

# Experiences in the Application of Acupuncture in Stroke Rehabilitation with Integrated Traditional Chinese and Western Medicine

Qirui Qu\*

College of Acupuncture, Moxibustion, Massage and Rehabilitation, Hunan University of Traditional Chinese Medicine, Changsha 410208, Hunan Province, China

\*Corresponding author: Qirui Qu, 2360758395@qq.com

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**Abstract:** Stroke, characterized by high morbidity, disability, and mortality rates, has become one of the significant diseases seriously threatening human health. Patients often suffer from multiple functional disorders such as hemiplegia, dysphagia, and cognitive dysfunction. Although Western medicine rehabilitation treatment can promote functional recovery to a certain extent, it still has limitations. As an essential part of traditional medicine, acupuncture therapy in traditional Chinese medicine has gradually gained attention in the field of stroke rehabilitation due to its unique theoretical system and treatment methods. This article aims to comprehensively review the application of acupuncture in stroke rehabilitation with integrated traditional Chinese and Western medicine, providing a reference for further optimizing the stroke rehabilitation program that integrates traditional Chinese and Western medicine.

**Keywords:** Acupuncture; Integrated traditional Chinese and Western medicine; Stroke rehabilitation

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## 1. Introduction

Stroke, also known as cerebrovascular accident, refers to a group of diseases that cause brain tissue damage due to the sudden rupture of blood vessels in the brain or the blockage of blood flow to the brain, including ischemic stroke and hemorrhagic stroke. In recent years, with the intensifying aging of the population and lifestyle changes, the incidence of stroke has been increasing year by year. According to relevant data, from 2012 to 2019, the standardized prevalence of stroke among people aged 40 and over in China increased, from 1.89% in 2012 to 2.58% in 2019. As of 2019, the number of people aged 40 and over in China who have had or are currently suffering from stroke has reached approximately 17.04 million <sup>[1]</sup>. Western medicine has made significant progress in the treatment of acute stroke, such as thrombolysis, thrombectomy, antiplatelet aggregation, and neuroprotective treatments, playing a vital role in saving lives and reducing brain damage. However, in the rehabilitation phase

of stroke, Western physical and occupational therapies mainly focus on improving limb function through passive or active exercise training. These methods have limitations in addressing complex neurological impairments and regulating overall bodily functions. Traditional Chinese medicine has a long history of understanding stroke, with relevant records dating back to the “Huangdi Neijing” (Yellow Emperor’s Classic of Internal Medicine). According to traditional Chinese medicine, the occurrence of stroke is mainly related to factors such as wind, fire, phlegm, stagnation, and deficiency, and the key pathogenesis is the disturbance of qi and blood, which ascends and attacks the brain. The “Huangdi Neijing” dedicates significant attention to acupuncture therapy. As a typical external treatment method in traditional Chinese medicine, acupuncture therapy differs from internal treatments like decoctions. Internal treatments rely on the properties of medicinal herbs to “correct imbalances with imbalances” and regulate the yin-yang balance of the internal organs <sup>[2]</sup>. Acupuncture therapy, on the other hand, involves stimulating acupuncture points on the body’s surface tissues. Its principle is to mobilize the body’s own qi, stimulate acupuncture points, activate the flow of qi, achieve the dredging of meridians, and regulate qi and blood, thereby achieving the goal of treating diseases. This demonstrates the unique treatment ideas and methods of external therapies in traditional Chinese medicine <sup>[3]</sup>. In recent years, increasing clinical studies have shown that acupuncture has unique advantages in stroke rehabilitation, effectively improving patients’ limb motor function, swallowing function, and cognitive function.

