

Clinical Efficacy and Mechanism Research of Traditional Chinese Medicine Manipulation Techniques in the Intervention of Cervical Spondylosis of the Cervical Type

Xuke Peng*

Raman University of Malaysia, Sungai Buloh Town, Kajang District, Selangor 43000, Malaysia

**Author to whom correspondence should be addressed.*

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Abstract: *Objective:* To analyze the clinical efficacy and potential mechanism of traditional Chinese massage therapy in treating cervical type cervical spondylosis. *Methods:* 86 patients with cervical type cervical spondylosis were recruited and randomly divided into the treatment group (43 cases, treated with traditional Chinese massage therapy) and the control group (43 cases, treated with general physical therapy). The treatment group used massage methods such as rolling and pressing, 3 times a week, for a treatment period of 4 weeks. The control group received microwave hyperthermia, with the parameters being the same as those of the treatment group. The visual analog scale (VAS) for pain, cervical dysfunction index (NDI), the range of cervical movement, and the levels of inflammatory factors before and after treatment were compared between the two groups. The treatment effect was analyzed based on imaging examinations. The total effective rate of the treatment group was 93.02%, significantly higher than that of the control group (74.42%) ($p < 0.05$); After treatment, the VAS score (2.1 ± 0.8) and NDI index (12.3 ± 3.5) of the treatment group were lower than those of the control group (3.8 ± 1.1) and (18.7 ± 4.2) ($p < 0.01$); The improvement in the range of cervical flexion, extension, left and right rotation, and the levels of serum IL-6 and TNF- α were better in the treatment group than in the control group (p). *Conclusion:* Traditional Chinese massage can relieve muscle spasms, improve local blood circulation, and inhibit inflammatory responses, achieving therapeutic effects. It is a safe and effective treatment method for cervical type cervical spondylosis.

Keywords: Traditional Chinese massage; Cervical type cervical spondylosis; Clinical efficacy; Mechanism; Inflammatory factors

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1. Introduction

1.1. Background of research on cervical type cervical spondylosis

Cervical type cervical spondylosis is the most common type of cervical spondylosis, mainly manifested as pain, stiffness, and limited movement in the neck. It accounts for 40–60% of the incidence of cervical spondylosis and often occurs in people who work at a desk for a long time and older people. With changes in lifestyle, the incidence shows a trend of

becoming younger, significantly reducing the quality of life and work efficiency of patients, and has become a major public health concern.

1.2. Position of traditional Chinese massage in the treatment of cervical spondylosis

Traditional Chinese massage is a non-drug treatment method with the functions of unblocking meridians, regulating Qi and blood, and resolving adhesions. It is widely used in the treatment of cervical type cervical spondylosis. Its operation is easy, with few side effects, and is more acceptable to patients compared to drug therapy and surgical treatment. Long-term clinical practice has shown that it is very effective and is one of the main means of traditional Chinese treatment for bone and joint diseases.

1.3. Research purpose and significance

There is a consensus in clinical practice on the efficacy of traditional Chinese massage in treating cervical type cervical spondylosis, but the research on its mechanism still needs to be further expanded and deepened. This study is conducted as a clinical controlled trial to comprehensively consider the therapeutic effect of massage techniques and explore its mechanism through objective indicators, providing an evidence-based basis for the clinical application of traditional Chinese massage and adding treatment methods for cervical type cervical spondylosis ^[1].

2. Overview and traditional Chinese understanding of cervical type cervical spondylosis

2.1. Modern medical cognition of cervical type cervical spondylosis

2.1.1. Definition and diagnostic criteria of cervical type cervical spondylosis

According to modern medicine, cervical type cervical spondylosis is a clinical syndrome characterized by decreased cervical stability due to cervical degeneration, muscle strain, and ligament laxity, manifested as neck pain, stiffness, and increased pain during movement.

