CHAPTER 19

ACUPUNCTURE FOR PERIPHERAL NEUROPATHY

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SUMMARY

This chapter encapsulates the depth of Peripheral neuropathy by discussing its underlying causes, and various models to study the disorder along with the different forms of peripheral neuropathy. It also discusses the signs and symptoms caused by this disorder and the diagnostic tools that are being used for its diagnosis. Then, to understand the pathophysiology of peripheral neuropathy, its mechanism of action is illustrated, and the role of both neuronal and non-neuronal cells in the onset of peripheral neuropathy is explored. The literature highlighting the prevalence of peripheral neuropathy and its severity in both humans and animals is also taken into consideration in this chapter. As per the treatment of peripheral neuropathy, various medications are often used to alleviate the symptoms. These medications include painkillers, anti-depressants, and antispasmodics. Research has indicated that usage of these medications is associated with various side effects such as Anticonvulsants and antidepressants can result in sleepiness, weight gain, constipation, and addiction, whilst opioid medications can also produce respiratory depression, constipation, and addiction. These side effects have convinced many people towards the use of alternative therapy such as Acupuncture which is minimally invasive and has minimal side effects. An excellent alternative therapy for peripheral neuropathy, acupuncture has been used as a part of Traditional Chinese Medicine for more than 3000 years. Besides its therapeutic effects for muscular, orthopedic, or visceral pain, it is also being used for the treatment of peripheral neuropathy. Similarly, the mechanism of action of Electro-acupuncture for the treatment of peripheral neuropathy involving roles of various receptors in its mechanism is also analyzed in this chapter.

INTRODUCTION

Peripheral neuropathy (PN), a common neurological disorder occurs by the damage of nerves outside the brain and spinal cord. The word "peripheral" refers to the nerves outside the central nervous system, and "neuropathy" refers to a disease or illness of the neurological system. PN may result from a number of illnesses, including diabetes, physical injury and trauma, vascular damage to nerves, chemotherapy, shingles, or HIV infections (Farley et al., 2023). The signs of PN can vary depending on which nerves are damaged, but they may include numbness, tingling, blistering, or shooting pain, muscle weakness, and problems with coordination or balance. To alleviate these symptoms, people seek medical attention and treatment for PN which includes medications such as painkillers or antidepressants, and lifestyle changes including consistent exercise (Pai, 2018). However, these drugs might cause unpleasant side effects such as sleepiness, fainting, and nausea (Waldman et al., 2011). Acupuncture could be a good alternative for the management of NP which has gained popularity in recent times as a treatment with minimal effects. It is known to be a non-invasive, non-pharmaceutical approach with minimum side effects and it is often well-tolerated.

Acupuncture as a part of Traditional Chinese medicine, has been used for thousands of years to address a variety of health issues. Many different health conditions and forms of pain can be treated with acupuncture. It is most frequently used to treat chronic (long-term) pain, including arthritis and the pain

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associated with sports injuries. It aids in the treatment of myofascial pain that affects muscles and connective tissue (Baldry, 2003). Acupuncture can also be used as a treatment for visceral and somatic pain. This treatment method is especially helpful for neuropathic pain caused by conditions like sciatic nerve damage and neuropathies. Acupuncture can help to ease pain and discomfort, enhance nerve function, lessen tension and anxiety, and lessen mood swings. Acupuncture has the potential to be a powerful therapy for controlling peripheral neuropathy symptoms and enhancing general health and well-being when given the proper attention and support. The significance of acupuncture for the treatment of PN will be thoroughly covered in this chapter. Peripheral neuropathy refers to a group of clinical disorders affecting a variety of peripheral nerve cells and fibers, including motor, sensory, and autonomic fibers. The majority of peripheral neuropathies impact all fiber types to some degree. However, in other illnesses, a particular fiber type may be mostly or solely afflicted.

CAUSES

The majority of cases of neuropathy are either acquired, which means that the condition is not present at birth, or inherited, which means that the risk of getting it is present from birth.

