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Acupuncture Research

Effect of Acupuncture on Clinical Symptoms of Patients with Intractable Facial Paralysis: A Multicentre, Randomized, Controlled Trial*

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ABSTRACT **Objective:** To evaluate the clinical effect and safety of acupuncture manipulation on treatment of intractable facial paralysis (IFP), and verify the practicality and precision of the Anzhong Facial Paralysis Precision Scale (Eyelid Closure Grading Scale, AFPPS-ECGS). **Methods:** A multicentre, single-blind, randomized controlled trial was conducted from October 2022 to June 2024. Eighty-nine IFP participants were randomly assigned to an ordinary acupuncture group (OAG, 45 cases) and a characteristic acupuncture group (CAG, 44 cases) using a random number table method. The main acupoints selected included Yangbai (GB 14), Quanliao (SI 18), Yingxiang (LI 20), Shuigou (GV 26), Dicang (ST 4), Chengjiang (CV 24), Taiyang (EX-HN 5), Jiache (ST 6), Fengchi (GB 20), and Hegu (LI 4). The OAG patients received ordinary acupuncture manipulation, while the CAG received characteristic acupuncture manipulation. Both groups received acupuncture treatment 3 times a week, with 10 times per course, lasting for 10 weeks. Facial recovery was assessed at baseline and after the 1st, 2nd and 3rd treatment course by AFPPS-ECGS and the House-Brackmann (H-B) Grading Scale. Infrared thermography technology was used to observe the temperature difference between healthy and affected sides in various facial regions. Adverse events and laboratory test abnormalities were recorded. The correlation between the scores of the two scales was analyzed using Pearson correlation coefficient. **Results:** After the 2nd treatment course, the two groups showed statistically significant differences in AFPPS-ECGS scores (P<0.05), with even greater significance after the 3rd course (P<0.01). Similarly, H-B Grading Scale scores demonstrated significant differences between groups following the 3rd treatment course (P<0.05). Regarding temperature measurements, significant differences in temperatures of frontal and ocular areas were observed after the 2nd course (P<0.05), becoming more pronounced after the 3rd course (P<0.01). Additionally, mouth corner temperature differences reached statistical significance by the 3rd course (P<0.05). No safety-related incidents were observed during the study. Correlation analysis revealed that the AFPPS-ECGS and the H-B Grading Scale were strongly correlated (r=0.86, 0.91, 0.93, and 0.91 at baseline, and after 1st, 2nd, and 3rd treatment course, respectively, all P<0.01). **Conclusions:** Acupuncture is an effective treatment for IFP, and the characteristic acupuncture manipulation enhances the therapeutic effect. The use of the AFPPS-ECGS can more accurately reflect the recovery status of patients with IFP. (Trial registration No. ChiCTR2200065442)

KEYWORDS acupuncture, intractable facial paralysis, Anzhong Facial Paralysis Precision Scale (Eyelid Closure Grading Scale), House-Brackmann Grading Scale, medical infrared thermal imaging device

Peripheral facial paralysis is a disease with main clinical manifestations of angular deviation of the mouth and incomplete eyelid closure. It usually occurs in spring

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and winter[1] and is not restricted by age or gender. The total incidence rate is 37.7/100,000 person-years.[2] Although peripheral nerve paralysis exhibits a degree of spontaneous recovery, some patients experience inadequate restoration of facial nerve function, potentially resulting in intractable facial paralysis (IFP). Currently, a universally accepted definition of IFP remains elusive. Kim, et al[3] believe that peripheral facial paralysis with a course of more than 3 months and no recovery can be classified as IFP. IFP has a long treatment course, slow onset, and is prone to residual symptoms of eyelid insufficiency. This condition not only impairs patients' facial appearance and significantly disrupts their daily activities, but also imposes substantial psychological distress. Mild cases often induce conjunctival congestion, dryness, hypertrophy, and hyperkeratosis, whereas severe cases can lead to organic damage, such as exposure keratitis and parenchymal corneal ulcers.[4] Its pathogenesis is believed to be related mainly to microcirculatory disorders, viral infections, and immune responses.[5] Other hypotheses suggest that IFP is related to anatomical changes or trauma, tumour changes, inflammation, and nerve compression.[6]

Peripheral facial nerve paralysis in its early stages can be managed through various treatment approaches. Conventional Western medical interventions typically include corticosteroid therapy, antiviral therapy, nerve nutrition, hyperbaric oxygen therapy, and surgery.[7] However, Western medicine currently lacks definitive diagnostic criteria and effective treatments for IFP. Acupuncture is a simple, accessible, and effective treatment for facial paralysis, demonstrating significant clinical efficacy with minimal adverse effects.[8,9] In addition, there are many methods for evaluating facial paralysis function, but they all have certain shortcomings. Therefore, developing an innovative and more objective and refined facial paralysis evaluation system to provide more accurate evaluation criteria for the clinical treatment of this disease is urgently needed.

