

# Discussion on the Role of Floating Needle in Chronic Whiplash Injury

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**Abstract:** Research shows that the annual incidence of whiplash injury in adolescents and adults is 3%~6%, and 50% of patients will still have persistent symptoms after one year, which means that the annual prevalence of chronic whiplash injury is increasing. At present, surgical treatment is commonly used for the acute stage of whiplash injury, and there is no commonly used treatment for the chronic recovery stage. Therefore, the role and efficacy of floating needle in chronic whiplash injury are discussed from two medical cases.

**Keywords:** Whiplash injury; floating needle; Fu's Subcutaneous Needling

## 1. Introduction

Whiplash injury is a cervical vertebra and/or cervical spinal cord injury, which is caused by excessive extension and flexion of the cervical spine and asynchronous movement of the head due to intense acceleration or deceleration of the body. In a car accident, the inertial velocity generated by a rear or side vehicle impact can cause further neck acceleration and deceleration of personnel inside the vehicle, resulting in neck bone or soft tissue damage. It can also be caused by other stimulating recreational activities. When an object is in rapid motion or at rest, the inertial motion causes rapid neck flexion or extension to cause injury. This like a whipping, hence the injury is called "whiplash injury", which often leads to cervical spine fractures and dislocations. Patients with whiplash injuries of the cervical spinal cord are mainly affected by traffic accidents injury. Cervical disc herniation is most common in the C5-C6 and C4-C5 segments, and the type of herniated intervertebral disc is mostly central type. The surgical effective rate is 94.5% [1].

Mild patients often experience symptoms such as headache, dizziness, neck stiffness, neck and shoulder pain, numbness, weakness, and sensory abnormalities in the upper or lower limbs, dysphagia, vision and hearing abnormalities. Severe patients are often caused by serious accidents, such as static fractures or dislocations. And in more severe cases, spinal cord edema, rupture or amputation can also occur, which may further lead to paralysis. In clinical practice, patients with mild symptoms often receive timely treatment, while people with blurred consciousness are more likely to be overlooked and miss the optimal treatment time.

Fu Zhonghua's acupuncture therapy is a diagnosis and treatment method created by Dr.Fu Zhonghua, which is inspired by the twelve needling method and wrist ankle acupuncture in the Yellow Emperor's Internal Classic, combining myofascial chains and trigger points to treat diseases. A disposable needle is used to scatter against the surrounding subcutaneous superficial fascia tissue at the myalgia points (affected muscles), strengthening the needle sensation by retaining the needle to alleviate the patient's pain. The traditional acupuncture and moxibustion directly punctures the deep tissue to produce a sense of getting qi during the treatment, while the needle insertion method of Fu's acupuncture is different from it. Parallel needles penetrate and indwell in the connective tissue of the subcutaneous superficial fascia, which is named "floating needle" because it seems to float between the subcutaneous skin and flesh.

## 2. Medical theoretical research on whiplash injury

### 2.1. Modern medical research on whiplash injuries

In recent years, modern medicine has conducted biomechanical studies on the anatomical structures of the neck, including the cervical facet joints, cervical root ganglia, cervical spinal cord, cervical muscles, cervical ligaments, cervical arteries, and cervical intervertebral discs. It is believed that facet joint injuries are the main cause of neck pain, and mainly manifested by the stretching of the joint capsule and the compression of the joint surface. Pathological and physiological studies after whiplash injury have found that inflammation, changes in neural and spinal cord plasticity are important causes of chronic neck pain after whiplash injury. The complex structure of the neck makes the specific diagnosis of whiplash injuries difficult. The advancement of medical imaging technology has brought a great help to the diagnosis of whiplash injury. Recent studies, especially the fat infiltration of muscles in cervical MRI, provide reliable evidence for the localization diagnosis of chronic neck pain after whiplash injury. On the basis of a clear diagnosis of whiplash injury, diagnosis and treatment should be graded based on the clinical grading of whiplash injury. Level I and II patients can receive targeted immobilization, physical therapy, medication, botulinum toxin, and psychological therapy for conservative treatment. Level III and IV patients can receive radiofrequency neurotomy, anterior and posterior surgical treatment [2,3]. This article uses floating needle therapy to treat chronic whiplash injury, mainly selecting two periods: firstly, the patient feels slightly uncomfortable in the cervical spine after sports injury, but there are no obvious abnormalities in the imaging examination. Secondly, the patient does not experience any discomfort after sports injury, but after a period of time, there is no obvious cause of cervical discomfort, such as cervical pain, shoulder pain and other symptoms of cervical spondylosis. However, there is no organic lesion such as cervical disc herniation in imaging, and the occurrence of spinal cord edema may be reported.

