Journal of Biosciences and Medicines, 2025, 13(8), 244-254
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Clinical Observation on the Treatment of Spastic Paraplegia after Stroke with Different Needles

Mi Zeng, Lei Gou, Yechang Liao, Xiaoming Yu, Haizhen Pan, Ling Liu

Heyuan Shenhe People's Hospital, Heyuan, China
Email: zengmmi@163.com

How to cite this paper: Zeng, M., Gou, L., Liao, Y.C., Yu, X.M., Pan, H.Z. and Liu, L. (2025) Clinical Observation on the Treatment of Spastic Paraplegia after Stroke with Different Needles. *Journal of Biosciences and Medicines*, **13**, 244-254.
https://doi.org/10.4236/jbm.2025.138019

Received: July 3, 2025
Accepted: August 12, 2025
Published: August 15, 2025

Abstract

Objective: To observe the clinical efficacy of different diameter specifications of acupuncture needles in the treatment of spastic hemiplegia after stroke. **Methods:** 90 patients with spastic hemiplegia after stroke who met the criteria were randomly divided into three groups: acupuncture group 1 (Qihuang needle 0.5 × 40 mm), acupuncture group 2 (ordinary 0.35 × 40 mm), and acupuncture group 3 (0.25 × 40 mm), with 30 cases in each group. The acupuncture points for acupuncture group 1 were Jianyu, Tianjing, Waiguan, Biaoli, Xuehai, Ququan, and Sanyinjiao, with treatment once every two days, three times a week, for a total of four weeks. The acupuncture points for acupuncture group 2 and acupuncture group 3 were the same: Jianyu penetrating Bi Nao, Nao Hui penetrating Tianjing, Sidu penetrating Waiguan, Yangxi penetrating Biaoli, Jimen penetrating Xuehai, Yinlingquan penetrating Diji, Ququan penetrating Yinbao, and Sanyinjiao penetrating Zhao Hai. The treatment was once a day, five times a week, for a total of four weeks. The changes in Fugl-Meyer motor function (FMA) score, Barthel Index (BI) score for activities of daily living, and Modified Ashworth Scale (MAS) grade for spasticity before and after treatment were observed in the three groups, and the clinical efficacy among the three groups was compared. **Results:** After treatment, the FMA score, BI score, and MAS grade of the upper and lower limbs in the three groups were all better than those before treatment ($P < 0.05$), and the improvement degree of the three indicators in acupuncture group 1 was better than that in acupuncture group 2 and acupuncture group 3 ($P < 0.05$). The total effective rate of acupuncture group 1 was 90%, which was higher than 66.6% and 63% of acupuncture group 2 and acupuncture group 3, respectively, and the difference was statistically significant ($P < 0.05$). **Conclusion:** The therapeutic effect of Qihuang needle in the treatment of spastic hemiplegia after stroke is more significant than that of ordinary acupuncture, which can better

improve the motor function and spastic state of the limbs in patients with spastic hemiplegia after stroke, improve clinical efficacy, and improve the quality of life of patients.

Keywords

Qi Huang Needle, Ordinary Acupuncture, Spasticity Hemiplegia, Stroke, Clinical Observations

1. Introduction

Spastic hemiplegia following stroke is a frequent complication of both ischemic and hemorrhagic strokes. This condition arises due to upper motor neuron injury, which places the lower motor neurons in a disinhibited state, leading to increased muscle tone, heightened tendon reflexes, and impaired muscle coordination [1]. Typically, post-stroke hemiplegia emerges within three weeks after the acute event, with approximately 80% of patients developing varying degrees of limb spasticity [2]. These patients may suffer from pain in the affected muscles and restricted limb mobility, which can further result in joint contractures, deformities, and other complications [3], ultimately causing a marked decline in functional ability and quality of life. Acupuncture, through stimulation of specific acupoints, has been shown to reduce motor neuron excitability and alleviate muscle spasticity [4]. In clinical settings, the author observed that needles of different diameters produced variable therapeutic outcomes when applied to the same acupoint. Furthermore, in patients with spastic hemiplegia, needle retention during acupuncture frequently led to involuntary limb movements, resulting in needle bending, breakage, and interruption of treatment, thereby compromising therapeutic efficacy. To address these issues, the author explored a non-retention, high-intensity acupuncture technique for the management of spastic hemiplegia in stroke patients. The Qihuang needle, developed by Professor Chen Zhenhu at the First Affiliated Hospital of Guangzhou University of Chinese Medicine, features a rounded sharp tip, a hollow shaft, and a larger diameter than conventional acupuncture needles. It is distinguished by its non-retention application, fewer required acupoints, and rapid onset of action [5], effectively overcoming the limitations of traditional retained-needle acupuncture. The present study aims to evaluate the therapeutic efficacy of the Qihuang needle in treating post-stroke spastic hemiplegia and to compare its outcomes with those of conventional acupuncture. The findings are reported as follows.

