

Clinical Report 1 (Japan)

Case Report: Treatment of a Patient with Peripheral Facial Palsy Associated with Sequelae Low Frequency Electroacupuncture

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Key words: peripheral facial palsy, acupuncture, low frequency electroacupuncture, thermography

Summary

The department of physiotherapeutics at Tsukuba University was established for the purpose of training teaching staff in acupuncture and moxibustion skills, to conduct research into physiotherapy, as well as preparation of teaching faculty. At the same time, an acupuncture and moxibustion outpatient department was established, for patients who express their wish to undergo acupuncture treatment are treated. The chief complaints of the patients are very diversified. Here we report the effects of acupuncture and moxibustion treatment of a patient with peripheral facial palsy associated with sequelae.

Among patients with peripheral facial nerve palsy, the most frequent type is Bell's palsy. Generally, this is a condition with a favorable prognosis marked by ratio of spontaneous healing in about 70% of the cases. In this patient more than 2 years had elapsed since the onset and the patient was diagnosed in many different medical facilities with Bell's palsy, which is difficult to heal completely. A facial nerve palsy score of 24 points, pathological associated movements, facial spasms, the crocodile tears phenomenon and similar sequelae were observed. Thermography showed a temperature difference between the paralyzed and the healthy side of 0.9°C, showing a lower temperature on the paralyzed side. The purpose of the acupuncture treatment was to achieve an improvement in facial circulation and activation of the facial nerve. The method of treatment used was low frequency electroacupuncture that had been developed at this department and specifically applied for stimulation of the facial nerve (nerve pulse) and facial muscles (muscle pulse).

The facial nerve palsy score and thermography

served as the means for the evaluation. The results revealed an improvement in the facial nerve palsy score and the disappearance of the temperature difference between the paralyzed and healthy sides. Further, subjectively the patient reported that she seemed to be able to move the mimic musculature more easily and experienced some relief of the crocodile tears phenomenon. Following prolonged application of low frequency electroacupuncture, improvement in facial circulation was observed, suggesting the possibility that it improves the patient's QOL.

I. Introduction of the Tsukuba University

Tsukuba University is a center, housing more than 20 joint research projects. This facility was established for the training of the teaching personnel in acupuncture and moxibustion skills and research into physiotherapy (Photo 1). Pedagogic organizations that allow their students to take the state examination for acupuncture and moxibustion skills include vocational schools, schools for the blind, centers for persons with visual impairments and universities. Since these are in charge of education other than that provided at universities, a teaching staff licence is required. This is the only facility of its kind in Japan that is authorized to issue teacher licences for people in charge of the teaching of acupuncture and moxibustion skills.

The curriculum in this facility requires two years. Each class has 20 students that are taught by four university teachers and 65 part-time lecturers. Also, in the past a large number of foreign students have been accepted.



Photo 1: Tsukuba University, School for the training of teachers of physiotherapy

The subject of the research in this facility are the basics and clinical application of low frequency electroacupuncture (Photo 2), research conducted in fields like circulatory and autonomic functions, muscle physiology etc. In this facility there is an acupuncture ambulatory practice for the practice of acupuncture and moxibustion clinics. Approximately 40 patients are treated here per day (about 8000 per year). Our concept regarding acupuncture and moxibustion is to perform acupuncture from the standpoint of western medicine. Accordingly, in cooperation with neighboring university hospitals, manual acupuncture and moxibustion treatment are performed. The center of this therapy is the low frequency electroacupuncture that was developed in this facility 30 years ago for clinical application in acupuncture anesthesia. With this technique, frequency and needling depth are determined depending basically on the pathophysiology. As a means of objective assessment of the therapeutic effects an infrared thermography device (Photo 3), a polygraph, a myograph (Photo 4) and electrocardiographs are used.