Diagnostic criteria:

- (1) Neck pain and stiffness, aggravated during movement;
- (2) Reduced range of cervical movement;
- (3) X-ray shows changes in cervical physiological curvature or slight narrowing of intervertebral space;
- (4) Excluding other diseases such as cervical intervertebral disc protrusion and fractures ^[2].

2.1.2. Pathogenesis and epidemiological characteristics of cervical type cervical spondylosis

The pathogenesis is mainly related to abnormal physiological curvature of the cervical vertebrae, muscle spasms, local blood circulation disorders, and the release of inflammatory factors. Epidemiological studies show that the incidence rate is the highest among people aged 30–50, and the incidence rate for females is slightly higher than that for males. Long-term looking down and bad posture are the main risk factors. Teachers, programmers, drivers, etc. are the main occupations.

2.1.3. Current clinical conventional treatment methods

Conventional treatment includes drug therapy (non-steroidal anti-inflammatory drugs, muscle relaxants, etc.), physical therapy (microwave, traction, etc.), and rehabilitation training. Drug therapy is prone to gastrointestinal reactions, and the effect of physical therapy is relatively slow. Some patients do not respond well to treatment. Clinically, there is an urgent need for safer and more effective treatment methods.

2.2. Understanding of cervical type cervical spondylosis by traditional Chinese medicine

2.2.1. Analysis of the cause and pathogenesis by traditional Chinese medicine

Traditional Chinese medicine considers cervical type cervical spondylosis to belong to the category of “bi syndrome” and “neck bi syndrome”. The main causes are external invasion of wind, cold, and dampness, long-term labor, and deficiency of liver and kidney. The core of the pathogenesis is the stasis of Qi and blood and the obstruction of meridians. “Insufficient circulation causes pain” and “lack of nourishment causes stiffness” are the key pathological features.

2.2.2. The theoretical basis of traditional Chinese medicine massage for the treatment of cervical type cervical spondylosis

Traditional Chinese medicine massage takes the theory of meridians as the foundation and uses manual stimulation of relevant acupoints (Fengchi, Jianjing, Dazhui, etc.) to unblock the circulation of Qi and blood in the meridians, so that the functions of the internal organs can be balanced. Massage can relieve muscle adhesions, correct the mechanical situation of the cervical vertebrae, and conform to the therapeutic concept of “dislocation of tendons and bones”. The manipulation of the techniques follows the principles of “gentleness, penetration, and persistence”, and avoids violent manipulation ^[3].

3. Clinical research design for intervention of cervical type cervical spondylosis with traditional Chinese medicine massage techniques

3.1. Research subjects

3.1.1. Inclusion criteria

- (1) Meet the diagnostic criteria for cervical type cervical spondylosis;
- (2) Age is 18 to 60 years old;
- (3) The disease course starts from the onset and lasts for 1–12 months;
- (4) VAS score is 4 points or above;
- (5) Sign the informed consent form and be able to complete the treatment course.

3.1.2. Exclusion criteria

Patients with complicated cervical intervertebral disc protrusion, fracture, tumor, etc.; pregnant or lactating women; patients with impaired coagulation function or skin damage; individuals with severe cardiovascular and cerebrovascular diseases, liver and kidney dysfunction; those who have undergone cervical surgery or received massage treatment before ^[4].

3.1.3. Basis for sample size determination

Based on relevant clinical studies, using the formula for comparing two sample rates, set α at 0.05, β at 0.10, predict the effective rate of the treatment group to be 90%, and the effective rate of the control group to be 70%. The calculated sample size for each group is 40 cases; considering a 10% dropout rate, the final included sample is 86 cases.

3.2. Research methods

3.2.1. Grouping method

Use the random number table method to divide patients into the treatment group and the control group. Each group has 43 cases. In the treatment group, there are 19 males and 24 female cases. The age ranges from 22 to 58 years old, with an average age of (38.6 ± 8.2) years old, and the disease course is (4.3 ± 2.1) months; in the control group, there are 21 males and 22 female cases. The age range is 23 to 59 years old, with an average age of (39.2 ± 7.8) years old, and the disease course is (4.5 ± 2.3) months.