## **2. The theoretical basis of acupuncture in stroke rehabilitation**

### **2.1. Theory of meridians and channels in traditional Chinese medicine**

In the theory of traditional Chinese medicine, “qi” is an important concept, which originates from ancient people’s observation of the universe, heaven and earth, and human life phenomena. After summarizing, the ancients used “qi” to summarize the functions of the viscera, meridians, and channels. Qi plays a role in human life activities, participates in promoting human body operations, and is also related to the coordination of the internal organs, meridians, and channels. It is the key point for traditional Chinese medicine to understand human physiology and pathology <sup>[4]</sup>. The theory of meridians and channels in traditional Chinese medicine believes that the human meridian system is a complex network composed of meridians and collateral meridians, which connects the internal organs, and external limbs, communicates the exterior and interior, runs through the upper and lower parts, and connects various parts of the human body into an organic whole. The meridians and channels are not only the passageways for the circulation of qi and blood but also an important system for the body to transmit information and regulate functions. When a disease occurs in the human body, the qi and blood circulation and regulatory functions of the meridians and channels will be disordered. Acupuncture stimulates corresponding acupoints to stimulate the regulatory effect of the meridians and channels, so that the qi and blood are smooth, and the viscera functions are restored to balance, thereby achieving the purpose of treating diseases. For stroke patients, due to the disturbance of qi and blood in the brain, which leads to the blockage of meridians and channels, acupuncture can select acupoints on the head, limbs, and other parts to dredge the meridians and channels, promote qi and blood circulation, and improve brain and limb functions.

### **2.2. Modern neuroanatomy and physiology theory**

In stroke rehabilitation, acupuncture can stimulate acupoints to stimulate qi, regulate qi and blood circulation, and help restore nervous system function. It is an important part of integrated traditional Chinese and Western medicine

rehabilitation<sup>[5]</sup>. From the perspective of modern neuroanatomy and physiology, acupuncture at acupoints can affect the function of the central nervous system through neural transmission pathways. On the one hand, the neural impulses generated by acupuncture stimulation of acupoints can be transmitted along the peripheral nerves to the spinal cord and brain, activating multiple regions of the cerebral cortex and promoting the release of neurotransmitters such as dopamine and 5-hydroxytryptamine. These neurotransmitters play an important role in regulating movement, sensation, and emotion. On the other hand, acupuncture can also regulate neural plasticity, promote the repair and regeneration of damaged nerve cells, induce the proliferation and differentiation of neural stem cells, and form new synaptic connections, thereby improving the neurological function of stroke patients.

### **3. Acupuncture treatment methods in stroke rehabilitation**

#### **3.1. Ordinary acupuncture treatment**

Ordinary acupuncture is the most commonly used acupuncture treatment method. Based on the principles of syndrome differentiation and treatment in traditional Chinese medicine, syndrome differentiation is performed according to the patient's symptoms, signs, tongue manifestations, and pulse conditions, such as liver yang hyperactivity type, wind-phlegm obstruction type, phlegm-heat fu-organ excess type, qi deficiency and blood stasis type, and yin deficiency and wind movement type. Then select the corresponding acupoints for acupuncture. Commonly used head acupoints include Baihui, Shenting, Fengchi, and Shuaigu, which can directly stimulate the cranial nerves and regulate brain function; limb acupoints such as Jianyu, Quchi, Waiguan, Hegu, Huantiao, Zusanli, Yanglingquan, and Sanyinjiao can promote the qi and blood circulation of the limbs and improve limb movement function. During acupuncture operation, appropriate acupuncture techniques such as lifting and thrusting, twisting, and turning are adopted according to the different characteristics of acupoints and the severity of the disease.

#### **3.2. Electro-acupuncture treatment**

Electro-acupuncture is based on ordinary acupuncture, where the filiform needle is connected to an electro-acupuncture device, and different frequencies, waveforms, and intensities of current are output to continuously stimulate the acupoints. The advantage of electro-acupuncture is that it can enhance the stimulation intensity and duration of acupuncture, improving the treatment effect. Different frequencies of electro-acupuncture stimulation have different effects. Low-frequency electro-acupuncture (1–2 Hz) can promote neuromuscular excitation and increase muscle tension; high-frequency electro-acupuncture (100 Hz) has a good analgesic effect and promotes blood circulation. In stroke rehabilitation treatment, the appropriate frequency and waveform are often selected according to the patient's specific situation. For example, for patients with hemiplegia, the shu-mi wave can be used on limb acupoints to promote muscle contraction and nerve function recovery.

