JAR Journal of Acupuncture Research

Review Article

pISSN 2586-288X • eISSN 2586-2898
J Acupunct Res 2023;40(2):97-110
https://doi.org/10.13045/jar.2023.00045

Trends of Clinical Research on Facial Spasm in Korean Medicine: A Review of Case Studies

Hea Sun Chun[1]
Ju Chul Kim[2]

[1]Department of Acupuncture & Moxibustion Medicine, College of Korean Medicine, Gachon University, Seongnam, Korea

[2]Research Institute of Korean Medicine Policy, The Association of Korean Medicine, Seoul, Korea

This review aimed to examine and analyze trends of clinical research using case studies on facial spasms in Korean medicine. Seven web databases were searched for case studies on facial spasms using Korean and English search terms. Case studies were selected using the exclusion and inclusion criteria. Overall, 13 case studies were selected, analyzed, and classified according to the publication year and journal, study participants, cause, treatment methods, pattern identification, evaluation methods, improvement, and side effects. Case studies reporting on various treatment methods in Korean medicine, including acupuncture and pharmacopuncture for facial spasms, have been published since 2000. In addition, studies on new treatment methods in Korean medicine for facial spasm have been published. Combination therapy is the most common method used in Korean medicine-based case studies; therefore, future studies on single treatment are necessary. Most of the case studies on Korean medicine reported improved symptoms and patient satisfaction with the Korean medicine treatment method. No side effects were reported, except for facial swelling and bruising, indicating that Korean medicine treatment methods for facial spasm were safe and effective. Therefore, the Korean medicine treatment methods for facial spasm can be actively used in clinical practice and future research.

Keywords: Blepharospasm; Case reports; Research; Spasm

Received: March 22, 2023; Revised: April 12, 2023; Accepted: April 14, 2023

Corresponding author: Hea Sun Chun
Department of Acupuncture & Moxibustion Medicine, College of Korean Medicine, Gachon University, 1342 Seongnam-daero, Sujeong-gu, Seongnam 13120, Korea
E-mail: happyi0927@gachon.ac.kr

Copyright © Korean Acupuncture & Moxibustion Medicine Society

This is an Open Access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derives License (https://creativecommons.org/licenses/by-nc-nd/4.0/). For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

INTRODUCTION

Facial spasm is clinically characterized by involuntary and paroxysmal contraction of the innervated facial muscles; however, it rarely appears bilaterally. It is often not accompanied by pain or any serious health problems. However, when these spasms become chronic, patients experience significant mental stress resulting in interpersonal disorders. Facial spasm, a chronic disease with an unknown cause, has no specific treatment. Treatment of facial spasms includes nonsurgical methods, such as oral medication, botulinum toxin injection, and facial nerve block therapy, and surgical methods, including selective resection of the facial nerve and microvascular decompression [1].

However, it is difficult to predict the effect of oral medication; whereas, botulinum toxin injection has the disadvantage of a short therapeutic effect; intracranial facial nerve decompression of Jannetta is difficult to perform in patients with advanced age, poor general condition, hearing impairment, or spasms after facial palsy, and healthy patients often reject craniotomy [2].

In Korean medicine, facial spasm is not recognized; however, blepharospasm is reported as a similar disease [3], and it is called "Anpojindo" and "Anryunjindo" because the spasmic part corresponds to the upper eyelid, and when the vibration is in between the eyebrows, it is called "Anmido". It is caused by a wind invasion of the liver blood-deficient muscles, which is classified into syndromes of wind obstructing the collaterals, wind-phlegm obstructing the collaterals, and so on. It is treated using therapies, such as liver tonification and blood enrichment. In Korean medicine, treatment methods such as acupuncture, pharmacopuncture, auricular acupuncture, and herbal medicine are performed to treat facial spasm [4].

As previously stated, existing Western medical treatments for facial spasm, such as oral medication, botulinum toxin injection, and decompression surgery, are limited [2]. Therefore, this study aimed to analyze clinical case studies on facial spasm in Korean medicine and examine the effect and safety of the treatment methods used.

MATERIALS AND METHODS

1. Data sources and searches

Search engines were used to search for clinical research studies on Korean medicine treatment for patients with facial spasm. Search terms, such as "Anmyeongyeongryeon (facial spasm in Korean)", "Gyeongryeon (spasm in Korean)", "facial spasm", and "spasm" were used on databases of PubMed, ScienceON, Research Information Sharing Service (RISS), Korean Studies Information Service System (KISS), DataBase Periodical Information Academic (DBpia), *Journal of Acupuncture Research*, and *Journal of Pharmacopuncture* for studies published until 20 December 2022.

2. Data selection

Based on the search on each database, case studies reported in English and Korean were selected. Overall, 29,245 studies were identified. The studies were reviewed, and in those with unclear or insufficient abstract content, the original text was read and analyzed. First, duplicate studies were excluded. Second, studies not related to Korean medicine were excluded. After reviewing the titles and abstracts of 262 retrieved Korean medicine studies and excluding studies that were not directly related to facial spasm, studies without original text, documents that were not in the form of studies, reviews, randomized controlled trial studies, and experimental studies, 13 studies were finally selected (Fig. 1).

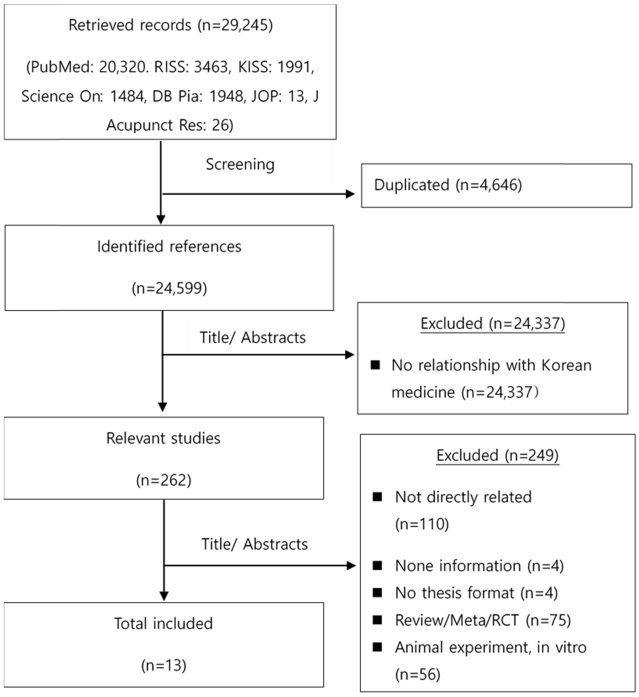

Fig. 1. Flowchart of the study selection progress. RCT, randomized controlled trial; RISS, Research Information Sharing Service; KISS, Korean Studies Information Service System; DBpia, DataBase Periodical Information Academic; JOP, *Journal of Pharmacopuncture*; J Acupunct Res, *Journal of Acupuncture Research*; Meta, meta-analysis.

As facial spasm usually begins in the periorbital musculature and progresses to the perioral muscles, platysma, and other muscles of facial expression [5], and there is no reference for facial spasm in Korean medicine other than blepharospasm, which is a similar disease [3], Korean medicine case studies on both blepharospasm and facial spasm were analyzed.