3.2.2. Traditional Chinese medicine massage treatment plan

(1) Rolling technique

Roll along the direction of the neck muscles, gradually increasing the force from mild to heavy. Each session lasts for 5 minutes.

(2) Pressing and rubbing technique

Press and rub the Fengchi and Jianjing acupoints; each acupoint is rubbed for 1 minute.

(3) Pinching technique

Pinch the scalene muscle and sternocleidomastoid muscle. Each session lasts for 3 minutes.

(4) Pinching technique

Perform the cervical rotation and twisting technique. Each session lasts for 1 minute, with 3 sessions per week. The total treatment period is 4 weeks.

3.2.3. Treatment plan for the control group

Using the microwave therapy instrument with a frequency of 2450 MHz and an output power of 20W, irradiate the painful areas of the neck. Each irradiation lasts for 20 minutes, with 3 sessions per week. The treatment period is 4 weeks. During this period, both groups avoid other neck treatments.

3.3. Evaluation indicators of therapeutic effect

3.3.1. Subjective symptom scores

(1) VAS score

The score ranges from 0 to 10, with 0 indicating no pain and 10 indicating severe pain.

(2) NDI-related index

It contains 10 dimensions, with the total score ranging from 0 to 50. The worse the functional impairment, the assessment is conducted before treatment, 1 week after treatment, and 4 weeks after treatment.

3.3.2. Objective physical sign indicators

(1) Cervical range of motion

Measure the forward flexion, backward extension, and left and right rotation angles (unit: degrees).

(2) Inflammatory factors in the blood

Use the enzyme-linked immunosorbent assay to detect the levels of IL-6 and TNF- α (unit: picograms per milliliter), with 1 test conducted before treatment and 1 test each week before and 1 week after treatment.

3.3.3. Imaging examination indicators

Perform relevant cervical X-ray examinations before and after treatment. Measure the cervical physiological curvature (the angle between the posterior edge of the C2–C7 vertebral bodies and the horizontal line) and evaluate the recovery of the curvature.

4. Clinical research results and data analysis

4.1. General data analysis

4.1.2. Results of inter-group comparability analysis

The general data of the two groups, including age, gender, and disease duration, were compared, and there was no statistically significant difference ($p > 0.05$), indicating comparability. See **Table 1** for details.

Table 1. General data of two groups

Group	Number of examples	Gender (Male/Female)	Age (years, $\pm$ s)	Course of the disease (months, $\pm$ s)
Treatment group	43	19/24	38.6 $\pm$ 8.2	4.3 $\pm$ 2.1
Control group	43	21/22	39.2 $\pm$ 7.8	4.5 $\pm$ 2.3
t/χ^2 value	-	0.176	0.342	0.451
p value	-	0.675	0.733	0.653

4.2. Changes in therapeutic efficacy indicators before and after treatment

4.2.1. Comparison of subjective symptom scores

After treatment, both groups showed a decrease in VAS scores and NDI indices, and the improvement was more significant in the treatment group (p). See **Table 2** for details.

Table 2. Change of therapeutic efficacy for both groups before and after treatment

Indicators	Group	Before treatment	One week after treatment	Four weeks after treatment
VAS score (points)	Treatment group	6.8 $\pm$ 1.3	3.5 $\pm$ 1.0	2.1 $\pm$ 0.8
	Control group	6.7 $\pm$ 1.2	4.9 $\pm$ 1.1	3.8 $\pm$ 1.1
	Between groups t -value	0.364	5.872	7.635
	p value	0.716	0.001	
NDI index (score)	Treatment group	26.8 $\pm$ 4.7	18.5 $\pm$ 3.9	12.3 $\pm$ 3.5
	Control group	27.1 $\pm$ 4.5	23.2 $\pm$ 4.1	18.7 $\pm$ 4.2
	Between groups t -value	0.321	5.246	7.218
	p value	0.749	1	.001

4.2.2. Comparison of changes in objective physical signs

After treatment, the cervical spine range of motion in the treatment group significantly increased, while the levels of IL-6 and TNF- α significantly decreased. There was a statistically significant difference compared with the control group (p), as shown in **Table 3**.