### 2.2. Traditional medical research on whiplash injuries

From the perspective of traditional medicine, whiplash injuries can correspond to meridian and tendon diseases. Shi Xuemin [4] believes that meridian and tendon diseases are often manifested as muscle and muscle lesions or motor related diseases in the area where the meridian passes through, with movement disorders and pain being the main symptoms. Differentiation and treatment of meridians usually identify which meridian is causing the disease based on the location of injury and pain and the circulation of the twelve meridians. On the meridian path along which the meridians are located, the muscles and muscles converge profusely, and pressing or needling, or combining distant and near, or combining upper and lower, or treating multiple meridians together. Floating needle therapy can promote the patency of qi and blood, playing a role in dredging meridians, promoting blood circulation and resolving blood stasis. The treatment principle of meridian diseases and floating needle therapy for whiplash injuries is consistent. The theoretical system of floating needle therapy [5] combines the principles of proximal treatment, skin theory, and pain as a acupoint in the Yellow Emperor's Internal Classic. And it incorporates new theories of modern medicine, making it understandable and usable for everyone. Its skin theory regulates the relevant meridians of the body through acupuncture of subcutaneous tissue, improves visceral function and promotes the smooth circulation of qi and blood to achieve the goal of treatment.

### 2.3. Clinical diagnosis

(1) Patients' previous vehicle impact injuries due to car accidents, symptoms of which include delayed neck pain, headache, dizziness, neck stiffness, neck and shoulder pain, and upper limb numbness [6]. (2) Patients' imaging examination excludes other diseases or mild edema manifestations. (3) Patients who experience recurrent symptoms due to fatigue, cold, and other causes after hospitalization and reaching the discharge standard during the acute phase.

### 2.4. Treatment ideas for this medical record

Due to the injury occurring in the neck, the sternocleidomastoid muscle, cervical clitoris muscle, and trapezius muscle were selected as the main affected muscles for treatment. Firstly, performing a "remote bombing" by stabbing and sweeping the anterior serrated muscle, while instructing the patient to perform reperfusion activities (such as shrugging, turning left and right to counteract the force) to achieve the goal of remote perfusion of the main affected muscle, which is as effective as a drumming.

If the therapeutic effect is not satisfactory, "local treatment" can be selected, and patients can be advised to cooperate with neck anterior, posterior, left, and right antagonistic movements by scanning the affected muscles of the neck.

### **2.5. Treatment method**

We used professional floating needle equipment and performed a flat puncture into the superficial fascia layer of the affected muscle for scanning and dispersing. The scanning and dispersing method involves holding the needle with the right hand, fixing the needle body with the thumb and middle finger, vigorously shaking the needle handle back and forth through the index and ring fingers to make the needle tip sweep back and forth in a fan-shaped shape. During the scanning and dispersing process, the needle insertion point also swings slightly left and right, while performing reperfusion activities.

Qi and Blood Exercise, also known as the "Four Way Lazy Lumber Plus" Lazy Lumber Enhanced Exercise Method [7], is a set of exercise methods summarized and explored by Professor Fu Zhonghua through long-term clinical treatment of muscle diseases. The stretching movements of qi and blood exercises mostly need to be carried out in conjunction with deep breathing, which has a more effective effect on unblocking qi and blood compared to general stretching movements. After fully stretching, stretch to the top left, top right, top left, and top right, respectively.

### **2.6. Clinical treatment results**

(1) Imaging examination shows significant absorption of edema. (2) Symptoms such as neck and shoulder pain, headache, dizziness, neck stiffness, neck and shoulder pain, and upper limb numbness have significantly improved.

## **3. Traditional Chinese Medicine Syndrome Differentiation and Classification of whiplash injury**

### **3.1. Acute phase**

After neck injury and within a few weeks after acute surgery, the neck continues to stiffen with limited mobility.

#### **3.1.1. Qi stagnation type**

Neck pain, shoulder pain and back pain attack, causing severe soreness and numbness in the body, which can be exacerbated by exposure to cold. If getting warm, the symptoms will decrease. Neck, shoulder, and back muscles are stiff, tense with limited mobility, and some are accompanied by anxiety, fear, etc.