Photo 2. Low frequency electroacupuncture treatment

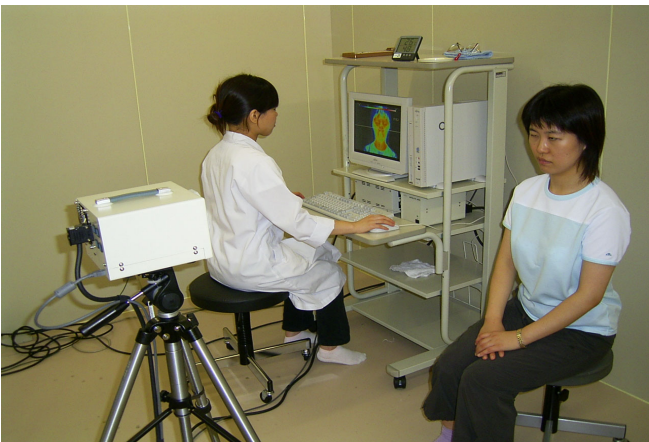


Photo 3. Scene showing thermographic measurements



Photo 4. Scene showing electromyographic measurements

II. Case report

1. Introduction

Among the forms of peripheral facial nerve palsy, Bell's palsy is the most frequent type. Generally, this is a condition with a favorable prognosis marked by a ratio of spontaneous healing of about 70%¹⁾. The 40-point method established by the Japan Society of Facial Nerve Research defines cure as an improvement of more than 36 points within 6 months after onset and no obvious late effects²⁾. Yet, in about 30% of the cases, pathological associated movements and other late effects remain and the approach to these symptoms has recently become a focus of attention. Sequelae include pathological associated movements, facial spasms, and the crocodile tears phenomenon. When Waller degeneration occurs during the process of regeneration of the nerve fibers, there may be excessive regeneration. This occurs because the regenerating axons do not follow the original course and is said to be irreversible³⁾.

We performed low frequency electroacupuncture on a patient with Bell's palsy more than 2 years after onset in the presence of clear late effects. Evaluation was based mainly on the facial paralysis score.

2. Case

Patient: 29-year old female

First visit: August 1, 2000

Chief complaint: left facial paralysis

Diagnosis: Bell's palsy

Anamnesis: The patient noticed in July 1998 that water spilled from her mouth during gargling after

rising in the morning. Upon consultation at a local neurosurgical clinic, the results of MRI and CT examinations did not show any anomalies, so that a peripheral facial nerve palsy was diagnosed. Therapeutically, prednisone was prescribed and taken over a period of 4 months. Later the patient visited the department of neurology at a university hospital. The results of the examination showed dysgeusia, auditory hypersthesia, positive testing for virus (type of virus unknown). In October of the same year, consultation was given at a nearby clinic of internal medicine. The results of the examination showed a negative seroconversion for the previously positive testing for virus. At that point low frequency treatment current therapy and mecobalamin was prescribed. The low frequency treatment was continued over a period of 7 months. In July 1999, consultation at the department neuro-otology of a university hospital. Gustation tests and hearing tests were performed, but the results of both tests were judged to be normal. In 2000, the patient started commuting to the current local clinic of neurology, performed facial massage at home, and was prescribed vitamins. At the time of onset, the patient reported the inability of left eyelid closure, spilling of water spilled from her mouth and similar symptoms, which gradually improved with the low frequency current therapy. Yet, since mild paralytic sequelae remained, she requested acupuncture treatment and thus visited our facility.

Past history: nothing particular

Family history: nothing particular

Current status: height = 159 cm, weight = 53 kg, blood pressure = 122/68 mmHg, pulse = 68 bpm, general health status = good.

Medications: mecobalamin (vitamin B12), ascorbic acid (vitamin C), fursultiamine (vitamin B1).

Findings during first visit:

Facial paralysis score (40-point method): 24 points (Table 1)

Electroneurography (below abbreviated ENoG) value: 25.1%, gustatory anomalies (+), auditory hypersensitivity (-) pathological associated movements (+), facial spasms (+), crocodile tears phenomenon (+)

	Almost normal (4 points)	Partial paralysis (2 points)	Severe paralysis (0 points)
Asymmetry during rest	●		
Wrinkling of the forehead		●	
Lightly closing the eyelids	●		
Tightly closing the eyelids		●	
Closing one eye	●		
Wrinkling the root of the nose		●	
Puffing the cheeks			●
Show teeth saying "eee"		●	
Whistling		●	
Turn down the corners of the mouth		●	
Subtotal	12	12	0
Total	24/40 points		

Table 1. 40-Point method (on first examination)

Thermographic measurements:

A Fujitsu INFRA-EYE 1200 was used, the room temperature adjusted to $26 \pm 1.0^\circ\text{C}$ and after a resting period of 20 minutes frontal thermographs of the face and from both sides obtained. Based on these images, the core temperature was deducted from three points: forehead, eyelids and, anterior buccal region. The average temperature of the face was calculated. This was then compared between corresponding regions on the affected and the healthy side. The results showed a temperature difference between the affected and the healthy side of 0.9°C , the temperature being lower on the paralyzed side.