2. Materials and Methods

2.1. General Information

Source of Cases: This study enrolled a total of 90 patients diagnosed with post-stroke spastic hemiplegia who were admitted to the inpatient wards and outpa-

tient clinics of Shenhe People's Hospital, Heyuan City, between September 2022 and August 2024. Eligible participants were randomly assigned to one of three acupuncture groups: Group 1 (Qihuang needle, 0.540 mm), Group 2 (conventional needle, 0.3540 mm), and Group 3 (0.25 × 40 mm), with 30 patients in each group. Based on preliminary experimental results (effect size d = 0.65), a two-tailed test with $\alpha = 0.05$, and a power of 80%, at least 27 cases per group are required. Thus, 30 cases per group were chosen to accommodate drop-out compensation (estimated drop-out rate ≤ 10%). The baseline clinical characteristics of the patients in the three groups were comparable (P > 0.05), as detailed in Table 1.

Table 1. General data comparison ($\bar{x}$ ± S) between the two groups.

Group	age (years)	gender (m/f/d)	Course of stroke (Month)	Type of stroke (Cerebral ischemia/intracerebral hemorrhage)
Acupuncture group 1	63.47 ± 4.36	20/10	4.08 ± 1.37	19/11
Acupuncture group 2	62.79 ± 4.78	19/11	4.18 ± 1.24	18/12
Acupuncture group 3	63.24 ± 5.03	18/12	4.32 ± 1.28	19/11

Western Medicine Diagnostic Criteria: The diagnostic criteria for Western medicine were based on the "Guidelines for the Secondary Prevention of Ischemic Stroke and Transient Ischemic Attack in China" [6] and the "Expert Consensus on Orthopedic Orthosis Rehabilitation Therapy for Elderly Hemiplegic Patients in China" [7].

Traditional Chinese Medicine Diagnostic Criteria: The diagnostic criteria for stroke were based on the "Standards for the Diagnosis and Efficacy Evaluation of Stroke (Trial Implementation)".

Inclusion Criteria:

1) Meeting the above-mentioned diagnostic criteria of both Western and Traditional Chinese medicine;

2) Aged between 40 and 70 years;

3) No adverse reactions such as needle syncope during the study process;

4) Modified Ashworth Spasticity Scale grade I to III;

5) Disease duration within 3 months;

6) The study protocol was approved by the Ethics Committee of Heyuan Shenhe People's Hospital (approval number).

Exclusion Criteria:

1) History of poliomyelitis, osteoarthropathy, or other conditions causing functional abnormalities of the affected limb;

2) Recurrent stroke or worsening of the condition;

3) Patients with skin ulceration who cannot receive acupuncture;

4) Patients with psychiatric disorders.

5) Patients did not take any muscle relaxant medications such as baclofen or eperisone, nor did they receive other forms of rehabilitation therapy during the study period.

2.2. Treatment Methods

2.2.1. Acupuncture Group 1

1) Acupoint Selection: Acupoints were selected based on the site of hemiplegia, including Jianjing, Tianjing, Waiguan, Pianli, Xuehai, Yinlingquan, Ququan, and Sanyinjiao.

2) Patient Positioning: Patients were placed in the supine position.