3. Data analysis

The selected 13 studies (Table 1) [6-18] were analyzed and classified according to the year and journal of publication, study participants, cause, treatment methods, pattern identification, evaluation methods, improvement, and side effects.

Among the reviewed 13 case studies, a few comprised 2 or more individual cases, resulting in a total of 29 cases of facial and blepharospasm. Each individual case in a case study was described numerically, such as case 1, case 2, and so on, if they should be analyzed.

RESULTS

1. Classification by year of publication

The number of published case studies on facial spasms was 1 each in 2000, 2007, 2009, 2011, 2012, 2013, and 2017, and 2 each in 2003, 2014, and 2022 (Fig. 2).

2. Classification by journal

The journals in which the case studies on facial spasm were published with corresponding number of studies were as follows: 5 studies in the *Journal of Acupuncture Research*, 3 in the *Journal of Korean Medicine Ophthalmology & Otolaryngology & Dermatology*, and 1 each in the *Journal of Oriental Neuropsychiatry*, *Journal of Korean Medicine Rehabilitation*, *Journal of the Society of Stroke on Korean Medicine*, *Journal of Applied Oriental Medicine*, and *Frontiers in Neurology* (Table 1).

Table 1. List of case studies to be analyzed

No	Author (y)	Title	Journal
1	Ha et al. [6] (2022)	Comprehensive Korean medicine treatment for benign essential blepharospasm in a patient responding poorly to botulinum toxin treatment	*J Acupunct Res*
2	Ryu et al. [7] (2012)	Case series of Hwa-Byung patients with facial spasm- by using oriental medical treatment with Melonis Calyx vomiting therapy	*J Orient Neuropsychiatry*
3	Kim et al. [8] (2003)	The clinical observation on 3 cases of patients with hemifacial spasm treated by Dong-Si acupuncture therapy	*J Korean Acupunct Moxibustion Soc*
4	Lee et al. [9] (2011)	Case study of facial palsy sequela include spasm treated with Miso Facial Rejuvenation Acupuncture	*J Korean Orient Med Ophthalmol Otolaryngol Dermatol*
5	Kim et al. [10] (2017)	Hemifacial spasm treated with acupuncture and electro-acupuncture in 2 patients: case report	*J Korean Med Rehabil*
6	Lee et al. [11] (2014)	A case of a patient with forcible closure of the eyelids diagnosed as blepharospasm treated with Traditional Korean Medicine	*J Soc Stroke Korean Med*
7	Hur and Song [12] (2013)	Effect of meridian tendino-musculature acupuncture on hemifacial spasm	*Acupuncture*
8	Park and Hong [13] (2007)	Two cases of the treatment of hemifacial spasm improved by Ukgansangamibang and moxa-treatment	*J Korean Orient Med Ophthalmol Otolaryngol Dermatol*
9	Park and Kim [14] (2003)	The clinical observation on 3 cases of hemifacial spasm	*J Orient Med Ophthalmol Otolaryngol Dermatol*
10	Jang [15] (2009)	Hemifacial spasm treated with placenta pharmacopuncture on three cases	*J Appl Orient Med*
11	Ji et al. [16] (2014)	The effect of needle-embedding therapy combined with oriental medical treatment on hemifacial spasm: report of 2 case	*Acupuncture*
12	Cho et al. [17] (2000)	The clinical observation on 5 cases of patient with hemifacial spasm	*J Korean Acupunct Moxibustion Soc*
13	Huang et al. [18] (2022)	Electroacupuncture on hemifacial spasm and temporomandibular joint pain co-morbidity: a case report	*Front Neurol*

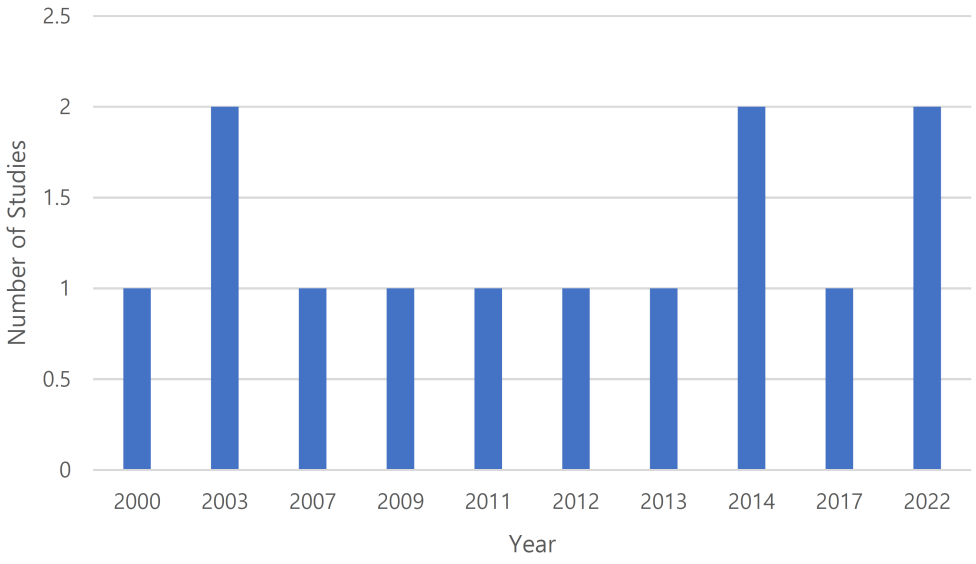

Fig. 2. Classification by the year of publication.

3. Classification by study participants

1) Classification by sex and age

Based on participants' sex, there were more women (n = 20) than men (n = 9). In addition, the age ranges of the participants were as follows: 5 patients were 21–30 years old; 6 were 31–40 years old; 7 were 41–50 years old; 7 were 51–60 years old; and 4 were 61–70 years old. Ages 41–50 and 51–60 years had the highest number of participants (n = 7 each) (Table 2).

2) Classification by spasm area

Facial spasms occurred most frequently on the left side in 18, right side in 7, and both sides in 4 patients. In addition, the cases were categorized as those limited to the eyelids and those in multiple parts of the face. Moreover, 10 and 19 cases occurred at the eyelids and multiple parts of the face, respectively, with relatively more cases occurring in multiple parts of the face (Table 3).

3) Classification according to causes of facial spasm

Excluding 4 studies [6,10,16,18] that did not describe the causative factors of facial spasm, 9 case studies were analyzed. In total, 23 cases were included in the 9 case studies. Stress and fatigue were the most common causes with 11 cases (47.8%), followed by stress in 8 (34.8%), fatigue in 2 (8.7%), and idiopathic and complication of facial palsy in 1 case (4.3%) each (Fig. 3).

4) Classification according to the treatment period

The treatment period was recorded in most studies, except in case 1 [8] and case 5 [17]. The treatment duration varied from 4 [15] to 400 days [17]. Twelve patients (44.4%) were treated for < 1 month; ten patients (37.0%) from 1 to 3 months; 2 patients (7.4%) from 3 to 6 months and from 6 months to 1 year; and 1 patient (3.7%) for ≥ 1 year (Fig. 4).

