IJICM International Journal of Islamic and Complementary Medicine

Elisha Rosalyn, *The role of acupuncture in peripheral neuropathy*
e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

THE ROLE OF ACUPUNCTURE IN THE MANAGEMENT OF PERIPHERAL NEUROPATHY: LITERATURE REVIEW

Elisha Rosalyn R[1], Indri Seta Septadina[2*]

[1]Biomedical Programme, Faculty of Medicine, University of Sriwijaya, Palembang, Indonesia
[2]Department of Anatomy, Faculty of Medicine, University of Sriwijaya, Palembang, Indonesia

ABSTRACT

Peripheral neuropathy (PN) is a condition characterized by damage to the peripheral nervous system, resulting in pain, numbness, and weakness in the hands and feet. Despite the availability of various treatments, neurological disorders remain a significant therapeutic challenge. The therapeutic effects of acupuncture are attributed to several mechanisms, including stimulation of nerve fibres, restoration of blood flow, release of neurotransmitters and hormones, modulation of the autonomic nervous system, anti-inflammatory effects, and increased neuroplasticity. These mechanisms collectively contribute to the relief of symptoms associated with peripheral neuropathy. Evidence suggests that acupuncture is beneficial in treating peripheral neuropathy. Studies have shown that acupuncture can improve nerve conduction study parameters in sensory and motor nerves, reduce neuropathic pain, and improve overall nerve function. Standardized acupuncture protocols that combine anatomical correlation with peripheral nerves and traditional approaches to neuropathic pain management appear to be effective. Further studies with larger sample sizes and randomized comparisons to sham acupuncture will help establish acupuncture as a guideline for treating peripheral neuropathy. This review outlines the potential of acupuncture as a complementary therapy in the management of peripheral neuropathy.

Keywords: *acupuncture, peripheral neuropathy, acupuncture points*

ABSTRAK

Neuropati perifer (PN) adalah kondisi yang ditandai dengan kerusakan pada sistem saraf perifer, yang menyebabkan gejala seperti nyeri, mati rasa, dan kelemahan pada tangan dan kaki. Meskipun telah dilakukan berbagai pengobatan, gangguan neurologis tetap menjadi tantangan terapeutik yang signifikan. Efek terapeutik akupunktur dikaitkan dengan beberapa mekanisme, termasuk stimulasi serabut saraf, pemulihan aliran darah, pelepasan neurotransmiter dan hormon, modulasi sistem saraf otonom, efek antiinflamasi, dan peningkatan neuroplastisitas. Mekanisme ini secara kolektif berkontribusi pada pengurangan gejala yang terkait dengan neuropati perifer. Bukti menunjukkan bahwa akupunktur bermanfaat dalam mengobati neuropati perifer. Protokol akupunktur terstandar yang menggabungkan korelasi anatomi dengan saraf perifer dan pendekatan tradisional untuk manajemen nyeri neuropatik 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 neuropati perifer. Tinjauan ini memaparkan potensi akupuntur sebagai terapi komplementer dalam pengelolaan neuropati perifer.

Kata kunci: *akupuntur, neuropati perifer, titik akupuntur*

Correspondence Author : Indri Seta Septadina
Department of Anatomy, Faculty of Medicine, University of Sriwijaya, Palembang, Indonesia
email: indrisetaseptadina@fk.unsri.ac.id

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

1. INTRODUCTION

Peripheral neuropathy is a group of peripheral nerve cells and fiber disorders, most of which are secondary to other pathologies.[1,2] Based on the number of nerves affected, neuropathy can be divided into those affecting one nerve (mononeuropathy) and those affecting many nerves (polyneuropathy). Some causes of peripheral neuropathy include type 2 diabetes mellitus, Guillain-Barre Syndrome, chemotherapy-induced trauma, nutritional deficiencies, inflammatory conditions, hereditary, and so on.[1] The pathophysiology depends on the cause. These cause damage to nerve fibres, which results in reduced or lost nerve function. However, 25-46% of nerve fibre damage is idiopathic.[3] The incidence of peripheral neuropathy reaches 77/100,000 population per year and covers 1-12% of all age groups and 30% of the elderly.[4] Early symptoms of peripheral neuropathy include sensory loss, numbness, pain, or burning with a glove and stocking pattern in the extremities. While advanced symptoms include numbness in the proximal area, weakness, and atrophy.[3] If not treated immediately, peripheral neuropathy can result in pain, ulceration, decreased quality of life, risk of falls, and even amputation.