3) Acupuncture Technique: A 40 mm disposable sterile acupuncture needle (Qihuang needle) was selected according to the thickness of local soft tissue. Following accurate acupoint localization, the skin within a 3 - 4 cm diameter centered on the acupoint was disinfected three times with Anerdine using a cotton swab. The operator placed the thumb and index finger of the supporting hand on either side of the insertion site, while the needling hand swiftly inserted the needle vertically to the subcutaneous tissue, advancing to the bone. Upon the needle tip reaching the periosteum and the patient experiencing soreness and distension at the site, the needle handle was gently agitated, then slightly withdrawn. The Hegu needling technique was performed at a 30˚ angle along the longitudinal axis of the body. After the arrival of "Deqi", the needle was withdrawn and the puncture site was pressed with a sterile dry cotton swab for 1 - 2 minutes. For each session, 2 - 4 acupoints were chosen according to the patient's condition, with a maximum of 4 points. Treatments were administered once every two days, three times per week, for a total of four weeks. Qihuang acupuncture is characterized by not leaving needles in place and selecting fewer acupuncture points, eliminating the need for daily sessions. Therefore, the chosen frequency is three times a week.

2.2.2. Acupuncture Group 2 and Group 3

Acupuncture Groups 2 and 3 utilized an identical acupoint selection protocol. Group 2 used needles of specification 0.35 × 40 mm, while Group 3 used 0.25 × 40 mm needles. The selected acupoints included: Jian penetrating Biniao, Nao meeting penetrating Tianjing, Sidu penetrating Waiguan, Yangxi penetrating Pianli, Jimen penetrating Xuehai, Yinlingquan penetrating Diji, Ququan penetrating Yinbao, and Sanyinjiao penetrating Zhaohai. Local skin at the acupoint was routinely disinfected with alcohol using a cotton swab. Huánqiú brand disposable sterile acupuncture needles were used. The needle was rapidly inserted, followed by manipulation techniques such as lifting, thrusting, and rotating to elicit the needling sensation, with optimal results when the sensation was conducted downward. Needles were retained for 30 minutes per session, five times per week, over a four-week treatment course.

2.3. Observation Indicators

1) Modified Ashworth Scale (MAS): The Modified Ashworth Scale was employed to assess the degree of muscle tone in the upper and lower limbs of patients from the three groups before and after treatment, in accordance with the established grading criteria. The scale comprises six grades (0, 1, 1+, 2, 3, 4), with corresponding scores ranging from 0 to 5 (assigning 2 points to grade 1+). Higher

grades indicate greater severity of limb spasticity associated with hemiplegia, whereas lower scores reflect milder spasticity.

0 points = No increase in muscle tone;

1 point = Slight increase in muscle tone;

2 points = Slight increase in muscle tone with widened resistance range;

3 points = Moderate increase in muscle tone, with consistent resistance throughout passive movement, though not to a degree that hinders joint motion;

4 points = Severe increase in muscle tone, with significantly increased resistance during passive movement and a markedly limited range of motion, allowing only partial full-range activity;

5 points: Extreme increase in muscle tone, with the affected limb being rigid, making passive movement nearly impossible.

2) Simplified Fugl-Meyer Assessment (FMA): The Fugl-Meyer Assessment was utilized to evaluate motor function in the upper and lower extremities, encompassing 50 items with a total possible score of 100. Of this, upper limb function contributes 66 points and lower limb function 34 points. Higher FMA scores are indicative of superior motor function.

Each item is scored as "cannot perform" (0 points), "partially perform" (1 point), or "fully perform" (2 points), with a total score ranging from 0 to 100 points.

3) Modified Barthel Index (MBI): The Modified Barthel Index was used to measure the patients' abilities in activities of daily living, categorized into five levels with a maximum score of 100. Scores of 60 or above denote basic self-care capability; scores between 41 and 59 indicate moderate disability; scores between 21 and 40 signify severe disability; and scores from 0 to 20 represent extremely severe functional impairment. Higher scores correspond to greater independence in daily living activities.

2.4. Statistical Analysis

Data from 90 patients with post-stroke spastic hemiplegia were entered into SPSS version 13.0 for statistical analysis. Categorical data were analyzed using the χ^2 test. Comparisons between the treatment and control groups were conducted using independent samples t-tests, while pre- and post-treatment comparisons within groups employed paired t-tests. A P-value of less than 0.05 was considered indicative of statistical significance.