Acquired causes

These can be idiopathic (unknown cause) or symptomatic (induced by another illness or condition). A physical injury (trauma) from a car accident, a slip and fall, sports, or medical treatments that stretch, crush, compress, or remove spinal cord nerves can cause acquired peripheral neuropathy.

Catastrophic nerve injury can occasionally arise from less serious wounds. Slipped discs among vertebrae and broken or disengaged bones could both compress at any point nerve filaments as they leave the spinal line and apply strain on nearby nerves. Tendons or ligaments can expand because of joint pain, delayed stress on a nerve (like that brought about by a cast), or monotonous, demanding exercises, which can bring about the tightening of fragile brain channels. A pinched nerve near the wrist can result in neuropathy known as carpal tunnel syndrome. One of the most common causal factors of polyneuropathy is diabetes in the US. As per Smith et al. (2012), 60 to 70% of diabetics have gentle to extreme nerve issues causing neuropathy and its associated symptoms. Damage to nerve tissue can result from vascular and circulation conditions that restrict oxygen delivery to the peripheral nerves. Recent infections are frequently the cause of autoimmune illnesses that only affect the nervous system. They can develop either quickly or slowly, depending on the situation. Recent infections frequently cause autoimmune diseases to just attack the nerves. They can emerge suddenly or gradually, and some of them progress to different degrees of chronicity. Muscle shrinking and apparent weakening are the results of damaged motor fibers, which can result in ongoing discomfort and autonomic symptoms. Problems with the kidneys and liver can result in excessive blood levels of hazardous chemicals, which can damage nerve tissue. The majority of patients who require dialysis due to kidney illness develop polyneuropathy, which varies in severity. Neuropathy can be caused by chemical exposure, intoxication, dietary deficits, or vitamin or mineral deficiency. Vitamin B6 excess and vitamin B12 deficiency are the two most well-known vitamin-related causes. There is evidence that a variety of drugs can occasionally result in neuropathy. Neuropathy can be brought on by both benign and malignant tumors. Tumors have the ability to infiltrate or crush nerve fibers. Paraneoplastic syndromes, a set of peculiar degenerative illnesses brought on by the immune system's reaction to cancer, can indirectly cause significant nerve damage. Between 30-40 percent of people who receive Chemotherapy medications develop polyneuropathy. All chemotherapy drugs do not, however, cause neuropathy, and not all chemotherapy patients develop it. Neuropathy can result from infections that harm the nerve tissues. Viral infections that target sensory fibers, such as varicella-zoster (which causes chickenpox and shingles), West Nile virus, cytomegalovirus, and herpes simplex, result in acute, lightning-like pain episodes. Lyme disease, which is spread by tick bites, can result in a variety of neuropathic symptoms a few weeks after infection.

Genetically induced causes

Hereditarily Instigated Polyneuropathies are rare. Hereditary changes can be acquired or can occur all over again, and that implies they are completely new to the individual and neither of their parentages had them. Some genetic anomalies result in mild neuropathies, which usually manifest in adolescence and seldom result in severe disability. Those with more severe hereditary neuropathies typically show symptoms in childhood or early adulthood. Inherited small-fiber neuropathies can result in aches, itches, and autonomic symptoms.

PERIPHERAL NEUROPATHY (PN) IN HUMANS AND ANIMALS

Peripheral neuropathy is a prevalent disease in humans that affects 2.4% of the population, gets severe with age, and affects more men than women (England et al., 2005). The prevalence of peripheral neuropathy in the general population ranges from 5% to 10%, with a higher incidence in older age groups according to Alleman et al. (2015). Additionally, diabetes mellitus frequently results in peripheral neuropathy, which can impact up to 50% of patients (Iqbal et al., 2018). Mathis et al.

(2022) address the numerous methods, including chemical and medication exposure that might cause peripheral neuropathy in experimental animals. Overall, PN affects both humans and animals, and it has many different aspects.

