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THE ROLE OF ACUPUNCTURE IN OVERCOMING COMPLAINTS OF CARPAL TUNNEL SYNDROME

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ABSTRAK

Carpal Tunnel Syndrome (CTS) adalah kondisi yang ditandai dengan kerusakan pada sistem saraf perifer, yang menyebabkan gejala seperti nyeri, mati rasa, dan kelemahan pada tangan. Meskipun telah dilakukan berbagai pengobatan, gangguan neurologis tetap menjadi tantangan terapeutik yang signifikan. Efek terapeutik akupunktur terhadap modulasi nyeri yang berkaitan dengan pelepasan hormone endorphin dan teori gerbang control, peningkatan aliran darah, mengurangi peradangan, dan efek elektrofisiologis. Mekanisme ini berkontribusi pada pengurangan gejala yang terkait dengan carpal tunnel syndrome. Akupunktur bermanfaat dalam mengobati CTS. Penelitian telah menunjukkan bahwa akupunktur dapat meningkatkan parameter studi konduksi saraf pada saraf sensorik dan motorik, mengurangi nyeri, dan meningkatkan fungsi saraf secara keseluruhan. Meskipun diperlukan penelitian yang lebih teliti untuk sepenuhnya mengkarakterisasi efek akupunktur pada carpal tunnel syndrome, bukti yang ada mendukung penggunaannya sebagai terapi komplementer. Protokol akupunktur terstandar yang menggabungkan korelasi fisiologi dengan saraf perifer dan pendekatan tradisional untuk manajemen nyeri tampaknya efektif. Penelitian lebih lanjut dengan ukuran sampel yang lebih besar dan perbandingan acak terhadap akupunktur palsu akan membantu menetapkan akupunktur sebagai pedoman untuk mengobati kondisi CTS. Tinjauan ini memaparkan potensi akupuntur sebagai terapi komplementer dalam mengatasi keluhan pada kondisi carpal tunnel syndrome.

Kata kunci: akupuntur, sindrom terowongan carpal, titik akupuntur

ABSTRACT

Carpal Tunnel Syndrome (CTS) is a condition characterized by damage to the peripheral nervous system, causing pain, numbness, and hand weakness. Despite various treatments, neurological disorders remain a significant therapeutic challenge. The therapeutic effects of acupuncture are attributed to several mechanisms, including pain modulation related to endorphin release and gate control theory, increased blood flow, reduced inflammation, and electrophysiological effects. These mechanisms collectively contribute to reducing symptoms associated with carpal tunnel syndrome. Evidence suggests that acupuncture is beneficial in treating CTS. Research has shown that acupuncture can improve nerve conduction study parameters in sensory and motor nerves, reduce pain, and improve overall nerve function. Although more rigorous research is needed to characterize the effects of acupuncture on carpal tunnel syndrome fully, existing evidence supports its use as a complementary therapy. Standardized acupuncture protocols that combine physiological correlation with peripheral nerves and traditional approaches to pain management appear to be effective. Further studies with larger sample sizes and randomized comparisons of sham acupuncture will help establish acupuncture as a guideline for treating CTS conditions. This review explains the potential of acupuncture as a complementary therapy in treating complaints in the condition of carpal tunnel syndrome.

***Keywords**: acupuncture, carpal tunnel syndrome, acupuncture points*

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1. INTRODUCTION

Carpal tunnel syndrome (CTS) is one of the most common forms of median nerve neuropathy. [1] Carpal Tunnel Syndrome (CTS) is a syndrome that occurs when the median nerve is compressed in the Carpal Tunnel in the wrist, as the nerve passes through the tunnel from the forearm to the hand. [9] The pathophysiology of CTS is a neuropathy that occurs due to *entrapment* of the nerve, which involves compression and traction. Compression and traction on the nerve cause intraneural microcirculation disorders, lesions on the axon and myelin sheath, and changes in the supporting tissue in the carpal tunnel. Entrapment of peripheral nerves can occur due to narrowing of the space through which the nerve passes, resulting in changes in function or even damage at the site of nerve compression and on its distal side. Entrapment of the median nerve is the most common example of this disorder. [6] Possible pathophysiological mechanisms in CTS disorders are increased pressure in the carpal tunnel, microcirculation disorders of the median nerve, changes in the supporting tissue of the median nerve and hypertrophy of synovial tissue in the carpal tunnel. Most of these syndromes are idiopathic. Patients experience complaints of stiffness, numbness (paresthesia), and pain, especially when doing work that uses a lot of hands. [22] The prevalence of Carpal tunnel syndrome affects 4-5% of the population, especially those aged 40-60 years, and the prevalence rate of CTS is higher in women (9.2%) than in men (6%). [2] This article aims to discuss the role of acupuncture as a complementary therapy to conventional treatment to reduce symptoms of carpal tunnel syndrome.