3. Results

3.1. Comparison of MAS Scores before and after Treatment between Groups

Prior to treatment, multiple comparisons using the Student-Newman-Keuls (SNK) test revealed no statistically significant differences in MAS scores among the three groups ($P > 0.05$), demonstrating baseline comparability. After four weeks of intervention, all three groups exhibited reductions in MAS scores com-

pared to baseline. Paired t-test results indicated that the changes in upper limb MAS scores before and after treatment were statistically significant ($P < 0.05$). Furthermore, post hoc SNK analysis showed that Group 1 (acupuncture) had significantly lower MAS scores than Groups 2 and 3 ($P < 0.05$), while no significant difference was observed between Groups 2 and 3 ($P > 0.05$) in Table 2.

Table 2. The MAS scores of the three groups of patients with spastic hemiplegia of the upper limb before treatment and after 4 weeks of treatment.

Group	Number of Cases	Before treatment	After treatment	t-value	P-value
Acupuncture group 1	30	3.04 ± 0.52	1.47 ± 0.68	12.20	<0.001
Acupuncture group 2	30	3.07 ± 0.58	2.33 ± 1.09	3.14	<0.05
Acupuncture group 3	30	3.05 ± 0.60	2.35 ± 1.03	2.45	<0.05
F-number		1.986	11.44		
P-value		0.143	0.000		

According to the results of the Student-Newman-Keuls (SNK) multiple comparison test, there were no statistically significant differences in the lower limb MAS scores among the three patient groups prior to treatment ($P > 0.05$), indicating that the groups were comparable at baseline. After four weeks of intervention, all three groups exhibited a reduction in lower limb MAS scores compared to their pre-treatment values ($P < 0.05$). Paired t-test analysis confirmed that these pre- and post-treatment changes in lower limb MAS scores were statistically significant ($P < 0.05$). Moreover, SNK multiple comparison further revealed that the MAS score in acupuncture group 1 was significantly lower than those in acupuncture group 2 and group 3 ($P < 0.05$), whereas no significant difference was observed between acupuncture group 2 and group 3 ($P > 0.05$) in Table 3.

Table 3. The comparison of MAS scores of patients with spastic hemiplegia of lower limbs before treatment and after 4 weeks of treatment in the three groups.

Constituencies	Number of cases	Before treatment	After treatment	t-value	P-value
Acupuncture group 1	30	1.91 ± 0.48	0.84 ± 0.24	10.95	<0.001
Acupuncture group 2	30	1.88 ± 0.48	1.32 ± 0.31	7.043	<0.001
Acupuncture group 3	30	1.92 ± 0.49	1.36 ± 0.33	5.37	<0.001
F-number		0.052	9.135		
P-value		0.949	<0.000		

3.2. Comparison of FMA Scores among the Three Patient Groups before and after Treatment

The SNK multiple comparison test indicated that there were no statistically significant differences in baseline FMA scores among the three patient groups prior

to treatment (P > 0.05), confirming group comparability. After four weeks of treatment, FMA scores in all groups increased significantly compared to baseline (P < 0.05), with paired t-test results demonstrating statistically significant improvements in FMA scores pre- and post-treatment (P < 0.05). Furthermore, the SNK multiple comparison test revealed that Group 1 (acupuncture) exhibited significantly higher post-treatment FMA scores than both Group 2 and Group 3 (P < 0.05), while no significant difference was observed between Group 2 and Group 3 (P > 0.05). Detailed results are presented in Table 4.

Table 4. The comparison of FMA before and after treatment of patients with spastic hemiplegia after stroke in the three groups (scores, $\bar{x}$ ± S).

