

Clinical Report 1 (Japan)

Acupuncture for Cervical Dystonia

Makiko Tani¹⁾, Aya Takada¹⁾, Hironori Inoue¹⁾,
Toshiaki Suzuki¹⁾, Ikuro Wakayama¹⁾, Sohei Yoshida¹⁾
and Toshihiko Kinoshita²⁾

1)Research Center of Neurological Diseases
Kansai University of Health Sciences

2)Department of Neuropsychiatry
Kansai Medical University

Abstract

We introduce our new concept for acupuncture therapy in patients with cervical dystonia. To achieve satisfactory therapeutic effects, we divided the affected muscles into two groups using clinical evaluations and EMG findings on motion analysis, i.e., muscles affected by a primary disorder and those by a secondary disorder. Abnormal hypertonus or hypotonus of the muscles and unsustained head movement are designated as the primary disorder. Muscle and skin shortening were designated as the secondary disorder. We used the needle retaining method for primary disorders and multiple epidermis-penetrating needle stimulation on tender spots for secondary disorders. Thus, we applied these different and specific acupuncture treatments to each group once a week. After 10 sessions of acupuncture treatment, clinical examination showed improvement in 72.9% of the patients, EMG evaluations showed improvement in all patients, and with no side effects in any patients. The characteristics of patients who did not respond to our acupuncture treatment were as follows: 1) longer duration of disease, 2) neck posture demonstrating retrocollis, 3) severe unsustained head movement, 4) longer intervals of treatment of more than a week, and 5) treated by several different methods of acupuncture previous to our treatment.

These findings suggest that acupuncture treatment using the needle retention method combined with multiple epidermis-penetrating needle stimulation is one of the most effective and

promising methods in patients with cervical dystonia.

Key words: cervical dystonia, acupuncture, electromyography, primary and secondary disorder, needle retention method, multiple epidermis-penetrating needle stimulation

I. Introduction

Dystonia is a diverse set of movement disorders characterized by involuntary muscle contractions, which may cause twisting and repetitive muscle movements, or abnormal postures. Different classifications of dystonia have been proposed based upon the following criteria: distribution of affected body parts, age at onset, cause, and genetic criteria. Cervical dystonia is one of the most common subtypes of dystonia.

Dystonia is the least understood movement disorder associated with basal ganglia dysfunction; however, a newly proposed hypothesis to explain this disorder involves multiple levels of the nervous system: spinal cord, basal ganglia, thalamus, somato-sensory system, sensorimotor integration, and motor cortical function¹⁾.

Treatment options for dystonia include drug treatment and surgical procedures. Drug treatment can be subdivided into the application of systemically active orally administered drugs and local botulinum toxin injections, while surgical treatment may involve selective peripheral denervation or functional brain surgery. We treated patients with cervical dystonia using acupuncture, and followed their progress by clinical and electromyography (EMG) evaluations²⁾. In this report, we introduce our new acupuncture method and provide clinical and EMG evaluations of the outcome.

II. Materials and Methods

To determine the most appropriate

acupuncture method for each patient with cervical dystonia, clinical and EMG evaluations were performed before acupuncture treatment. Based on these clinical and EMG evaluations, acupuncture regimens were developed respectively for primary or secondary disorders of cervical dystonia. Primary disorders indicate local muscular hypertonus, hypotonus, or unsustained head movement due to basal ganglia dysfunction or other causes derived from the central nervous system. Secondary disorders indicate muscle and/or skin shortening due to primary disorders.

Written informed consent for our acupuncture method was obtained from each patient.

1. Clinical evaluations

Clinical evaluation included the Tsui scale modified by Mezaki et al.³⁾, range of motion (ROM) of the neck and visual analogue scale.

