



Syndrome Differentiation and Mechanism Exploration of “Tongguan Liqiao” Acupuncture Method for Treating Poststroke Dysphagia

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Abstract

Keywords

- ▶ “Tongguan Liqiao” acupuncture method
- ▶ poststroke dysphagia
- ▶ adjusting the spirit
- ▶ double sling mechanism
- ▶ neural functional remodeling

“Tongguan Liqiao” acupuncture method established by Xuemin Shi, a master of traditional Chinese medicine in China and academician of the Chinese Academy of Engineering, derives from the famous “Xing Nao Kai Qiao” therapy (activating the brain and opening the orifices) acupuncture method. It fundamentally takes “adjusting the spirit” as the root of selecting acupoints based on syndrome differentiation. Neiguan (PC 6), Renzhong (DU 26), and Sanyinjiao (SP 6) are selected as the main acupoints to adjust the spirit and revive the brain, nourish the liver and kidney, which treats the root cause. Acupoints such as Lianquan (RN 23), Yifeng (SJ 17), Wangu (GB 12), and Fengchi (GB 20) in the neck region are selected for “unblocking orifices,” which relieves the symptoms. This acupuncture method features deep needling, which aligns with modern swallowing function anatomy. The method can improve the function of poststroke dysphagia by enhancing cerebral blood supply and metabolism and promoting neural functional remodeling.

“Tongguan Liqiao” acupuncture method was created by Xuemin Shi, a master of traditional Chinese medicine (TCM) in China and academician of the Chinese Academy of Engineering. This is a unique acupuncture method focused on treating patients with poststroke swallowing disorders. Studies have verified that this acupuncture method offers outstanding treatment efficacy, safety, and economy, and it has been recognized by the National Administration of Traditional Chinese Medicine as a TCM suitable clinical technique for nationwide promotion.¹ The acupoint selection in “Tongguan Liqiao” acupuncture method aligns with modern anatomical knowledge. Relevant studies have shown that this method can improve poststroke dysphagia by

enhancing cerebral circulation and metabolism and promoting neural functional remodeling. This article introduces “Tongguan Liqiao” acupuncture method from the aspects of selecting acupoints based on syndrome differentiation and treatment mechanism.

Adjusting the Spirit and Selecting Acupoints Based on Syndrome Differentiation

TCM master and academician of the Chinese Academy of Engineering, Xuemin Shi, innovatively pointed out that “when the orifices are closed, the spirit hides, and the spirit will not guide qi” is the overall pathogenesis of stroke. He

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established the “Xing Nao Kai Qiao” therapy (activating the brain and opening the orifices) acupuncture method, which is applied to stroke patients and has achieved good clinical efficacy.^{2,3} “Tongguan Liqiao” acupuncture method is derived from the famous “reviving the brain and opening the orifices” acupuncture method. It is a specific acupuncture scheme summarized and established for the functional impairment of stroke patients—dysphagia after stroke.⁴ Therefore, in terms of selecting acupoints based on syndrome differentiation, this acupuncture method inherits the concept of “adjusting the spirit,” which emphasizes “reviving the brain and opening the orifices.” The main acupoints selected include Neiguan (PC 6), Renzhong (DU 26), and Sanyinjiao (SP 6), aiming to adjust the spirit, revive the brain, nourish the liver and kidney, which treats the root cause of the disease. At the same time, academician Xuemin Shi analyzed that dysphagia caused by stroke is due to the loss of control of the orifices by the brain, resulting in symptoms such as difficulty in pushing food and swallowing or even aspiration, which is called “blockages of the orifices.” Therefore, acupoints such as Lianquan (RN 23), Yifeng (SJ 17), Wangu (GB 12), and Fengchi (GB 20) in the neck region are selected to “unblock orifices,” which relieves the symptoms. The combination of treating both the root cause and the symptoms reflects academician Xuemin Shi’s integrated approach of combining overall and local treatment strategies and combining disease and syndrome differentiation treatments.

Aligning with the Anatomy of Swallowing Function and Deep Needling as the Essential

Swallowing reflex involves coordinated movements of multiple pairs of cranial nerves and the muscles they innervate, and patients with swallowing disorders after stroke often show reduced function of related nerves and muscles.⁵ Therefore, stimulating the relevant nerves and muscles involved in swallowing is the foundation and key to the recovery of swallowing function, and it is also the starting point for selecting acupoints for acupuncture treatment of swallowing disorders after stroke, mainly focusing on acupoints in the neck region.^{6,7} In the selection of acupoints in the neck region, “Tongguan Liqiao” acupuncture method includes not only the traditional acupoint needling of Lianquan (RN 23),⁸ but also innovatively applies the seldom-recorded acupoints in ancient texts such as Yifeng (SJ 17), Wangu (GB 12), and Fengchi (GB 20) for the treatment of swallowing disorders,^{9–11} emphasizing deep needling. Such acupoint selection and needling techniques are consistent with modern understanding of swallowing nerves, muscle anatomy, and biomechanics. It mainly embodies the following aspects.