This study focused on patients with IFP and compared the characteristic acupuncture group (CAG) with the ordinary acupuncture group (OAG). The team's unique Anzhong Facial Paralysis Precision Scale (Eyelid Closure Grading Scale, AFPPS-ECGS) was used as the observation index, and the House-Brackmann (H-B) Grading Scale and infrared thermography technology were used to evaluate the efficacy of characteristic acupuncture manipulation for treatment of IFP.

METHODS

Study Design

This was a 10-week multicentre, single-blind, randomized controlled trial. From October 2022 to June 2024, patients diagnosed with IFP were screened at multiple medical centers, including the First Affiliated Hospital of Anhui University of Chinese Medicine, Shuguang Hospital Anhui Branch Affiliated to Shanghai University of Traditional Chinese Medicine, and Bozhou Hospital of Traditional Chinese Medicine. This trial followed the CONSORT[10] and STRICTA guidelines.[11] The protocol was approved by the Institutional Review Committee of the First Affiliated Hospital of Anhui University of Chinese Medicine (No. 2022AH-79), and registered with the Chinese Clinical Trial Registry (No. ChiCTR2200065442).

Inclusion and Exclusion Criteria

The inclusion criteria included the followings: (1) Diagnostic criteria: based on Neurology[12] and New Compilation of Modern Practical Internal Medicine,[13] patients were required to meet the following criteria: a) medical history: a history of viral infection, facial cooling, and wind exposure; b) clinical manifestations: sudden onset of unilateral facial discomfort, progressing to complete facial paralysis within 1–2 h of onset, disappearance of forehead wrinkles and nasolabial folds, inability to lift eyebrows, close eyes, and show teeth, and some patients may initially have symptoms such as pain in the mastoid process and inside and behind the ear. (2) Age and gender: participants aged 18–70 years, irrespective of gender. (3) Disease duration: persistent sympotoms for ⩾3 months, with clinical features including: eyelid ptosis of the affected side, spasms, inversion, or facial spasms. (4) Willingness to participate, confirmed by written informed consent.

The exclusion criteria included: (1) facial paralysis or facial repture infections caused by other diseases (such as Guillain–Barré syndrome, traumatic brain injury, intracranial tumours, and labyrinthitis); (2) breastfeeding, pregnancy, and precon ceptional period; (3) serious primary illness or mental disorders that cannot cooperate with treatment; (4) currently receiving treatment from other Chinese or Western medicine; (5) dizziness, intolerance or cannot adherence to treatment; (6) other sudden illnesses requiring immediate treatment during the study treatment period.

Dropout and Termination Criteria

The dropout criteria were as follows: (1) unable to continue cooperating with the treatment during the study; and (2) not treated according to the prescribed plan, resulting in incomplete data that precluded the determination of clinical treatment efficacy.

The termination criteria were as follows: (1) could not tolerate the treatment or experienced serious adverse events; (2) developed other conditions necessitating immediate treatment during the observation period, thereby requiring discontinuation of the study; and (3) chose to withdraw their informed consent.

Randomized Allocation of Participants

A third-party investigator generated a randomized sequence using SPSS 22.0 statistical software (IBM, USA), sealed the allocation codes in opaque envelopes with timestamps and signatures, and delivered them to the research coordinator. The coordinator then enrolled eligible participants and performed randomization accordingly. The participants were randomly assigned to 2 intervention groups at a 1:1 ratio.

Blinding

This trial adopted single-blind design. The participants and data collectors were blinded. The randomization sequence was inserted into sequentially numbered, opaque, sealed envelopes. The acupuncturist treating the patient opened these envelopes.

Sample Size Estimation

According to previous research results,[14] the effective rate of ordinary acupuncture in treating facial paralysis is 60%, whereas the effective rate of characteristic acupuncture therapy is 90%. Referring to the sample size estimation formula:[15] $n=\left[Z_{\alpha/2}\sqrt{2\bar{p}(1-\bar{p})}+Z_{\beta}\sqrt{p_1(1-p_1)+p_2(1-p_2)}\right]^2/(p_1-p_2)^2$, considering the values p_1=0.6, p_1=0.9, $\bar{p}$=0.75, the standard normal distribution function (-Z) value table shows that $Z_{\alpha/2}$=1.96, Z_{β}=0.84; therefore, we can estimate that $n\approx40$. Considering a 10% dropout rate, 44 people needed to be recruited for each group.

