



Case Report

Effect of Facial Chuna Manual Therapy Combined with Korean Medicine Treatment for Bell's Palsy

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ABSTRACT

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The effect of combined Korean medicine treatment including facial chuna manual therapy was retrospectively investigated in patients with Bell's palsy. There were 16 patients (14 males) who received 2 months outpatient treatment following > 14 days of hospitalization. The Yanagihara score and House-Brackmann grade were used to measure the severity of symptoms and recovery. The patients (mean age 58.5 ± 24.74 years) were categorized based on their medical history of hypertension ($n = 10$), diabetes mellitus ($n = 10$), or oral intake of steroids early in the diagnosis of Bell's palsy ($n = 10$). There was no difference between patients who had or did not have a previous history of diabetes mellitus or oral steroid. Both the Yanagihara-score and House-Brackmann grade improved significantly in the total patient sample after treatment ($p < 0.001$). Combined Korean medicine including facial chuna manual therapy may have a beneficial effect on patient symptoms and recovery.

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Introduction

Facial paralysis is divided into central and peripheral depending on the cause. Bell's palsy is a type of peripheral facial paralysis caused by inflammation or ischemic compression of the facial nerve (the 7th brain nerve) [1].

The progression of facial paralysis can be divided into different stages, namely, the paralytic stage, aggravating stage, parallel stage, and recovery stage [2]. It is documented that treatment in early stage (within 72 hours of symptoms appearing) of paralysis is effective for recovery [3]. Factors affecting the prognosis of Bell's palsy include complete paralysis, delayed recovery, late treatment from the onset date, patients over 60 years of age, post-auricular pain, loss of taste, diabetes, and hypertension [4]. As a conservative treatment in

Western medicine, oral intake of a corticosteroid during the early stage of Bell's palsy is primarily considered [5].

Acupuncture, moxibustion, electroacupuncture, burying acupuncture, cupping, pharmacopuncture, and chuna therapy are known to be effective as oriental medicine treatments, and many Korean medical institutions have implemented these treatment modalities. There are 3 cases reporting treatment of facial palsy with chuna therapy. One study demonstrated the effective application of cervical spine therapy in inpatients and outpatients [6]. Additionally, 2 case reports have been published which discuss the improvement achieved by direct manipulation of the facial muscles [7,8]. However, there is no report regarding facial chuna manual therapy performed for patients who have undergone a combination of inpatient and outpatient treatment. Therefore, this study was

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conducted to evaluate the effects of facial chuna manual therapy during hospitalization and outpatient treatment.

Case Report

Patient selection

Patients with Bell's palsy who were admitted for treatment at the Jecheon Hospital of Korean Medicine, Semyung University between August 2021 to March 2022, and who received outpatient treatment in the Department of Acupuncture were retrospectively reviewed using electronic medical records. Of the 20 patients with peripheral facial paralysis who received outpatient treatment, 16 patients were selected for this study, and data were analyzed retrospectively. All patients were treated with combined Korean medicine treatment including facial chuna manual therapy. Data were analyzed according to the characteristics of each patient group.

Inclusion criteria

- Diagnosis of peripheral facial paralysis.
- Admitted within 10 days from the onset date.
- Length of hospitalization > 14 days.
- Age range 15–80 years.

Exclusion criteria

- Diagnosis of central facial paralysis.
- Patients with traumatic, congenital, oncologic, granulomatous, or metabolic facial palsy or facial palsy caused by an adverse drug reaction or Herpes Zoster.
- Deficiency of outpatient treatment after hospitalization.

Ethical statement

In order to protect patients' personal information, medical records were accessed following approval from the Institutional Review Board of Department of Acupuncture Medicine Jecheon Hospital of Korean medicine, Semyung University (IRB no.: SMJOH-EX-2021-05) (Total number of the patients were informed of the treatment and possibilities of being published on journal, and also consented about being taken photos of their face during treatment and being published without revealing one's own identification).

