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Effects of Jingjin Acupuncture Combined with Rood-Based Facial Rehabilitation on Peripheral Facial Paralysis: A Randomized Controlled Clinical Observation

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Abstract: ***Objective: To evaluate the clinical effects and safety of Jingjin acupuncture combined with Rood-based facial rehabilitation in patients with peripheral facial paralysis. Methods: Sixty patients with peripheral facial paralysis were allocated in a 1:1 ratio to an observation group or a control group using a random number table. Both groups received Rood-based facial rehabilitation. The observation group received Jingjin acupuncture, whereas the control group received conventional acupuncture. Treatment was administered once daily, 6 sessions per week, for 2 consecutive weeks. Outcomes included the House-Brackmann (H-B) facial nerve grading system, a self-comparison symptom score between the affected and unaffected sides, the Facial Disability Index (FDI), clinical response category, and adverse events. Results: After 2 weeks of treatment, the distribution of clinical response categories differed significantly between groups (P=0.034), with a higher proportion of markedly effective responses in the observation group. The post-treatment H-B grade distribution favored the observation group (Mann-Whitney U=305.5, P=0.021). The self-comparison symptom score decreased in both groups and was lower in the observation group after treatment (16.98±2.23 vs. 19.36±1.56, P<0.001). The post-treatment FDI score was higher in the observation group than in the control group (28.97±1.35 vs. 25.36±1.52, P<0.001). No serious adverse events were observed. Mild subcutaneous hematoma occurred in 2 patients in the observation group and 3 patients in the control group and resolved after compression. Conclusion: Jingjin acupuncture combined with Rood-based facial rehabilitation may improve facial nerve function, facial symptoms, and patient-reported facial disability in peripheral facial paralysis more effectively than conventional acupuncture combined with the same rehabilitation program. Because this was a single-center study with a small sample size and short follow-up, larger randomized controlled trials with blinded assessment and longer follow-up are warranted.***

Keywords: Peripheral facial paralysis, Bell palsy, Jingjin acupuncture, Meridian sinews, Rood-based rehabilitation, Facial nerve function, Clinical observation.

1. Introduction

Peripheral facial paralysis (PFP), also known as “kou pi” in traditional Chinese medicine, is characterized by acute or subacute weakness or paralysis of the facial muscles on one side of the face. Typical manifestations include disappearance of forehead wrinkles, incomplete eyelid closure, shallow nasolabial fold, deviation of the mouth angle, facial stiffness, altered taste, hyperacusis, and retroauricular pain [1]. Bell palsy is the most common idiopathic form of acute peripheral facial nerve paresis or paralysis, but the broader clinical concept of PFP also includes cases related to infection, inflammation, trauma, and other peripheral facial nerve disorders.

Although many patients recover spontaneously or with standard medical treatment, approximately 20%-30% of patients may have different degrees of sequelae when treatment is delayed or inappropriate [2]. Early and standardized evaluation is therefore important. The House-Brackmann grading system remains widely used for global facial nerve assessment [3], and the Facial Disability Index (FDI) provides patient-reported information on facial physical function and social/well-being impact.

Acupuncture is commonly used for PFP in China and other regions, and clinical evidence has suggested definite therapeutic effects for facial paralysis [4]. Facial exercise and rehabilitation programs may also support recovery and reduce persistent dysfunction. These findings suggest that combined neuromuscular stimulation and active rehabilitation may be clinically meaningful, but more standardized clinical observations are needed.

In traditional Chinese medicine, PFP is often described as “kou pi” and is closely related to dysfunction of the meridian sinews (Jingjin) in the facial region. The facial area is traversed by the meridian sinews of the hand and foot yang channels, especially the Yangming meridian sinews; when healthy qi is insufficient and the sinews are not properly nourished, facial muscles may become flaccid and weak [5,6]. Jingjin acupuncture emphasizes shallow, regional, and directional stimulation along the affected facial muscle and tendon pathways. From a modern perspective, this approach may provide focused neuromuscular stimulation, improve local circulation, and facilitate recovery of facial muscle function. Rood-based rehabilitation uses sensory stimulation and guided muscle activation to promote neuromuscular control. The present study compared Jingjin acupuncture plus Rood-based facial rehabilitation with conventional acupuncture plus the same rehabilitation program in patients with PFP.