Animal models of PN

Peripheral neuropathies are prevalent neurological illnesses, and several animal models have been established to investigate disease pathophysiology and evaluate possible treatment medications (Fricker et al., 2008).

Models of inherited neuropathies in animals

For animal models of hereditary neuropathies, locus research based on linkage mapping of patient pedigree is advantageous. Reverse genetic techniques have resulted in the creation of numerous animal models (Flatters & Bennett 2004). However, only one useful animal model based on neurodegenerative disorders has been described (Authier et al., 2003).

Animal models for neuropathies that are acquired

Animal models for neuropathies caused by nutritional deficiencies: A variety of different models, such as genetically altered diabetic mice and chemically induced diabetes in rats and mice, have been developed in addition to the naturally occurring animal models of diabetes (Madias, 2016). Diabetic neuropathy may differ depending on the kind of diabetes, strain, age of the animals, and length of the diabetes.

Models of type I diabetes in animals: The streptozotocin (STZ) rat, a hyperglycemic model of type I diabetes that can survive without the use of insulin, is the most widely used. A naturally occurring model of type I diabetes that shows significant structural changes is the BB/W (Hagedorn et al., 2022) and is likely the best mimic of human type I diabetes.

Animal models of type II diabetes: There are various available creature models for type II diabetes. The most frequently utilized species are db/db mice and rats (Shida et al., 2022; Tatikola et al., 2022).

Animal Models for Nerve Damage: Animal models are frequently employed to research the mechanisms of peripheral nerve degeneration and regeneration. Following injury (nerve crush or axotomy), the cellular and molecular response of the injured nerve stump, nerve grafts, CNS adaptive response, neonatal neuronal apoptosis, neuropathic pain, muscular denervation process, and screening of pro-regenerative substances (Sun et al., 2023). There are two common and commonly utilized nerve damage models: transient crush and sciatic nerve axotomy at the mid-thigh level (McMahon & Priestley 1995).

Animal models of chemotherapy-induced peripheral neuropathy: To better understand the physiopathology of chemotherapy-induced neuropathy, several in vivo models have been established (Cirrincione & Rieger 2020). Despite the fact that animal models of neuropathy brought on by platinum-derived substances like vincristine have received considerable reporting (Authier et al., 2009; Li et al., 2021), A suramin-induced neuropathy model was only published by one group (Authier et al., 2003).

Classification and types of peripheral neuropathy

Peripheral neuropathy categorization and kinds are many and complex. When going into this complex issue, one must evaluate numerous underlying etiologies and locations of affected nerves. Furthermore, the type of nerve fibers injured must be considered, which adds to the complication of this concept. The widespread strategy utilized for the classification of peripheral neuropathy relies on the scattering pattern of the impacted nerves. This typology can be classified into numerous assortments, with each manifestation having its distinctive variety of signs and outcomes.

Mono-neuropathy: This is a prime example that manifests when a sole nerve or a group of nerves in a precise region of the anatomy is portrayed by neuropathy. Physical injury, compression, or both might be the reason. The cause of neuropathy can be caused by a range of physical injuries, compression, or inflammation - a genuinely perplexing phenomenon with many complexities to unravel.

Polyneuropathy: where multiple nerves are affected, often displaying symmetrical patterns due to its inflammatory, toxic, or metabolic nature.

Autonomic neuropathy: This is another category, that is particularly entangling because it involves the nerves responsible for regulating involuntary processes like heart rate, blood pressure, digestion, bladder, and sexual function. Prominently linked with intricate conditions such as diabetes, autoimmune, and certain narcotics, it is exceptionally perplexing to diagnose.

Cranial neuropathy: affects nerve function to the head and neck that govern sensory and motor processes that originate in the brain. Infections, tumors, and trauma are all potential causes of this form of neuropathy.