4. Classification based on Korean medicine treatment

1) Classification based on Korean medicine treatment methods

Case studies of facial spasm were classified according to Korean medicine treatment methods as follows: acupuncture, electroacupuncture, needle-embedding therapy, pharmacopuncture, auricular acupuncture, moxibustion, cupping, herbal medicine, psychotherapy, and Melonis Calyx vomiting therapy.

In most cases, 2 or more Korean medicine treatment methods were combined, and only Korean medicine treatment methods were used in 12 studies (92.3%), except the study by Lee et al. (Table 4) [11].

2) Analysis of acupuncture

Among the 29 cases, acupuncture was not performed in 1 case: case 5 [17]. Most acupuncture procedures were performed using both local and distal acupoints (53.8%) [6,8,10,11,16-18]. Only local acupoints were used in 23.1% [9,12,14], and only distal acupoints were used in 23.1% [7,13,15].

A total of 56 acupoints were used, and analyzing frequent acupoints was considered meaningful; therefore, frequent acupoints were derived (Tables 2, 5).

Table 2. Analysis of pattern identification, acupoints, and muscles operated

Author	Case (sex, age)	Pattern identification	Acupoints and muscles
Ha et al. [6]	1 (M, 34)	-	BL2 GB14, GV26, LI4, LI11, LR3, ST2, ST36, TE23, EX-HN3, EX-HN4, EX-HN5
Ryu et al. [7]	1 (M, 54)	Liver qi depression, liver fire flaming upward	HT8, LR2, SI3, BL62
	2 (F, 66)	Liver qi depression, depressed gallbladder with harassing	HT8, LR2, PC6, SP4, CV17
	3 (F, 29)	Liver qi depression, liver fire flaming upward	HT8, KI10, LR2, SI3, BL62
Kim et al. [8]	1 (M, 28)	-	Cheuk-samni*, Cheuk-ha-samni*
	2 (M, 30)	-	Cheuk-samni*, Cheuk-ha-samni* TE17, ST7, GB14, BL2, TE23, ST1, ST2, ST6
	3 (F, 58)	-	Cheuk-samni*, Cheuk-ha-samni*
Lee et al. [9]	1 (M, 29)	-	Sternocleidomastoid m†. Auricular m†. Temporal m†. Masseter m†. Orbicularis oris m†. Depressor labii inferioris m†. Depressor anguli oris m†. Risorius m†. Zygomaticus major & minor m†. Levator Labii superioris m†. Levator Labii superioris alaeque m†. Orbicularis oculi m†. Frontalis m†. Horizontal buttress
Kim et al. [10]	1 (F, 56)	-	ST1, ST4, ST6, ST7, LI20, GV26, CV24, BL2, TE23, TE17, LI4, ST36
	2 (F, 40)	-	
Lee et al. [11]	1 (F, 52)	Liver yang transforming into wind	BL2, TE23, EX-HN5, ST2, LI4, LI11, LR3, ST36
Hur and Song [12]	1 (F, 64)	-	GB20, TE17, GB12, LI18, ST10, LI17, ST11
	2 (F, 41)	-	
Park and Hong [13]	1 (F, 43)	-	SI5, ST41, GB41, ST43, SI3, LI5
	2 (F, 51)	-	
Park and Kim [14]	1 (M, 43)	-	GB21, CV14, TE15, BL43, BL10, GB20
	2 (F, 44)	-	ST36, ST37, LI4, LR3, GB21, GB20, GV16
	3 (M, 39)	-	GB21, GB20, GV16, LI18, LI17, ST11, SI16
Jang [15]	1 (F, 41)	Liver qi depression	KI10, LR8, LU8, LR4
	2 (F, 36)	Liver qi depression, spleen qi deficiency	
	3 (F, 45)	Liver qi depression, dual deficiency of the heart-spleen	
Ji et al. [16]	1 (F, 59)	-	GB14, ST1, ST2, BL2, TE23, TE17, LI20, ST4, ST6, ST7, ST8, EX-HN4, EX-HN5, LI4, ST36, LR3, Cheuk-samni*, Cheuk-ha-samni*
	2 (F, 26)	-	
Cho et al. [17]	1 (F, 58)	-	GV20, TE17, EX-HN5, ST7, TE5, ST4, LI4
	2 (F, 67)	-	GV20, TE17, EX-HN5, ST7, TE5, LI4, LI20, BL2, TE23, ST2
	3 (F, 67)	-	BL2, TE23, ST8, EX-HN5, ST7, LI4, BL1, GB20, TE17
	4 (M, 37)	-	BL2, TE23, ST2, ST7, LR3, GB20, TE17
	5 (M, 35)	-	-
Huang et al. [18]	1 (F, 50)	-	LI4, LU10, EX-HN3, GV20‡

M, male; F, female.
*Dong-Si acupuncture points, †muscle, ‡acupoints used for temporomandibular joint pain treatment were excluded.

3) Analysis of electroacupuncture

Electroacupuncture was used in 3 studies [10,11,18]. Acupoints ST4 (Dicang)–ST6 (Jiache), BL2 (Cuanzhu)–TE23 (Sizhukong), EX-HN5 (Taeyang)–ST2 (Sibai), and LI4 (Hegu)–LU10 (Yuji) were used for electroacupuncture (Table 6).

Table 3. Classification by spasm area

Spasm area	Left	Right	Both	Total
Eyelids*	5	2	3	10
Face†	13	5	1	19
Total	18	7	4	29

*Spasm limited to eyelids only, †spasm in multiple parts of the face, including the eyelids.

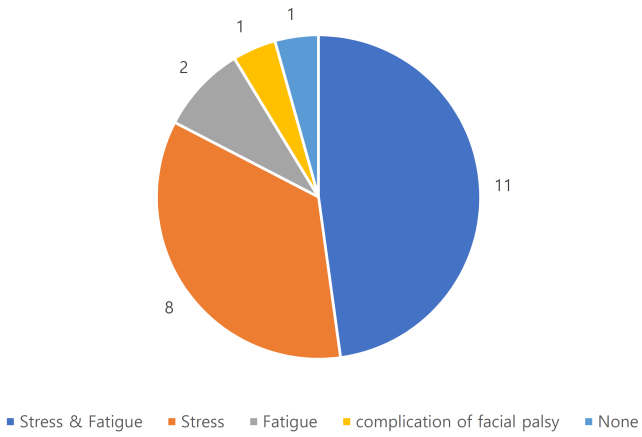

Fig. 3. Classification according to the causes of facial spasm.

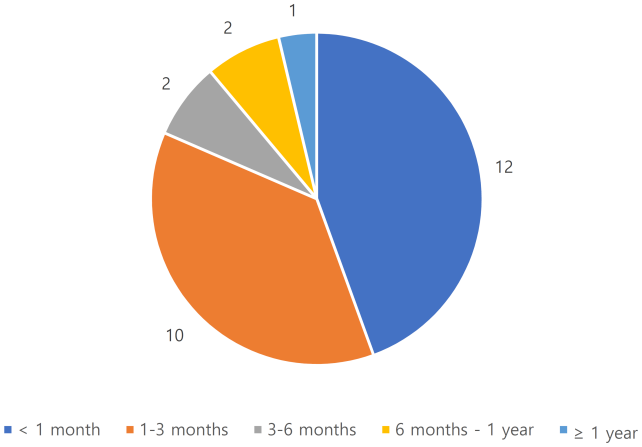

Fig. 4. Classification according to the treatment period.