Fitting the “Double Slings” Mechanism to Enhance the Function of the Hyolaryngeal Complex

The elevation of the hyolaryngeal complex is crucial during the swallowing process. During the pulling-up process of the hyolaryngeal complex, the upper esophageal sphincter opens, closing the laryngeal vestibular to allow the food bolus to enter the esophagus and avoid aspiration.^{12,13} During the elevation of the hyolaryngeal complex, the muscles of the hyoid bone

and the pharynx, respectively, constitute the anterior suspension and posterior suspension, forming the “double sling” mechanism for the elevation of the hyolaryngeal complex.¹⁴ This process is mainly innervated by the cranial nerves IX and X.^{13,15}

Represented by the Lianquan (RN 23), acupoints of superior Lianquan (RN 23) and lateral Lianquan (RN 23) are traditional acupoints for treating swallowing disorders, and their local anatomy corresponds to the anterior suspension mentioned above. Studies have shown that acupuncture at the Lianquan (RN 23) can improve the myoelectricity of the muscles of the hyoid bone and promote elevation of the throat.¹⁶ Since the distribution of the muscles of the pharynx is deep and their internal structure is complex,¹⁵ there are few acupuncture protocols that can fit the corresponding posterior suspension of the hyolaryngeal complex. In “Tongguan Liqiao” acupuncture method, deep needling at the Yifeng (SJ 17) and Wangu (GB 12) can reach the area of the pharyngeal muscles. Long-term clinical studies have also confirmed the safety of this needling method.^{17–19} When combined with needling traditional acupoint Lianquan (RN 23), it can further improve the elevation of the hyolaryngeal complex.

Deep Needling to the Pharynx to Improve Swallowing Biomechanics

Swallowing is a dynamic, biomechanical process, and the formation of pressure gradients is key to successful swallowing.²⁰ Among them, the sequential contraction of the posterior tongue and the pharyngeal constrictor muscles is an important step in forming the biological pressure gradient.²¹ In “Tongguan Liqiao” acupuncture method, deep needling of acupoints in the neck region toward the throat stimulates the site of needling to reach the above-mentioned deep pharyngeal muscles. For example, deep needling of Lianquan (RN 23) can reach the root of the tongue, while needling of Fengchi (GB 20), Wangu (GB 12), and Yifeng (SJ 17) can reach the upper and middle pharyngeal constrictor muscles, enhancing local muscle strength and improving swallowing biomechanics.

At the same time, deep needling of Yifeng (SJ 17), Wangu (GB 12), and Fengchi (GB 20) toward the laryngeal prominence can reach the gap between the anterior and posterior stylohyoid,^{11,22,23} which is also the area where cranial nerves IX–XII for cranial nerve penetration and neck branches.¹⁵ The cranial nerves IX–XII is directly related to functions such as elevation of the throat and airway cough reflex during swallowing,^{12,24} and stimulating this area through needling can effectively promote the recovery of swallowing function by providing surrounding nerve stimulation.

Multiple Approaches to Regulate Cerebral Blood Supply and Improve Cerebral Metabolism

Ischemic stroke is a condition characterized by localized ischemia, hypoxia, and necrosis of brain tissue, leading to neurological dysfunction. The cascade reaction triggered by glucose/energy metabolism disorders and ischemia-reperfusion injury is a crucial aspect of ischemic penumbra function

damage.²⁵ Therefore, improving cerebral blood supply and promoting cerebral tissue metabolism is a critical measure to rescue ischemic penumbra function damage and restore neurological function. Studies show that the acupoints combination in “Tongguan Liqiao” method can achieve the purpose of improving cerebral blood supply and promoting cerebral metabolism through multiple approaches.

Main Acupoints Neiguan (PC 6) and Renzhong (DU 26) for the Improvement of Cerebral Blood Supply and Metabolism

The main acupoints Neiguan (PC 6) and Renzhong (DU 26) in “Tongguan Liqiao” acupuncture method originate from the “reviving the brain and opening orifices” acupuncture method, and their combination can effectively regulate and improve overall cerebral blood supply.

Improving Cerebral Blood Supply through the Heart–Brain Circulation Relationship

At rest, cerebral blood flow accounts for 1/5 of cardiac output. Therefore, normal heart and brain function are critical in maintaining constant cerebral blood flow.²⁵ Acupuncture at Neiguan (PC 6) can improve myocardial blood supply, enhance heart function, and improve cardiac output, thereby improving cerebral blood supply.^{26,27}