Assessment methods

Yanagihara unweighted grading system

In this study, the patients facial paralysis was evaluated using the Yanagihara unweighted grading system (Y-score), which is the most widely used regional scale evaluating the degree of facial palsy. The degree of paralysis is expressed as a score on a scale of 0 to 4, the muscle group is divided into 10, and the perfect score of recovery is evaluated as 40. The above evaluation method was performed twice a week by the operator.

House-Brackmann scale

The House-Brackmann scale (HB grade) is categorized into 5 grades for evaluating facial paralysis and secondary symptoms. The

HB grade was evaluated by the operator at the start of treatment and at the end of treatment.

Treatment methods

Acupuncture

Acupuncture was performed using 0.20 × 30 mm sterile acupuncture needles (Dong Bang Acupuncture Co. Seoul, Korea) twice a day for 5 days, and once a day for 2 days whilst hospitalized. During outpatient treatment, acupuncture was performed 3 times a week. The following acupoints were selected, and the needles were retained for 15 minutes. Yepung (TE17), Sajukgong (TE23), Yangbaek (GB14), Cheonggung (SI19), Jichang (ST4), Hyeopgeo (ST6), Sabaek (ST2), Georyo (ST3), and Daeyeong (ST5).

Electroacupuncture treatment

Electrical stimulation was maintained at 3Hz (through the needle), delivered by an electro stimulator (Hanil TM, Seoul, Korea) applied to Sajukgong (TE23), Yangbaek (GB14), Jichang (ST4), Hyeopgeo (ST6), Sabaek (ST2), Georyo (ST3).

Pharmacopuncture

Soyum and cervi cornu parvum pharmacopuncture (AJ medication, Seoul, Korea) were applied to the paralyzed side of the face. Soyum pharmacopuncture was used in the prodromal and acute phases, and cervi cornu parvum pharmacopuncture was used after the parallel and recovery phases [9].

Physical therapy

Low-frequency stimulation (silver spike point) was used 5 times a week during hospitalization and 3 times a week during outpatient treatment.

Indirect moxibustion

Indirect moxibustion was performed on the ear of the affected side for 15 minutes, 5 days a week during hospitalization.

Herbal medicine treatment

According to the symptoms of the patient, Igeopungsan was administered in the prodromal and acute phases, and Bogigeopungsan was administered in the stationary phase, and the drug equivalent to 120 cc was administered 3 times a day. Herbal medicine was not administered to patients with r- glutamyl transpeptidase of 100 or higher or to those with a history related to liver disease.

Facial chuna manual therapy

The following manual manipulation was performed 5 times a week for inpatients and 3 times a week for outpatients. The manual manipulation method was divided into two stages. After massage was applied to the paralyzed affected side, assist and resist technique was performed for each muscle group of the face.

The massage method was conducted according to the following sequence. Light pressure was applied by the operator with the 1st finger such that it started from the midline of the facial part of the target facial muscle and continued in a smooth curve to the mastoid

process of Yepung (TE17).

The frontal and zygomatic parts start from the midline of the facial area, following Taeyang (Ex HN 5) and Imun (TE21) to the staptes behind the ears. The area around the upper and lower lips extend from the midline of the facial area and follow the smooth line along the acupoints of Hyeopgeo (ST6), Yepung (TE17). Massage over the orbicularis oculi muscle was performed in a circular manner by drawing a semicircle on the upper and lower eyelid from Jungmyeong (BL1) to Dongjaryo (GB1; Fig.1).

After the massage, assist and resist therapy was applied to the facial muscles including the frontalis, the corrugator supercilii, procerus, nasalis, the orbicularis oculi, levator labii superioris, levator angulioris, orbicularis oris, the risorius, and the modiolus [10]. The movement of the patient's facial muscles was assessed according to the Y-score criteria, and if more than 30% of movement was observed, it was judged that the muscle strength was secured and assist therapy was performed.

When performing assist therapy, the patient moves the targeted



Fig. 1. Massage technique.



Fig. 2. Assist and resist technique.

main muscle as much as possible by making a facial expression on the paralyzed side. According to the patient's facial expression, resistance was applied to the moving muscle in the opposite direction to increase muscle strength (Fig. 2).