3. Treatment

1) Treatment method

To improve circulation and the mimic musculature on the side of the facial nerve palsy the following treatment was performed.

(1) Facial nerve pulse

Stimulation of the facial nerve with low frequency electroacupuncture using a frequency of 1 Hz for a period of 15 minutes at TE17 and ST7. The needle at

TE17 was directed obliquely upward and inserted to a depth of about 10-15 mm, while the needle at ST7 was inserted perpendicular for about 10 mm.

(2) Muscle pulse

For stimulation of the orbicular muscle of eye GB1, for the orbicular muscle of mouth ST4 and for the venter frontalis GB14 low frequency electroacupuncture with a frequency of 1 Hz was applied for a period of 15 minutes.

Otherwise, "Taiyo", ST2, ST3 were added as required. The used needles were disposable 50-mm, No. 18 needles (Seirin Inc.). Initially treatment frequency was twice a month, which was later changed to one a week.

2) Treatment duration

August 1, 2000 to March 25, 2001 (total: 28 sessions)

4. Treatment course

Subjectively the movement of the forehead on the paralyzed side and buccal stiffness were improved and the crocodile tear phenomenon decreased occasionally on some days. Objectively, the score of 24 points obtained at the beginning of the treatment with the 40-point method (August 1, 2000) had improved by the 27th treatment (February 19, 2001) to 30 points (Figure 1). Among the 40 points for the item "puff the cheek," the initially leaking air had stopped leaking, an improvement from 0 to 2 points, and "whistling" had improved from 2 to 4 points.

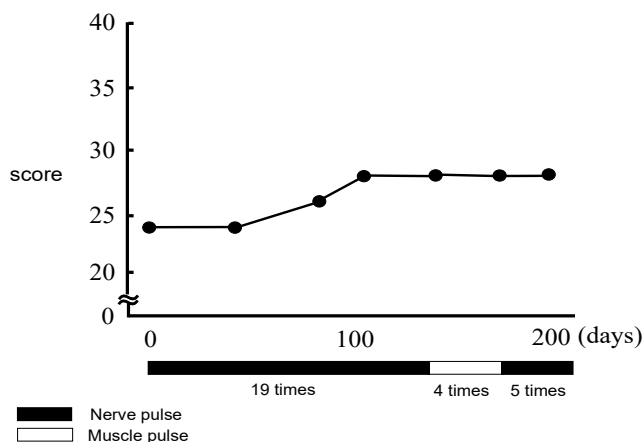


Figure 2 Variations in the score for the facial paralysis

Thermography showed that the initially measured temperature difference between the paralyzed and the healthy side of 0.9°C had improved to 0.7°C. By the 15th treatment session the temperature difference had

improved to 0.8°C before treatment, so that almost no differences to the first session were observed, but after the treatment the left-right difference had disappeared (Photo 5).

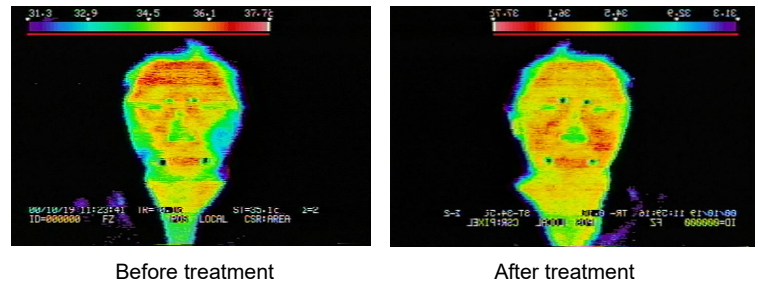


Photo 5 Thermography of the face

Thermography of the face during the 15th treatment. During the application of facial nerve pulse stimulation a decrease in the temperature difference between the healthy and paralyzed sides before and after the treatment were observed.