Intervention

The primary acupoints selected of both groups were located on the head and face, including Yangbai (GB 14), Quanliao (SI 18), Yingxiang (LI 20), Shuigou (GV 26), Dicang (ST 4), Chengjiang (CV 24), Taiyang (EX-HN 5), Jiache (ST 6), Fengchi (GB 20), and Hegu (LI 4), as shown in Appendix 1. Both groups received acupuncture treatment for 30 min per session, 3 times per week. A full treatment course consisted of 10 sessions, and patients underwent 3 consecutive courses, totaling 30 sessions. All acupuncture procedures were performed by licensed acupuncturists with over 5 years of clinical experience.

In the OAG, sterile disposable acupuncture needles (0.25 mm × 40 mm or 0.25 mm × 25 mm; Huatuo Brand, Suzhou Medical Supplies Factory Co., Ltd., China) were inserted at the selected acupoints to a depth of 0.5–1 inch (1.3–2.5 cm). The ordinary acupuncture techniques were employed, involving lifting, thrusting, and rotating the needles to elicit deqi sensation.

The CAG patients received characteristic acupuncture manipulation, including long needle penetration acupuncture, stagnating needle lifting and pulling acupuncture, and healthy side balance acupuncture. Long needle penetration acupuncture method utilized a 0.25 mm × 40 mm acupuncture needle. This method involved horizontal penetration and flat insertion, with the needle body at an angle of approximately 15 degrees to the skin, closely adhering to the skin surface, and penetrating from one acupoint to another. For the stagnating needle lifting and pulling acupuncture, the flat needling method was employed with 0.25 mm × 40 mm needles. After the needle was punctured to a certain depth at the acupoint and and into muscle, the needle handle was twisted to form a stagnant needle, which was then pulled up several times. In healthy side balance acupuncture, besides ordinary acupuncture treatment on the affected side, acupoints were properly selected on the healthy side, and 0.25 mm × 25 mm acupuncture needles were used in the middle for shallow needling. The amount of stimulation was small, and the degree of local slight needling sensation was considered.

ST 4 and ST 6 acupoints on the affected side were penetrated to each other by long needle penetration acupuncture. In this method, the needle tips of the GB 14 and SI 18 acupoints were inserted downwards, the tips were twisted in one direction, the needle handle was pulled after the needle is stopped, and stagnating needle lifting and pulling acupuncture were performed. A shallow needle was placed on the ST 4 and LI 20 acupoints, and healthy side balance acupuncture was performed. Routine needling was performed on the

remaining acupoints, as shown in Appendix 2.

Concomitant Medication

During the study period, patients were allowed to use neurotrophic medications, and patients were required to report whether they were taking other medications during the study period and the name, dosage, and date of the medication used were recorded.

Observation Indicators

Main Observation Indicator

AFPPS-ECGS is graded by measuring the degree of incomplete eyelid closure and the ratio of the maximum eye distance difference on the opposite side of the eyelid. Level 0: normal complete eyelid closure; Level 1: mild lagophthalmos (delayed/weak closure); Level 2: incomplete eyelid closure with scleral exposure ⩽1/5 of palpebral fissure; Level 3: incomplete eyelid closure with scleral exposure ⩽2/5 of palpebral fissure; Level 4: incomplete eyelid closure with scleral exposure ⩽3/5 of palpebral fissure; Level 5: Incomplete eyelid closure with scleral exposure ⩽4/5 of palpebral fissure.

Secondary Observation Indicators

H-B Grading Scale

The H-B Grading Scale is a comprehensive assessment of facial nerve function, including motor and resting states, as well as secondary damage, with corresponding quantitative standards. This scale classifies facial nerve function into Grades Ⅰ (normal) to Ⅵ (complete facial paralysis), with higher grades indicating worse facial nerve function.[16]

Temperature Differences between Healthy and Affected Sides in Various Facial Regions

This study used a medical infrared thermal imaging device (model TMT-9000) produced by Hangzhou Xinhan Optoelectronics Technology Co., Ltd. (China), for thermal imaging data acquisition. The room temperature was maintained at 20–25 ℃, and the humidity was controlled at 50% to 60%. Moreover, the environment was windless, silent, slightly dim, and free from strong thermal radiation sources. During collection, the patient sat at a distance of 0.5 m from the infrared camera, holding their breath and keeping their eyes open. The entire process took only a few seconds. During this process, thermal imaging images of the patient's front, left and right sides were collected to ensure the comprehensiveness and accuracy of the data. Thermal imaging images of the ocular area, frontal area, zygomatic area, and corner of the mouth on both sides of the patient were collected and the temperature difference of each area between both sides were calculated (healthy and affected sides temperature difference=healthy side average temperature – affected side average temperature).

Evaluation Time

All patients were evaluated using the above scales and examinations before treatment and after the 1st, 2nd, and 3rd course of treatments. The researchers who conducted the evaluation were acupuncturists and neurologists with more than 5 years of clinical experience.