The primary management for peripheral neuropathy is treating the underlying cause, such as controlling blood sugar in diabetic peripheral neuropathy, administering corticosteroids in peripheral neuropathy caused by autoimmune, and providing proper nutrition in peripheral neuropathy caused by specific nutritional deficiencies.[1,5] However, managing the symptoms experienced, such as tingling and pain, is also no less important because it can interfere with daily activities. Various non-pharmacological therapies have been developed to address the causes and reduce the symptoms of peripheral neuropathy. One of them is complementary therapy acupuncture.[6]

Acupuncture is a complementary therapy using fine iron needles inserted with specific techniques into the body's acupoints.[6,7] This therapy has been applied since ancient times in Traditional Chinese Medicine (TCM). Several studies have shown that acupuncture can improve neurological deficits due to peripheral nerve injury through its role in promoting nerve regeneration and axon growth, reducing the expression of receptor proteins that cause pain in mice suffering from diabetic peripheral neuropathy, improving motor conduction velocity (MCV) in chemotherapy-induced peripheral neuropathy.[8,9,10] This shows the potential of acupuncture as a complementary therapy in the management of peripheral neuropathy with various causes.

2. METHOD

The method used in this literature review involves utilizing electronic databases, namely Google Scholar and PubMed. The keywords used include "acupuncture," "peripheral neuropathy," and "acupuncture points." The inclusion criteria are Indonesian and English articles discussing acupuncture's role in treating peripheral neuropathy. The exclusion criteria include dissertations/theses, letters to the editor, and articles discussing mechanisms other

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

than cancer. The articles reviewed and included in this study consist of 20 studies, comprising 12 types of reviews, 10 observational studies, and 2 reports.

3. RESULTS

3.1 The development of acupuncture as a complementary therapy

Acupuncture has been practiced by Traditional Chinese Medicine (TCM) for thousands of years. In the Neolithic era, acupuncture used bones to remove blood and break up abscesses. In 1963, needles made of ground stone were discovered. Furthermore, along with the development of acupuncture, acupuncture needles made of bronze, iron, silver, and stainless steel were discovered. These needles are inserted into specific points on the body called acupoints, so that these points are activated to 'cure diseases' according to their distribution. If the point is fully activated, the patient or acupuncturist will feel pain, numbness, fullness, or heaviness called De Qi. According to TCM theory, Qi is the internal energy in the human body that is important for health. 7 This Qi flows in the meridian area, which consists of yin and yang , and collaterals related to internal organs and extends 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 to 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 out of 202 countries practiced acupuncture. 7 The practice of acupuncture has undergone many modifications, such as the emergence of pharmacopuncture, electroacupuncture, acupressure, etc. [13,14,15]

3.2 The role of acupuncture in peripheral neuropathy

Peripheral neuropathy 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 Carpal Tunnel Syndrome, diabetes, and chemotherapy-induced.

Acupuncture has been explored 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. 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. Another study showed that acupuncture was as effective as night splinting in managing CTS symptoms.[16]

In diabetic peripheral neuropathy, acupuncture is known to reduce the neurological disorders that arise.[17,18] Furthermore, it is known that in patients with chemotherapy-induced peripheral neuropathy, acupuncture reduces pain and improves quality of life.[19] However,

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

further research is still needed to confirm the efficacy of acupuncture in peripheral neuropathy due to Carpal Tunnel Syndrome, diabetes, and chemotherapy-induced.

3.3 The underlying mechanisms of acupuncture in improving neurological disorders in the above diseases include:

3.3.1 Nerve Fiber Stimulation

Acupuncture stimulates sensory and autonomic nerve fibers, which are rich in nerve fibers, at specific points in the body. This stimulation activates local receptors, which transmit nerve impulses to the spinal cord and brain, leading to modulation of physiological functions. 20

3.3.2 Release of Neurotransmitters and Hormones

Acupuncture needles release endorphins, serotonin, and dopamine, neurotransmitters in pain relief and mood regulation. This release helps balance the autonomic nervous system and influences the release of hormones.[20]

3.3.3 Autonomic Nervous System Modulation

Acupuncture affects the autonomic nervous system, influencing involuntary body functions such as heart rate, blood pressure, and digestion. This modulation can produce various therapeutic effects, including pain relief and antiemetic effects.[20]

3.3.4 Anti-inflammatory Effects

Acupuncture exerts potent anti-inflammatory effects through multiple biological systems, including the immune, digestive, and nervous systems. It activates multiple pathways, such as the cholinergic anti-inflammatory pathway (CAIP), the vagus-adrenal medulla-dopamine pathway, and the sympathetic pathway, which ultimately modulate immune cells through neurotransmitters and hormones.[20]

3.3.5 Neuroplasticity and Central Autonomic Control

Acupuncture may enhance neuroplasticity by stimulating specific points that increase segregation in the D2/D3 area of the S1 somatosensory cortex, thereby increasing GABA neurotransmission. This process may also involve central autonomic control over arteriolar blood vessels, leading to vasodilation and increased neural nutrition and oxygenation. [20]

3.3.6 Local Reactions and Vasodilation

Acupuncture needle insertion can cause local reactions such as vasodilation, which is facilitated by the release of nitric oxide and calcitonin gene-related peptides. This process promotes nerve healing by increasing its nutrition and oxygenation. [20]

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

3.3.7 Acupuncture points for peripheral neuropathy

Acupuncture for peripheral neuropathy involves using specific acupuncture points to help manage symptoms such as pain, numbness, and tingling. Here are some common acupuncture points used for peripheral neuropathy: [21]

ST-36 (Zusanli) : Located on the lower leg, approximately 5 cm below the kneecap and 1.5 cm lateral to the anterior tibial tendon. This point is often used for general health and well-being, as well as for pain management and improving circulation.