2. Materials and Methods

2.1 Study Design and Participants

This was a single-center, randomized, controlled clinical observation conducted at the Affiliated Hospital of Shaanxi University of Chinese Medicine. Sixty patients with PFP were enrolled and randomly assigned in a 1:1 ratio to an observation group (n=30) or a control group (n=30) using a random number table. The study protocol was approved by the Ethics Committee of the Affiliated Hospital of Shaanxi University of Chinese Medicine (approval No. SZFYIEC-PJ-2023- [162]). All participants voluntarily entered the study and signed informed consent before treatment.

The diagnosis of PFP was based on standard neurological and acupuncture references [7,8] and the presence of unilateral facial muscle paralysis, disappearance of forehead wrinkles, facial numbness or stiffness, widened palpebral fissure, mouth angle deviation, and difficulty with eyelid closure, eyebrow movement, or tooth exposure. Baseline sex, age, and disease duration were comparable between groups.

Table 1: Baseline demographic and disease-duration characteristics.

Group	n	Male/Female	Age, years (mean±SD)	Disease duration, days, range	Disease duration, days (mean±SD)
Observation	30	16/14	45.17±9.45	1-57	17.4±11.7
Control	30	17/13	43.19±7.73	3-60	18.2±12.4

2.2 Inclusion Criteria

Patients were eligible if they met the diagnostic criteria for PFP; were 15-75 years old; had a disease duration of 1-60 days; could be evaluated using the House-Brackmann facial nerve grading system; and voluntarily provided written informed consent.

2.3 Exclusion Criteria

Patients were excluded if they had central facial dysfunction caused by cerebrovascular disease, intracranial tumor, or other central nervous system disease; severe hepatic or renal dysfunction, endocrine or metabolic disorder, or psychiatric disorder; pregnancy or lactation; infection, ulceration, or obvious skin damage in the acupuncture or training area; or concurrent participation in another clinical trial.

2.4 Interventions

2.4.1 Observation group: Jingjin acupuncture plus Rood-based facial rehabilitation

Acupoints were selected on the affected side according to the distribution of the facial meridian sinews and commonly used acupuncture prescriptions for PFP. The selected points were Yangbai (GB14), Taiyang (EX-HN5), Sibai (ST2), Yuyao (EX-HN4), Cuanzhu (BL2), Sizhukong (TE23), Yifeng (TE17), Dicang (ST4), Quanliao (SI18), Jiache (ST6), Yingxiang (LI20), Qianzheng (EX-HN16), Xiaguan (ST7), Shuigou (GV26), and Chengjiang (CV24). Sterile disposable acupuncture needles (Huatuo brand; 0.30 mm x 40 mm, 0.30 mm x 50 mm, or 0.30 mm x 75 mm) were used after routine disinfection.

For Yangbai (GB14), four needles were inserted transversely toward Shangxing (GV23), Touwei (ST8), Cuanzhu (BL2), and Sizhukong (TE23), to a depth of approximately 15 mm, with mild needling sensation. For Sibai (ST2), two needles were inserted transversely toward the inner and outer canthi, approximately 15 mm deep. From Taiyang (EX-HN5), a 0.30 mm × 75 mm needle was inserted transversely toward Dicang (ST4), approximately 50-60 mm deep. From Dicang (ST4), a 0.30 mm × 75 mm needle was inserted transversely toward Jiache (ST6), approximately 50 mm deep. Cuanzhu (BL2) was needled transversely toward Yuyao (EX-HN4), and Sizhukong (TE23) was needled transversely toward Taiyang (EX-HN5), both to a depth of approximately 15 mm with twirling to obtain deqi. Shuigou (GV26) and Chengjiang (CV24) were needled transversely toward the affected side to approximately 20 mm, with twirling manipulation. Yingxiang (LI20) was inserted obliquely toward the nasal root to approximately 5 mm. Fengchi (GB20), when used according to clinical presentation, was inserted toward the nasal tip to approximately 20 mm. Other points were needled conventionally with even reinforcing-reducing manipulation. Needles were retained for 30 minutes without additional manipulation during retention.

Rood-based facial rehabilitation was performed with therapist assistance according to previously reported facial muscle functional rehabilitation training methods [9]. Patients were guided to perform eyebrow lifting, frowning, eyelid closure, forceful eye closure, nasal wrinkling, cheek puffing, tooth showing, and lip protrusion. Each contraction was maintained for approximately 5 seconds and repeated 5-10 times per movement.