Safety Evaluation

Adverse events during the study period were reported in the Case Report Form. The recorded content included the time, cause, clinical symptoms, signs, and corresponding emergency response plans of adverse events, as well as laboratory test abnormalities with clinical significance. In addition, according to clinical doctors, all events were evaluated for their relevance and severity to intervention measures.

Data Management

An electronic input database was established on the basis of the CRF project, and achievement evaluators collected relevant information in a timely and accurate manner according to the requirements of the CRF. Only outcome assessors could access the CRF and perform dual data entry. The Evidence-Based Medicine Centre of the First Affiliated Hospital of Anhui University of Chinese Medicine was responsible for monitoring the research and data every 3 months.

Statistical Analysis

This experiment collected data through a central random system, established a terminal database, and used SPSS 22.0 statistical software for data analysis and statistical description. For quantitative data, normal analysis and homogeneity of variance tests were used. When both conditions were met, a paired sample *t* test was used for intragroup data, and an independent sample *t* test was used for intergroup data. If only a normal distribution was satisfied, the corrected *t* test was used. If neither of the above two conditions were met, then the rank sum test was chosen. Quantitative data that satisfied normality are represented by the

mean ± standard deviation ($\bar{x} \pm s$); when not satisfied, data are represented by the median and interquartile [M (P25, P75)]. Qualitative data were analysed via the chi square test and are expressed as percentages (%); the rank sum test was used to select categorical data. Pearson correlation coefficient was used for correlation analysis. All tests were two-sided, with $P<0.05$ considered statistically significant.

RESULTS

Recruitment and Dropout Summary

From October 2022 to June 2024, 89 eligible patients were recruited from inpatient and outpatient departments of the multiple medical centers. During the treatment, 9 patients dropped out (4 in the CAG and 5 in the OAG). A total of 80 cases were included in the final analysis, as shown in Figure 1.

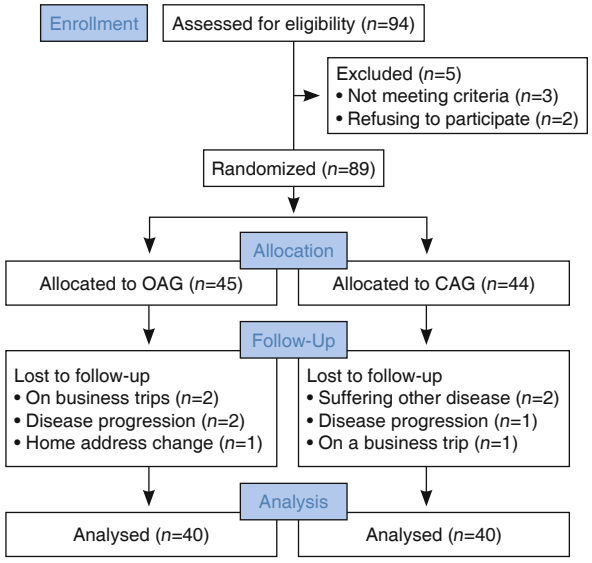

Figure 1. Recruitment and Dropout Flow Diagram of IFP Patients Treated with Acupuncture

Notes: OAG: ordinary acupuncture group; CAG: characteristic acupuncture group; IFP: intractable facial paralysis; the same below

Participant Characteristics at Baseline

There were no significant differences in age, gender, affected side, or course of disease between the two groups, as shown in Table 1 ($P>0.05$).

Comparative Analysis of AFPPS-ECGS Score

There was no statistically significant difference in the AFPPS-ECGS score between the two groups of patients before treatment and after the first course of treatment ($P>0.05$). After the second course of treatment, there was statistically significant difference in the AFPPS-ECGS score between the two groups ($P<0.05$). After the third course of treatment, the difference was more significant ($P<0.01$), the CAG group demonstrated superior therapeutic efficacy compared to the OAG group, as shown in Figure 2 and Appendix 3.

Table 1. Comparison of General Data of IFP Patient between Two Groups

Parameter	OAG (n=40)	CAG (n=40)	χ^2/t	P value
Male [Case (%)]	18 (45.0)	16 (40.0)	0.21	0.65
Age (Year, $\bar{x} \pm s$)	47.23 ± 13.96	45.60 ± 14.27	0.52	0.61
Course of illness (Month, $\bar{x} \pm s$)	3.85 ± 0.59	3.93 ± 0.63	0.56	0.57
Affected side [Case (%)]			2.45	0.12
Left	17 (42.5)	24 (60.0)		
Right	23 (57.5)	16 (40.0)		