#### **3.1.2. Blood stasis type**

The neck is accompanied by acupuncture or burning pain, and the painful area is fixed. The symptoms are mild during the day and severe at night, with unbearable pain, weakened limb muscle strength. With numbness, cyanosis. Or it may be accompanied by numbness, cyanosis, pulsating pain in the head, dizziness, etc.

### **3.2. Chronic period**

Pain, numbness, decreased perception, soreness, and fatigue in the neck and shoulders attack for several months or even one year after a car accident or surgery. Weather changes or poor lifestyle and dietary habits can exacerbate the above symptoms.

#### **3.2.1. Phlegm turbidity obstruction type**

Stiff neck, heavy limbs, numbness and limited mobility attack. Due to weather changes, the appeal situation may worsen.

#### **3.2.2. Liver and kidney deficiency**

Neck soreness and softness attack, which may be accompanied by tinnitus, dizziness, unclear vision, burning face, bitter mouth and dry throat, insomnia and dreaminess, irritability and irritability. Do not sit for long periods of time. Pain and weakness in the waist and knees, numbness in affected limbs, limited mobility and spasms attack after fatigue.

### 3.2.3. Deficiency of Qi and Blood

Neck pain attack with prolonged course and recurrent onset, which may be accompanied by fatigue and weakness, dull complexion, low tone, lack of food, constipation, etc.

## 4. Traditional Chinese Medicine Principles of Floating Needle Therapy

Floating needle therapy combines traditional and modern medical theories, and is a learning, inheritance, and innovative development of ordinary acupuncture [8]. The manifestation of floating needle therapy in traditional Chinese medicine theory is as follows: (1) The twelve needling methods in "Lingshu Guan Acupuncture" point out that the subcutaneous theory of floating needle is that the needle tip reaches the subcutaneous superficial fascia tissue and does not continue to penetrate the muscle layer. And its treatment method is the same as the traditional twelve skin theory. "Su Wen" says: "The beginning of a husband's disease... must first enter the skin." This indicates that the portal of the human body is the skin, and it is also the development and manifestation of the disease. "Pain caused by qi stagnation and blood stasis" is caused by local cold coagulation and blockage, while the treatment method of floating needle therapy is to stimulate the corresponding skin through local scanning, regulating the function of relevant organs dredging meridian stasis to promote the local circulation of qi and blood. (2) Floating needle therapy uses instruments to operate on subcutaneous fascia tissue during treatment, selecting the insertion point near the affected muscle, which is similar to the acupuncture method of "burrs" and "floating needles" mentioned in the "Internal Classic". (3) The principle of selecting acupoints for floating needles is centered around the pain point, with the needle tip pointing towards the affected side. This is different from the traditional Chinese medicine theory of "Pain Point Needling", which regards the needle prickling point as a acupoint. (4) The "needle retention theory" is the same as traditional acupuncture methods, and the floating needle leaves a soft tube under the skin after treatment to strengthen local stimulation and continue to work, thereby increasing the therapeutic effect. (5) The floating needle instrument is different from traditional acupuncture tools in that the floating needle is long and high in hardness, and it can be randomly scattered under the skin. Large scale scanning can promote local blood circulation and achieve the goal of nourishing the right and eliminating evil.

## 5. Operation method of floating needle therapy

The insertion point of the floating needle should consider the pain area and check the responsible muscle groups of the affected muscles to further confirm the main affected muscle points. The treatment point should be clearly referred to as "remote bombing", and combined with the needle tip pointing towards the neck, shoulder, back, chest, abdomen, and waist for treatment and completing designated reperfusion activities, to treat the remote affected muscle targets. "Remote bombing" [9] can be explained as "flashlight effect". Due to the needle insertion point pointing from the distal responsible muscle group to the affected muscles of the neck, shoulder, chest, abdomen, and lower back, which is transmitted through subcutaneous meridians, nerves, and muscle electrical signals, when multiple affected muscle groups appear locally, the remote processing method can be used. Doctors should choose the muscles at the centrifugal end of the multiple affected muscle group, align the needle tip with the multiple affected muscle group and perform reperfusion therapy, which can reduce the number of acupoints that require acupuncture and achieve the purpose of expanding the scope of the affected muscle group. It can further alleviate the patient's pain, achieve good therapeutic effect, and prevent the multiple affected muscle group from feeling tight, stiff, slippery feeling. Once the spastic state of the multiple lesion muscle group is relieved, the needle can be removed.