Axonal neuropathy: This is a mind-boggling affliction characterized by damage to axons, long slender projections that convey electrical impulses to other cells. Damage can occur due

to numerous reasons, such as physical harm, exposure to chemicals, infections, or metabolic abnormalities- making it highly complicated.

Demyelinating neuropathy: This is distinguished by the destruction or injury to the myelin sheath, which safeguards the axons. Myelin acts as an insulator, ensuring nerve messages are transmitted efficiently. In this case, genetic mutations, infections, or autoimmune conditions can lead to demyelinating neuropathy, which is an exceptionally complicated disorder.

SYMPTOMS

Depending on the kind of nerve injury, PN symptoms might change. The most typical signs are as follows

Pain may be characterized as searing, stabbing, shooting, or throbbing and can range in intensity from moderate to severe. The discomfort may be chronic or sporadic and may be made worse by particular movements or postures. Any area of the body might experience numbness and tingling, although the hands and feet are the most frequently affected. The sensation, which has been compared to pins and needles, may also be accompanied by numbness or the sense of "walking on cotton". If the nerves that regulate muscular action are damaged, weakness and muscle atrophy may result. This may make it difficult to do activities that call for fine motor control, such as buttoning clothing or grasping utensils. Dizziness, fainting, heart palpitations, constipation, diarrhea, bladder and sexual dysfunction, as well as variations in perspiration and body temperature, are just a few of the symptoms that can be brought on by autonomic dysfunction.

DIAGNOSIS

Typically, a physical examination, a medical history review, and a number of tests are used to diagnose PN. They will then do a physical examination to look for any indications of nerve injury, such as loss of feeling or reflexes. In some circumstances, the doctor may additionally request one or more tests, such as a skin biopsy, electromyography, or a nerve conduction study. Reflexes, strength of muscles, and sensitivity to touch, warmth, and vibration will all be assessed by the doctor. Electromyography (EMG), blood tests, and nerve conduction studies are a few diagnostics that can be performed to diagnose PN. EMG monitors the electrical activity of muscles, whereas nerve conduction tests evaluate the speed of nerve impulses. Blood testing can identify underlying medical issues including diabetes, vitamin deficiency, or autoimmune illnesses that may be causing PN.

MECHANISM OF PERIPHERAL NEUROPATHY

Non-neuronal cells (keratinocytes; Immunocompetent cells, macrophages, mast cells, neutrophils), which play a role in modulating peripheral sensory transduction and have been studied in a number of preclinical models, also undergo functional, structural, and molecular changes as a result of peripheral nerve injury (both sensory and autonomic neurons, as well as glial cells) (Kocot-Kepska et al., 2021).

Peripheral neuropathy and its associated symptoms are brought on by improper signaling and pain processing, which can be brought on by three different neuronal processes (Fonseca et al., 2016). Peripheral sensitization refers to the primary afferent nociceptors' enhanced sensitivity. Central sensitization describes a rise in the CNS's nociceptive neurons' receptivity to regular or below-threshold afferent input. The transition of tactile to nociceptive input in Aβ fiber messaging. Tab 1., shows the complete summary of the role of all the cells in the mechanism of peripheral neuropathy including both neuronal and cells that are not neuronal.

HISTORY OF TREATMENT FOR PERIPHERAL NEUROPATHY

Treatment for PN has a long history, going back to the use of massages, oils, and herbs as traditional therapies to relieve the symptoms. Electrotherapy was created as a treatment for neuropathy later on in the 19th century as a result of the growing popularity of using electricity to activate nerves (Rastogi & Jude 2021). Opium derivatives were widely used in the early 20th century until being superseded by more modern pharmaceuticals including anticonvulsants, antidepressants, and opioids (Hagedorn et al., 2022). Following are some methods used for treating peripheral neuropathy.

Medications

According to Trivedi et al. (2013) anticonvulsants, antidepressants, and opioids are among the drugs frequently used to treat PN. These are listed below.