Group	Number of examples	Before treatment	After treatment	t-value	P-value
Acupuncture 1 group	30	40.34 ± 13.21	70.45 ± 6.78	8.752	<0.001
Acupuncture 2 group	30	39.89 ± 14.01	55.31 ± 9.49	5.173	<0.001
Acupuncture 3 group	30	40.25 ± 13.11	52.69 ± 9.68	3.682	<0.001
F-number		0.471	7.29		
P-value		0.626	0.001		

3.3. Comparison of MBI Differences among the Three Patient Groups before and after Treatment

According to the results of the Student-Newman-Keuls (SNK) multiple comparison test, there were no statistically significant differences in pre-treatment MBI scores among the three groups (P > 0.05), confirming baseline comparability. After four weeks of treatment, MBI scores in all groups showed significant increases compared to baseline (P < 0.05). Paired t-test analysis further indicated that these pre- and post-treatment changes in MBI scores were statistically significant (P < 0.05). Additionally, SNK multiple comparison revealed that Group 1 (acupuncture) exhibited significantly higher post-treatment MBI scores than both Group 2 and Group 3 (P < 0.05), while no significant difference was observed between Groups 2 and 3 (P > 0.05). Details are presented in Table 5.

Table 5. The comparison of MBI before and after treatment of patients with spastic hemiplegia after stroke in the three groups (scores, $\bar{x}$ ± S).

Group	Number of Cases	Before treatment	After treatment	t-value	P-value
Acupuncture group 1	30	38.63 ± 16.78	89.08 ± 14.51	14.946	<0.001
Acupuncture group 2	30	38.36 ± 16.91	63.15 ± 14.41	5.452	<0.001
Acupuncture group 3	30	37.99 ± 16.87	59.39 ± 14.55	4.50	<0.001
F-number		0.265	47.17		
P-value		0.768	<0.000		

3.4. Results Comparison of Overall Efficacy Rates among the Three Groups

The overall efficacy rate in acupuncture group 1 was significantly higher than that

in acupuncture group 2 (P < 0.05), and also significantly higher than that in acupuncture group 3 (P < 0.05). In contrast, no statistically significant difference was observed in the overall efficacy rates between acupuncture group 2 and acupuncture group 3 (P > 0.05). Detailed data are presented in Table 6.

Table 6. No statistically significant difference observed in the overall efficacy rates between acupuncture group 2 and acupuncture group 3 (P > 0.05).

Group	Number of Cases	Basic Healing (Example)	Significant progress (examples)	Progress (example)	Invalid (example)	Overall effective rate (%)
Acupuncture group 1 (Qihuang group)	30	10	12	15	3	90
Acupuncture 2 sets (0.35 × 40 mm)	30	8	5	8	10	66.6
3 groups of acupuncture (0.25 × 40 mm)	30	3	4	12	11	63

Note: The χ^2 test results indicated a statistically significant difference in the efficacy rates among the three needle types for treating post-stroke spastic hemiplegia ($\chi^2 = 4.812$, P < 0.05). Specifically, the efficacy rate in acupuncture group 1 was significantly higher than that in acupuncture group 2 ($\chi^2 = 5.963$, P < 0.05), and also higher than that in acupuncture group 3. However, there was no statistically significant difference in efficacy rates between acupuncture group 2 and group 3 ($\chi^2 = 0.073$, P > 0.05).

4. Discussion

The present study was designed to compare the therapeutic efficacy of different acupuncture needles in the management of post-stroke spastic hemiplegia, with the aim of providing scientific evidence to inform needle selection for patients with post-stroke hemiplegia. The findings indicate that all three groups—acupuncture group 1 (Qihuang needle, 0.540 mm), acupuncture group 2 (0.3540 mm), and acupuncture group 3 (0.25 × 40 mm)—were effective in alleviating symptoms of post-stroke spastic hemiplegia. Notably, the Qihuang needle group demonstrated superior outcomes in terms of motor function, activities of daily living, and muscle tone when compared to the two groups utilizing thinner conventional needles. However, no significant difference was observed between the two conventional acupuncture groups, suggesting that minor differences in needle diameter may not translate into discernible differences in clinical efficacy. The use of the larger-diameter, single-use sterile Qihuang needle resulted in a marked improvement in patient symptoms, whereas the therapeutic effects of conventional needles with only slight diameter differences were comparable. The superiority of the Qihuang needle may be attributed not only to its larger diameter and increased stimulation but also to its functional resemblance to the small needle-knife. Beyond acupoint stimulation, the Qihuang needle is employed with the Hegu puncture technique, which facilitates the release of soft tissue adhesions and enhances local blood circulation, thereby contributing to reduced muscle tone and alleviation of spasticity [8]. Before treatment, factors such as age, gender, course of the disease, type of stroke, MAS scores, FMA scores, and Barthel scores were statistically comparable across the groups (P > 0.05), indicating these factors did not af-

fect the differences in treatment outcomes. However, the presence of comorbidities like hypertension, diabetes, and hyperlipidemia in stroke patients could influence the specific effects of acupuncture in improving post-stroke spasticity.