① Modified Tsui scale (Table 1)

Table.1 Modified Tsui Score	
A) Amplitude of sustained movements (Rotation, Lateral head tilt and Antero-or Retro-collis)	0:absent 1:<15° 2:<30° 3:<45° 4:≥45°
B) Duration of sustained movements	1:intermittent 2:constant
C) Axial distortion	
- Scoliosis	0:absent 1:<15° 2:<30° 3:≥30°
- Shoulder- elevation	0:absent 1:<7° 2:<15° 3:≥15°
D) Unsustained head movements	
- Severity	1:moderate, 2:severe
- Duration	1:occasional, 2:continuous
Total Score=(A×B)+C+D	

This scale has a maximal score of 34 and assesses the abnormality of neck posture based on the amplitude of sustained movements of the neck, duration of sustained movements of the neck, axial distortion, and unsustained head movement.

② ROM of the neck

Active and passive ROM of the neck were tested to clarify abnormal mobility, muscle tonus, muscle and skin shortening, and muscle weakness.

③ Visual analogue scale

The visual analogue scale awarded values on a scale of 0 (normal) to 10 (worst).

2. EMG evaluation

EMG evaluation using Viking IV (NICOLET) tested the EMG activity of the sternocleidomastoid muscle (SCM), the trapezius muscle and the splenius muscle (SPL) at rest and during actions involving 5 different movements: neck flexion, extension, right rotation, left rotation, and shoulder elevation in the sitting position. To determine whether shoulder and trunk muscles were affected, EMG activities of these muscles, such as the abdominal muscle and erector spinae muscle, were also tested. In addition, neck movement was tested using displacement transducers, built-in reel type (KYOWA) and dynamic strain amplifiers, DPM-601A (KYOWA), simultaneously with EMG records

The affected muscles with clinical evaluations showing abnormal EMG findings indicated primary disorders, i.e., hypertonus muscles, hypotonus muscles, or unsustained head movement. Affected muscles with normal EMG findings indicated secondary disorders, i.e., muscle shortening. Skin shortening is also an important secondary disorder.

3. Acupuncture methods

The needle retention method on the meridian points for primary disorders and multiple epidermis-penetrating needle stimulation on tender spots for secondary disorders were applied once a week.

For the needle retention method, pre-sterilized disposable acupuncture needles (0.2 mm in diameter, 50 mm in length) were inserted ipsilaterally into Hegu (LI4) when the SCM muscle was affected. Also, we selected ipsilateral Waiguan (TE5) when the trapezius was affected

and ipsilateral Houxi (SI3) when the SPL muscle was affected. The selection of these acupoints was based on the meridian concept of typical distal acupoints on the meridians running through the affected muscles. If the affected muscles included the trunk flexor or extensor muscles, pre-sterilized disposable acupuncture needles were inserted into the ipsilateral Chongyang (ST42) and ipsilateral Kunlun (BL60), respectively. Acupuncture needles were inserted 5 mm in depth and left in place for 5 minutes to decrease and 10 minutes to increase muscle tonus. A retained needle on Baihui (GV20) at the top of the head was used for treating unsustained head movement, with needles being 5 mm in depth and left for 10 minutes. For muscle and skin shortening, ten points in the tender area were selected and multiple epidermis-penetrating needle stimulation was applied to decrease the tension in the tender area.

III. Results

1. Effect of acupuncture

Among 48 patients (26 males and 22 females, mean age of 40.8 years, mean disease duration of 44.8 months; range: 3- 252 months), clinical examination, especially by the modified Tsui scale, showed improvement in 35 patients (72.9 %), and no change or deterioration in 13 patients (27.1%) after 10 sessions of acupuncture treatment. EMG evaluation showed improvement in all patients after the acupuncture treatment. There were no side effects in any of the patients.

The characteristics of patients who did not respond to our acupuncture treatment were as follows: 1) longer duration of disease, 2) neck posture demonstrating retrocollis, 3) severe unsustained head movement, 4) more than 1 week intervals between acupuncture sessions, and 5) treated by several different methods of acupuncture previous to our treatment.