Multiple Approaches to Alleviate Vascular Spasm and Improve Cerebral Metabolism

The Renzhong (DU 26) is distributed with branches of the facial nerve and trigeminal nerve. Research shows that vasoactive intestinal peptide nerve fibers located in the pterygopalatine ganglion of the facial nerve and substance P (SP) nerve fibers in the trigeminal ganglion can alleviate cerebral vascular spasm and regulate cerebral blood supply.^{28,29} Additionally, multiple studies have shown that needling Shuigou (DU 26) can down-regulate protein kinase C level and activity, improve glucose metabolism in ischemic brain tissue, reduce the levels of interleukin-1 β (IL-1 β), interleukin-6 (IL-6), and interleukin-8 (IL-8) in ischemic brain tissue, and improve ischemic brain tissue metabolism through multiple pathways such as regulating ATP-sensitive K⁺ channels (K_{ATP}).^{30–34}

In actual acupuncture operation, “Tongguan Liqiao” method involves first needling Neiguan (PC 6) to increase cerebral blood supply through the heart–brain circulation relationship, then needling Renzhong (DU 26) to further adjust the distribution of cerebral blood supply; these two needlings complement each other.

Acupoint Selection in the Neck Region for the Improvement of Posterior Circulation Blood Supply

The swallowing central pattern generator is located in the brainstem. Statistics show that 80% of patients with brainstem lesions may experience swallowing disorders.³⁵ Research indicates that in “Tongguan Liqiao” acupuncture method needling the acupoints Fengchi (GB 20) and Wangu (GB 12) in the neck region can increase vertebral artery cerebral blood flow and promote the establishment of collateral circulation with slight, high-frequency manipulation,

creating favorable conditions for the recovery of brain function in patients with swallowing disorders, especially those with ischemic swallowing disorders due to posterior cerebral circulation ischemia.^{36,37}

Potential Neural Function Remodeling Effects

Swallowing reflex involves multiple brain cortices that work together and coordinate with each other.^{38,39} In poststroke swallowing disorders, nerve plasticity induced by stimulation is an essential part of swallowing function recovery, with sensory stimulation playing a particularly critical role.^{40,41} After applying “Tongguan Liqiao” acupuncture method, patients experience a unique subjective sensation in their throat, described as feeling like a fishbone is stuck. This sensation triggers an involuntary swallowing action, forming an effective sensory stimulus that induces neural function remodeling.⁴¹

Furthermore, stimulation of the soft palate and pharyngeal arches is also a common method for inducing swallowing neural function remodeling.⁴² Unlike traditional oral acupuncture, which often needles the Jinjin (EX-HN 12) and Yuye (EX-HN 13), selecting point stimulation of the soft palate, pharyngeal arches, and posterior pharyngeal wall, aiming to induce the cough reflex under the method of the tongue “Tongguan Liqiao” acupuncture may serve as another target for inducing swallowing neural plasticity.

Additionally, in swallowing activity, the frontal lobe and postcentral gyrus are important activation domains.^{43,44} Functional magnetic resonance imaging studies have shown that needling Neiguan (PC 6) and Renzhong (DU 26) can activate various brain regions, including the frontal lobe and postcentral gyrus; the activation domains have certain degrees of correlation.^{45,46} This provides a potential research direction to explore the neural plasticity of swallowing cortex in “Tongguan Liqiao” acupuncture method.

It is worth mentioning that a rigorous and standardized manipulation technique is the cornerstone and key to ensuring the efficacy of “Tongguan Liqiao” acupuncture method.⁴⁷ As mentioned above, slight high-frequency rotations at the Fengchi (GB 20), Wangu (GB 12), and Yifeng (SJ 17) aim to improve posterior circulation blood supply. Similarly, pecking needling technique at the Renzhong (DU 26) with the degree of eyeball moisture indicating full activation of the pterygopalatine ganglion represents the optimal stimulation to improve brain blood supply, which sets this acupuncture method apart from other therapies.^{4,28}

Conclusion

“Tongguan Liqiao” acupuncture method differs from traditional acupuncture in terms of point selection and combination, needling depth and manipulation techniques. It takes “adjusting the spirit” as the root of selecting acupoints based on syndrome differentiation. Neiguan (PC 6), Renzhong (DU 26), and Sanyinjiao (SP 6) are selected as the main acupoints to adjust the spirit and revive the brain, nourish the liver and

kidney. Acupoints of Lianquan (RN 23), Yifeng (SJ 17), Wangu (GB 12), and Fengchi (GB 20) in the neck region are selected for “unblocking orifices.” This acupuncture method features deep needling, which aligns with modern swallowing function anatomy. By improving brain blood supply and metabolism and promoting neural function remodeling, it facilitates the recovery of swallowing function after stroke. In the future, “Tongguan Liqiao” acupuncture method will need objective instrumentation to enhance the clinical evidence level for this technique. Additionally, it is necessary to further explore the deep mechanism of the treatment of dysphagia by this acupuncture method from the perspective of neural function remodeling.

CRediT Authorship Contribution Statement

Hongwen Huang: Writing—original draft, writing—review and editing, and project administration. Chao Chen: Investigation and resources. Xiaonong Fan: Conceptualization, supervision, resources, and writing—review and editing.

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Conflict of Interest

The authors declare no conflict of interest.

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