The operator wore polyethylene gloves (Seungwon medical Co. Bucheon, Korea) to perform a hygienic procedure, and by reducing facial friction, the patient's discomfort and expected abrasions on the facial skin surface were reduced.

Statistical methods

Differences in scale scores before and after final treatment were compared using the Wilcoxon-signed rank test. Differences in facial palsy scales of previous history or steroid intake were compared using the Mann-Whitney test. Patients were categorized based on their history of hypertension, diabetes mellitus, and oral steroids intakes. The statistical significance level was set at $p < 0.05$.

General characteristics

Among the selected 16 patients, 14 were males and 2 were females, and the age distribution ranged from 16 to 79 years old. The mean age was 58.5 ± 24.74 years. Of the selected patients, 11 patients had left facial paralysis and 7 patients had right facial paralysis. After 2 months of treatment, 3 cases had a HB Grade 1 which is indicative of a full recovery, 2 cases remained < HB Grade 3, and the rest of the 11 cases remained within a HB Grade 2. Regarding additional factors known to affect the prognosis of facial paralysis, 10 patients had a previous history of hypertension, and 6 patients had a previous history of diabetes mellitus, and 8 patients had an oral intake of steroids at the initial stage of facial paralysis (Table 5).

Assessments

The Y-score and the HB grade were compared before and after treatment. The Y-score before treatment increased from 11.69 ± 5.55 to 33.63 ± 6.06 after treatment. The HB grade decreased from 3.69 ± 0.60 before treatment to 1.56 ± 0.63 after treatment. On comparison, statistically significant changes were observed at all evaluation stages ($p < 0.05$; Table 1).

Group A included patients with a history of hypertension, and Group B did not have a history of hypertension. In Group A, the Y-score increased from 12 ± 6.32 to 31.22 ± 6.85 , and HB grade decreased from 3.55 ± 0.72 to 1.77 ± 0.66 . In Group B, the Y-score increased from 11.28 ± 4.82 to 36.71 ± 3.09 , and the HB grade decreased 3.85 ± 0.37 to 1.28 ± 0.48 (Table 2). As a result of examining whether there was a difference in scores between groups for Y-pre- and Y-post-treatment difference, Group A had less change than Group B ($p < 0.5$). The post-increase in Group A was not greater than in Group B (Table 2). As a result of examining whether there was a difference in scores between groups for HB-pre- and HB-post-treatment difference, Group A had less change than Group B ($p < 0.5$). Compared with Group A, the post-treatment decrease was not greater in Group B (Table 2).

In another Group A, there were patients with a history of

Table 1. Changes in Scale Scores Before Treatment and After the Final Treatment.

	Before treatment				After treatment				<i>p</i> *
	Mean ± SD	Quartile			Mean ± SD	Quartile			
		25%	50%	75%		25%	50%	75%	
Y-score	11.69 ± 5.55	8.00	9.00	15.25	33.63 ± 6.06	32.25	34.50	38.50	< 0.001
H-B grade	3.69 ± 0.60	3.25	4.00	4.00	1.56 ± 0.63	1.00	1.50	2.00	< 0.001

* Compared within group: analyzed using the Wilcoxon signed rank test.

Table 2. Pre- Post-Treatment Differences in Facial Palsy Parameters: Based on Hypertension.

	Group A† (n = 10)		Group B‡ (n = 6)		<i>p</i> value of the difference*
	Mean ± SD	Pre-post-treatment difference	Mean ± SD	Pre-post-treatment difference	
Y-pre§	12 ± 6.32		11.28 ± 4.82		
Y-post¶	31.22 ± 6.85	-19.22 ± 6.01	36.71 ± 3.09	-25.43 ± 3.54	0.011
HB-pre	3.55 ± 0.72		3.85 ± 0.37		
HB-post**	1.77 ± 0.66	1.78 ± 0.63	1.28 ± 0.48	2.57 ± 0.52	0.031

* Compared between groups: analyzed using Mann-Whitney test.

† History of hypertension.

‡ No history of hypertension.