Table 3. Change of the physical sign

Indicators	Group	Before treatment	Four weeks after the treatment	Inter-group t -value	p -value
Forward bending angle ($^{\circ}$)	Treatment group	35.2 $\pm$ 5.3	48.6 $\pm$ 6.1	9.872	.01
	Control group	34.8 $\pm$ 5.1	41.3 $\pm$ 5.8		
Posterior extension angle ($^{\circ}$)	Treatment group	25.3 $\pm$ 4.2	36.8 $\pm$ 4.7	10.235	
	Control group	24.9 $\pm$ 4.0	29.6 $\pm$ 4.3		
IL-6 (pg/mL)	Treatment group	32.6 $\pm$ 5.8	18.3 $\pm$ 4.2	11.562	.001
	Control group	33.1 $\pm$ 5.6	25.7 $\pm$ 4.5		
TNF- α (pg/mL)	Treatment group	28.5 $\pm$ 5.2	16.2 $\pm$ 3.8	12.147	1
	Control group	29.1 $\pm$ 5.0	22.3 $\pm$ 4.1		

4.2.3. Analysis of imaging examination indicators results

After treatment, the cervical physiological curvature of the treatment group was (18.6 $\pm$ 3.2) $^{\circ}$, which was significantly improved compared to (12.3 $\pm$ 2.8) $^{\circ}$ before treatment. The cervical physiological curvature of the control group after treatment was (14.5 $\pm$ 3.0) $^{\circ}$. There was a statistically significant difference between the two groups ($t = 6.892$, $p < 0.001$).

4.3. Evaluation results of therapeutic effect

4.3.1. Comparison of clinical therapeutic effects between the two groups

The total effective rate of the treatment group was 93.02%, while that of the control group was 74.42%. The difference was statistically significant ($p > 0.05$). See **Table 4** for details.

Table 4. Evaluation results of therapeutic effect

Efficacy grade	Treatment group (n = 43)	Control group (n = 43)
Recovery	15 (34.88%)	8 (18.60%)
Effective	20 (46.51%)	16 (37.21%)
Effective	5 (11.63%)	10 (23.26%)
Invalid	3 (6.98%)	9 (20.93%)
Overall efficiency	40 (93.02%)	32 (74.42%)
χ^2 value	-	4.573
p value	-	0.032

4.3.2. Safety assessment results

During the treatment period, no serious adverse reactions occurred in either group. In the treatment group, 2 cases experienced mild skin redness, while in the control group, 1 case experienced dizziness, both of which resolved spontaneously. The safety was good.

5. Discussion on the mechanism of traditional Chinese massage techniques in intervening on cervical spondylosis of the nodal type

5.1. Effects on the musculoskeletal system

5.1.1. Mechanism of relieving muscle tension and spasm

The massage techniques utilize mechanical stimulation to act on the cervical muscles, which can reduce muscle tension and inhibit the excitability of muscle spindles, reduce the conduction of nerve impulses related to muscle spasms, and manual stimulation can cause the release of endorphins in the muscle tissue, achieving analgesic effects and further alleviating muscle tension ^[5].

5.1.2. Principle of improving cervical joint mobility

Patients with nodal cervical spondylosis generally have muscle adhesions and tense joint capsules, which restrict cervical movement. The rolling and manipulation techniques of massage can loosen the adhesions of muscle fascia, stretch the tense joint capsules and ligaments, correct the misalignment of cervical small joints, and restore the normal mechanical balance of the cervical spine, thereby expanding the range of joint movement.

