

Original Article

Effects of Spiral Taping in Motor Disturbance of the Neck Induced by Cervical Sprain

-Randomized Clinical Controlled Trials-

Kwon Ki-rok

Department of Acupuncture & Moxibustion, College of Oriental Medicine,
Sangji University

Abstract

Objectives : This study was conducted for objective verification of effects of spiral taping therapy for the patients with motor disturbance.

Methods : To verify whether spiral taping therapy is effective for treating motor disturbance from cervical sprain, 28 patients were randomly allocated into the control and experiment groups. Then 23 subjects who fulfilled the experiment requirements were measured for lateral rotation angle using the goniometer. Changes in rotation were observed and compared. Control group received acupuncture and herbal acupuncture treatment, whileas the experiment group received spiral taping therapy in addition.

Results : Differences in age and the degree of motor disturbance were disregarded in comparison of the groups prior to rendering treatments. For the control group, significant changes were observed after the second treatment until the termination of treatment. For the experiment group, significant changes were observed after the first treatment until the termination of treatment. Difference between the groups was insignificant but experiment group with spiral taping therapy showed better results.

Conclusion : Spiral taping therapy can be an effective complementary treatment method for treating neck motor disturbance. Further studies in the subject should be conducted to yield more concrete verification.

Key words : spiral taping therapy, neck pain, randimized clinical controlled trials, range of motion.

-
- **Acceptance** : 2006. 3. 17. • **Adjustment** : 2006. 3. 21. • **Adoption** : 2006. 3. 21.
• **Corresponding author** : Kwon Ki-rok, Department of Acupuncture & Moxibustion, College of Oriental
Medicine, Sangji University, 283 Woosan-dong, Wonju city, Kangwon-do, 220-702,
Korea
Tel. 82-33-741-9257 E-mail : beevenom@paran.com

I. Introduction

Neck pain is common complaints with a point prevalence of 10-18% and lifetime prevalence of 30-50%. In many cases symptoms persist, causing severe discomfort and inability to work¹⁻²⁾. Neck pain can originate from disorders in the neck, such as neural tissue, vertebral or intervertebral joints, discs, bones, muscles, and ligaments.

From long use of computer, driving, and chronic pain caused many people to complain for stiff pain. Especially, cervical sprain with acute severe pain and neck motor disturbance calls for enormous hindrance in daily living and early treatment is essential.

Taping therapy refers to plastering specially formed tape along the meridian or on the meridian points and neuromuscular points to balance the body by invigorating blood and qi circulation. Spiral balance taping and kinesio taping are used clinically.

Generally, taping therapy is applied on musculoskeletal disorders and pain, strengthening muscular power, and even effective for internal disorders of insomnia and urinary dysfunction. But taping therapy is known to be most effective for treating musculoskeletal disorders and relieving pain and recovery³⁾.

Spiral balance taping was developed by Tanaka of Japan, and Roll tape and Cross tape are used clinically⁴⁾. Roll tape is used to fix imbalance of the body by taping spirally along the axis of the trunk and limbs. Cross tape is used to relieve pain and functional impairment by taping 3×4 in lattice structure on affected areas.

This randomized clinical control trial was conducted for objective evaluation of effects of spiral taping therapy administered by many doctors of Oriental medicine in Korea. Significant results were obtained in the treatment of motor disturbance from cervical sprain.

II. Methods

1. Patients

Patients admitted to Sangji Oriental Medicine Hospital, Department of Acupuncture from Dec. 2005 to March 2006 for acute neck pain with motor disturbance were chosen for randomized clinical trials.

The criteria for inclusion and exclusion of the study sample were as follows:

1) Criteria of inclusion

- * patients with motor disturbance of neck and back, especially with increased pain while moving the neck
- * patients with onset of less than a week
- * patients without exterior shock such as traffic accident
- * patients without complaints of pain radiating towards shoulder and upper limbs

2) Criteria of exclusion

- * patients with external injury such as traffic accident
- * patients with onset of more than a week
- * patients with pain radiating towards shoulder and upper limbs with suspicion of herniation of intervertebral disk
- * patients with prior treatment with anti-inflammatory drugs, analgesics, and other treatments including acupuncture
- * patients with less than 5 treatments

2. Treatment

Both groups received acupuncture treatment and herbal acupuncture treatment concurrently for 3 times a week. Experiment group received spiral taping therapy with 3×4 tape after the treatment.