GB-34 (Yanglingquan): Located on the lateral aspect of the leg, about 2 cm below the head of the fibula. This point is effective in treating numbness and swelling of the lower body in the knee, making it useful for conditions such as diabetic peripheral neuropathy.

SP-3 (Tai Bai) : Located on the medial aspect of the big toe, in the crease formed when the toes are curled under. This point is thought to help relieve pain caused by chemotherapy-induced neuropathy, as the medial plantar nerve runs through this area.

SP-8 (Diji): Located in the middle of the inner ankle, in the gap between the upper and lower bones inside the knee (about 1/3 above the lower knee). The tibial nerve passes near this point, making it effective in treating symptoms of peripheral neuropathy.

BI-56 (Zhi Yin) : Located on the back of the leg, six finger widths from the center of the back of the knee (at the top of the calf muscle). This point is very effective in treating symptoms of muscle weakness associated with peripheral neuropathy.

LI-11 (Quchi) : Located on the lateral aspect of the forearm, about 2 cun above the wrist crease. This point is often used to treat pain and inflammation in the upper body, and can be beneficial for conditions affecting the hand and arm.

KI-27 (Shulao) : Located on the medial aspect of the leg, about 3 cun below the knee crease. This point is used to treat lower body pain and swelling, which can be beneficial for conditions such as diabetic peripheral neuropathy.

TE-5 (Waiguan): Located on the lateral aspect of the forearm, about 2 cun above the wrist crease. This point is often used to treat pain and inflammation in the upper body and can be beneficial for conditions affecting the hand and arm.

CV-12 (Zhongwan): It is located at the midpoint of the abdomen, about 1.5 cm below the xiphoid process. This point is often used to treat digestive problems and stress-related conditions, indirectly benefiting patients with peripheral neuropathy by improving overall health.

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

EX-B3 (Weiwanxiashu) : Located on the lower back, approximately 1.5 cun lateral to the spinous process of the third lumbar vertebra. This point is used to treat lower back pain and may benefit conditions affecting the lower extremities.

4. CONCLUSION

Acupuncture has emerged as a promising complementary therapy for the management of peripheral neuropathy (PN), a condition characterized by damage to the peripheral nervous system that causes symptoms such as pain, numbness, and weakness in the hands and feet. Existing literature supports the efficacy of acupuncture in improving nerve function and alleviating symptoms associated with PN. A standardized acupuncture protocol has been introduced, combining structural acupuncture principles based on proximity to peripheral nerves and traditional approaches to treating neuropathic pain. This protocol includes specific points such as ST-36, GB-34, SP-3, SP-8, and BI-56, effectively managing PN symptoms. Acupuncture is highly effective in treating diabetic peripheral neuropathy (DPN). Studies have shown that acupuncture improves nerve conduction study parameters in sensory and motor nerves, reduces neuropathic pain, and improves overall nerve function. The therapeutic effects of acupuncture on PN are due to several mechanisms, including stimulation of nerve fibres, restoration of blood flow, the release of neurotransmitters and hormones, modulation of the autonomic nervous system, anti-inflammatory effects, and enhancement of neuroplasticity. 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 treating PN.

REFERENCES

1. Hammi C, Yeung B. Neuropathy. [Updated 2022 Oct 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK542220/
2. Dimitrova A, Murchison C, Oken B. Acupuncture for the Treatment of Peripheral Neuropathy: A Systematic Review and Meta-Analysis. J Altern Complement Med. 2017 Mar;23(3):164-179. doi: 10.1089/acm.2016.0155. Epub 2017 Jan 23. PMID: 28112552; PMCID: PMC5359694
3. Castelli G, Desai KM, Cantone RE. Peripheral Neuropathy: Evaluation and Differential Diagnosis. Am Fam Physician. 2020 Dec 15;102(12):732-739. PMID: 33320513.
4. Lehmann, H.C., Wunderlich, G., Fink, G.R. et al. Diagnosis of peripheral neuropathy. Neurol. Res. Pract. 2, 20 (2020). https://doi.org/10.1186/s42466-020-00064-2

