

# Acupuncture for post operative neurophatic pain: a case report



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## ABSTRACT

**Introduction:** Postoperative neuropathy can result from nerve transection, bruising, stretching, or inflammation. Chronic Post-Surgical Neuropathic Pain (CPSNP) refers to pain persisting for at least three months after surgery, distinct from preoperative pain and localized to the surgical site or referral area. Acupuncture, a therapeutic technique for acute and chronic pain, has shown promise in managing CPSNP. In this case report, we explore the use of acupuncture to alleviate chronic pain following hand surgery. CPSNP poses significant challenges for patients recovering from surgical procedures. Acupuncture, with its potential to modulate nerve activity and activate pain control systems in the brain, offers an alternative approach to pain management. **Case Report:** Patient Profile: A 37-year-old woman presented to the medical acupuncture polyclinic with complaints related to her left hand. Specifically, she experienced numbness, heat, and pain in the tips of fingers 2, 3, 4, and 5. Occasionally, the discomfort extended to her elbow. Medical History: The patient had undergone Carpal Tunnel Syndrome (CTS) surgery on her left hand approximately one year ago. The diagnosis of CTS was established in 2021, leading to open surgery on the wrist. Current Pain Assessment: The patient reported a Numeric Rating Scale (NRS) pain score of 5. Physical Examination: Examination revealed pain and limited range of motion (ROM) in her hand. Acupuncture Treatment: Manual acupuncture therapy was administered, targeting specific body acupuncture points and utilizing ear acupuncture. **Outcome:** After six therapy sessions, the patient experienced a reduction in pain intensity and an improvement in overall quality of life. **Conclusion:** Acupuncture shows promise as an adjunctive therapy for managing chronic post-surgical neuropathic pain. Further research is warranted to explore its efficacy and long-term effects in similar cases.

Received: June, 17 2024

Accepted: July, 18 2024

Published online: July, 31 2024

BMWJ 2024;Vol (1), page (25) – (34)

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DOI:

<https://doi.org/10.71341/bmwj.v1i1.6>

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Published by PT BMW Journal Sejahtera

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**Keywords:**

neuropathic pain, postsurgical neuropathic pain, carpal tunnel syndrome, acupuncture

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## INTRODUCTION

The International Association for the Study of Pain (IASP) defines neuropathic pain as pain resulting from lesions or diseases affecting the somatosensory nervous system (Barke et al., 2018; Bonezzi et al., 2020; Finnerup et al., 2021). Studies show that 7-10% of the global population commonly experiences neuropathic pain, with about 20-25% of individuals having chronic pain conditions. This high morbidity significantly impacts patients, their families, and society psychologically and economically (Ju et al., 2017; Ma et al., 2022).

Carpal Tunnel Syndrome (CTS) is a leading cause of neuropathic pain, stemming from median nerve demyelination in the wrist (Dimitrova et al., 2017). CTS symptoms vary among patients but typically include hand pain, numbness, and tingling along the median nerve's distribution. CTS management includes conservative treatment, medication, and surgery (either open or endoscopic) when other methods fail (Pace et al., 2023). However, surgical intervention can lead to complications such as infection, incomplete transverse carpal ligament release, and nerve injury (Huntley & Shannon, 2020; Joshi et al., 2022; Justin O. Sevy, 2022).

Surgery-Induced Neuropathic Pain is a significant clinical issue, affecting an estimated 10-50% of post-operative patients. This condition can result from nerve transection, bruising, stretching, or inflammation. Chronic post-surgical neuropathic pain (CPSNP) is defined as persistent pain lasting at least three months after surgery, with characteristics distinct from pre-existing pain or increased intensity, localized to the surgical site or referral area, and excluding other potential causes like cancer recurrence or infection. Surgery and nerve damage trigger a series of events that include both pain sensation and inflammatory response, resulting in "peripheral and central sensitization" produced by repetitive bursts of nerve activity from nociceptors. In affected patients, this activity leads to chemical, structural, and functional changes in the peripheral nervous system (PNS) and central nervous system (CNS). Maladaptive changes in damaged nerves cause peripheral neuropathic manifestations, such as allodynia, sensory loss, stabbing pain, paresthesia/dysesthesia, burning sensation, and others that can appear long after the effects of surgical injury have resolved. The CNS manifestations that occur are called 'pain centralization' and affect sensory, emotional, and other systems (e.g., cognitive) and contribute to several manifestations of chronic pain syndrome (e.g., depression) (Borsook et al., 2014; Prudhomme et al., 2020). Neuropathic pain treatment can involve pharmacotherapy and non-pharmacotherapy. The Neuropathic Pain Special Interest Group (NeuPSIG) of IASP recommend pharmacological