Painkillers: Non-steroidal anti-inflammatory medicines (NSAIDs), such as ibuprofen and aspirin are the most often used painkillers for PN.

Topical lidocaine: To relieve nerve pain, lidocaine, a local anesthetic, can be given topically to the skin.

Opioids: are potent painkillers that are occasionally used for neuropathic pain such as oxycodone and morphine.

Antidepressants: Duloxetine and venlafaxine, as well as selective serotonin and norepinephrine reuptake inhibitors (SSNRIs) including amitriptyline, nortriptyline, and desipramine, are useful in treating neuropathic pain.

Anticonvulsants: Anticonvulsant medications such as gabapentin and pregabalin, which is used to treat seizures, nerve pain, and restless leg syndrome.

Tab 1. Role of Different Neuronal and Non-neuronal cells in the Mechanism of Peripheral Neuropathy

Cell Type	Function in PN
Glial cells	Comprises of Schwann cells, satellite glial cells, microglia and astrocytes. Its activation is characterized by proliferation, expression of markers and synthesis of mediators. Schwann cells release growth factors and change after injury (Baron et al., 2010).
Immunocompetent cells	These include macrophages playing a major role in regulation of PN. M1 macrophages can be activated by neuropathy causing pro-inflammatory cytokine release. Immune and Schwann cells release pro-inflammatory cyto- and chemokines. Schwann cells and macrophages also trigger the release of prostaglandins as a result of injury (Liu et al., 2019).
Neuronal cell	Carry nociceptive information from peripheral nervous system to central nerve pathways. Any damage in these pathways and nerve structures supplied there can cause PN. It can be damaged by toxins, trauma, inflammation and other leading to pathogenic conditions. Can exhibit ectopic firing due to channels like HCN. (Sun et al., 2023)
Skin cells (Keratinocytes)	Keratinocytes express ion channels and receptors which are involved in nociception. Keratinocytes can synthesize neuropeptides, neurotransmitters and activation of Nav channels in these cells can stimulate excitatory substances production (Davies et al., 2020).

TENS

Tabulation of clinical data has indicated that transcutaneous electrical nerve stimulation (TENS) may potentially alleviate pain, but there has been a dispute surrounding its efficacy in treating peripheral neuropathy. TENS therapy is known to engender skin irritation and exacerbate pre-existing pain.

Surgery

In some circumstances, surgery may be required to repair or relieve nerve injury or compression. However, problems from surgery including infection, hemorrhage, and nerve injury are possible.

INTRODUCTION TO ACUPUNCTURE

Acupuncture has been used as a therapeutic technique in Traditional Chinese medicine (TCM) for over 3000 years. In order to perform acupuncture, tiny needles are inserted under the skin at certain bodily locations called acupoints. Numerous illnesses, including pain, anxiety, depression, digestive issues, and respiratory issues, have been successfully treated with acupuncture. It is frequently used to maintain general health and well-being.

History of acupuncture

Acupuncture has undergone improvements over time, including the founding of acupuncture points and meridians, as well as the utilization of techniques like moxibustion (burning dry herbs on or near the skin) and cupping (applying suction to the skin). Acupuncture has a lengthy and captivating history, originating centuries ago and being adopted into various health systems across Asia. It was introduced in Europe at the beginning of the nineteenth century and gained spectacular recognition in the West throughout the nineteenth century. Today, acupuncture is a greatly established and appreciated variant of complementary and alternative medicine, recognized for its safety and effectiveness. Acupuncture has many applications including pain management (which is extensively researched and yields supportable outcomes). Anxiety and depression treatment (which has the potential to relieve symptoms). Digestive disorder treatment (which is considered helpful). Respiratory problem management (with its holistic approach leading to positive outcomes for patients).