2.4.2 Control group: conventional acupuncture plus Rood-based facial rehabilitation

The control group received conventional acupuncture based on standard acupuncture texts. Acupoints included Yangbai (GB14), Sibai (ST2), Quanliao (SI18), Jiache (ST6), Dicang (ST4), Yifeng (TE17), Qianzheng (EX-HN16), Taiyang (EX-HN5), and Hegu (LI4). After routine disinfection, sterile disposable Huatuo needles (0.30 mm × 40 mm) were inserted at an angle of approximately 15-30 degrees to a depth of 10-15 mm for facial points, using even reinforcing-reducing manipulation with moderate stimulation. Hegu (LI4) was needled with a 1.5-cun needle at approximately 80-90 degrees to a depth of 25-30 mm, with heavier insertion and lighter lifting until the needling sensation radiated locally. Needles were retained for 30 minutes without additional manipulation during retention.

Rood-based facial rehabilitation in the control group was identical to that in the observation group. Both groups received treatment once daily, 6 sessions per week, for 2 consecutive weeks.

2.5 Outcome Measures

The primary outcome was facial nerve function assessed by the House-Brackmann grading system [3]. Grades I-VI indicate normal function to complete paralysis, respectively.

Secondary outcomes included a self-comparison symptom score between the affected and unaffected sides and the FDI. The self-comparison symptom score evaluated 12 items, including frontalis movement, eyelid opening and closure, nasolabial fold depth, and auricular or mastoid pain; each item was scored 0-3, with higher scores indicating more severe symptoms. For the FDI, lower scores indicate more severe facial functional impairment in this study.

Clinical response was categorized according to the Criteria of Diagnosis and Therapeutic Effect of Diseases and Syndromes in Traditional Chinese Medicine [10], using the House-Brackmann grade as the main reference. Markedly effective was defined as H-B grade I-II, with clinical symptoms largely resolved and facial expression muscle movement basically restored. Effective was defined as H-B grade III-IV, with improvement of symptoms and relatively symmetrical appearance at rest but residual weakness during expression. Ineffective was defined as H-B grade V-VI, with no obvious improvement.

2.6 Statistical Analysis

Statistical analysis was performed using SPSS 20.0. Continuous variables are presented as mean±standard deviation. Ordinal H-B grade distributions were compared using the Mann-Whitney U test. Categorical clinical response distributions were compared using the chi-square test. A two-sided $P<0.05$ was considered statistically significant.

3. Results

3.1 Clinical Response

After 2 weeks of treatment, the clinical response category distribution differed significantly between groups ($\chi 2=6.789$, $P=0.034$). The observation group had a higher markedly effective rate and lower ineffective rate than the control group (Table 2).

Table 2: Clinical response after treatment. Note: The three-category response distribution was compared using chi-square test

Group	n	Markedly effective, n	Effective, n	Ineffective, n	Total response rate, %
Observation	30	15	11	4	86.6
Control	30	6	14	10	66.6

3.2 House-Brackmann Facial Nerve Grade

Before treatment, most patients in both groups were graded H-B III-V. After treatment, the distribution shifted toward lower H-B grades in both groups. The post-treatment H-B grade distribution favored the observation group compared with the control group (Mann-Whitney $U=305.5$, $P=0.021$; Table 3).

Table 3: House-Brackmann grade distribution before and after treatment

Group	Time	n	I	II	III	IV	V	VI
Observation	Before	30	0	0	5	16	9	0
Observation	After	30	19	5	3	2	1	0
Control	Before	30	0	1	4	17	8	0
Control	After	30	12	3	4	7	4	0

3.3 Self-comparison Symptom Score

The self-comparison symptom score decreased after treatment in both groups. After treatment, the score was significantly lower in the observation group than in the control group (16.98±2.23 vs. 19.36±1.56, $P<0.001$; Table 4). Given the numerical baseline difference in the self-comparison symptom score, the between-group result for this secondary outcome should be interpreted with caution.

Table 4: Self-comparison symptom score before and after treatment. Higher scores indicate more severe symptoms.

Group	n	Before treatment	After treatment
Observation	30	29.63±1.27	16.98±2.23
Control	30	28.23±1.09	19.36±1.56

3.4 Facial Disability Index

The FDI score increased after treatment in both groups. After treatment, the FDI score was significantly higher in the observation group than in the control group (28.97±1.35 vs. 25.36±1.52, $P<0.001$; Table 5).