4) Analysis of auricular acupuncture

Auricular acupuncture was performed in 1 study [17]. Auricular acupuncture was performed alternately on both sides, and each treatment was maintained for 3 days. A total of 8 auricular acupoints were used, and "Sinmun", "Gan", "Noegan", "Myeonhyeopgu", and "Pijilha" were used the most, 4 times each (16.7%), "Gu" was used twice (8.3%), and "Bi" and "Chim" were used once each (4.2%) (Table 6).

Table 4. Classification based on the Korean medicine

Treatment	Case
Single treatment (KM)	
AA	Case 5 [17]
Combined treatment	
Combined treatment (KM)	
Acu, EA	Kim et al. [10]
	Huang et al. [18]
Acu, Pharm	Hur and Song [12]
	Case 1 [15]
Acu, HM	Kim et al. [8]
	Lee et al. [9]
	Case 3 [17]
Acu, Pharm, HM	Ha et al. [6]
Acu, AA, HM	Case 1 [17]
	Case 4 [17]
Acu, Moxa, HM	Park and Hong [13]
Acu, pricking, C, HM	Park and Kim [14]
Acu, needle, embedding therapy, Moxa	Ji et al. [16]
Acu, Moxa, Pharm, HM	Case 2 [15]
	Case 3 [15]
Acu, AA, pricking, C, HM	Case 2 [17]
Acu, HM, Melonis Calyx vomiting therapy, psychotherapy	Ryu et al. [7]
Combined treatment (KM + WM)	
Acu, EA, Moxa, retained C, HM, WM	Lee et al. [11]

KM, Korean medicine; AA, auricular acupuncture; Acu, acupuncture; EA, electroacupuncture; Pharm, pharmacopuncture; HM, herbal medicine; Moxa, moxibustion; C, cupping; WM, Western medicine.

Table 5. List of the 5 most frequently used acupoints

Acupoint	Number of uses
LI4	9
TE17	8
BL2	8
TE23	8
ST7	7

5) Analysis of pharmacopuncture

Pharmacopuncture was performed in 3 studies [6,12,15], including bee-venom and placental pharmacopuncture. A total of 12 acupoints were used, of which ST3 (Juliao), ST5 (Daying), and ST6 were used the most, as they were each used twice (Table 6).

6) Analysis of moxibustion

Moxibustion treatment was performed in 4 studies

Table 6. Analysis of electroacupuncture, auricular acupuncture, pharmacopuncture, moxibustion, and cupping treatment

Author	Case	Electroacupuncture	Auricular acupuncture	Pharmacopuncture	Moxibustion	Cupping
Ha et al. [6]	1			Bee venom, around both eyes		
Kim et al. [10]		ST4–ST6				
Lee et al. [11]	1	BL2–TE23 EX-HN5–ST2			CV12, CV4	Retained (BL 1st line)
Hur and Song [12]	1			Placenta, TE17, TP* of SCM		
	2			Placenta, TP* of SCM		
Park and Hong [13]	1				CV12	
Park and Kim [14]	1					Pricking, TP* between TE17-GB20
	2					
	3					Pricking, GB21, TP* between TE17-GB20
Jang [15]	1			Placenta, ST4, ST6, ST5, ST3		
	2			Placenta, BL1, BL2, ST2, TE23, GB1, BL3	CV12, CV4	
	3			Placenta, ST6, ST5, ST7, ST3	CV12, CV4	
Ji et al. [16]					CV4, CV6	
Cho et al. [17]	1		Sinmun, Gan, Noegan, Gu, Myeonhyeopgu, Pijilha			
	2		Sinmun, Gan, Noegan, Gu, Myeonhyeopgu, Pijilha			Pricking, TE17
	4		Sinmun, Gan, Bi, Pijilha, Chim, Noegan, Myeonhyeopgu			
	5		Gan, Noegan, Pijilha, Myeonhyeopgu, Sinmun			
Huang et al. [18]	1	LI4-LU10				

*Tender points.

[11,13,15,16]. The acupoints used for moxibustion treatment were CV12 (Zhongwan) and CV4 (Guanyuan), which were each used 4 times, and CV6 (Qihai), which was used once (Table 6).

7) Analysis of cupping

Cupping treatment, including retained and pricking-cupping methods, was used in 3 studies [11,14,17]. Retained cupping was performed along the first line of the bladder meridian (BL) [11]. Pricking-cupping was performed on GB 21 (Jianjing), and the tender point between TE17 (Yifeng) and GB20 (Fengchi) [14], whereas it was performed on TE17 (Table 6) [17].

8) Analysis of needle-embedding therapy

Needle-embedding therapy was performed in 1 study [16] and twice in each case. Regarding the treatment area, the first treatment was performed mainly on the symptomatic area, and the second treatment focused on the area with many residual symptoms (Table 4) [16].

9) Analysis of herbal medicine

Herbal medicine treatment was used in 9 case studies [6-9,11,13-15,17] with 20 individual cases. Herbal medicine preparations were used in the form of decoction and powder. Six studies (66.7%) [6,7,11,13,15,17] prescribed only decoctions, and 2 studies (22.2%) [8,14] had 3 cases in common, where decoction and powder were prescribed in 2 and 1 case, respectively. Lee et al. (11.1%) [9] prescribed only powder preparation. From the beginning to the end of the treatments, 7 (77.8%) [6,8,9,11,13-15] and 2 studies (22.2%) [7,17] prescribed 1 and 2 types of herbal medicine, respectively. Of the herbal medicine prescriptions used in 8 studies [6,8,9,11,13-15,17], exclud-

ing cases in which the names of the prescribed herbal medicine were not specified [7], Eokgan-san-gami was used most frequently in 3 cases (16.7%), followed by Gamigwibi-tang in 2 cases (11.1%) (Table 7).

10) Analysis of other Korean medicine treatments

Other Korean medicine treatment methods used included psychotherapy and Melonis Calyx vomiting therapy [7]. Psychotherapy was based on Giungoroen and supportive psychotherapy. Melonis Calyx vomiting therapy involved the administration of 1 g of Melonis Calyx powder with lukewarm water every 30 minutes at 7:00 a.m. on an empty stomach. If vomiting started before 4 g of the maximum dose was administered, further administration would be stopped (Table 4).

5. Analysis of pattern identification

Three studies [7,11,15] reported pattern identification. The patterns identified were liver qi depression, liver fire flaming upward, depressed gallbladder with harassing, liver yang transforming into wind, spleen qi deficiency, and dual deficiency of the heart-spleen. Among them, liver qi depression was diagnosed the most, with 6 diagnoses (50.0%), followed by liver fire flaming upward with 2 diagnoses (16.7%) (Table 2).