treatment of neuropathic pain: tricyclic antidepressants (TCAs), gabapentin, pregabalin, and serotonin-noradrenaline reuptake inhibitors (SNRIs) duloxetine and venlafaxine as first-line drugs. Drug-based therapies often have side effects and may not effectively alleviate pain as perceived by patients. When pharmacotherapy fails to manage pain long-term or patients develop resistance and tolerance to pain medications, non-pharmacological approaches become necessary (Binder & Baron, 2016; Shinu et al., 2022; Thapa & Euasobhon, 2018). The non pharmacological treatment for neurophatic pains are transcutaneous electrical nerve stimulation, psychotherapy (cognitive behavioral therapy and mindfulness), and also acupuncture (Moisset et al., 2020).

In recent years, extensive research has elucidated the pain-relieving mechanisms and immune system effects of acupuncture, a widely used non-drug therapy for both short-term and persistent pain. The analgesic action triggered by acupuncture operates throughout different parts of the nervous system, from the spinal cord to the brain (He et al., 2022). In this case report, acupuncture used as a therapeutic technique for chronic pain that persist after hand surgery for remove the compression of median nerve in CTS. Acupuncture works by inhibits nerve activity caused by neuropathic pain and modulates areas of the brain by activating pain control systems, therefore could reduce pain in neurophatic pain. Acupuncture could be an effective therapeutic option for post-surgical neuropathic pain.

## **2. Case Presentation**

A 37-year-old woman visits the acupuncture medical polyclinic with complaints of numbness, heat, and pain in her left-hand fingers, particularly the tips of fingers 2, 3, 4, and 5. These symptoms began approximately a year ago following her CTS surgery on her left hand. The patient had CTS placement in October 2021 and underwent surgery in November 2021. Post-surgery, her hand pain and stiffness decreased, but her fingertips became numb and felt hot. These symptoms worsen when she writes or types on a laptop or cellphone, and improve when she's inactive or in a cool room. She reports waking up 2-3 times nightly due to numbness, heat, and pain. Occasionally, the pain or numbness spreads to her elbow.

Physical examination reveals normal vital signs, pain (NRS 5) and limited Range of Motion (ROM), with no edema or warmth in her left hand. Based on these findings, she is diagnosed with Post-Surgical Neuropathic Pain. She was taking pharmacological treatment dexamethasone 3 x 0.5mg, catflam 3 x 50mg, and omeprazole 2 x 20mg for pain. While the medication provides temporary relief, symptoms return when she stops taking it.