#### **3.3. Special acupuncture therapy**

Special acupuncture therapy refers to some acupuncture techniques with unique operation methods or treatment characteristics developed based on traditional acupuncture. Special acupuncture therapy includes fire needle, needle knife, penetration needle, etc.<sup>[6]</sup>. Fire needle provides warm stimulation, needle knife performs tissue dissection, and penetration needle penetrates spasmodic tissue, all of which can stimulate meridians and acupoints, promote the rapid emergence of meridian and acupoint effects, enhance the sensation of acupuncture, and thus improve clinical efficacy.

### **3.3.1. Fire needle therapy**

In acupuncture therapy, fire needle therapy belongs to a special type, which has evolved from filiform needles. It combines the advantages of moxibustion and acupuncture, which can not only exert the warming effect of moxibustion but also produce the mechanical stimulation of acupuncture. The fire needle transmits the heat carried by the needle body through meridians and collateral meridians, which can directly stimulate the yang qi in the body, promote qi and blood circulation, allow warm stimulation to reach the diseased area, and also improve the function of internal organs <sup>[7]</sup>. Fire needle is a method of puncturing acupoints quickly after burning a specially made needle red. It has the effect of warming and dredging meridians. In stroke rehabilitation, it can deal with limb muscle atrophy and joint contracture, using warm stimulation to promote qi and blood, strengthen muscle strength, and relieve spasms.

### **3.3.2. Needle knife therapy**

Needle knife therapy combines the concepts of traditional Chinese acupuncture and Western surgical operations. Stroke causes muscle spasms and soft tissue adhesions in patients, affecting limb movement function. The small blade at the front end of the needle knife can precisely cut and peel the diseased area. For example, if a patient has upper limb flexor spasms due to stroke, and the muscles, tendons, and surrounding tissues are adherent, making it difficult to extend the upper limbs, the needle knife can penetrate the adhesion, release abnormal connections, restore the muscular state, improve upper limb movements, help patients complete grasping and stretching actions, and enhance self-care ability.

### **3.3.3. Penetration needle therapy**

Penetration needle therapy uses a specially made long needle to stimulate deep meridians, acupoints, or diseased tissues through the skin and muscles. This therapy stimulates deep acupoints, stimulates the deep meridians and qi, and regulates neural transmission. Penetrating needle stimulation of lower limb acupoints activates nerve reflex arcs, promotes nerve function repair and remodeling, enhances nerve control over muscles, improves lower limb motor function, helps patients regain walking and standing ability, and improves quality of life.

## **4. Clinical effects of acupuncture in stroke rehabilitation**

### **4.1. Impact on limb motor function**

Acupuncture has multiple mechanisms in promoting the recovery of limb motor function in stroke patients. By regulating nerve function, stimulating the motor area of the cerebral cortex, promoting neuroplastic changes, and thus rebuilding or compensating for damaged motor nerve pathways; in promoting muscle contraction, it can improve the nutritional supply of limb muscles, prevent muscle atrophy, and enhance muscle strength and joint mobility; it can also improve blood circulation, creating good conditions for recovery. Xie Mingyun randomly divided 72 patients with limb dysfunction after a stroke into a control group (conventional treatment, ordinary acupuncture combined with rehabilitation exercise) and an experimental group (ordinary acupuncture combined with temporal three-needle and rehabilitation exercise based on conventional treatment) <sup>[8]</sup>. After treatment, it was found that the experimental group had lower scores for traditional Chinese medicine symptoms and hemorheological indicators, higher FuglMeyer scores, and a higher proportion of muscle strength grades V-VI compared to the control group, with a lower proportion of grades I-IV. This shows that acupuncture therapy is beneficial for improving patients' muscle strength and limb function.