6. Analysis of the evaluation methods

Among the evaluation methods, Scott's description was used in 9 studies (28.1%) and appeared to be the most used evaluation method. In addition, visual analog scale (VAS) and treatment satisfaction (excellent, good, and poor) were used in 3 cases (9.4%); treatment satisfaction (very satisfied, satisfied, normal, dissatisfied, and very dissatisfied), Blepharospasm Disability Index, and Jankovic Rating Scale in 2 cases (6.3%); and Numerical Rating Scale, duration of spasm, number of spasms, Instrument of Oriental Medical Evaluation for Hwa-Byung (IOMEHB), Beck Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI), length of eye opening, frequency of spasm, global rating scale, blink reflex (BR), and lateral spread responses (LSR) in 1 case (3.1%) (Table 8).

7. Analysis of improvement

In most cases, facial spasm improved following treat-

Table 7. Analysis of herbal medicine

Author	Case	Herbal medicine
Ha et al. [6]	1	Sayeok-san
Ryu et al. [7]	1	1st: Pueraiae radix 16 g, Scutellariae radix 8 g 2nd: Pueraiae radix 16 g, Scutellariae radix, Paeoniae radix Alba 8 g, Glycyrrhizae radix 4 g
	2	Pinelliae Rhizoma 12 g, Trichosanthis Fructus 8 g, Zingiberis Rhizoma Crudus 4 g, Evodiae Fructus 2 g
	3	Gardeniae Fructus 8 g, Glycyrrhizae radix 4 g
Kim et al. [8]	1	Pyeongganjigyeong-tang-gami
	2	Gamiongwi-tang
	3	Gamiondam-tang Ex*
Lee et al. [9]	1	Danggwisu-san Ex*
Lee et al. [11]	1	Eokgan-san-gami
Park and Hong [13]	1	Eokgan-san-gami
	2	Eokgan-san-gami
Park and Kim [14]	1	Ssanghwa-tang-hab-igigeopung-san-gagam
	2	Hyangsapyeongwi-san Ex*
	3	Palmijihwang-tang-gagam
Jang [15]	2	Ikgibohyeol-tang
	3	Cheongsimyeonja-tang
Cho et al. [17]	1	Gamigwibi-tang
	2	Yugul-tang, Gamigwibi-tang
	3	Gamisoyo-san
	4	Soyo-san-hap-sihosogan-san

Ex, extracts.
*Ex, powder preparation.

Table 8. Analysis of the evaluation methods

Evaluation method	Author
Jankovic Rating Scale	Ha et al. [6], Huang et al. [18]
Blepharospasm Disability Index	Ha et al. [6], Lee et al. [11]
Numerical Rating Scale, duration of spasm, number of spasm	Ha et al. [6]
Visual analog scale	Ryu et al. [7], Lee et al. [9], Kim et al. [10]
Scott's description	Ryu et al. [7], Kim et al. [8], Kim et al. [10], Hur and Song [12], Park and Hong [13], Park and Kim [14], Jang [15], Ji et al. [16], Cho et al. [17]
Instrument of Oriental Medical Evaluation for Hwa-Byung, Beck Depression Inventory, State-Trait Anxiety Inventory	Ryu et al. [7]
Treatment satisfaction (excellent, good, poor)	Kim et al. [8], Hur and Song [12], Cho et al. [17]
Treatment satisfaction (very satisfied, satisfied, normal, dissatisfied, very dissatisfied)	Kim et al. [10], Ji et al. [16]
Length of eye opening	Lee et al. [11]
Frequency of spasm	Jang [15]
Global rating scale, blink reflex, lateral spread responses	Huang et al. [18]

ment with Korean medicine based on evaluation scales, such as Scott's description and VAS.

8. Analysis of side effects

Among case studies on facial spasm, side effects were reported in 8 studies [8-11,14,16-18], and no side effects were reported in 6 studies [8,10,11,14,17,18]. In 2 studies [9,16], Miso facial rejuvenation acupuncture [9] and needle-embedding therapy [16] were performed with complaints of discomfort, such as swelling and bruising of the face, after the procedure were reported, and no other side effects occurred.

DISCUSSION

Facial spasm is a pathological condition characterized by involuntary and intermittent unilateral contraction of the whole or part of the muscles innervated by the facial nerves and occurs most often in middle-aged women. The etiology is often unknown, and possible causes include mechanical compression of the blood vessels of the facial nerve at the cerebellopontine angle. Treatment includes medical and surgical treatment and facial nerve block; however, their effects are often unsatisfactory [19]. Side effects such as dry-eye symptoms, transient ptosis of botulinum toxin injection [20], sigmoid sinus thrombosis, severe edema of the cerebellum, cerebellar abscess, and hearing loss due to microvascular decompression [21] have been reported.

In Korean medicine, dual deficiency of the heart-spleen, dual deficiency of qi and blood after suffering from fatigue due to illness or overexertion, blood deficiency engendering wind due to liver blood deficiency, and intense liver fire are considered possible causes and are treated with herbal medicine and acupuncture [22].

As facial spasm is particularly severe when patients are nervous or talking to others, patients are prone to depression because of aggravated mental anxiety; as a result, they tend to avoid work and everyday interpersonal relationships [23]. Spasms are often progressive in terms of intensity, frequency, and affected area [24]. As mentioned above, the treatment of facial spasm was unsatisfactory [19], and the number of side effects has been reported [20,21]. Therefore, we analyzed the clinical research trends in Korean medicine, focusing on case studies on facial spasm to examine the trends, effects, and stability of Korean medicine treatment.

Case studies on facial spasms have been published since 2000, and the most recent was published in 2022. Among them, the years with the largest number of case studies published were 2003, 2014, and 2022, with 2 case studies each.

Journals that published case studies on facial spasms include the *Journal of Acupuncture Research*, which has the most publication (5), followed by the *Journal of Korean Medicine Ophthalmology & Otolaryngology & Dermatology* (3). This reflects the use of various acupuncture treatments, such as Dong-Si [8,16], meridian tendino-musculature acupuncture [12,14], and the characteristics of facial spasms according to the onset site.

Regarding participant sex and age, there were 9 men and 20 women (women-to-men ratio, 2.2:1). In addition, the most common age range was 41–60 years, with the

left side being the most affected. This is similar to previous findings, i.e., the average age for facial spasm onset is the 40s and 50s, and the ratio of men to women was approximately 1:2 [1]; a ratio of 1:2.1 for both men-to-women and right-to-left sides [23].

As for the causes of facial spasm, stress with fatigue accounted for the largest proportion (11 cases, 47.8%), followed by stress (8 cases, 34.8%), and fatigue (2 cases, 8.7%). Convulsions can be caused or aggravated by mental stress, fatigue, and conversation [25], which is consistent with the reports that mental stress and fatigue are the most common causes.