2. Case studies

Patient 1 was a 24-year-old male. He had previously received medication and MAB (muscle afferent block) in other hospitals, but the neck posture remained unchanged and demonstrated left rotation and left lateral flexion. The modified Tsui score was 14. Clinical and EMG evaluations revealed that the main problems were increased muscle tonus in the left SPL and decreased muscle tonus in the left SCM. EMG activity in the left SCM during right neck rotation was weak (Figure 1, left). Acupuncture treatment was initially performed once a week using the retaining needle method at the left Houxi (SI3) to decrease the tonus of the left SPL and left Hegu (LI4) to increase the tonus of the left SCM. Multiple epidermis-penetrating needle stimulation was employed in the left nuchal region before the retention needle method was applied. After 25 sessions using these techniques, the abnormal neck posture with left rotation and left lateral flexion, and EMG findings during right neck rotation were markedly improved and the modified Tsui score recovered to 8 (Figure 1, right).

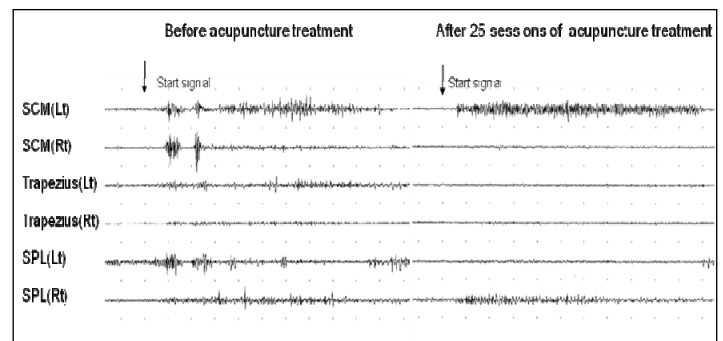


Figure 1

Patient 2 was a 21-year-old female. She had previously received medication and MAB in other hospitals, but left rotation of the neck and left elevation of the shoulder girdle were still prominent. The modified Tsui score was 25 and the visual analogue scale was 10. Clinical and EMG evaluations revealed that the main problems were increased muscle tonus in the

right SCM and the left SPL, and shortened skin at the left front region of the neck. EMG activities in the right SCM and the left SPL increased during right neck rotation (Figure 2, left).

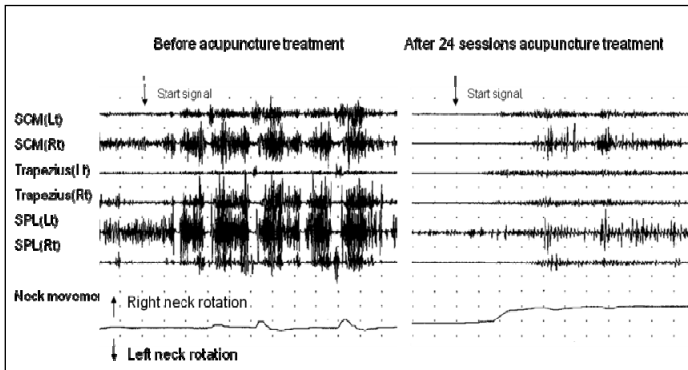


Figure 2

Acupuncture treatment was initially performed once a week using the needle retention method at the right Hegu (LI4) and left Houxi (SI3) to decrease the tonus of the right SCM and left SPL. Multiple epidermis-penetrating needle stimulation was employed at the front neck to stretch the skin before the needle retention method was applied. After 10 sessions using these techniques, the abnormal neck posture was slightly improved to 22 in the modified Tsui score, and 7 on the visual analogue scale. However, elevation and flexion of the left shoulder girdle still remained, indicating the involvement of the levator scapulae muscle and pectoralis major. Therefore, the needle retention method at the left Kunlun (BL60) to decrease the tonus of the left levator scapulae muscle and at the left Chongyang (ST42) to decrease the tonus of the left pectoralis major muscle was added to the regular acupuncture regimen. The EMG data, modified Tsui score, and visual analogue scale showed further improvement after 40 sessions of acupuncture treatment (Figure 2, left and Figure 3).