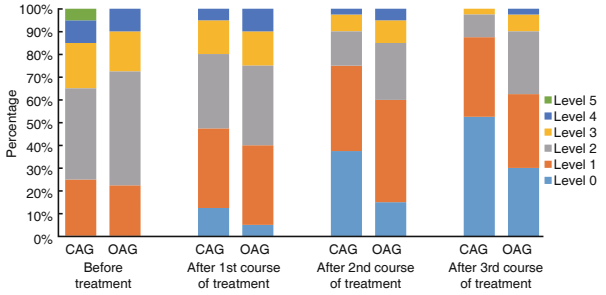

Figure 2. Comparison of AFPPS-ECGS Score between Two Groups of IFP Patients before Treatment and after Each Course of Treatment

Notes: AFPPS-ECGS: Anzhong Facial Paralysis Precision Scale (Eyelid Closure Grading Scale); IFP: intractable facial paralysis; the same below

Comparative Analysis of H-B Grading Scale Score

There was no statistically significant difference in the H-B Grading Scale score between the two groups of patients before treatment ($P>0.05$). After the first and second courses of treatment, there was no statistically significant difference in the results between the two groups ($P>0.05$). By the end of the third course of treatment, the difference in the H-B Grading Scale score between the two groups was statistically significant ($P<0.05$), the CAG group demonstrated superior therapeutic efficacy compared to the OAG group, as shown in Figure 3 and Appendix 4.

Comparative Analysis of Temperature Differences between Healthy and Affected Sides in Various Facial Regions

There was no statistically significant difference in the temperature difference between the 4 facial regions (frontal area, ocular area, zygomatic area, and corner of the mouth area) before treatment between the two groups of patients ($P>0.05$). After the second and third course of treatment, the difference in temperature of the frontal and ocular areas was statistically significant

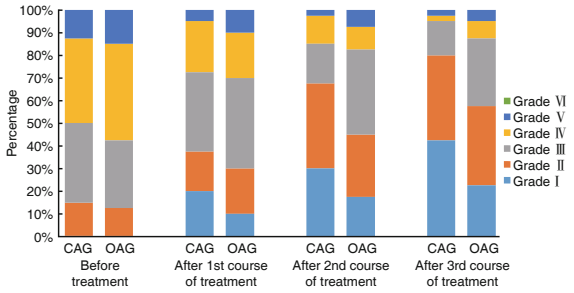

Figure 3. Comparison of H-B Grading Scale Score between Two Groups of IFP Patients before Treatment and after Each Course of Treatment

Notes: H-B Grading Scale: House-Brackmann Grading Scale; the same below

(P<0.05 or P<0.01). After the third course of treatment, the difference in temperature of the mouth corner area was statistically significant (P<0.05). the CAG group demonstrated superior therapeutic efficacy compared to the OAG group. Although there were differences in the values of the zygomatic area throughout the experiment, they were not statistically significant (P>0.05), as shown in Figure 4 and Appendix 5.

Safety Evaluation of Treatment for Two Groups of Patients

Throughout the entire research process, neither group experienced any adverse reactions or safety events.

Correlation Analysis

As shown in Figure 5 and Appendix 6, the correlation analysis between the AFPPS-ECGS and the H-B Grading Scale scores in the two groups of patients before treatment and after each course of treatment revealed a strong correlation (r=0.86, 0.91, 0.93, and 0.91 at baseline, and after 1st, 2nd, and 3rd treatment course, respectively, all P<0.01).

DISCUSSION

Different acupuncture manipulation can produce different therapeutic effects, which is one of the key factors affecting the efficacy of acupuncture.[17] As a sophisticated field of acupuncture technology, acupuncture manipulation is increasingly receiving widespread attention and research.[18] Research has shown that acupuncture manipulation has a good effect on peripheral facial nerve paralysis at different stages, significantly accelerating the repair of facial nerves.[19] The CAG in this study underwent three types of acupuncture manipulation, namely, long needle penetration acupuncture, stagnating needle lifting and pulling acupuncture, and healthy side balance acupuncture, which can significantly improve the degree of facial nerve damage. Moreover, the differences in observation indicators between the CAG and OAG after the third course of treatment were mostly significant. The reason for this may be that patients with IFP have more severe symptoms and a longer medical history. Long-term acupuncture may lead to noninflammatory exudation of facial tissues, the formation of hard lumps, and muscle adhesion,