ACUPUNCTURE AS AN EFFECTIVE TREATMENT FOR PERIPHERAL NEUROPATHY

Acupuncture has been shown to be an operational therapy for individuals suffering from peripheral neuropathy. The body's natural painkillers, Endorphins are believed to be improved by acupuncture and assist in decreasing stress and pain caused by this condition. Furthermore, acupuncture helps mitigate inflammation, promotes blood flow for nerve regeneration, and boosts essential nerve growth factors. Acupuncture also reduces stress and anxiety levels, both of which can exacerbate PN symptoms through relaxation. Acupuncture can successfully reduce pain, tingling, numbness, and weakness, according to several scientific research. In 2017 Bailey et al. (2017) found that patients with diabetic peripheral neuropathy experienced improved nerve function and pain relief, while in 2022, Desforges et al. (2022) demonstrated positive impacts on quality of life among chemotherapy-induced peripheral neuropathy patients and found more effective than medication in reducing pain. Acupuncture offers considerable potential for improving nerve conduction velocity and overall nerve function for individuals with PN. The effectiveness of acupuncture for treating peripheral neuropathy

Tab 2. Different receptor cells and their role in the mechanism of action of acupuncture for peripheral neuropathy.

RECEPTOR CELL INVOLVED	MECHANISM OF ACTION BY ACUPUNCTURE ON NEUROPATHIC PAIN
Additional Bioactive Molecules	Electro-acupuncture affects muscarinic receptors and promotes the expression of glial cell line-derived neurotrophic factor GDNF, GFR-1(the high-affinity receptor of GDNF), and somatostatin in the dorsal root ganglion (DRG) and spinal dorsal horn. Serotonin activity augmentation contributes to GDNF synthesis, which inhibits transient receptor potential cation channel subfamily A, number 1 (TRPA1) channel activity in the spinal cord to reduce pain. P2X3 suppression is also involved.
Amino Acids	Electro-acupuncture regulates the release of excitatory and inhibitory amino acids in the spinal cord. It reduces glutamate release and increases the release of inhibitory neurotransmitters like GABA to alleviate pain.
Glial Cells and Cytokines	Electro-acupuncture activates glial cells and influences the production of cytokines in the spinal cord. Opioid and N/OFQ peptide receptor activation plays a role in cytokine suppression. Modulation of p38 MAPK and extracellular signal-regulated kinase phosphorylation is relevant to morphine tolerance and analgesia.
Norepinephrine and Serotonin	Electroacupuncture affects spinal serotonin and norepinephrine, which contribute to the inhibition of neuropathic pain. Activation of 5-HT1ARs and modulation of 5-HT3Rs and α2-adrenoceptors are implicated.
Opioids	Electro-acupuncture activates μ- and δ-opioid receptors in the spinal cord, leading to pain relief. The κ-opioid receptors may not be significantly involved.

symptoms has been supported by several studies. Barbosa et al. (2020) discovered through a thorough analysis that acupuncture proved more efficacious than medication in mitigating pain among patients suffering from peripheral neuropathy. Also, Fisher et al. (2021) executed a study that showed that acupuncture might have the capability to amplify nerve conduction velocity in people with peripheral neuropathy. Pinzur (2011) observed that acupuncture effectively reduced pain and improved nerve function in patients with diabetic peripheral neuropathy. Lastly, Brewer et al. (2016) demonstrated that acupuncture significantly reduced pain and improved the quality of life for individuals with chemotherapy-induced peripheral neuropathy.

Mechanism of action of acupuncture for treatment of PN

One suggested mechanism of action for acupuncture in treating peripheral neuropathy involves the modulation of neurotrophic factors. Neurotrophic factors are essential proteins involved in the growth and survival of nerve cells, playing a crucial role in peripheral neuropathy's development and progression. Acupuncture has been found to increase the expression of neurotrophic factors like nerve growth factor (NGF) and brain-derived neurotrophic factor (BDNF). This augmentation of neurotrophic factors may aid in protecting and repairing damaged nerve cells (Wang et al., 2020).