Table 5: Facial Disability Index before and after treatment. Higher scores indicate better facial function in this study

Group	n	Before treatment	After treatment
Observation	30	19.10±2.23	28.97±1.35
Control	30	18.23±2.26	25.36±1.52

3.5 Safety

No fainting during acupuncture, stuck needle, infection, or other serious adverse events occurred during the study. Mild subcutaneous hematoma occurred in 2 patients in the observation group and 3 patients in the control group; all cases resolved after local compression and did not affect continuation of treatment.

4. Discussion

This randomized controlled clinical observation found that Jingjin acupuncture combined with Rood-based facial rehabilitation was associated with greater improvement in H-B grade distribution, facial symptom score, FDI score, and clinical response category than conventional acupuncture combined with the same rehabilitation program. These findings are broadly consistent with previous studies suggesting beneficial effects of acupuncture, Jingjin acupuncture, and facial rehabilitation for PFP.

The treatment rationale can be understood from both traditional and modern perspectives. In traditional Chinese medicine, PFP is considered a disorder of the facial meridian sinews, often related to invasion of wind and cold, obstruction of qi and blood, and failure of the facial sinews to be nourished and controlled. The face is a convergence region of multiple yang channels, particularly the Yangming channel system [5,6]. Jingjin acupuncture originates from the classical

theory that treatment should be directed to the affected sinew region and painful or reactive sites, with the purpose of relaxing contracture, activating weakened muscles, regulating local qi and blood, and restoring coordinated facial movement [11].

From a biomedical perspective, many selected points are located near facial nerve branches or motor points of facial expression muscles. The anatomical course of the buccal branch of the facial nerve is consistent with the line from Dicang (ST4) to Jiache (ST6), and stimulation along this line may excite local neuromuscular tissues and relieve facial stiffness [12]. Needling at Xiaguan (ST7) may regulate local circulation and inflammatory responses, thereby helping reduce neural edema and promote facial nerve recovery [13]. Yifeng (TE17) has also been emphasized in the treatment of peripheral facial paralysis because of its relationship with the Shaoyang channels and the facial nerve region [14]. Penetrating or regional needling around the orbicularis oris and other facial muscles may further activate qi and blood and improve neuromuscular function [15]. Modern studies suggest that acupuncture may reduce inflammatory mediators, improve local microcirculation, regulate immune responses, and promote facial nerve repair [16].

Rood-based rehabilitation complements acupuncture by providing repeated sensory and motor stimulation. Guided eyebrow lifting, eye closure, cheek puffing, tooth showing, and lip protrusion may help activate weakened facial muscles, improve voluntary control, enhance local blood flow and metabolism, and prevent disuse-related decline [17]. Previous studies have suggested that active facial muscle rehabilitation can improve nerve excitability and conduction efficiency, promote muscle strength recovery, maintain facial expression muscle function, and reduce muscle atrophy after nerve injury [18]. In this study, both groups received the same rehabilitation program, which helps isolate the potential added effect of Jingjin acupuncture compared with conventional acupuncture.

The present study also has limitations. First, the sample size was small and the study was conducted at a single center. Second, blinding of participants and acupuncturists was not feasible, and and assessor blinding was not implemented. Third, the treatment period was only 2 weeks and no long-term follow-up was available; therefore, persistence of benefit and prevention of synkinesis cannot be determined. Fourth, the baseline self-comparison symptom score appears imbalanced according to the available aggregate data, so adjusted analysis or change-score analysis should be performed using raw data before final submission. Fifth, the study did not include standardized medical treatment details, electrophysiological assessment, or stratification by disease phase and severity. Future trials should use concealed allocation, blinded outcome assessment, preregistration, CONSORT reporting, longer follow-up, and clinically meaningful patient-reported outcomes.

5. Conclusion

Jingjin acupuncture combined with Rood-based facial rehabilitation may be more effective than conventional acupuncture combined with the same rehabilitation program for improving facial nerve function and clinical symptoms in patients with peripheral facial paralysis. The intervention was well tolerated in this short-term clinical observation. Larger, rigorously designed randomized controlled trials are needed to confirm the efficacy, safety, and durability of this combined treatment approach.

Ethics approval and consent to participate

The study protocol was approved by the Ethics Committee of the Affiliated Hospital of Shaanxi University of Chinese Medicine (approval No. SZFYIEC-PJ-2023- [162]). All participants provided written informed consent before enrollment.

Consent for publication

Not applicable. No identifiable personal information is reported.

Availability of data and materials

The datasets generated or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

RL drafted the manuscript and participated in data collection. FY participated in clinical observation and data organization. ST designed and supervised the study and revised the manuscript. All authors read and approved the final manuscript.

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