The origins of acupuncture therapy can be traced back to the Stone Age, as documented in Shuowen Jiezi: "Bian refers to treating diseases by pricking with stones" [9]. According to the Huangdi Neijing, needles were classified and named—such as round needle, spoon needle, lance needle, sharp needle, sword needle, round-sharp needle, long needle, filiform needle, and large needle—based on their distinct therapeutic functions [10]. By the Ming and Qing dynasties, only filiform and sharp needles remained in clinical use [11]. As manufacturing techniques advanced, needle production became increasingly sophisticated. In 1953, Cheng Dan'an established China's first national needle manufacturing plant, which standardized the shape, size, and length of filiform needles, thus enabling industrial-scale production. Following this standardization, clinicians typically selected filiform needles of varying lengths according to anatomical location, pain threshold, or clinical experience, often overlooking the significance of needle thickness. The morphology of acupuncture needles is a critical determinant of therapeutic efficacy. Presently, the use of filiform needles is characterized by uniform morphology, whereas other acupuncture techniques employ a wider variety of needle forms [12]. The choice of needle should be tailored to the specific pathology: thick fire needles are suitable for incision and pus drainage, long needles can reach areas inaccessible to short needles, and small needle knives can release tissue adhesions beyond the capability of standard filiform needles. However, most modern acupuncturists rely solely on standard filiform needles, which may diminish the therapeutic benefits associated with other needle types. In the author's view, the clinical efficacy of acupuncture is closely linked to the technique of needle manipulation, the diameter of the needle, and the physical characteristics of the applied stimulus. Factors such as the mechanical properties of the instrument (geometric configuration), the mechanical dynamics of the needling process (amplitude, frequency, velocity changes), and the physical properties of the target tissue all significantly influence the biomechanical process and therapeutic outcomes of acupuncture [13]. The Qihuang needle, with its larger diameter, more readily elicits the characteristic sensations of soreness, numbness, distension, and heaviness (deqi), delivers a stronger mechanical stimulus, effectively activates local sensory receptors, enhances neural signal transmission, and better modulates neuromuscular function. Xie Yufeng *et al*. [14] demonstrated that, in the treatment of cervicogenic headache, filiform needles with a diameter of 0.45 mm provided superior improvements in short-form McGill pain questionnaire scores compared to 0.3 mm needles. Thicker needles deliver greater stimulation, more effectively activate local meridian qi, promote the circulation of qi and blood, and can facilitate the release of adhesions, thereby yielding enhanced therapeutic effects.

It is well recognized that the therapeutic efficacy of acupuncture is intimately associated with various factors, including manipulation techniques, characteris-

tics of the needles (such as length, diameter, and shape), and the duration of needle retention. The present study specifically investigates the clinical efficacy of acupuncture using needles of varying diameters. In clinical practice, achieving therapeutic outcomes through acupuncture is not solely dependent on maximizing the intensity of stimulation; rather, the degree of stimulation should be judiciously tailored to the patient's age, physical constitution, type of disease (whether involving meridians or internal organs), and specific syndrome differentiation [15]. It should be emphasized that the present study is limited by its small sample size and the absence of a multicenter research design. Therefore, the efficacy of larger-diameter needles in patients recovering from ischemic stroke warrants further validation through larger-scale clinical studies. Considering acupuncture's sustained effects is crucial for its clinical utility. Given our study's current limitations, we plan to increase the frequency of rehabilitation assessments in future studies, evaluating MAS, simplified FMA scores, and Barthel scores at 3 and 6 months post-intervention to compare differences at various time points against the end of the intervention.