The shortest treatment period of Korean medicine treatment was 4 days, which was 1 month in onset. The longest treatment period was approximately 400 days, which was 6 years in onset. A total of 12 cases (44.4%) had a treatment duration of < 1 month, followed by 1–3 months in 10 cases (37.0%). Therefore, the treatment duration was < 3 months in 22 cases (81.4%), which comprised most of the individual cases. Of the 22 cases with a treatment duration of < 3 months, the disease duration was < 3 months in 5 (22.7%) cases, 3 months to < 1 year in 7 cases (31.8%), and ≥ 1 year in 10 cases (45.5%), which showed that 12 (54.5%) patients had a disease duration of < 1 year, accounting for more than half of the cases. In comparison, the disease duration in all 5 cases (18.5%) with treatment duration of ≥ 3 months was ≥ 1 year, and the longest duration was 6 years. Based on these results, the longer the duration of facial spasm, the longer the treatment duration. Thus, deriving a more meaningful relationship is necessary between the disease and treatment duration through more future clinical studies.

In most studies (12 studies, 92.3%) only Korean medicine treatment methods was used. Of these 12 studies, 1 case (3.6%) used a single treatment method, whereas 27 cases (96.4%) used 2 or more Korean medicine treatment methods. This makes it difficult to determine which treatment method was effective; therefore, future clinical studies using only a single treatment method are needed.

Of the Korean medicine treatment methods, acupuncture treatment was used in most cases, accounting for 28 (96.6%) of 29 cases. In the case of acupoints used for acupuncture treatment, 3 studies [9,12,14] (23.1%) used only local acupoints, and 7 studies [6,8,10,11,16-18] (53.8%) used both local and distal acupoints. Therefore, in most cases, acupuncture was performed using local acupoints. This supports the finding that acupoints distributed on the face along the route of the facial nerve can be used in acupuncture treatment for facial spasm [3]. Acupuncture treatment for facial spasm appeared to use various acupuncture methods such as Dong-Si [8,16] and Sa-am acupuncture [13,15]. Among the acupoints of Dong-Si acupuncture, Cheuk-samni and Cheuk-ha-samni were commonly combined, as their combination is used to treat facial diseases, such as facial nerve spasms [26]. Regarding Sa-am acupuncture, Park and Hong [13] chose stomach tonification and wisunghanggyeok as the acupoints located on the face are enormously distributed in the stomach meridian, whereas Jang [15] chose liver tonification by demonstrating that liver qi depression was the main etiologic factor. Two studies were using meridian tendino-musculature acupuncture [12,14], and since myofascial pain syndrome corresponds to meridian tendino-musculature acupuncture [4], they were classified as meridian tendino-musculature acupuncture. Studies using meridian tendino-musculature acupuncture [12,14] commonly used acupoints corresponding to the sternocleidomastoid muscle (SCM). The trapezius muscle was also treated [14], and 2 studies [12,14] reported that the SCM and trapezius muscles were the most commonly used muscles to treat facial diseases. In addition, in a study using Miso facial rejuvenation acupuncture [9] to stimulate facial muscles [27], acupuncture was applied to the SCM, confirming that the SCM was used frequently when acupuncture treatment for facial spasm was performed mainly on the muscles. Among the acupoints used for the acupuncture treatment of facial spasm, LI4, TE17, BL2, TE23, and ST7 (Xiaguan) were the most frequently used acupoints. For TE17, the idea that compression of the root entry zone of the facial nerve is a common cause of hemifacial spasms is generally accepted [28], and its significance can be found in that TE17 is an acupoint in the interneuron area before the branching of the nerve in the first area where the facial nerve emerges from the skull [3]. LI4 and ST7 are the basic acupoints for facial spasm acupuncture treatment [4], BL2 is used to treat all eye and facial diseases [29], and TE23 is used to treat head and face diseases [30]. Clinical studies using various acupuncture methods are warranted; however, most of the studies on acupuncture treatment were not studies using acupuncture alone; therefore, in the future, supplemental results through single treatment analysis of acupuncture treatment are needed to determine the significance of acupuncture treatment.

For electroacupuncture treatment, in most studies [10,11], the acupoints used differed depending on the site of facial spasm. For facial spasm around the eyelids, mouth, and cheeks [10], ST4–ST6 were used. For facial

spasms limited to the eyelids [11], BL2–TE23 and EX-HN5–ST2 were used. However, Huang et al. [18] treated LI4-LU10, which are distal acupoints, because of the inhibition of the hyperexcitability of the spastic side. This study is considered meaningful because it reports that facial spasm can be treated with electroacupuncture at the distal acupoint when the hyperexcitability of the spastic area is a concern. In particular, 1 study reported that such as acupuncture, herbal medicine resulted only in a slight response and the condition worsened again. However, after the initiation of electroacupuncture treatment, all symptoms, including spasms, showed improvements, showing the possibility of using electroacupuncture for the treatment of facial spasm in the future [11].

Auricular acupuncture treatment was used because the nerves are very rich and detailed in the ears, and facial nerves are distributed [4]. A total of 8 auricular acupoints were used, and among them, "Sinmun", "Gan", "Noegan", "Myeonhyeopgu" and "Pijilha" were mostly used. "Sinmun" and "Pijilha" have tranquilizing effects. "Gan" is used in the treatment of convulsions, and "Myeonhyeopgu" is used for treating diseases, such as facial spasm and trigeminal neuralgia, by gliding through, unblocking the meridian, and activating collaterals [4]. This can be understood in a similar context to the point that in this study, stress and fatigue, or stress alone, accounted for most of the causes of facial spasm. However, only 1 clinical study on facial spasm used auricular acupuncture treatment [17]; therefore, more clinical studies using auricular acupuncture are needed.

Most of the areas where pharmacopuncture was applied focused on the affected area, such as around the spasm area [6] or acupoints on the facial spasm area [15]; however, pharmacopuncture used on the acupoints of TE17 and SCM [12], which showed that the study [12] was based on meridian tendino-musculature acupuncture and used pharmacopuncture in the same context as acupuncture treatment based because the SCM is the most commonly implicated muscle for treating facial diseases. Two studies used placenta pharmacopuncture [12,15]; in both studies, placenta pharmacopuncture was used based on the efficacy of tonifying qi, essence, and regulating autonomic nerves [31]. One study [6] used bee-venom pharmacopuncture because melittin, the component of bee venom [4], reduces dopamine transporters through multiple mechanisms [32,33]. However, since none of these studies utilized pharmacopuncture alone, if pharmacopuncture single-trial studies are actively conducted in the future to prove the significance, safety of pharmacopuncture, it may be a basis for replacing existing botulinum treatments for facial spasm.

CV12, CV4, and CV6 acupoints were used in moxibustion treatment, all of which belonged to the conception vessel (CV). This can be meaningful in that CV treats nervous system diseases and the facial part through which CV passes along with the efficacy of relaxation sinews and activation of CV collaterals [30].

The types of cupping used were retained and pricking-cupping methods. In particular, pricking-cupping was commonly performed on TE17 [14,17], which may be the basis why TE17 was widely used in acupuncture treatment as mentioned above.

Needle-embedding therapy treats diseases by continuously stimulating the acupoint with embedding needles [4] with the aim of increasing therapeutic effect by maximally prolonging the stimulation time for the acupoint [34]. Needle-embedding therapy improved the symptoms and treatment satisfaction [16]. This finding can be the basis for the use of needle-embedding therapy in the treatment of facial spasm in the future. However, only 1 case study on facial spasm used needle-embedding therapy [16]; therefore, more studies are needed.