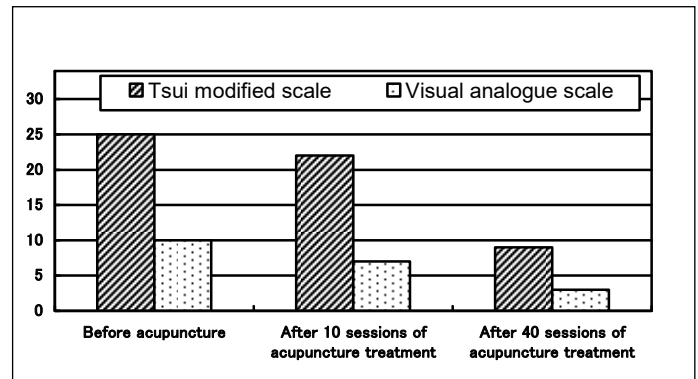


Figure 3

Patient 3 was a 47-year-old male with retrocollis and extension of the trunk. Clinical and EMG evaluations showed that the main problems were increased tonus in the bilateral trunk extensor muscles and the bilateral SCM, and decreased tonus in bilateral trunk flexor muscles during walking (Figure 4). Acupuncture treatment was initially performed once a week using the needle retention method at the bilateral Kunlun (BL60) to decrease the tonus of the bilateral trunk extensor muscles and bilateral Chongyang (ST42) to increase the tonus of the bilateral trunk flexor muscles. Neck and trunk posture during walking were improved with almost normal EMG data after 24 sessions of acupuncture treatment (Figure 4).

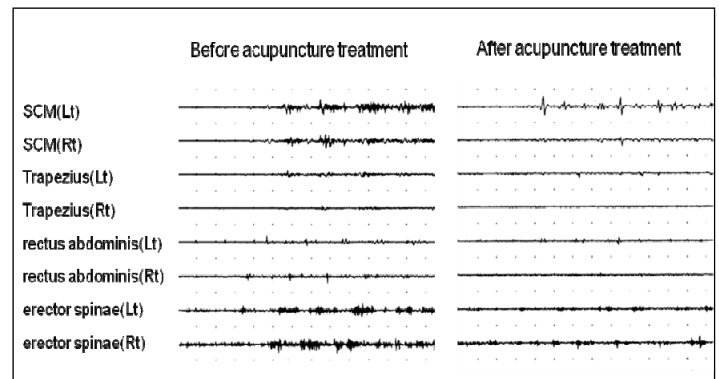


Figure 4

IV. Discussion

Treatment of cervical dystonia includes several methods such as medication, injection of botulinum toxin, surgery, and so on, but presently, there are no specifically effective methods. Although acupuncture is not widely accepted as a common method to treat this intractable

neurological disease, we applied acupuncture in patients with cervical dystonia, and developed a unique method of acupuncture treatment. Our method employs knowledge of both modern medical technology and ancient Chinese/Japanese traditional medicine, particularly that of meridians.

The following is a summary of our unique acupuncture method:

- 1) Using clinical evaluations and EMG findings on motion analysis, we divided affected muscles into two groups, muscles affected by primary disorder and those by secondary disorder. Thereafter, we applied different and specific acupuncture methods to each group.
- 2) For muscles with primary disorder, we used the needle retention method on distal acupoints along the meridian running through the affected muscle. For muscles with secondary disorder, multiple epidermis-penetrating needle stimulation on tender spots was applied. In our previous study²⁾, EMG findings during and after acupuncture using our method were much improved compared to other acupuncture methods, indicating the superiority of our method.
- 3) In addition, we applied the same acupuncture method to trunk muscles, and found that it was very important to improve trunk function for the successful treatment of cervical dystonia. When we assessed patients who had both cervical and trunk postural abnormalities, we realized that correction of the trunk muscles positively influenced the postural abnormality of the neck.
- 4) We decided the depth of retained needles to be 5 mm since the potential in the primary sensory area during acupuncture treatment with 5 mm depth showed a significant change in the somatosensory evoked potential (SEP).
- 5) We decided the standard duration of retained needle treatment to be 5 minutes to decrease muscle tonus and 10 minutes to increase it, although we changed the duration to some extent

according to the condition of the affected muscles, determined by manual palpation in individual cases. Importantly, techniques such as botulinum toxin injection can only decrease muscle tonus, whereas we found that acupuncture can produce bidirectional effects, both increasing and decreasing muscle tonus.