§ Y score before treatment.

|| HB grade before treatment.

¶ Y score after treatment.

** HB grade after treatment.

Table 3. Pre- Post-Treatment Differences in Facial Palsy Parameters: Based on Diabetes Mellitus.

	Group A† (n = 10)		Group B‡ (n = 6)		<i>p</i> value of the difference*
	Mean ± SD	Pre-post-treatment difference	Mean ± SD	Pre-post-treatment difference	
Y-pre§	12.5 ± 7.50		11.2 ± 4.39		
Y-post¶	33.5 ± 8.45	-21.0 ± 8.58	33.7 ± 4.64	-22.50 ± 5.52	0.713
HB-pre	3.6 ± 0.54		3.7 ± 0.67		
HB-post**	1.4 ± 0.54	2.17 ± 0.41	1.6 ± 0.69	2.10 ± 0.88	0.958

* Compared between groups: analyzed using Mann-Whitney test.

† History of diabetes mellitus.

‡ No history of diabetes mellitus.

§ Y score before treatment.

|| HB grade before treatment.

¶ Y score after treatment.

** HB grade after treatment.

diabetes mellitus and in another Group B patients did not have a history of diabetes mellitus. In Group A, the Y-score increased from 12.5 ± 7.50 to 33.5 ± 8.45, and the HB grade decreased from 3.6 ± 0.54 to 1.4 ± 0.54. In Group B, the Y-score increased from 11.2 ± 4.39 to 33.7 ± 4.64, and the HB grade decreased from 3.7

± 0.67 to 1.6 ± 0.69 (Table 3). We examined whether there was a difference between the groups for Y-pre- and Y-post-treatment difference scores (*p* = 0.713). There was no difference in the extent of change between Groups A and B. Compared with the pre-treatment increase in Group A, the post-treatment increase was

Table 4. Pre-Post-Treatment Differences in Facial Palsy Parameters: Based on Oral Steroids.

	Group A [†] (n = 10)		Group B [‡] (n = 6)		p value of the difference*
	Mean ± SD	Pre-post-treatment difference	Mean ± SD	Pre-post-treatment difference	
Y-pre [§]	12.75 ± 6.27		10.62 ± 4.89		
Y-post [¶]	34.25 ± 5.70	-21.50 ± 6.05	33 ± 6.74	-22.38 ± 7.48	0.721
HB-pre	3.5 ± 0.75		3.87 ± 0.35		
HB-post ^{**}	1.5 ± 0.75	2.00 ± 0.93	1.62 ± 0.51	2.25 ± 0.46	0.645

* Compared between groups: analyzed using Mann-Whitney test.

[†] Oral intake of steroids at an early stage of palsy.

[‡] No oral intake of steroids at an early stage of palsy.

[§] Y score before treatment.

^{||} HB grade before treatment.

[¶] Y score after treatment.

^{**} HB grade after treatment.

Table 5. General Demographics of Patients.

	Total patient group
Age (y), mean ± SD	58.5 ± 24.74
Sex (male/female)	14/2
Left/right	11/7
History of hypertension	10
History of diabetes mellitus	6
Oral intake of steroids at initial stage of facial paralysis	8

similar to the post-treatment increase in Group B (Table 3). As a result of examining whether there was a difference between the groups for HB-pre and HB-post-treatment difference scores, there was no difference in the extent of change in Group A compared with Group B ($p = 0.958$). In other words, the post-treatment reduction in Group A was similar to Group B compared with the prior amount (Table 3).

In another Group A, patients had oral steroid intake at an early stage of palsy, and Group B comprised patients who did not take oral steroid at an early stage of palsy. In Group A, the Y-score increased from 12.75 ± 6.27 to 34.25 ± 5.70 , and the HB grade decreased from 3.5 ± 0.75 to 1.5 ± 0.75 . In Group B, the Y-score increased from 10.62 ± 4.89 to 33 ± 6.74 , and the HB grade decreased from 3.87 ± 0.35 to 1.62 ± 0.51 (Table 4). It was examined whether there was a difference between the groups for Y-pre and Y-post-treatment difference scores ($p = 0.721$). There was no difference in the extent of change between Groups A and B. Compared with the pre-increase in Group A, the post-treatment increase was not different from the post-treatment increase in Group B (Table 4). As a result of examining whether there was a

difference between the groups for HB-pre and HB-post-treatment difference scores, there was no difference in the extent of change in Group A compared with Group B ($p = 0.645$). In other words, the post-treatment reduction amount in Group A was not different from Group B compared with the prior amount (Table 4).