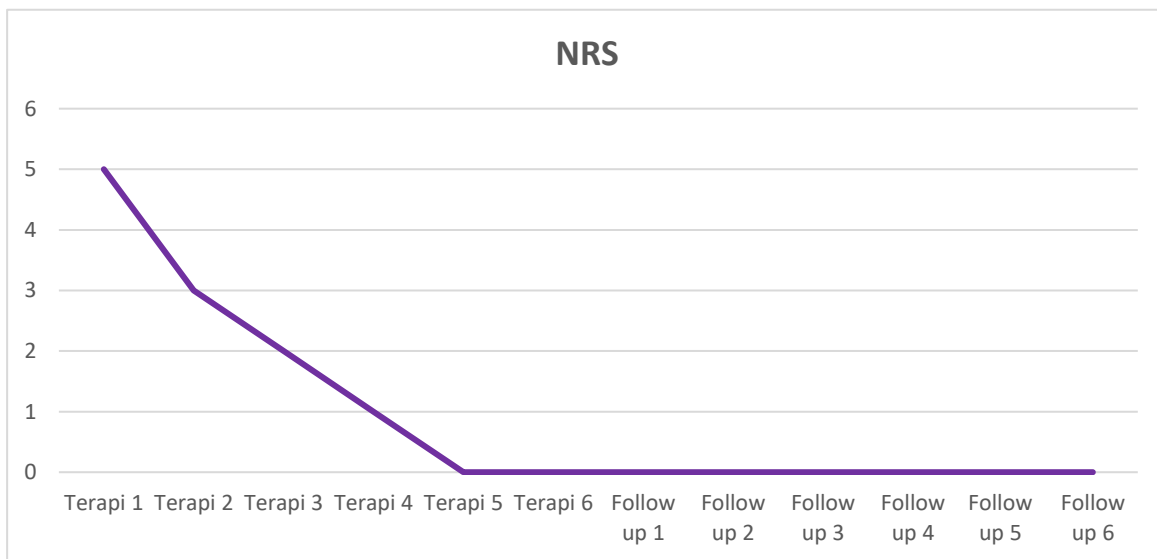
### 3. Acupuncture Therapy

In this case report, acupuncture were inserted perpendicularly at points EXHN3, GV20, PC6, PC7, HT7, LU9, LI10 Baxie Sinistra, LI4 bilaterally and Ear points: Shenmen, master sensory bilaterally. The needles used were Huanqiu 0.20 x 13mm for ear points, and 025 x 0.25mm for body acupoints. The needle is retained for 30 minutes. The patient received acupuncture therapy at the outpatient clinic 6<sup>th</sup> times, twice a week. Therapy is carried out at the outpatient clinic at Cipto Mangunkusumo Hospital, Jakarta, which is carried out by a medical acupuncture specialist on duty. The patient felt a decrease in pain after the first acupuncture therapy where the patient's NRS decreased to 3 and the patient also said that he could sleep well at night because the pain he felt no longer disturbed his sleep. The patient no longer felt pain when the 5<sup>th</sup> therapy was carried out and it lasted for the next year so that the patient was able to carry out activities as usual and indicated that the patient's quality of life also improved after acupuncture.