1) Acupuncture treatment

Meridian points were selected based on the distal meridian principle and selected for symptoms.

- ① Pain along the Small intestine meridian: tonify SI-3 and sedate SI-5.
- ② Pain along the Triple burner meridian: sedate TB-5 (a.k.a. SJ-5).
- ③ Pain along the Large intestine meridian: sedate LI-11.

Acupuncture administration was done on the other side of the pain, and tonification was done by rotating the needle clockwise 9 times and sedation was done by rotating the needle counterclockwise 6 times.

2) Herbal acupuncture treatment

CF (oil of Safflower flower seed) herbal acupuncture

extract was injected near the tender point with less than 0.05ml per injection. Less than 0.4ml was used per treatment.

3) Spiral taping therapy

After administering acupuncture and herbal acupuncture, 3×4 tape was plastered around the tender point. The procedure was done mostly around sternocleidomastoid (SCM) and trapezius muscles (Fig. 1-2). Five to seven tapes were used per treatment.

3. Assessment

Measurement of lateral rotation (combination of right and left) was done before the treatment on all patients using goniometer (Fig. 3) and observed changes after the treatment. (Fig. 4).



Fig. 1. 3×4 tape plastered on SCM muscle of a patient with severe pain



Fig. 2. 3×4 tape plastered on trapezius muscle of a patient with severe pain

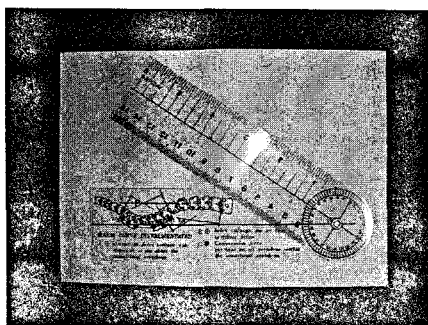


Fig. 3. Goniometer used to measure lateral rotation

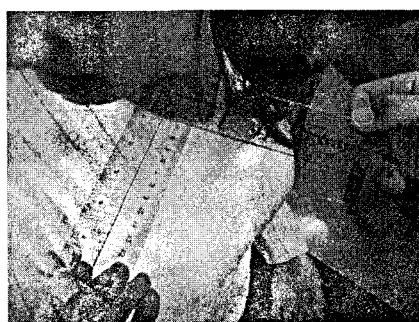


Fig. 4. Maximum rotation was measured for evaluation

4. Statistical Analysis

Comparison between the control and experiment groups was done by independent 2-sample t-test. Changes in patients depending on the number of procedures were measured by profile plot, and effect verification between the groups was done by repeat major analysis. Statistical analysis was done by SPSS (version 10.0) and significance was determined at p -value<0.05.

III. Results

1. Characteristics of participating patients

Out of 28 patients admitted to Sangji Oriental Medicine Hospital, Department of Acupuncture cute neck pain with motor disturbance, 23 were chosen for randomized clinical trials. 11 were allocated into the control group receiving acupuncture and herbal acupuncture treatments. 12 were allocated into the experiment group receiving spiral taping therapy in addition to aforementioned treatments. Subjects were comprised of 10 males

and 13 females. Average age was 35.6 ± 11.8 for the control group and 35.5 ± 13.1 for the experiment group, difference being insignificant. Measurement of ROM (range of motion) at the time of admission was $127.7 \pm 17.0^\circ$ for the control group and $124.2 \pm 20.6^\circ$ for the experiment group, again difference being insignificant.

2. Evaluation of effectiveness between the groups depending on the number of procedures

For the control group, significant changes were observed after the second treatment compared to at time of admission. For the experiment group with spiral taping, significant changes were observed after the first treatment.