Discussion

Chuna treatment is thought to have a positive effect on the prognosis of facial paralysis by affecting the meridian acupuncture points, soft tissues, and cervical nerves. By applying cervical vertebra therapy, it is possible to stimulate the nerve receptors in the facial muscles by limiting the movement of the cervical vertebrae [6]. There are several manual therapies used to manage facial palsy including cervical chuna manual therapy, neuromuscular re-education, and non-resistive therapy. Few studies have been conducted regarding these treatment methods which increase the activity of the corresponding muscles and acupoints by direct contact with the affected side causing facial paralysis. There has been a case report 20 days after the onset of Bell's palsy [7], and another

report presenting 2 cases treated for sequelae of facial palsy [8].

The cause of Bell's palsy is unknown, however, metabolic diseases such as hypertension and diabetes, and age are known to influence its onset and prognosis [2,11]. Attribute to the age range of patients in this study, age was excluded as a analyzing factor. In this study age distributed from 16 to 79 years old, and also the age of patients was concentrated on average 50–60. Thus, it was not adequate to divide into several groups according to age. Recovery from facial paralysis and its degree of symptom improvement are delayed in patients with metabolic disease. Oral intake of a corticosteroid (prednisolone) at an early stage (within 72 hours of symptoms appearing) of diagnosis of Bell's palsy is available usually as a 10-day course and is offered as a conservative treatment in Western medicine [5].

In this study, statistical analysis was performed to determine whether there was a difference in the treatment effect after receiving combined Korean medicine treatment and FCMT in patients with or without a history hypertension, diabetes mellitus, or an oral intake of steroids early in the diagnosis of Bell's palsy. There was no statistically significant difference in the extent of change before and after treatment in the patient groups (except for hypertensive group) who received combined Korean medicine treatment with FCMT.

Facial chuna therapy for peripheral facial paralysis can stimulate proprioceptive neuromuscular receptors in the facial area. This is because the trigeminal nerve fibers receive proprioceptive sensations from the facial muscles and simultaneously deliver neural information to the central nervous system [12,13]. This can lead to nerve re-education and muscle recovery, by providing effective neurofeedback for the paralyzed facial muscle movement by assisting the origin and resisting the insertion region of the facial muscle [14,15].

After incomplete recovery from Bell's palsy only a part of the facial muscle fibers have connection with the facial nerve restored. These few recovered muscle fibers are required to do the job of the whole muscle [16]. As a result, it can cause an overload on the recovered muscle fibers. By manipulating facial muscles separately with facial chuna manual therapy, fatigue or other sequelae may be prevented. Regarding the influence of several factors known to affect recovery of Bell's palsy (such as hypertension, diabetes mellitus, and oral intake of steroids), the present study did not show a statistically significant difference between patients with or without a history of diabetes mellitus, and with or without an oral intake of steroids early in the diagnosis of Bell's palsy. Thus, combined Korean medicine and FCMT may help in the recovery of Bell's palsy concerning these patients, but symptom improvement may be delayed for those patients who had a history of hypertension ($n = 10$) compared with those patients without hypertension ($n = 6$).

FCMT has the advantage of direct targeted treatment by manipulating acupuncture points of Korean medicine, along with effecting nerve re-education, and by directly contacting the facial area activating the facial muscles.

The limitations of this retrospective study were that the number of patients was small, and there was a limited period of treatment and post treatment observation. A long-term follow-up would help in the assessment of various stages and prognosis of facial paralysis. Additionally, the effect of FCMT alone could not be determined

because it was combined with complex Korean medicine treatment. Despite the above limitation, this study is meaningful in that it evaluated the effect of complex Korean medicine combined with FCMT in treating facial paralysis for patients who received outpatient treatment after hospitalization during the acute and recovery phases.