And select the second affected muscle point for treatment, and the injection point can select the affected muscle that is still tight, stiff, hard, and slippery for treatment. Inject the needle in other local directions such as the upper, lower, left, and right of the local affected muscle, and cooperate with scanning and designated reperfusion activities for treatment. The injection point is mostly selected from the muscle abdomen, and the injection point is called "local affected muscle target treatment". Due to the large number of affected muscle parts in the patient, the number of injections can be increased, and the scanning area can also be expanded according to the scope of the affected muscle, Try to handle as many affected muscles as possible at once, while also paying attention to the patient's bearing capacity. The final number of injections chosen is proportional to the treatment intensity.

## 6. Clinical medical records

### 6.1. Medical record 1

A patient, male, 45 years old, was admitted to our hospital with the main complaint of "6 years after neck surgery for car accident injury" and the diagnosis of "neck whip like injury surgery". The patient reported that he had neck injury caused by a car accident 6 years ago and underwent neck decompression surgery on the 5th day. After treatment, the symptoms gradually decreased until he recovered and was discharged without any abnormal changes. Current symptoms: Half a year after discharge, the patient experienced unilateral limb numbness, decreased sensation, and normal muscle strength due to fatigue and cold, with no other discomfort. The results of seeking medical treatment in various hospitals were not satisfactory, so we went to our department for diagnosis and treatment of chronic whiplash injuries. Physical examination showed that the physiological curvature of the cervical spine was normal, with slight limitations in neck movement, tenderness on both sides of the right interspinous and nuchal ligaments (+), tenderness on both sides of the left interspinous and nuchal ligaments (-), significant reduction in superficial sensation on the right side below the C3 plane, and normal superficial sensation on the left side. The muscle strength of both upper and lower limbs is normal, the radial arteries are palpable, and the dorsal arteries of both feet are palpable. Physiological reflex exists, but pathological reflex is not elicited. Floating needle examination: The main affected muscle group on the right side: scalenus, sternocleidomastoid, pectoralis major, serratus anterior, rectus abdominis, tibialis anterior, head clamp, neck clamp, levator scapulae, latissimus dorsi, erector spinalis, and triceps cruris.

#### 6.1.1. Floating needle diagnosis and treatment process

We examined the affected muscles, including sternocleidomastoid (+++), trapezius (+++), pectoralis major (+++), serratus anterior (++), rectus abdominis (+++), latissimus dorsi (+++), and erector spinalis (++) .

#### 6.1.2. Treatment method

We adopted "Remote bombing", combined with local muscle target treatment and instructing patients to daily cooperate with Qi and blood exercises (3 times a day). During the treatment, scanning and reperfusion activities are used.

#### 6.1.3. Second diagnosis and treatment

The patient complained that unilateral limb numbness was significantly improved compared to yesterday. After performing qi and blood exercises, he felt a slight heat and sweating in the local area, and his muscle strength was normal without any other discomfort. We continued to treat the previous muscle condition, and after the second diagnosis, the patient recovered.

### 6.2. Medical Record 2

The patient, male, 61 years old, came to our hospital for treatment due to "multiple body pain and limited mobility caused by a car accident without undergoing surgical treatment for 1 year". The diagnosis was "chronic whiplash injury". One year ago, due to a collision with other vehicles while driving, the patient immediately felt whole body pain and limited mobility, without dizziness, vomiting, or limb weakness. He had a history of hypertension. After 3 days of hospitalization, he suddenly experienced "weakness in both upper limbs with shallow sensory decline". Specialized physical examination: Multiple abrasions throughout the body, straightened physiological curvature of the cervical spine, slightly limited neck movement, tenderness (+) on both sides of the interspinous and nuchal ligaments, superficial sensory decline in the C4 and T2 planes, significant decrease in superficial sensation on the skin of both upper limbs, and 3-grade muscle strength and tension of the right upper limb flexor and extensor muscles. The MRI of the head and neck shows multiple abnormal signals in both cerebellar hemispheres, central half oval, and frontal parietal occipital lobes. Considering the medical history of brain contusion, it is recommended to have a short-term follow-up examination. C5-T2 vertebral spinous process level soft tissue abnormal signal, considering edema, it is recommended to have a follow-up examination, with CT examination if necessary. The report pointed out that the intervertebral disc between C3/C4, C5-C6, C6-C7 was prominent, and the cervical vertebrae showed hyperostosis. The conservative treatment included injecting methylcobalamin to nourish nerves, injecting mannitol to reduce intracranial pressure, injecting methylprednisolone sodium succinate for anti-inflammatory purposes. It also included dynamic observation of head CT/ MRI and