## 4.2. Impact on swallowing function

Swallowing disorder after stroke is one of the common complications, which seriously affects patients' nutritional intake and quality of life, and can even lead to complications such as aspiration and lung infection. Acupuncture has unique advantages in treating swallowing disorders. In traditional Chinese medicine, swallowing disorders are believed to be related to poor circulation of qi and blood in the throat meridians. By needling acupoints such as Lianquan, Fengchi, Renying, and Yifeng, acupuncture can dredge the throat meridians, regulate qi and blood circulation, and improve swallowing function. Bo Huali selected 60 patients with swallowing dysfunction after a stroke and randomly divided them into two groups<sup>[9]</sup>. The control group only received rehabilitation training, while the observation group received acupuncture treatment based on the control group's rehabilitation training. After treatment, it was observed that the observation group was significantly better than the control group in terms of total treatment efficiency and swallowing function score. This shows that rehabilitation training combined with acupuncture treatment can better meet the treatment needs of patients with swallowing dysfunction after stroke, has a positive effect on improving patients' swallowing function, and has certain clinical promotion significance.

## 4.3. Impact on cognitive function

Cognitive dysfunction after a stroke includes memory loss, inability to concentrate, executive dysfunction, etc., which seriously affects patients' daily living abilities and rehabilitation effects. Acupuncture has a certain therapeutic effect on cognitive dysfunction after stroke by regulating the level of neurotransmitters in the brain, improving cerebral blood circulation, and promoting the repair of nerve cells. Chen Honglin and Guan Fang explored the effects of acupuncture combined with cognitive rehabilitation training on mild cognitive dysfunction after stroke<sup>[10]</sup>. They selected 110 patients and randomly divided them into a control group and an observation group, all receiving conventional treatment. The control group received cognitive rehabilitation training, while the observation group received additional acupuncture treatment. The results showed that after treatment, the observation group had higher MMSE and MoCA scores and nitric oxide levels than the control group, and lower intracranial artery-related resistance index and endothelin-1 levels, with statistically significant differences ( $P<0.05$ ). This shows that acupuncture combined with cognitive rehabilitation training has significant clinical effects, can improve cerebrovascular indicators, and enhance vascular endothelial function.

## 4.4. Impact on other functional disorders

Acupuncture has a positive significance in improving multiple functional disorders in stroke patients. Apart from limb movement, swallowing, and cognitive functions, it also has certain effects on speech, balance, and bowel and bladder functions. In terms of speech function, needling acupoints such as Tongli, Lianquan, Jinjin, and Yuye can promote the recovery of speech function. For balance function, acupuncture at acupoints such as Zusanli, Sanyinjiao, and Xuanzhong can improve patients' balance ability and reduce the risk of falls. In terms of bowel and bladder function, acupuncture at acupoints such as Zhongji, Guanyuan, Qihai, and Sanyinjiao can regulate bladder function and effectively improve symptoms such as urinary incontinence or retention in stroke patients. This shows that acupuncture plays a non-negligible role in the rehabilitation of multiple functional disorders in stroke patients and provides an effective way for patients' functional recovery.

## 5. Conclusion and prospects

As an important means of traditional Chinese medicine treatment, acupuncture has important application value

in the rehabilitation of stroke combining traditional Chinese and Western medicine. From the theoretical basis, the meridians and collaterals theory of traditional Chinese medicine and modern neuroanatomy and physiology theories provide a scientific basis for the treatment of stroke with acupuncture. In terms of treatment methods, various acupuncture techniques such as ordinary acupuncture, electroacupuncture, and special acupuncture therapies can be selected and applied according to the specific conditions of patients. Clinical studies have shown that acupuncture has significant effects in improving limb motor function, swallowing function, cognitive function, and other aspects of stroke patients, and also has a certain improvement effect on other functional disorders. Combining acupuncture with Western medicine rehabilitation treatment to form an integrated traditional Chinese and Western medicine stroke rehabilitation model can fully leverage the advantages of both traditional Chinese and Western medicine, improve the rehabilitation effect of stroke patients, and enhance their quality of life. Although acupuncture has achieved certain results in the rehabilitation of stroke combining traditional Chinese and Western medicine, there are still some problems that need further resolution. In clinical application, the acupoint prescriptions and acupuncture techniques for the treatment of stroke with acupuncture are not yet fully standardized, and there are large differences in treatment plans among different doctors, which may affect the stability and comparability of treatment effects. In the future, multi-center, large-sample clinical studies are needed to optimize acupuncture treatment plans and develop unified standards for acupoint prescriptions and acupuncture techniques.

## Disclosure statement

The author declares no conflict of interest.

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