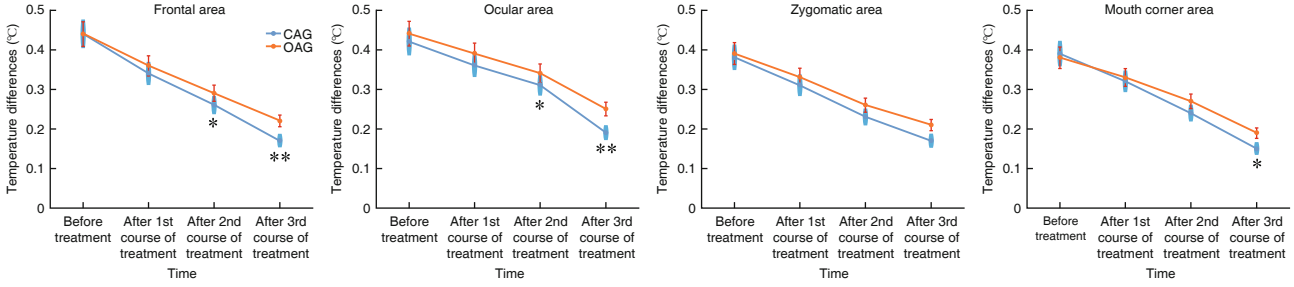

Figure 4. Comparison of Temperature Differences between Healthy and Affected Sides in Various Facial Regions of IFP Patients between Two Groups before Treatment and after Each Course of Treatment ($\bar{x} \pm s$)

Note: $^{*}P$<0.05, $^{**}P$<0.01 *vs*. OAG group

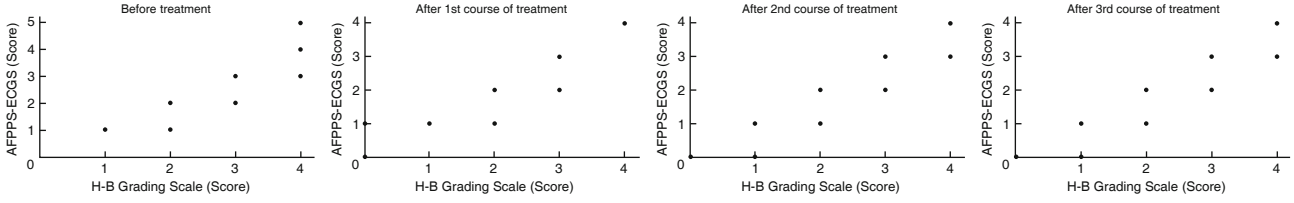

Figure 5. Correlation Analysis between AFPPS-ECGS and H-B Grading Scale

Notes: H-B Grading Scale grades Ⅰ–Ⅵ were rescaled to 0–5 (with Grade Ⅰ = 0 and Grade Ⅵ = 5) in the correlation analysis

thereby weakening the effectiveness of acupuncture. After treatment with characteristic manipulation, the effectiveness of acupuncture weakens more slowly. The findings of this study indicate that acupuncture is an effective treatment for IFP. Notably, the therapeutic effects are enhanced when manual therapy is combined with ordinary acupuncture. This combined approach proves beneficial even in cases where the disease has persisted for an extended period. Furthermore, the application of specific acupuncture manipulation is particularly effective in improving symptoms related to eyelid closure.

The H-B Grading Scale is a tool used to assess the severity of symptoms in patients with facial paralysis. Facial paralysis can be classified into different levels on the basis of the functional status of facial muscles, ranging from normal to complete paralysis, with a total of 6 levels.[20] This grading scale is highly important for assessing the severity of symptoms in patients with facial paralysis, developing treatment plans, and monitoring treatment outcomes and is widely used in clinical practice.[21] However, the H-B Grading Scale also has several limitations, as it mainly evaluates facial muscle movement ability and ignores other important aspects, such as facial sensation and appearance. In practical evaluation, the H-B Grading Scale is considered to have a weak correlation with the degree of nerve damage.[22] Huang, et al[23] used electrical response grading and the H-B Grading Scale to detect the degree of nerve damage in patients with Bell's palsy and reported that the H-B Grading Scale is suitable for patients with mild facial nerve injury but has poor evaluation quality for severe facial nerve injury and is not significantly correlated with prognosis. Therefore, the existing scales were refined and innovated on the basis of this research.

The team researched and developed the AFPPS-ECGS, which was clinically validated, applied, and promoted, forming an industry-recognized and authoritative evaluation standard for facial paralysis. The AFPPS currently comprises four dimensions: Eyebrow Ptosis Grading Scale, ECGS, Oral Commissure Ptosis Grading Scale and Philtrum Deviation Grading Scale (Appendix 7). This study selected one dimension of the AFPPS, which is the ECGS, as the observation index. By measuring the degree of incomplete eyelid closure and the ratio of the maximum eye distance difference on the opposite side of the eyelid, the severity of symptoms corresponding to different parts of the eyelid was classified, and the clinical symptom severity and degree of recovery were more objectively and finely measured and evaluated.