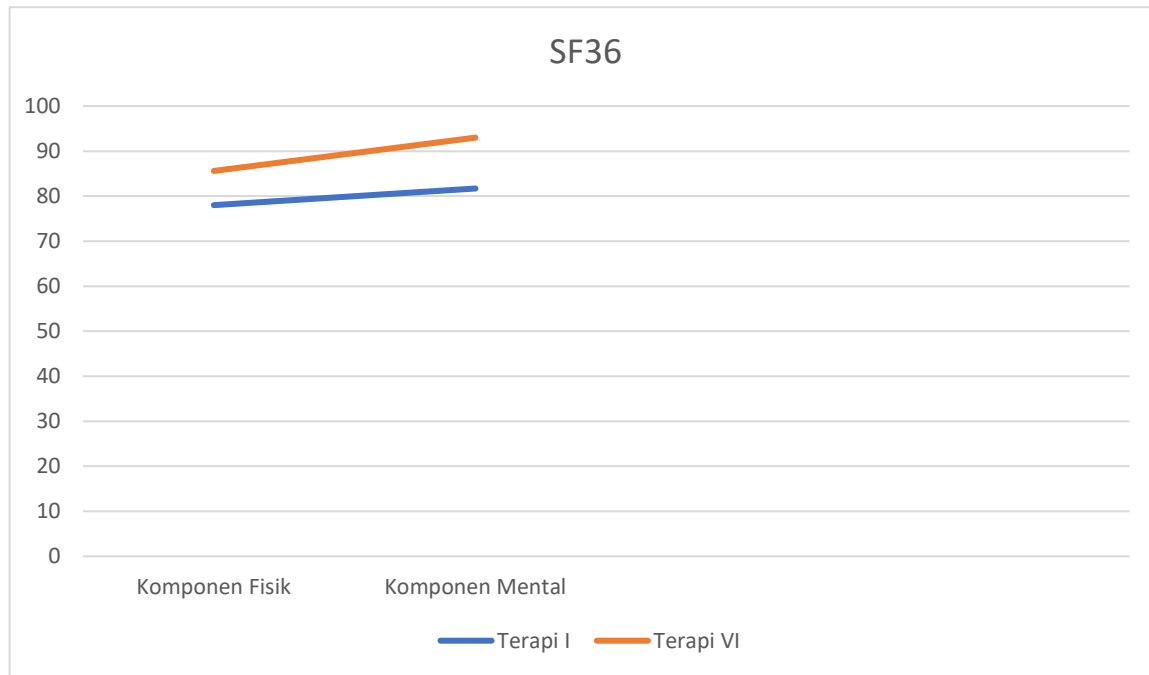
#### 4. Clinical results

The main clinical outcome assessed in this patient were pain reduction as measured by the NRS scale and also the patient's quality of life as assessed by the SF36 score. When she came to the medical acupuncture outpatient clinic, the patient's NRS was 5 and after therapy the pain felt decreased in the 2nd to 6th therapy, namely 3, 2, 1, 0, 0 (Graph 1). The patient's quality of life as measured when they first arrived and after the last therapy also increased as measured by the SF36 score, where there was an increase in the patient's physical and mental component scores (Graph 2)

**Graph 1. Intensity pain (NRS)**



**Graph 2. Quality live ( Component physical and mental with SF36)**



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## *DISCUSSION*

The mechanism of acupuncture for neuropathic pain is mediated by the somatosensory system. Acupuncture modulates changes in receptors and ion channels, inhibits the activation of protein kinases and glia and activates the descending pain control system. Acupuncture, a minimally invasive technique for nerve stimulation, is a valuable therapy for treating neuropathic pain with minimal side effects. The most critical primary afferent nerve types in transmitting acupuncture signals are A $\beta$ , A $\delta$ , and C fibers. Acupuncture's analgesic effects are facilitated by activity in the brain and spinal cord. The central mechanisms underlying the neurohumoral and neurotransmitters effect. At spinal level, spinal opioids, glutamate, norepinephrine and serotonin are the key elements acupuncture-induced analgesia. At brain level, Endogenous opioid peptides, limbic system play essential roles in mediating the analgesia.(He et al., 2022; Ju et al., 2017; Ma et al., 2022)

In this case, acupuncture hinders nerve activity caused by neuropathic pain by reducing associated pain ion channels and activating protein kinases. Furthermore, functional magnetic resonance imaging studies have shown that acupuncture at specific points modulates certain brain areas and can activate pain-reduction control systems.(Ju et al., 2017; Ma et al., 2022)

The goal of acupuncture therapy in this case is to restore function to the affected extremity, specifically the left-hand area, and to enhance the patient's current quality of life, which has been compromised by their persistent pain. The acupuncture points used include PC6, PC7, HT7, LU9, LI4, LI10, and Baxie Sinistra. These are local points around the wrist, hand, and fingers where the complaints are focused. Their mechanism of action aligns with local acupuncture principles: creating microtrauma that stimulates the release of local neuropeptides. This process causes blood vessel dilation, increasing local blood flow and aiding tissue repair. (Rubens, 2021; White, 2009)

The GV20 acupoint stimulation boosts endorphin production, which in turn suppresses cortisol levels result in reducing mental stress and anxiety (Robinson, 2016; WHO, 2009). Stimulating the EX-HN3 acupoint enhances serotonin expression in the raphe magnus nucleus while inhibiting locus coeruleus (LC) activity. This dual action reduces mental stress and anxiety responses, additionally providing a calming effect.(Robinson, 2016; WHO, 2009) Activating the MA-TF1 Shenmen acupoint on the ear can stimulate the vagus nerve nucleus in the brainstem,

promoting the release of endogenous opioid peptides, which provide both pain-relieving and calming effects.(King et al., 2013)

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## CONCLUSION

Acupuncture is a widely used clinical technique worldwide for treating both acute and chronic pain. We reported in this case report that acupuncture has benefit in treating neuropathic pain by decreasing pain score for patient undergoing hand surgery for CTS treatment. No side effects were observed in this patient, and the improvement in their clinical course was also influenced by the duration of the injury. It can be concluded that acupuncture is safe and effective non-pharmacological treatment option for patients with post-operative neuropathic pain. However, more high-quality studies still needed to strengthen the findings of this case report.

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