3. Verification of effectiveness between the groups

Effects of the control group and experiment group were compared using repeat major analysis. As a result, significance probability was at $p=0.073$, as the difference exists but insignificant.

Table 1. General characteristics of participants

	Control Group(n=11)	Treatment Group(n=12)
Sex(M/F)	5/6	5/7
Age	$35.6 \pm 11.8^*$	35.5 ± 13.1
ROM(first visit)	127.7 ± 17.0	124.2 ± 20.6

* Values are mean±SD.

Table 2. Changes in ROM depending on the number of procedures

group	No. of Tx.	At the time of				
		admission	after 1st time	after 2nd time	after 3rd time	after 4th time
Control Group		127.7 ± 17.0	138.6 ± 16.3	$141.8 \pm 13.7^*$	$148.2 \pm 14.3^*$	$155.9 \pm 12.0^*$
Treatment Group		124.2 ± 20.6	$147.1 \pm 14.8^*$	$156.7 \pm 9.1^*$	$163.8 \pm 7.7^*$	$168.8 \pm 8.0^*$

* p -value<0.05.

Table 3. Comparison of progress between the groups

Source	Type III sum of square	d.f	sum of square	F	Significance probability
Intercept	2489421.3	1	2489421.3	3336.6	.000
Group	2660.5	1	2660.5	3.566	.073
Error	15668.2	21	746		

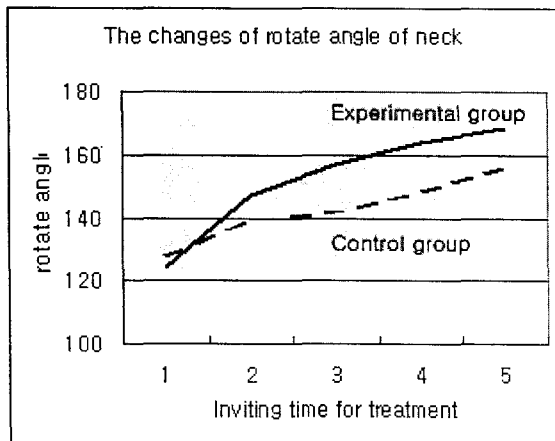


Fig. 5. Comparison of progress between groups depending on the number of treatments

IV. Discussion

Neck pain is a common musculoskeletal symptom. It is estimated that in the general population the point prevalence for neck pain varies between 9.5% and 22%¹⁾. Neck pain is becoming increasingly prevalent in today's society.

The neck is a complicated structure containing several joints with capsules, discs, ligaments, fascia, and muscle, all of which may become hypersensitive to loading in conditions of pain.

Neck pain has multiple causes including tumor, infection, trauma, spinal degeneration, and mechanical factors.

Increased computer usage and sitting long hours on a chair can trigger onset of tension of the neck muscles. As fatigue accumulates in the neck muscles, improper sleep can also cause abrupt pain in the morning.

Pain of the neck limits ROM (range of motion) and hinders daily activities.

Excess muscle tone of SCM, scalenus, and trapezius muscle can easily cause motor disturbance, especially lateral rotation⁵⁾.

Taping therapy is a treatment method using elastic or non-elastic tape on the skin surface to treat musculoskeletal disorders. Its easy to use and effective, thus quickly gaining popularity. Taping therapy in clinics is generally divided into elastic taping and non-elastic taping. Elastic taping is also known as kinesio taping, developed by a Japanese doctor, Arikawa in the 80's. Kinesio tape has similar elasticity with muscles and constant adhesiveness. It uses cloth tape with good aeration to control contraction and relaxation of the muscle and reported to be effective for acute and chronic orthopedic disorders⁶⁻⁷⁾.

Spiral taping therapy was developed by Tanaka of Japan in the 70's. Roll tape and Cross tape are used clinically⁴⁾. Roll tape is used by taping spirally along the axis of the trunk and limbs. Cross tape is used to relieve pain and functional impairment by taping 3×4 in lattice structure on affected areas.