Funding

Heyuan City Science and Technology Program Project Application Project, Project Number: 220926151602090.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Fang, S.Q., Qian, K. and Ji, Z. (2024) Effects of Appropriate Traditional Chinese Medicine Techniques on Limb Function and Activities of Daily Living in Post-Stroke Patients with Spastic Hemiplegia. *Hebei Journal of Traditional Chinese Medicine*, **46**, 1996-2000.

[2] Chen, Z.S., Zhang, H.T., Zhao, Y., *et al.* (2025) Effect of Yin-Yang Balancing Acupuncture Combined with Wax Therapy on Rehabilitation of Elderly Patients with Post-Stroke Limb Spasticity. Chinese *Journal of Gerontology*, **45**, 2121-2124.

[3] Lü, X.X. (2024) Clinical Observation on the Efficacy of Guan Ci (Joint Needling) at Myofascial Nodes for Spastic Paralysis of Upper Limb After Stroke. North China University of Science and Technology.

[4] Mei, J.J., Li, J.W., Wang, Y.Y., Zhang, J.Y., Zhang, L.H., Guo, J. and Li, R.Q. (2025) Effects of Du Meridian Electroacupuncture on KCC2 and GABAARα1 Expression in the Cortex of Rats with Post-Stroke Limb Spasticity. *Chinese Journal of Rehabilitation Medicine*, **40**, 487-494.

[5] Li, J.L. (2024) Clinical Observation on the Efficacy of Qihuang Acupuncture Therapy in Treating Vertebral Artery Type Cervical Spondylosis. Guangzhou University of Chinese Medicine.

[6] (2011) Guidelines for the Secondary Prevention of Ischemic Stroke and Transient Ischemic Attack in China (2010). *Chinese Clinical Doctor*, **39**, 68-74.

[7] Liu, G.H. and Cao, F.Q. (2020) Expert Consensus on Orthopedic Brace Rehabilitation

for Elderly Hemiplegic Patients in China. *Chinese Journal of Orthopedic Traumatology of Traditional Chinese Medicine*, **28**, 82-85.

[8] Wen, J. and Chen, N.P. (2025) Observation on the Efficacy of Small Needle Knife Combined with Transcranial Magnetic Stimulation in Treating Upper Limb Spasticity in the Sequelae Stage of Cerebral Infarction. *Traditional Chinese Medicine Rehabilitation*, **2**, 18-22.

[9] He, P.R. (2001) Bianshi Therapy. *Proceedings of the First National Academic Seminar on Bianshi Therapy*, Beijing, 20-22 October 2001, 3.

[10] Gu, N.X., Huang, L. and Ji, L.X. (2024) Exploration on the Clinical Application of Combined Superior Techniques of the New Nine Needles Based on the "Mixed Treatment" Theory. *Journal of Clinical Acupuncture*, **40**, 92-95.

[11] Wang, G.D. (2020) Research on the Innovation of Cheng Dan'An's Acupuncture Instruments. Nanjing University of Chinese Medicine.

[12] Zhang, Y. and Zhang, H. (2024) Comparative Analysis of "Needling to the Disease Site" vs. "Qi to the Disease Site" Techniques. *Proceedings of the* 2024 *Annual Meeting of the China Acupuncture Association*, Tianjin, 27-30 September 2024, 5.

[13] Ji, H., Tan, W.K., Wu, T.Y., *et al.* (2024) Biomechanical Basis of Acupuncture Therapy. *Applied Mathematics and Mechanics*, **45**, 803-822. https://doi.org/10.21656/1000-0887.450132

[14] Xie, Y.F., Chen, Y., Feng, J., *et al.* (2019) Comparative Analysis of the Therapeutic Effects of Needles of Different Diameters in the Pressure-Sensitive Point Needling Method for Cervicogenic Headache. *Herald of Traditional Chinese Medicine*, **25**.

[15] Zhou, Q.C. and Zhao, J.P. (2016) Clinical Application Analysis of Acupuncture Dose. *China Journal of Traditional Chinese Medicine and Pharmacy*, **31**, 4461-4463.