In the case of herbal medicine treatment,, most studies [6,8,9,11,13-15] used 1 type of herbal medicine. Of the 20 cases, Eokgan-san-gami was used the most (3 cases, 16.7%), followed by Gamigwibi-tang (2 cases, 11.1%). Eokgan-san treats deficiency heat of the liver meridian and is a prescription used for those who become nervous due to excess liver qi, are easily angry, cannot sleep due to excitement, and have twisted muscles [35]. In addition, Gamigwibi-tang is a prescription based on Gwibi-tang, which has the effect of tonifying qi, replenishing blood, fortifying the spleen, nourishing the heart, and curing heart and spleen damage induced by anxiety, thought, and anger [36]. This point is consistent with the fact that 19 cases (82.6%) of facial spasm in this study were related to stress and that stress was the common cause of cases which Eokgan-san [11,13] and Gamigwibi-tang [17] were prescribed.

Other treatments include psychotherapy and Melonis Calyx vomiting therapy used [7], which were characterized by the study of patients with Hwa-Byung and facial spasm comorbidity. As a result, all Hwa-Byung symptoms, including facial spasm, rapidly improved in all cases following Melonis Calyx vomiting therapy [7]. Since Melonis Calyx vomiting therapy does not induce a serious reaction on the human body when 0.5–3 g is administered [37], clinical studies on facial spasms using melonis calyx vomiting therapy are needed to prove its effect more significantly.

Regarding pattern identification, liver qi depression accounted for most cases, with a total (6 times, 50.0%), followed by liver fire flaming upward (2 times, 16.7%). Stress and fatigue were common factors in patients diagnosed with liver qi depression and liver fire flaming upward [7,15]. This characteristic is similar to liver qi depression caused by malfunction in free coursing of liver due to psychological causes [38], and liver fire flaming upward is a step further from liver qi depression caused by these psychological factors [39].

Regarding the evaluation methods, Scott's description was the most used (28.1%), followed by VAS and treatment satisfaction (excellent, good, and poor) (9.4% each). Scott's description was used to evaluate the degree and progress of facial spasm as objectively as possible; however, subjective discomfort and satisfaction with symptoms insufficiently expressed by Scott's description were supplemented using VAS and treatment satisfaction, respectively. In addition to facial spasm symptoms, studies on patients with Hwa-Byung evaluated mental state changes using IOMEHB, BDI, and STAI [7]. In addition, Huang et al. [18] used BR and LSR to evaluate excitability changes at the brainstem interneuron level and hyperexcitability of the facial motor nucleus, respectively. As such, the degree of improvement was evaluated using various evaluation methods according to the patient's characteristics and mechanism of onset.

Improvements were noted in most cases, and treatment satisfaction was excellent, good, or satisfied in 10 (71.4%) of the 14 cases belonging to 5 studies [8,10,12,16,17]. Only 4 cases (28.6%) were identified as poor; therefore, satisfaction with Korean medicine treatment was considered high. In the study by Cho et al. [17], Scott's description showed no improvement in 2 cases after treatment compared with before treatment, whereas 2 cases improved after treatment, but were not significantly different at 3 months. In addition, treatment satisfaction was poor in all 4 cases. In case 5 [17], Scott's description improved from 3 to 0, which was maintained after 3 months, and treatment satisfaction was excellent. The onset period was shorter than 3 months in case 5 [17], while the remaining 4 cases had an onset period of > 1 year. According to Cho et al. [17], the symptom period and treatment effect were inversely proportional, i.e., the longer the disease duration of facial spasm, the longer the treatment period. However, only 5 studies (38.5%) investigated maintenance and recurrence after treatment [6,7,14,17,18]; hence, more significant results on the effect of the treatment can be derived if the confirmation of maintenance and recurrence is actively carried out in the future.

No side effects were reported, except those reported by 2 studies [9,16]. Common side effects were facial swelling and bruising after the procedure [9,16]. The patient was very satisfied with the improvement in symptoms [9], and the treatment satisfaction was present "satisfied" in 2 individual cases [16]; hence, the side effects did not significantly affect the patients' treatment satisfaction. Based on these results, Korean medicine treatment for facial spasm has a low risk of side effects, which can be advantageous in clinical use. However, since the proportion of studies that have confirmed recurrence or maintenance is relatively small, more significant results can be demonstrated if more Korean medicine clinical studies are published in the future by supplementing this point. In addition, this study is limited by its analysis of case studies alone; thus, examination of research trends in various study designs is warranted.

CONCLUSION

This study analyzed case studies using various Korean treatment methods, including acupuncture and electroacupuncture, in the treatment of facial spasm. Side effects were few, and symptoms improved in most cases. It is noteworthy that case studies using new treatment methods have been published. However, the present study was limited to case studies, most of which used combined treatment; thus, it is necessary to supplement these findings in the future.

AUTHOR CONTRIBUTIONS

Conceptualization: HSC. Data curation: HSC, JCK. Formal analysis: HSC. Funding acquisition: HSC. Investigation: HSC, JCK. Methodology: HSC. Project administration: HSC, JCK. Resources: HSC. Supervision: HSC. Visualization: HSC, JCK. Writing – original draft: HSC, JCK. Writing – review & editing: HSC.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

FUNDING

This work was supported by the Gachon University research fund of 2022 (GCU-202205810001).

ETHICAL STATEMENT

This research did not involve any human or animal experiment.

ORCID

Hea Sun Chun, https://orcid.org/0000-0002-1002-9312
Ju Chul Kim, https://orcid.org/0000-0002-7210-1527

