patting till the skin becomes warm. The map of acupuncture points is shown in figure 4.

**Massage with thermal magnetic therapy**

After performing the above massage steps, the thermal magnetic therapeutic apparatus will be applied. Firstly place heating pad at patient's lumbar sacral region, and then fix it with an elastic bandage. The power range of the thermal magnetic therapeutic apparatus is 24mT-48mT with 5 temper-
ature levels including low temperature, mid-low temperature, medium temperature, mid-high temperature, and high temperature. The proper level can be selected based on the heat-resistant capacity of the patient, and normally a treatment lasts for 25-30min\textsuperscript{5}.

**Measurement indexes**
- Patient’s back muscle is tested using back dynamometer.
- Dorsal muscle endurance and trunk muscle endurance: let patient lie flat on stomach with both hands laced behind head, fix the lower limbs, and keep the body above the navel out of bed edge, and then measure time for holding body strictly horizontal (normally will be around 60s).
- Evaluation of spinal mobility: let patient keep standing, bend down as much as possible to touch the lowest part of lower limb with finger. Touching the lower thigh gets -1 point, touching 1/3 of upper crus gets 1 point, and touching 1/3 of middle crus gets 2 points.

**Evaluation standard of therapeutic effect**

The LMS pain symptoms of two groups of patients were scored out using the pain scale VAS (visual analogue scale) method, and then the two groups of patients were compared in terms of symptom integral, lumbar muscle force, spinal mobility and clinical effect. The clinical effect can be represented by 3 evaluation standards: significantly effective: all symptoms are removed and totally recovered; Effective: symptoms are significantly eliminated, and basically recovered; Non-effective: no change of symptoms and ill degree may be even increased for some patients. Total effective rate = (Significantly effective + effective)/total number of patients x 100%.

**Results**

After treatment, the total effective rate of the control group was 87.45%, while the treatment group was 96.54%. By comparing the therapeutic effect between the two groups, the therapeutic effect of treatment was significantly better than the control group, wherein the comparative difference was P<0.05 with statistical significance. After 2-4 weeks of treatment, indexes such as symptom integral, lumbar muscle force and holding time tested for muscle endurance of both groups improved significantly, and the treatment group achieved more significant effect over the control group, wherein the comparative difference was P<0.05 with statistical significance. However, in terms of spine mobility, no significant evaluation difference existed between both groups, P>0.05. The therapeutic effect in both groups before and after treatment is shown as Table 1. The comparison of therapeutic effects of both groups is shown in Table 2.

**Discussion**

Lumbar muscle strain is a common lumbar muscle inflammation with characteristics such as recurrent attacks and a long course of disease. If it is not treated in a timely manner, with progression of the disease course, it will finally lead to lumbar muscle fibrosis and even muscle tears in limited quantity, so as to form fiber rope, scar, adhesion and eventually long-term chronic lumbar back pain\textsuperscript{6}. The LMS is normally caused by the injury of soft tissues such as lumbar muscle, ligament, and fascia during exercise; on the other hand, the pathological change of such disease is mainly the non-specific or inflammatory change of muscle tissue.
fibroblast. Western medicine regards the delayed healing of lumbar muscle injury as mainly due to cumulative muscle injuries. Even if the creatinine caused by regional aseptic inflammation cannot be removed in a timely manner, the spinal nerve will be stimulated or compressed, which will lead to lumbar pain. From the perspective of anatomy, LMS is normally accompanied by myofascial adhesion and muscle texture disorder.

Massage manipulation evolved from ancient therapy, is one of the major TCM approaches to treat such disease. With different strengths of massage and manipulation applied on the human body, it can enhance blood circulation, so as to straighten out the adhesion between muscle fiber and stripped soft tissue, reduce inflammation and edema in the diseased region, achieving the effect of relieving muscle spasm, harmonizing qi-blood and smoothing veneration, and finally strengthen physique and accelerate recovery.

Magnetic therapy can accelerate blood circulation, enhance angiectasis, increase the amount of nutrients in regional tissues, diminish inflammation, diffuse out blood and water that are retained in swollen tissue space, and reduce pain; on the other hand, thermal therapy can effectively strengthen metabolism, relieve fatigue, provide more energy for muscle movement, quickly remove pain-producing substances. Moreover, thermal therapy can enhance the production of β-philippines peptide and arginine vasopressin, diminish inflammation, reduce nerve excitation, relieve pain and enhance recovery. In recent years, applying massage with thermal magnetic therapy for LMS athletes has achieved significant clinical effect.

In clinical practice, scholars generally believe a tepid magnetic field apparatus has three effects including warming, magnetic field and microvibration, which can be directly applied on deep lumbar muscle, so as to increase the cell temperature of regional tissue, accelerate biological membrane dispersion, improve membrane potential, enhance blood circulation and drainage of metabolite, diminish small vascular vasoconstriction, improve stress relation between vertebrae, resolve nerve pressure symptoms, and achieve an anti-inflammatory analgesic effect.

In the research of Liu Jizhi et al., there were 120 elderly lumbar disc herniation (LDH) patients who received thermal magnetic medium frequency electrotherapy, achieving an improvement rate of 100% and significantly effective rate of 76.67%. In this research, the control group achieved total improvement rate of 87.45%, and the treatment group 96.54%. Comparing the clinical effect in both groups, it was found that the treatment group achieved a much more significant effect than the control group with P<0.05 and statistical significance. After 2-4 weeks of treatment, indexes such as symptom integral, lumbar muscle force and holding time tested for muscle endurance of both groups improved significantly, and the treatment group achieved a more significant effect over the control group, wherein the comparative difference was P<0.05 with statistical significance. However, in terms of spine mobility, no significant evaluation difference existed between both groups: P>0.05. This result is consistent with the results of Li Jizhi.

In conclusion, applying massage with thermal magnetic therapy for LMS athletes has achieved significant clinical effect, which is worth being promoted for wide application.

References


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