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

5. Maher R Khdour, Treatment of diabetic peripheral neuropathy: a review, Journal of Pharmacy and Pharmacology, Volume 72, Issue 7, July 2020, Pages 863–872, https://doi.org/10.1111/jphp.13241
6. Dimitrova A. Introducing a Standardized Acupuncture Protocol for Peripheral Neuropathy: A Case Series. Med Acupunct. 2017 Dec 1;29(6):352-365. doi: 10.1089/acu.2017.1242. PMID: 29279730; PMCID: PMC5733739.
7. Zhu J, Li J, Yang L, Liu S. Acupuncture, from the ancient to the current. Anat Rec (Hoboken). 2021 Nov;304(11):2365-2371. doi: 10.1002/ar.24625. Epub 2021 Apr 6. PMID: 33825344.
8. Yang Y, Rao C, Yin T, Wang S, Shi H, Yan X, Zhang L, Meng nervous system. Front Cell Neurosci. 2023 Oct 24;17:1253438. doi: 10.3389/fncel.2023.1253438. PMID: 37941605; PMCID: PMC10627933.
9. Cho E, Kim W. Effect of Acupuncture on Diabetic Neuropathy: A Narrative Review. International Journal of Molecular Sciences. 2021; 22(16):8575. https://doi.org/10.3390/ijms22168575
10. Jin Y, Wang Y, Zhang J, Xiao X, Zhang Q. Efficacy and Safety of Acupuncture against Chemotherapy-Induced Peripheral Neuropathy: A Systematic Review and Meta-Analysis. Evid Based Complement Alternat Med. 2020 Nov 9;2020:8875433. doi: 10.1155/2020/8875433. PMID: 33224260; PMCID: PMC7669337.
11. Ifrim Chen F, Antochi AD, Barbilian AG. Acupuncture and the retrospect of its modern research. Rom J Morphol Embryol. 2019;60(2):411-418. PMID: 31658313.
12. Zhuang Y, Xing JJ, Li J, Zeng BY, Liang FR. History of acupuncture research. Int Rev Neurobiol. 2013;111:1-23. doi: 10.1016/B978-0-12-411545-3.00001-8. PMID: 24215915.
13. Lim C, Park S, Sun S, Lee K. Research on Korean Pharmacopuncture in South Korea since 2007. J Pharmacopuncture. 2014 Dec;17(4):15-21. doi: 10.3831/KPI.2014.17.032. PMID: 25780715; PMCID: PMC4332009.
14. Kwon, S., Lee, J. W., & Kim, S. (2018, September 27). An Overview of Electroacupuncture Research Trends in Korea. Korean Journal of Acupuncture. Society for Meridians and Acupoints. https://doi.org/10.14406/acu.2018.018
15. Mehta P, Dhapte V, Kadam S, Dhapte V. Contemporary acupressure therapy: Adroit cure for painless recovery of therapeutic treatments. J Tradit Complement Med. 2016 Jul 22;7(2):251-263. doi: 10.1016/j.jtcme.2016.06.004. PMID: 28417094; PMCID: PMC5388088.
16. Khosrawi S, Moghtaderi A, Haghighat S. Acupuncture in the treatment of carpal tunnel syndrome: A randomized controlled trial study. J Res Med Sci. 2012 Jan;17(1):1-7. PMID: 23248650; PMCID: PMC3523426.
17. Jeon E, Kwon H, Shin I, Kang S, Shon H. Effect of Acupuncture on Diabetic Peripheral Neuropathy: An Uncontrolled Preliminary Study from Korea. *Acupuncture in Medicine* . 2014;32(4):350-352. doi: 10.1136/acupmed-2013-010479

e-ISSN: 2828-4569,Volume 5, No 2, 2024
https://doi.org/10.55116/IJICM.V5I2.95
Page 128-135

18. Hoerder S, Habermann IV, Hahn K, Meyer-Hamme G, Ortiz M, Grabowska W, Roll S, Willich SN, Schroeder S, Brinkhaus B, Dietzel J. Acupuncture in diabetic peripheral neuropathy-neurological outcomes of the randomized acupuncture in diabetic peripheral neuropathy trial. World J Diabetes. 2023 Dec 15;14(12):1813-1823. doi: 10.4239/wjd.v14.i12.1813. PMID: 38222786; PMCID: PMC10784801.
19. Chien TJ, Liu CY, Fang CJ, Kuo CY. The Efficacy of Acupuncture in Chemotherapy-Induced Peripheral Neuropathy: Systematic Review and Meta-Analysis. *Integrative Cancer Therapies* . 2019;18. doi: 10.1177/1534735419886662
20. Lin JG, Kotha P, Chen YH. Understandings of acupuncture application and mechanisms. Am J Transl Res. 2022 Mar 15;14(3):1469-1481. PMID: 35422904; PMCID: PMC8991130.