Currently, there are few effective diagnostic and evaluation tools for IFP.[24] Scale is the mainstream assessment method for facial paralysis, but the commonly used clinical scales have a single form, insufficient depth, and different emphases, which cannot meet the current assessment needs.[25] At the same time, shortcomings such as cumbersome and difficult statistical scores, low input efficiency, and the possibility of errors in test results due to personal preferences exist. To address the above issues, this study also used infrared thermography as a detection method for posttreatment evaluation, providing a more objective comparison of clinical efficacy. The incidence of low-temperature areas in infrared thermography is related to the location of the disease; that is, the higher the location of the disease is, the higher the incidence of cold and low-temperature areas. It can be used as an auxiliary detection method for the clinical diagnosis of facial paralysis sites and conditions.[26] The observation indicators of this study have both subjective and objective observation indicators, and the combination of the two can be more complementary, allowing the evaluation of efficacy from multiple perspectives, reducing the occurrence of potential bias, and thus improving the quality of clinical evidence.

The research findings indicate a close alignment in the overall trends observed in the H-B Grading Scale and the AFPPS-ECGS, suggesting consistency between the two scales in evaluating the clinical efficacy of IFP. Furthermore, correlation analysis revealed a strong relationship between these scales, underscoring the practicality of the AFPPS-ECGS. The difference in temperature between the frontal and ocular regions of the two groups of patients was statistically significant after the 2nd course of treatment, which was consistent with the results of the AFPPS-ECGS, whereas the H-B Grading Scale showed significant differences after the 3rd course of treatment. Therefore, the AFPPS-ECGS is more sensitive in evaluating changes in facial details in patients with IFP.

This study included 80 effective cases, and there

were no adverse events in either group of patients during the entire trial process. The characteristic and ordinary acupuncture treatments for IFP are safe and effective and are worthy of promotion.

There are some limitations in our study. First, the sample size of this study is relatively small, which may have resulted in some deviation between the evaluation of the data and the actual results. In addition, long needle penetration acupuncture, stagnating needle lifting and pulling acupuncture, and healthy side balance acupuncture are suitable for different patients with different symptoms and signs involving different acupoints. Therefore, in further research, the sample size should be expanded to compare the effects of different acupuncture manipulation on different symptoms and signs between groups to minimize experimental errors. Second, follow-up was not included in this study, so subsequent research should pay attention to the follow-up process of patients to clearly understand the long-term effects of treatment. Third, this study focused only on the acupuncture treatment of IFP. In the future, further research can be conducted on the staging (acute phase, recovery phase, and sequelae phase) treatment of facial paralysis, and different diagnosis and treatment plans can be applied for different stages. Furthermore, the use of the AFPPS-ECGS in other stages can be further verified.

In conclusion, acupuncture has a good therapeutic effect on peripheral facial nerve paralysis, and acupuncture manipulation plays an important role in this process. Adding characteristic manipulation on the basis of ordinary acupuncture can significantly improve the clinical symptoms of patients with IFP. Moreover, this study firstly evaluated facial nerve recovery via the AFPPS-ECGS. The AFPPS-ECGS can accurately reflect changes in the facial details of patients, and when combined with infrared thermography technology, it can more accurately reflect patient prognosis. Characteristic acupuncture manipulation is safe and reliable and is worthy of clinical promotion in treatment of IFP.

Conflict of Interest

All authors declare that they have no conflicts of interest.

Authors Contributions

Yuan AH and Yang J conceived and designed this study. Xie HY and Ye M participated in the drafting of the experimental plan and the preparation of the manuscript. Shi J, Liu Z, Li B, Yuan XW, and Zhou C collected the clinical medical records and treatment. Kan WJ and Liu XJ were responsible for data calculation. Tong HM, Wang ZH and Cha BX were in charge of the use of relevant instruments. Lastly, Yuan AH provided funding for the project and completed the final review. All authors read and approved the final version.

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REFERENCES

1. Salbas E, Ketenci S. Infodemiology of Bell's palsy: tracing the seasonality of facial paralysis. J Back Musculoskelet 2022;35:615-623.
2. Morales DR, Donnan PT, Daly F, Staa TV, Sullivan FM. Impact of clinical trial findings on Bell's palsy management in general practice in the UK 2001–2012: interrupted time series regression analysis. BMJ Open 2013;3:e003121.
3. Kim DR, Kim JH, Jung SH, Won YJ, Seo SM, Park JS, et al. Neuromuscular retraining therapy for early stage severe Bell's palsy patients minimizes facial synkinesis. Clin Rehabil 2023;37:1510-1520.
4. Salloum G, Carruth BP, Hill RH, Czyz CN, Bersani TA. Transitioning from a gold weight to an "enhanced" palpebral spring in the management of paralytic lagophthalmos secondary to facial nerve palsy. Orbit-abingdon 2019;38:119-123.
5. Rajangam J, Lakshmanan AP, Rao KU, Jayashree D, Radhakrishnan R, Roshitha B, et al. Bell palsy: facts and current research perspectives. CNS Neurol Disord Drug Targets 2024;23:203-214.
6. Jeong J, Yoon SR, Lim H, Oh J, Choi HS. Risk factors for Bell's palsy based on the Korean national health insurance service national sample cohort data. Sci Rep 2021;11:23387.
7. Shafshak TS. The treatment of facial palsy from the point of view of physical and rehabilitation medicine. Eura Medicophys 2006;42:41-47.
8. Yu BY, Wang YP, Shang HC, Wang LY, Wan YJ, Zhao C, et al. Effect of thick-needle therapy in patients with Bell's palsy at recovery stage: a multi-center randomized controlled trial. Chin J integr Med 2020;26:455-461.
9. Zhang R, Wu T, Wang R, Wang D, Liu Q. Compare the efficacy of acupuncture with drugs in the treatment of Bell's palsy: a systematic review and meta-analysis of RCTs.