intermittent electroacupuncture treatment. Symptoms gradually alleviated after treatment. Before discharge, the physical examination showed that the upper limb elbow, wrist flexion and extension muscle strength was level 4, and the right upper limb elbow, wrist flexion and extension muscle strength was level 5, with normal muscle tension. Before discharge, the cervical spine MRI showed abnormal soft tissue signals at the level of C5-T2 vertebral spinous process, considering edema, and the range was slightly reduced compared to before. The symptoms of C3/C4, C5/C6, C6/C7 intervertebral disc herniation and cervical vertebral osteohyperplasia were roughly the same as before. No abnormal changes were observed after discharge. The current symptoms are as follows: the patient complained of numbness and decreased sensation in both upper limbs due to cold one year after discharge, with normal muscle tone in the upper elbow and wrist flexor extensor muscles at level 3, and in the right upper elbow and wrist flexor extensor muscles at level 4. The patient sought medical treatment at our place for a systematic diagnosis and treatment, and was diagnosed with chronic whiplash injury. Physical examination showed normal cervical curvature, stiff neck movement, and tenderness on both sides of the right interspinous and nuchal ligaments (-). There is tenderness (+) on both sides of the left interspinous and nuchal ligaments, and slight decrease in bilateral superficial sensation appears in the cervical 4 and thoracic 1 planes. The muscle strength of both upper and lower limbs is normal, and both radial arteries are palpable. According to the principle of floating needle examination, bilateral rectus abdominis, trapezius, sternocleidomastoid, pectoralis minor, rectus abdominis, head clip, neck clip, levator scapulae, latissimus dorsi, erector spinae are the main responsible muscles.

### **6.2.1. Floating needle diagnosis and treatment process**

We have selected relevant muscles with positive signs, including rectus abdominis (+++), sternocleidomastoid (++), trapezius (+++), cervical muscle (+++), pectoralis minor (+++), latissimus dorsi (+++), erector spinae (++) .

### **6.2.2. Treatment method**

We adopted "Remote bombing (rectus abdominis)", combined with local treatment of affected muscle targets and instructing patients to daily cooperate with Qi and blood exercises (6 times a day)". During the treatment, scanning is used in conjunction with reperfusion activities.

### **6.2.3. Second diagnosis and treatment**

The patient complained of numbness in both upper limbs, significant improvement compared to yesterday. His neck sensation had slightly improved, and was slightly hot and sweaty after qi and blood exercises. Meanwhile, his muscle strength was normal without any other discomfort. We continue to treat the previous muscle condition, and after the second diagnosis, the patient almost recovered.

## **7. Conclusion**

Research shows that the annual incidence rate of whiplash injury in adolescents and adults is 3%~6%<sup>[11]</sup>, and 50% of patients will still have persistent symptoms one year later<sup>[12]</sup>, which means that the annual prevalence of chronic whiplash injury is increasing. There are many factors that can induce spinal cord injury, and mechanical inertia impact is more common to further cause injury. Patients with whiplash injury have a complete decrease in their ability to live<sup>[13]</sup>, and most of the severe cases cannot take care of themselves. Patients' physical and psychological health are severely affected, and their families bear a heavy burden<sup>[14]</sup>.

At present, there is limited data on the treatment of cervical whiplash injuries with floating needles. However, the floating needle theory suggests that the composition of the human body is nothing more than "qi and blood", with "blood" corresponding to blood and "qi" corresponding to the muscle system. The stability of the cervical spine largely depends on the support of surrounding neck muscles, with 70% of the stability coming from muscles, especially deep muscles<sup>[15]</sup>. Therefore, using floating needles to treat cervical whiplash injuries has theoretical support. The floating needle searches for the shallow affected muscle and achieves mutual recruitment and activation with the deep muscle by flat needling of the superficial fascia under the affected muscle, allowing blood to flow with qi and connect with qi and blood. The clinical effect of floating needle is significant in the treatment effect, as it has the advantages of safe, convenient, painless, low cost, short treatment and recovery time, and fast response speed, which has been recognized by a large number of patients.

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