2. METHODS

Data were collected by employing a variety of reputable scientific search engines, such as Google Scholar, ScienceDirect, Web of Science, and Elsevier, etc. The author's team processed and analyzed the data to reach the conclusion.

3. DISCUSSION

This condition often progresses from intermittent symptoms to more persistent problems, including muscle atrophy in severe cases. [6] In treating CTS, there are conservative therapies and surgical therapies. Conservative therapy includes wrist splints, local steroid injections, oral steroids, or ketoprofen phonophoresis, carpal tunnel release, and physiotherapy in the form of arm and wrist stretching. Surgical therapy is performed if conservative therapy no longer produces improvement. [5] Among the existing interventions, acupuncture has received special attention in the medical field as a complementary therapy to treat CTS with mild to moderate symptoms. [4]

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Acupuncture is one of the non-pharmacological therapeutic modalities that is done by acupuncture using fine needles at acupuncture points. Acupuncture at acupuncture points can activate nerve fibres (Figure 1) and peripheral afferent receptors, producing sensory interactions at various levels of the central nervous system and releasing various transmitters and modulators, thus producing anti-inflammatory signals, neuroendocrine and neuroimmune signals. [3,4] This therapy has been applied since ancient times in Traditional Chinese Medicine (*TCM*).

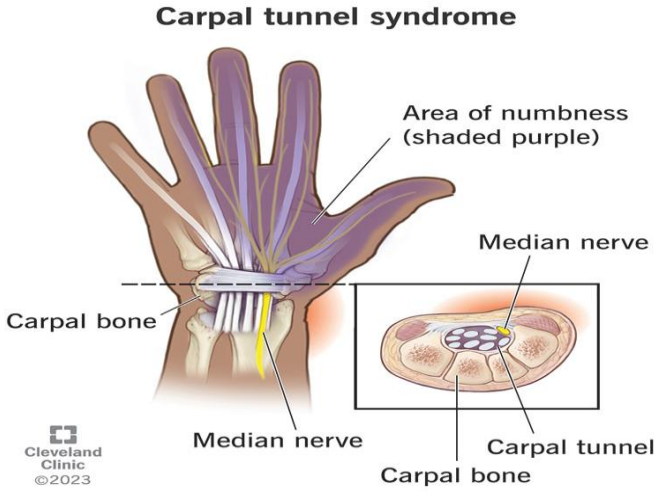


Figure 1. Mechanism of Carpal Tunnel Syndrom

Acupuncture has been a component of Traditional Chinese Medicine (TCM) for thousands of years. In the Neolithic era, practitioners used bones to draw blood and treat abscesses. A significant discovery in 1963 revealed needles made from ground stone. As acupuncture evolved, needles made from bronze, iron, silver, and stainless steel were introduced. These needles are inserted into specific points on the body called *acupoints*, activating them to 'promote healing' along their path. When a point is fully activated, the patient or *acupuncturist* will experience pain, numbness, fullness, or heaviness, known as *De Qi* . According to TCM theory, Qi is the internal energy within the human body that is essential for health. [7] This Qi flows through meridians, which are composed of *yin* and *yang* , and collaterals associated with the internal organs and extend to the extremities and joints on the outside. These areas influence the body's homeostasis. [11]

Acupuncture spread to Korea and Japan in the 6th century and then reached Europe and America in the 17th and 18th centuries. [12] Since then, acupuncture has continued to grow throughout the world. *The World Health Organization* noted in 2013 that 183 of the world's 202 countries practiced acupuncture. [7] The practice of acupuncture has undergone many modifications, such as the emergence of pharmacopuncture, electroacupuncture, acupressure, and so on. [13,14,15]

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Carpal Tunnel Syndrome is a disorder of the peripheral nerves caused by various underlying pathologies. The underlying pathology results in damage to the peripheral nerve fibers. Acupuncture is known to be beneficial in peripheral neuropathy caused by one of them, *Carpal Tunnel Syndrome.* [8]

Acupuncture has been investigated as a potential treatment for carpal tunnel syndrome (CTS), a form of peripheral neuropathy characterized by compression of the median nerve at the wrist, leading to symptoms such as tingling, numbness, and weakness in the hand. [10,21] Several studies have investigated the efficacy of acupuncture for CTS. A randomized controlled trial found that acupuncture significantly improved global symptom scores (GSS) and nerve conduction velocity (NCV) in patients with mild to moderate CTS. [16] Acupuncture therapy for carpal tunnel syndrome is known to reduce the neurological disorders that arise. [17,18] Acupuncture reduces pain and improves quality of life. [19] However, further research is needed to further confirm the efficacy of acupuncture in peripheral neuropathy due to *Carpal Tunnel Syndrome.*