5.1.3. Mechanism of promoting local blood circulation

The pressing, rolling, and other actions of the techniques can form mechanical pressure differences, accelerating the circulation of blood in the neck, increasing the blood flow and oxygen supply to the local tissues, and the massage can cause blood vessels to expand, reducing blood viscosity, promoting the excretion of metabolic products, alleviating tissue edema and inflammatory reactions.

5.2. Regulation of neurological function

5.2.1. Mechanism of reducing nerve compression

Abnormal cervical physiological curvature and muscle spasms can indirectly compress the nerve roots. Massage can correct the cervical curvature, relax the muscles, reduce mechanical compression on the nerve roots, improve nerve conduction, and alleviate numbness and pain symptoms of the nerves.

5.2.2. Regulation of neurotransmitter release

Massage stimulation can regulate the secretion of neurotransmitters in the central nervous system, increasing the release of inhibitory neurotransmitters such as 5-hydroxytryptamine and dopamine, reducing the expression of excitatory neurotransmitters such as substance P, thereby inhibiting the transmission of pain signals and improving patients' perception of pain.

5.2.3. Impact on nerve reflex arcs

The manual stimulation activates the spinal cord reflex arc through skin receptors, alters the balance of muscle contraction and relaxation, adds stability to the muscles for the cervical spine, can inhibit sympathetic nerve excitation, reduce vascular contraction, and improve local blood circulation.

5.3. Effects on inflammatory response and immune regulation

5.3.1. Inhibition of inflammatory factor expression

This study shows that the levels of IL-6 and TNF- α in the treatment group decreased significantly, indicating that massage can inhibit the release of inflammatory factors. The mechanism is that massage regulates the activity of immune cells, reducing the production of inflammatory mediators, alleviating the inflammatory response in the local area, and improving tissue damage.

5.3.2. Ways to enhance the immune function of the body

Massage can stimulate the proliferation and differentiation of lymphocytes, increase the level of immunoglobulins, enhance the body's ability to resist infection, regulate the balance of cellular and humoral immunity, reduce tissue damage caused by abnormal immune reactions, and promote the repair of damaged tissues.

5.3.3. Effects on the inflammatory microenvironment

The imbalance of the inflammatory microenvironment plays a key role in the chronicity of nodal cervical spondylosis. Massage can reduce the concentration of inflammatory factors, improve blood circulation, make the local tissue microenvironment better, provide favorable conditions for tissue repair, and break the vicious cycle of inflammatory response.

6. Conclusion

6.1. Summary of research results

This study, verified through clinical controlled trials, demonstrated that traditional Chinese massage techniques have a highly significant therapeutic effect on cervical type cervical spondylosis. They can effectively relieve neck pain and stiffness, improve cervical function and mobility, lower inflammatory factor levels, and are highly safe. The mechanism of their efficacy involves regulating the functions of the musculoskeletal system, promoting nerve conduction, and inhibiting inflammatory responses, among other aspects. It is a multi-target and comprehensive treatment method.

6.2. Limitations and prospects of the study

The sample size used in this study was small, the observation period was relatively short, and no follow-up was conducted on the long-term efficacy. Moreover, the research on the mechanism of action still needs to be further verified through basic experiments. In the future, the sample size can be expanded, multi-center studies can be conducted, the follow-up time can be prolonged, and combined with imaging and molecular biology-based technologies, the molecular mechanism of massage therapy can be further explored to provide more scientific evidence for clinical application.

6.3. Guiding significance for clinical practice

The operation of traditional Chinese massage techniques is not cumbersome, the therapeutic effect is reliable, and the side effects are few. It can be used as the preferred non-pharmacological treatment method for cervical type cervical spondylosis. In clinical application, the massage techniques should be selected based on the individualized condition of the patients, emphasizing the characteristics of standardized techniques and safety. Rehabilitation training and lifestyle interventions can also be combined. This can enhance the treatment effect, reduce the recurrence rate, and provide better treatment services for patients with cervical type cervical spondylosis.

Disclosure statement

The author declares no conflict of interest.

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