5. Discussion

This was a case in which more than 2 years had elapsed since the onset and associated with clear manifest pathological associated movements. A score of 24 was obtained with the 40-point method and the ENoG value was 25.1%. Based on these symptoms we concluded that a complete denervation had occurred, rendering the prognosis unfavorable. The ENoG value allows to objectively quantify the degree of the Waller degeneration and is thus significant regarding the prediction of the prognosis. Based on the relevant values obtained between the 8th and 14th day after onset of the paralysis it is possible to assess the duration probably required until recovery⁴⁾. Since in this patient more than 2 years had elapsed since the onset of the paralysis, the score obtained with the 40-point method being 24 and the ENoG value 25.1%, we concluded that in this patient a complete recovery would be difficult⁵⁾.

The patient had, in particular, problems moving the forehead and complained of a feeling of buccal stiffness. Following the acupuncture treatment an improving tendency was reported subjectively for these symptoms. Also, among the 40 points, the item "puff the cheek" had improved from 0 to 2 points and "whistling" had improved from 2 to 4 points.

Previously air had leaked during puffing the cheeks but now air did not leak any more and the patient improved so far as to be able to whistle.

Eighty days after treatment began (the 15th treatment session) thermography showed a left-right temperature difference between the paralyzed and the healthy side before treatment, but following the low frequency electroacupuncture this left-right difference had disappeared. The correlation between peripheral facial paralysis and thermography has been examined, but reports vary widely depending on the researcher. Okamura et al. reported on the correlation between skin temperature and paralysis and indicated regarding the correlation with the prognosis, that in cases presenting with low temperature during the acute phase, a conservative treatment should lead to recovery, while patients presenting with high temperature often require surgical intervention⁵). Ishikawa et al. reported that complete recovery is unlikely in cases where the left-right temperature difference of the entire face during the first visit was more than 1°C, or else the temperature difference in the preotic buccal region 0.4°C, and moreover the score for the mimic musculature less than 20 points. Furthermore, even on the same paralyzed side skin facial temperature may be in comparison to the healthy side either high or low depending on the region⁶). In healthy people the left-right temperature difference ranges between 0.12 and 0.18°C. Any temperature difference that exceeds this range should be viewed as a pathological finding⁷). In this case the temperature difference between the paralyzed and healthy sides was 0.9°C, in the prebuccal regions even a laterality of 1.3°C was observed, so that this may clearly be identified as a pathologic finding. Moreover, Uchino et al. suggested that based on the sympathetic skin response (SSR) and thermography it may be possible to derive minimal microcirculatory disturbances, which may serve as an important factor affecting the prognosis⁸). The patient's thermography showed a decrease in the average temperature difference between the paralyzed and healthy sides immediately following the low frequency electroacupuncture, which allows to infer an improvement in microcirculation. Moreover, with an increasing number of treatments,

this reactivity improved.

A low frequency electroacupuncture device was used for the low frequency electroacupuncture treatment method for this patient to treat the pathologically affected tissues and organs with electroacupuncture^{9,10}). The stimulation was, depending on the treated areas, classified into muscle pulse, nerve pulse, intervertebral joint pulse and subcutaneous pulse; but the authors used for the treatment of peripheral facial paralysis facial nerve pulse and mimic musculature pulse. Elsewhere "following regeneration of the synapses in the muscles electrical stimulation inhibits axon regeneration"^{11,12}), "low frequency stimulation may trigger pathologic associated movements"¹³) has been reported. Thus, concerns have been voiced regarding the treatment of facial paralysis with low frequency electroacupuncture, but Kasuya et al. have reported that treatment of peripheral facial paralysis with low frequency electroacupuncture initiated within three weeks after onset did not delay the improvement on the paralysis¹⁴). In this patient no tendency towards further aggravation of the sequelae was observed, but instead, a reduction in facial stiffness and the crocodile tear phenomenon was subjectively reported. This allows one to presume that the acupuncture treatment probably improved the QOL of this patient. We think, that in the future it will be necessary to examine how such sequelae should be approached by acupuncture, increase the number of treated patients, and investigate the effectiveness of acupuncture treatment based on the results of electrophysiologic examinations as well as its effects on the patient's QOL.

6. Conclusions

We performed low frequency electroacupuncture in a patient more than 2 years after the onset of peripheral facial paralysis, in whom pharmacotherapy did not improve the symptoms. The obtained results were as follows.

1. The facial paralysis score improved from 24 points to 28 points.
2. Following low frequency electroacupuncture, the difference in the average temperature as observed with thermography between the paralyzed and healthy side, decreased.
3. Subjectively the feeling of buccal stiffness and the frequency of crocodile tear phenomenon decreased.

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