6) For multiple epidermis-penetrating stimulation on tender spots, we learned from our experience that we should continue stimulation until the tenderness disappears in each treatment.

7) In patients with dystonia exhibiting both primary and secondary disorders, we found that we have to treat muscles with secondary disorders first.

Although the effectiveness by clinical evaluations after 10 sessions was 72.9 %, there were some patients who did not show any improvements using our method. Therefore, we need to develop other new techniques of acupuncture treatment for those patients, particularly with retrocollis and unsustained head movement.

V. Conclusions

We have developed a unique method of acupuncture treatment using knowledge of modern medical techniques as well as ancient Chinese/Japanese traditional medicine. We believe that our method will become one of the most effective treatments for patients with cervical dystonia.

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Introduction of Kansai University of Health Sciences (KUHS)

Ikuro Wakayama

Department of Acupuncture and Moxibustion
Kansai University of Health Sciences

1) General information of Kansai University of Health Sciences

Kansai University of Health Sciences (KUHS), former Kansai College of Oriental Medicine (KCOM), is located in southern Osaka Prefecture near Kansai International Airport. Access from the airport as well as from the railway station is very convenient. KUHS is composed of three departments, Department of Acupuncture and Moxibustion, Department of Physical Therapy and Graduate School of Health Sciences. The Department of Acupuncture and Moxibustion includes two divisions, a program in oriental medicine and a program in acupuncture and athletic training.

KCOM was founded in 1985 as a three-year college for training acupuncturists, then reorganized as a four-year college in 2003. On April, 2007, a four-year program for physical therapists was added, and the name of the institution became Kansai University of Health Sciences. In addition, a postgraduate two-year master degree program was started at the same time.

2) Educational stuffs of KUHS

The motto of KUHS is bringing up young talent to serve the community as an acupuncturist or physical therapist. To send fully trained professionals to the community, KUHS provides capable teachers in the fields of general education, basic and clinical oriental medicine, basic and clinical western medicine, acupuncture and moxibustion, and physical therapy all supported by a detailed curriculum.

3) Research works conducting in KUHS

Researchers actively perform investigations in the field of basic and clinical medicine related to acupuncture and moxibustion, and physical therapy. The themes of each research team are listed below.

- (1) Anatomical and biological investigation of the mechanisms of action of acupuncture and moxibustion
- (2) Investigation of the influence of acupuncture and moxibustion on the immune system
- (3) Neurobiology of acupuncture stimulation
- (4) Novel acupuncture treatment in patients with cervical dystonia and related disorders
- (5) Study of the effect of acupuncture in patients with hemodialysis
- (6) Effect of acupuncture treatment on patients with osteoarthritis of the knee - a randomized controlled trial
- (7) Changes in the autonomic system following acupuncture stimulation
- (8) Psychological changes in patients receiving acupuncture and moxibustion
- (9) Study of the effect of ear acupuncture

4) Outpatient Clinic attached to KUHS

The mission of our outpatient clinic is to render good service to the community and patients, and to lead our students to learn clinical skills of acupuncture and moxibustion, physical therapy, as well as skills for personal communication. Our outpatient clinic has 16 medical doctors working in the Divisions of Internal Medicine, Neurology, Psychiatry, Orthopedics, Surgery, Rehabilitation, Dermatology, Gynecology and Kampo Medicine (Japanese traditional herbal medicine). The clinic is equipped with MRI and other modern technological instruments to establish a precise diagnosis as well as to prepare crude drugs from plants and animal products to provide traditional and natural remedies.

In addition, the clinic has an institute for acupuncture and moxibustion treatment. Presently, 21 acupuncturists work in the institute treating patients using traditional, modern or combined techniques. Techniques or principles used are traditional Japanese / Chinese medicine, Ryodoraku method, Akabane method, trigger point techniques and so on.

In conclusion, KUHS provides good opportunities for the students aiming to become a knowledgeable, skillful and well trained acupuncturist and physical therapist as well as for patients who are eager to receive oriental medical therapies and integrated (modern and traditional combined) medical therapies.

Photo1: University Campus,



Photo 2: Outpatient Clinic