Basic principle of spiral taping therapy is defined by the notion if there is a pain in the body, then there is a pressure point on epidemiologically corresponding parts of the body. With incorporation of myology and meridian theory, it treats pain and discomfort by balancing the body⁸⁾. As spiral taping therapy treats discomfort by increasing the body's recovery capability and shares common principle with Oriental medicine, it is gaining popularity among the practitioners of Oriental medicine in Korea.

This study was conducted for objective verification of effects of spiral taping therapy. 28 patients with a complaint of neck motor disturbance from Dec. 2005 to March 2006 were chosen for randomized clinical trials.

5 subjects were eliminated during the process. 11 subjects were allocated into the control group receiving acupuncture and herbal acupuncture treatments, and 12 subjects were allocated into the experiment group receiving spiral taping therapy in addition to aforementioned treatments. Treatment progress was compared and evaluated. Subjects were comprised of 10 males and 13 females. For the age distribution, 7 were in their 20's (30.4%), being most numerous. Average age was 35.6 ± 11.8 for the control group and 35.5 ± 13.1 for the experiment group, difference being insignificant. (Table 1.). For ROM, 12 subjects were in the range of $130-160^\circ$ (52.2%), being the highest distribution group. Measurement of ROM (range of motion) at the time of admission was $127.7 \pm 17.0^\circ$ for the control group and $124.2 \pm 20.6^\circ$ for the experiment group, again difference being insignificant.

Both groups received acupuncture and CF herbal acupuncture several 3x4 tape was plastered around the tender point, mostly around sternocleidomastoid (SCM) and trapezius muscles

Measurement of lateral rotation (combination of right and left) was done before the treatment on all patients using goniometer and evaluated.

For changes in ROM depending on the number of procedures, significant changes were observed after the second treatment in the control group, and significant changes were observed after the first treatment in the experiment group. (Table 2).

For Greenhouse-Geisser verification between the groups, significance probability was at $p=0.000$, both groups being effective for the treatment of motor disturbance due to neck sprain.

Effects of the control group and experiment group were compared using repeat major analysis. Despite the experiment group showing faster improvement, significance probability was at $p=0.073$, being statistically insignificant.

This result was perhaps contributed by small number of subjects. More concrete and larger scale clinical study should be conducted.

In spiral taping therapy, Roll tape and Cross tape of 3x4 lattice form are plastered on the body to promote and sustain balance. Other hypotheses are applied for better clinical results. For example, the direction of taping and using diagnostic tools like O-ring test and OT-103 can help the treatment but must be objectively proven for academic approach.

In this study, these hypotheses were excluded and taping was done only around the tender points. Administration technique in this study may have relatively reduced the effectiveness. Despite shortcomings, it was proven that spiral taping indeed helped recovery by plastering 3x4 tapes around the muscle tender points. Further study must be followed to yield more concrete data.

V. Reference

1. Bovim G, Schrader H, Sand T. Neck pain in the general population. *Spine*. 1994 ; 19 : 1307.
2. Andersson GBJ. The epidemiology of spinal disorders. In: Flynn JW, ed. *The adult spine : principles and practice*. Philadelphia, PA : Lippincott Raven. 1997 : 130-41.
3. Uh Kang. Taping method for musculoskeletal Disorders. Woojin. 1999 : 3-19.
4. Tanaka S. *Spiral balance therapy*. PYUNG HWA ME. CO. 1997.
5. Stanley Hoppenfeld. 척추와 사지의 검진. 대학서림. 1992 : 132.
6. Arikawa Isao. *Taping Medicine*. Arikawa OS Clinic Institute. 1997.
7. Yoo Byung-Gyu et. 동결건 환자에 대한 키네시오 테이프 적용이 관절가동범위 및 통증에 미치는 영향. *대한물리치료학회지*. 2001 ; 8(1) : 143-151.
8. Tanaka S. *Spiral balance taping*. spiraltapingkorea. 2004; 11.