Medicine 2019;98:e15566.
10. Schulz KF, Altman DG and Moher D. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. BMC Med 2010;8:18.
11. MacPherson H, Altman DG, Hammerschlag R, Li YP, Wu TX, Adrian W, et al. Revised standards for reporting interventions in clinical trials of acupuncture (STRICTA): extending the CONSORT statement. Acupunct Med 2010;3:140-155.
12. Jia JP, ed. Neurology. 8th edition. Beijing: People's Health Press; 2018:159.
13. Zhang P, Song YL, Jin YC, Wang LY, Ding XM, Yang LX, eds. New compilation of modern practical internal medicine. Qingdao: China Ocean University Press; 2014:227.
14. Yang H, Zhao JT, Jin YQ, Ma L, Liu Z. Clinical study on the treatment of intractable facial paralysis based on the "three dimensional five methods". Clin J Acupunct Moxibust (Chin) 2024;40:17-22.
15. Zhu JM, ed. Medical statistical analysis methods. Hefei: China University of Science and Technology Press; 2016.
16. House JW, Brackmann DE. Facial nerve grading system. Otolaryng Head Neck 1985;93:146-147.
17. He J, Su C, Chen J, Li J, Yang J, Liu C. Manual acupuncture manipulation recognition method via interactive fusion of spatial multiscale motion features. IET Signal Proc 2023;2024:1-16.
18. Xiu WC, Gang WJ, Zhou Q, Shi LJ, Hu XY, Ming TY, et al. Factors and their impact on treatment effect of acupuncture in different outcomes: a meta-regression of acupuncture randomized controlled trials. Chin J Integr Med 2024;30:260-266.
19. Fan L, Yang Q, Zhai W. Clinical study of electroacupuncture plus stuck-needle lifting method for intractable facial paralysis. J Acupunct Tuina Sci (Chin) 2023;22:134-139.
20. Mengi E, Orhan Kara C, Necdet Ardıç F, Topuz B, Metin U, Alptürk U, et al. Comparison of the reliability of the House-Brackmann, Facial Nerve Grading System 2.0, and Sunnybrook Facial Grading System for the evaluation of patients with peripheral facial paralysis. J Int Adv Otol 2023;20:14-18.
21. Mat Lazim N, Ismail H, Abdul Halim S, Nik Othman N, Haron A. Comparison of 3 grading systems (House-Brackmann, Sunnybrook, Sydney) for the assessment of facial nerve paralysis and prediction of neural recovery. Medeni Med J 2023;38:111-119.
22. Chae SA, Yoo SD, Lee SA, Soh Y, Yoo MC, Yun Y, et al. Association between clinical symptoms, electrodiagnostic findings, clinical outcome, and prodromal symptoms in patients with Bell's palsy. Ann Oto Rhinol Laryn 2022;132:27-34.
23. Huang B, Zhou ZL, Wang LL, Zuo C, Lu Y, Chen Y. Electrical response grading *versus* House-Brackmann scale for evaluation of facial nerve injury after Bell's palsy: a comparative study. J Integr Med 2014;12:367-371.
24. Yu BY, Wang YP, Shang HC, Wang LY, Wan YJ, Zhao C, et al. Effect of thick-needle therapy in patients with Bell's palsy at recovery stage: a multi-center randomized controlled Trial. Chin J Integr Med 2020;26:455-461.
25. Fan L, Yang Q, Zhai W. Clinical study of electroacupuncture plus stuck-needle lifting method for intractable facial paralysis. J Acupunct Tuina Sci (Chin) 2023;22:134-139.
26. Liu X, Feng J, Zhang R, Luan JM, Wu ZY. Quantitative assessment of Bell's palsy-related facial thermal asymmetry using infrared thermography: a preliminary study. J Therm Biol 2021;100:103070.

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