REFERENCES

1. Lim HK, Kwak NK, Lee YB, Yoon KB. Fluoroscopy guided facial nerve block in the treatment of facial spasm. J Korean Pain Soc 1995;8:82-85.
2. Kim C, Lee YB, Lee HK, Yoon KB, Choi R. Facial nerve block for the treatment of facial spasm: a retrospective analysis of 27 patients. J Korean Pain Soc 1994;7:43-48.
3. Cho HS, Jang JH, Kim KH, Yoon JH, Kim KS. A study on hemifacial spasm. Dongguk J Inst Orient Med 1999;7:69-79.
4. Korean Acupuncture & Moxibustion Medicine Society Textbook Compilation Committee. Acupuncture medicine. Rev. ed. Hanmi Medical Publishing. 2021:181, 195, 224, 234-235, 241-244, 660-662.
5. Chaudhry N, Srivastava A, Joshi L. Hemifacial spasm: the past, present and future. J Neurol Sci 2015;356:27-31. doi: 10.1016/j.jns.2015.06.032
6. Ha SJ, Kim SA, Lee SJ, Choi SW, Lee SH. Comprehensive Korean medicine treatment for benign essential blepharospasm in a patient responding poorly to botulinum toxin treatment. J Acupunct Res 2022;39:49-52. doi: 10.13045/jar.2021.00262
7. Ryu HS, Ahn HJ, Lee SB, Park SJ. Case series of Hwa-Byung patients with facial spasm - by using oriental medical treatment with Melonis Calyx Vomiting Therapy. J Orient Neuropsychiatry 2012:23:183-198. doi: 10.7231/jon.2012.23.4.183
8. Kim TW, Kim HE, Cho MJ, Kang YH, Lee JD. The clinical observation on 3 cases of patients with hemifacial spasm treated by Dong-Si acupuncture therapy. J Korean Acupunct Moxibustion Soc 2003;20:218-227.
9. Lee YJ, Choi JH, Lee JC, Park SY, Kim JH, Choi JH, et al. Case study of facial palsy sequela include spasm treated with Miso Facial Rejuvenation Acupuncture. J Korean Orient Med Ophthalmol Otolaryngol Dermatol 2011;24:119-128. doi: 10.6114/jkood.2011.24.3.119
10. Kim ST, Song MY, Kwon MG, Sul JU, Jo HG. Hemifacial spasm treated with acupuncture and electro-acupuncture in 2 patients: case report. J Korean Med Rehabil 2017;27:77-81. doi: 10.18325/jkmr.2017.27.1.77
11. Lee YR, Hyun SH, Kim YS, Cho KH, Moon SK, Jung WS. A case of a patient with forcible closure of the eyelids diagnosed as blepharospasm treated with Traditional Korean Medicine. J Soc Stroke Korean Med 2014;15:80-84.
12. Hur KY, Song HS. Effect of meridian tendino-musculature acupuncture on hemifacial spasm. Acupuncture 2013;30:197-202. doi: 10.13045/acupunct.2013037
13. Park MC, Hong SU. Two cases of the treatement of hemifacial spasm improved by Ukgansangamibang and moxa-treatment. J Korean Orient Med Ophthalmol Otolaryngol Dermatol 2007;20:236-242.
14. Park HS, Kim YB. The clinical observation on 3 cases of hemifacial spasm. J Orient Med Ophthalmol Otolaryngol Dermatol 2003;16:242-251.
15. Jang WS. Hemifacial spasm treated with placenta pharmacopuncture on three cases. J Appl Orient Med 2009;9:49-57.
16. Ji YS, Yuk DI, Kim JH, Kim YI. The effect of needle-embedding therapy combined with oriental medical treatment on hemifacial spasm: report of 2 case. Acupuncture 2014;31:163-171. doi: 10.13045/acupunct.2014063
17. Cho HS, Choi YH, Jang JH. The clinical observation on 5 cases of patient with hemifacial spasm. J Korean Acupunct Moxibustion Soc 2000;17:188-199.
18. Huang JP, Liang ZM, Zou QW, Zhan J, Li WT, Li S, et al. Electroacupuncture on hemifacial spasm and temporomandibular joint pain co-morbidity: a case report. Front Neurol 2022;13:931412. doi: 10.3389/fneur.2022.931412
19. Jeong JO, Kwon JY, Kim HK, Baik SW, Kim IS, Chung KS. CT guided chemical facial nerve block in the treatment of facial spasm. J Korean Pain Soc 1993;6:251-254.
20. Scott AB, Kennedy RA, Stubbs HA. Botulinum A toxin injection as a treatment for blepharospasm. Arch Ophthalmol 1985;103:347-350. doi: 10.1001/archopht.1985.01050030043017
21. Han IB, Chang JH, Chang JW, Park YG, Kim DI, Chung SS. The role of postoperative magnetic resonance imaging of microvascular decompression of the facial nerve in patients with hemifacial spasm. J Korean Neurosurg Soc 2001;30 Suppl 1:44-50.
22. Roh SS. Korean medicine ophthalmology, otolaryngology & dermatology. Jumin Publishing. 2003:165-166.
23. Kim C, Yang SK, Lee HK, Lee HJ, Oh JH, Noh WH, et al. Retrospective study of facial nerve block for facial spasm. J Korean Pain Soc 1996;9:89-93.
24. Rosenstengel C, Matthes M, Baldauf J, Fleck S, Schroeder H. Hemifacial spasm: conservative and surgical treatment options.

Dtsch Arztebl Int 2012;109:667-673. doi: 10.3238/arztebl.2012.0667
25. Kim JC, Kim WS, Ahn SK, Shyn KH. Clinieal studies in patients with essential blepharospasm and with hemifacial spasm. J Korean Ophthalmol Soc 1991;32:837-843.
26. Ju HU. Introduction to Dong-si acupuncture through acupuncture points illustration. 2nd ed. Fishwoodbook. 2020:126.
27. Lee SY, Ko JM, Kim JH, Kwon HJ, Chung JY, Song SH, et al. Case study of *Miso* Facial Rejuvenation Acupuncture on intractable facial palsy. J Korean Acupunct Moxibustion Soc 2009;26:163-171.
28. Iwakuma T, Matsumoto A, Nakamura N. Hemifacial spasm. Comparison of three different operative procedures in 110 patients. J Neurosurg 1982;57:753-756. doi: 10.3171/jns.1982.57.6.0753
29. Meridian & Acupoint Textbook Compilation Committee. Acupuncture points Vol. 1. Jeongdam Book. 2020:495.
30. Meridian & Acupoint Textbook Compilation Committee. Acupuncture points Vol. 2. Jeongdam Book. 2020:226, 455.
31. Korean Pharmacopuncture Institute Textbook Compilation Committee. Pharmacopuncturology. 3rd ed. Hanmi Medical Publishing. 2019:248-249.
32. Keith DJ, Eshleman AJ, Janowsky A. Melittin stimulates fatty acid release through non-phospholipase-mediated mechanisms and interacts with the dopamine transporter and other membrane-spanning proteins. Eur J Pharmacol 2011;650:501-510. doi: 10.1016/j.ejphar.2010.10.023
33. Keith DJ, Wolfrum K, Eshleman AJ, Janowsky A. Melittin initiates dopamine transporter internalization and recycling in transfected HEK-293 cells. Eur J Pharmacol 2012;690:13-21. doi: 10.1016/j.ejphar.2012.05.020
34. Lee KH, Lee DH, Kwon KR, Park HS, Park YY. A literary study on embedding therapy. J Pharmacopunct 2003;6:15-21. doi: 10.3831/KPI.2003.6.3.015
35. Lee JH. Essential formulae in oriental medicine with illustrations. Rev. ed. Uibang Publishing Company. 2007:518.
36. Hwang DY, Shin MG. Bangyackhappyen. Younglimsa. 2010:156.
37. Lee SW, Seol MH, Na HY, Yoo JH, Ahn YM, Lee BC, et al. Retrospective study of safety of Tu Fa (吐法) by *Melonis Calyx*: analysis of clinical features and liver and kidney functions. J Intern Korean Med 2015;36:498-506.
38. Kim BS, Kim DU, Lee JH, U HJ, Kim BU. A literature review on diagnosis of liver Qi depression. J Intern Korean Med 1992;13:70-76.
39. Pyo RJ, U HJ, Lee JH, Park JH, Kim BU. A literature review on liver fire flaming upward. J Intern Korean Med 1993;14:92-100.