The underlying mechanism of acupuncture in improving neurological disorders in carpal tunnel syndrome is:

1. Modulation of Nervous and Immune Interactions

Acupuncture affects the interaction between the nervous system and the immune system. It activates pathways that lead to the release of neurotransmitters and modulators, producing anti-inflammatory signals and neuroendocrine responses that further help reduce inflammation and promote healing. [10,20]

2. Brain Area Activation

Acupuncture stimulates specific areas of the brain, such as the primary somatosensory cortex, secondary somatosensory cortex, and prefrontal cortex. This activation is crucial for sensory perception, which is particularly relevant for patients experiencing sensory symptoms such as paresthesia and pain associated with CTS. [10,20]

3. Neuroprotective Effects

The therapy increases the expression of neurotrophic factors (NTFs) such as brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF). These factors are essential for the development, survival, and function of neurons, providing a protective effect on neural tissue affected by CTS. [10.20]

4. Increased Blood Circulation

Acupuncture can promote better blood circulation in the wrist and hand area, which can help reduce inflammation and swelling around the median nerve. Increased circulation can help facilitate healing and reduce symptoms in CTS. [10,20]

5. Nerve Function Restoration (Electrophysiological Effects)

Acupuncture has been shown to have a positive effect on nerve conduction velocity, which is essential for restoring normal function in the median nerve affected by CTS. This may lead to improved sensory and motor function in the hand. [10,20]

6. Inflammation Reduction (anti-inflammatory effect)

Acupuncture has been shown to have anti-inflammatory properties by increasing the expression of anti-inflammatory cytokines, such as IL-10, while decreasing pro-inflammatory cytokines such as TNF-α, IL-1β, and IL-6. Modulation of these cytokine levels helps reduce inflammation in the affected area, contributing to symptom relief. [10,20]

Acupuncture is often used in the treatment of carpal tunnel syndrome (CTS), and specific acupuncture points are targeted to relieve symptoms. Here are the main acupuncture points commonly used in the management of CTS. [5]

1. **PC-7 (Demand-Most frequently used)**
   This point is located on the wrist and is believed to have a significant effect in reducing pain and improving function in the hand.

2. **PC-6 (Neiguan)**
   Located on the inner forearm, about 2 finger widths above the wrist crease, this point is known for its ability to relieve pain and improve circulation in the arm and hand.

3. **LI-4 (Hegu)**
   Found on the back of the hand, between the first and second metacarpal bones, this point is often used for pain relief and is believed to have a systemic effect on the body, helping to reduce discomfort in the wrist and hand.

4. **TH-5 (Waiguan)**
   This point is located on the outer forearm, approximately 2 finger widths above the crease of the wrist. It is used to relieve pain and improve the function of the wrist and hand.

5. **LU-7 (Lieque)**
   Located on the radial side of the forearm, about one and a half finger widths above the wrist crease, this point is known for its ability to help with respiratory problems and can also help reduce pain in the wrist area.

6. **SI-5 (Yanggu)**
   Located on the wrist joint, on the ulnar side, this point is specifically targeted for wrist pain and can help reduce symptoms associated with CTS.

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7. **GB-34 (Yanglingquan)**
   Found on the lateral side of the leg, just below the knee, this point is often used for its ability to relieve pain and improve overall circulation, which can indirectly benefit the wrists and hands.

8. **SP-6 (Sanyinjiao)**
   Located on the inner side of the lower leg, this point is known for its ability to improve overall health and well-being, which can benefit patients with chronic conditions such as CTS.

4. Conclusion

Acupuncture is a safe and potentially effective treatment for carpal tunnel syndrome, a condition characterized by damage to the peripheral nervous system that causes symptoms such as pain, numbness, tingling, and weakness in the hand. Existing literature supports the efficacy of acupuncture in improving nerve function and alleviating symptoms associated with CTS. A standardized acupuncture protocol, which combines the principles of structural acupuncture based on proximity to peripheral nerves and traditional approaches to treating symptoms in carpal tunnel syndrome, includes specific points such as PC-7, PC-6, LI-4, TH-5, LU-7, SI-5, GB-34, and SP-6 that have been shown to be effective in managing symptoms in CTS. Acupuncture is highly effective in treating Carpal Tunnel Syndrome. Studies have shown that acupuncture improves nerve conduction study parameters in sensory and motor nerves, reduces pain, and improves overall nerve function. The therapeutic effects of acupuncture on CTS are due to several mechanisms, including pain modulation related to endorphin release and gate control theory, increased blood flow, reduced inflammation, and electrophysiological effects . Although the evidence is promising, further studies with larger sample sizes and randomized comparisons with pseudo-acupuncture and other acupuncture methods are needed to fully establish acupuncture as a guideline in the treatment of CTS.

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