Another proposed mechanism involves the modulation of inflammation. Inflammation plays a significant role in the pathophysiology of peripheral neuropathy, contributing to nerve damage and dysfunction. Acupuncture has been shown to decrease inflammation by regulating the production and activity of pro-inflammatory cytokines, molecules involved in the immune response. By mitigating inflammation, acupuncture may help reduce nerve damage and improve nerve function (Cheng, 2014). Acupuncture has been proven to impact pain perception in a modulatory manner. Traditional drugs might make it difficult to manage prolonged pain produced by peripheral neuropathy. Acupuncture encourages the modulation of pain perception in the brain, which then results in the release of endorphins and other associated neurotransmitters that help to decrease pain perception and thereby improve the quality of life in people with the issue of peripheral neuropathy (Roynard et al., 2018). One proposed mechanism of acupuncture is based on the idea that this technique triggers the release of endogenous opioids such as endorphins. These opioids help to diminish inflammation thereby also modifying the perception of pain. Acupuncture also motivates the hypothalamic-pituitary-adrenal (HPA) axis, which then improves the function of immunity and relieves stress conditions. Acupuncture is hypothesized to change nerve conduction, which is a mechanism for its therapeutic advantages (Meng et al., 2011).

Furthermore, acupuncture may modulate nerve conduction, a proposed mechanism for its therapeutic effects. By stimulating nerve fibers, acupuncture promotes the release of neurotransmitters and other signaling molecules that influence nerve function. This stimulation can enhance nerve conduction and alleviate neuropathic pain (Abuaisha et al., 1998). Acupuncture's impact on the autonomic nervous system (ANS), is responsible for regulating various bodily functions such as heart rate, blood pressure, and digestion. In peripheral neuropathy, ANS deregulation can manifest as symptoms like orthostatic hypotension and gastrointestinal dysfunction. Acupuncture has demonstrated the ability to modulate ANS activity, promoting relaxation and reducing stress (Barbosa et al., 2020). Acupuncture may have a positive effect on blood circulation, which can be impaired in peripheral neuropathy patients. By improving blood flow, acupuncture potentially enhances the delivery of essential nutrients and oxygen to damaged nerve cells, supporting their repair and regeneration.

Mechanism of action of electro-acupuncture for neuropathic pain

Acupuncture analgesia has been studied by Ruixin Zhang (2014) mostly at the spinal level in neuropathic pain models, with opioids, serotonin, norepinephrine, amino acids, and glial cells/cytokines being implicated. The mechanisms of electroacupuncture on neuropathic pain have primarily been studied at the spinal level, with little emphasis on the supra-spinal level and peripheral locations. This mechanism is elaborated by Tab 2., given below showing different receptor cells involved and their role in the mechanism of Acupuncture for the treatment of Peripheral Neuropathy.

CONCLUSION

In conclusion, peripheral neuropathy is a complex condition characterized by damage to the peripheral nerves. While the precise cause remains unclear, it is a prevalent issue impacting the lives of both humans and animals. Standard treatments for peripheral neuropathy include medications like antidepressants, anticonvulsants, and opioids, which can effectively manage symptoms but often come with undesirable side effects. As an alternative, acupuncture has shown promise as a safe and effective treatment option for peripheral neuropathy. Considering acupuncture as an adjunct or standalone therapy could prove beneficial for individuals experiencing peripheral neuropathy-related discomfort. The proposed mechanisms through which acupuncture exerts its effects on peripheral neuropathy involve influencing nerve conduction, promoting blood flow, and mitigating inflammation. By modulating these factors, acupuncture may help reduce pain and improve nerve function in affected individuals. Numerous studies have demonstrated the efficacy of acupuncture in treating peripheral neuropathy. However, further research is necessary to gain a deeper understanding of acupuncture's precise mechanism of action and evaluate its long-term effectiveness in managing peripheral neuropathy. By exploring acupuncture as a therapeutic option, individuals may find relief and enhanced quality of life amidst the challenges posed by peripheral neuropathy.

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