Author Contributions

Conceptualization: RJD. Methodology: RJD. Formal investigation: RJD, JNY, CYA, RSM, LEY, LCK, LSM and HYJ. Data analysis: RJD, CYA. Writing original draft: CYA. Writing - review and editing: RJD, CYA, JNY and RSM

Conflicts of Interest

The authors declare that they have no competing interests.

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None.

Ethical Statement

Not applicable.

Data Availability

All relevant data are included in this manuscript.

References

- [1] Kim JS. Kim's Facial chuna manual therapy. Daegu (Korea): Wiz communications publisher; 2020. p. 5–6.
- [2] Hong KE. Prevalence and Treatment Pattern of Korean Patients with Facial Palsy. *J Acupunct Res* 2010;27:137–146.
- [3] Choi JE, Kwon MS, Nam DW. Facial Nerve Damage in Bell's Palsy according to When Korean Medical Treatment was Started: A Retrospective Study. *J Acupuncture Res* 2016;33:51–60.
- [4] Department of Acupuncture and Moxibustion in Korea. Textbook of Acupuncture and Moxibustion Medicine. Seoul (Korea): Hanmibook; 2016. p. 640–641.
- [5] Sullivan FM, Swan IRC, Donnan PT, Morrison JM, Smith BH, McKinstry B et al. Early treatment with prednisolone or acyclovir in Bell's palsy. *N Engl J Med* 2007;357:1598–1607.
- [6] Park JH, Yoon HM. Effects of Muscle Energy Technique of Upper Trapezius and Sternocleidomastoid Muscles on Bell's Palsy. *J Acupuncture Res* 2017;34:190–196.
- [7] Choi JH, Yoon YS, Lee KJ, Park KS, Shin JS, Ha IH. The effect of SJS nonresistance technique-facial palsy on a patient with post-acute phase Bell's palsy unresponsive to conventional treatment: A case report. *Explore (NY)* 2021;17:203–207.
- [8] Choi GY, Park YK, Woo SH, Lee HJ, Kim JS. Facial chuna manual therapy and acupuncture treatment for the sequelae of peripheral facial nerve palsy: Two clinical cases. *J Acupuncture Res* 2022;39:70–75.
- [9] Lee YJ, Choi YA, Ryu SM, Roh JD. Clinical review of pharmacopuncture therapy based on the progression of bell's palsy. *J Acupuncture Res* 2021;38:236–241.
- [10] Kim JS. Kim's Facial chuna manual therapy. Daegu (Korea): Wiz communications publisher; 2020. p. 66–67.

- [11] SY Jung, JY Jung, JY Byun, MS Park, SH Kim, SG Yeo. The effect of metabolic syndrome on Bell's palsy recovery rate. *Acta Oto-Laryngologica* 2018;138:670-674.
- [12] Jeong JY, Lee ES, Seo DG, Shin SY, Kim SY, Kwon HK et al. The clinical research of cervical treatment's effects on bell's palsy. *J Acupunct Res* 2014;31:45-55.
- [13] Sardaru D, Pendefunda L. Neuro-proprioceptive facilitation in the reeducation of functional problems in facial paralysis. A practical approach. *Rev Med Chir Soc Med Nat Iasi* 2013;117:101-106.
- [14] Manikandan N. Effect of facial neuromuscular re-education on facial symmetry in patients with Bell's palsy: a randomized controlled trial. *Clin Rehabil* 2007;21:338-343.
- [15] Park YK, Lee CI, Lee JH, Lee HJ, Kim JS et al. A facial Chuna manual therapy for peripheral facial nerve palsy. *J Acupuncture Res* 2019;36:197-203.
- [16] Crystal Touch [Internet]. Chronic facial pains and contractures after Bell's palsy. [cited 2022 Apr 4]. Available from : <https://crystal-touch.nl/chronic-facial-pains-and-contractures-after-bells-palsy>.