

# The use of acupuncture for treating painful diabetic neuropathy: a case study

*Sajida Ugradar*

**Citation:** Ugradar S (2020) The use of acupuncture for treating painful diabetic neuropathy: a case study. *The Diabetic Foot Journal* 23(4): 48–51

## Article points

1. Acupuncture is an option for the management of painful diabetic neuropathy.
2. A 74-year-old woman with diabetic neuropathy decided to trial acupuncture as an alternative to her multi-drug regimen.
3. After 6 weeks of acupuncture, she had no neuropathic pain.

## Key words

- Acupuncture
- Complementary and alternative medicine
- Diabetic neuropathy
- Pain

## Author

Sajida Ugradar is Diabetes Advanced Podiatrist, Oxleas NHS Foundation Trust, London, UK

**A patient presented with neuropathy in both feet, complaining of painful diabetic neuropathy. The pain was constant, but worse at night, causing sleep disturbances and affecting her quality of life. After unsuccessful standard treatment, both feet were successfully treated using acupuncture. The article includes a discussion of the literature that supports the use of acupuncture to reduce painful diabetic neuropathy symptoms. Acupuncture can be an effective treatment in selected individuals, has fewer side-effects and may be more cost-effective than pharmacological treatment. However, larger studies are required to demonstrate the efficacy of acupuncture.**

**P**eripheral diabetic neuropathy (PDN) is the most common complication of diabetes, with significant consequences on a patient's daily activity, quality of life, mood, mobility, ability to work, interpersonal relationships, overall self-worth, independence and morbidity (Corbett, 2005; Basic-Kes et al, 2011; Arora and Niraj, 2013). About 30% of patients with type 2 diabetes will develop PDN. This increases the risk for foot ulcers, infection and amputation, and is a significant source of disability and medical costs (Bailey et al, 2017).

## Case study

A 74-year-old woman presented with numbness, stiffness and constant pain in her feet bilaterally but worse in the right. The pain worsened at night, disturbing her sleep and reducing her quality of life. She had a medical history of poorly controlled type 2 diabetes for 14 years and hyperlipidaemia. She was on a regimen of simvastatin, amlodipine, metformin and insulin, and her most recent HbA<sub>1c</sub> was 65 mmol.

She described tiredness during the day, feeling sleepy all day, with the desire to 'catch up on lost sleep', low activity levels and low mood. Her GP had prescribed amitriptyline to take at night as required, with little relief.

A vascular examination using a hand-held Doppler and palpation of pulses did not show any

signs of peripheral arterial disease. A neurological examination using a monofilament and a neuropathic pain diagnostic questionnaire (DN4; Bouhassira et al, 2005) revealed a loss of protective sensation, and neuropathic pain was diagnosed.

Treatment options for painful diabetic neuropathy (PDN) were discussed. The patient was keen to try a few sessions of acupuncture therapy and review its efficacy. She felt she was consuming multiple drugs with several different side-effects and wanted to trial an alternative option.

The patient completed a 6-week course of acupuncture. Each weekly session involved the insertion of six needles into each foot for 30 minutes. The six acupuncture points used were K1, KD5, KD7, medial and lateral approach to anterior ankle along joint line (ST41), between the first and second metatarsal (LV3), all needles stimulated to reach de qi. De qi is the descriptive nature of the sensations felt by the patient and often described as a dull ache or tingling feeling (Joyce et al, 2016).

Additionally, advice was provided concerning the poor management of her blood glucose.

Based on the patient's reported progress using a visual analogue scale (VAS) during the first 2 weeks of care, we reviewed her case and decided to proceed with an additional four treatments in each of the subsequent 4 weeks. During the last week of acupuncture therapy, she experienced no

neuropathic pain and reported feeling generally more energetic, able to walk more, improvement in sensation and range of motion in the ankle joint than before commencing acupuncture. Following a total of 6 weeks of care (six treatments) and an initial VAS score of 10 reduced to 0, she was discharged from the service.

## Discussion

Diabetes is a chronic disease that requires continual medical care, along with patient self-management and education in order to reduce the risk of long-term complications (Basic-Kes et al, 2011). The National Institute for Health and Care Excellence (NICE) has defined peripheral neuropathic pain as 'pain caused by a lesion or disease of the peripheral somatosensory nervous system' (NICE, 2019). There is often uncertainty regarding the nature and exact location of a lesion or health condition associated with neuropathic pain. Neuropathic pain can be intermittent or constant, and spontaneous or provoked.

Diabetic polyneuropathy is primarily symmetric sensory neuropathy, initially affecting distal lower extremities. Metabolic and microvascular factors are responsible for nerve damage, causing loss of nerve function, numbness, painful sensory symptoms, and muscle weakness (Basic-Kes et al, 2011). Symptoms are often described as odd sensations, rather than pain, and can be sporadic. PDN typically causes burning pain, paraesthesia and numbness in a stocking-glove pattern that advances proximally (Snyder et al, 2016). The nerve damage is progressive as pain diminishes (Corbett, 2005). Evidence shows that 10–18% of patients have indications of nerve damage at the time of their diabetes diagnosis (Basic-Kes et al, 2011). Early PDN recognition and assessment are critical to optimise management. The diagnosis is primarily clinical: symptom description, history and exclusion of other aetiologies of neuropathy (Majid, 2010).

Treatment of PDN remains challenging; however, recommendations exist and require a trial and error approach (Rosenberg and Watson, 2015). Neuropathic pain is often difficult to manage because it is resistant to many pharmaceutical agents (Joyce et al, 2016). Treatment should improve blood circulation or ameliorate the oxidative stress that

damages nerves and drives development of PDN (Bailey et al, 2017).

There is considerable variation in how treatment is initiated, the dosages used and the order in which pharmacological agents are introduced, whether therapeutic doses are achieved and whether there is correct sequencing of therapeutic classes.

A further issue is that a number of commonly used treatments are unlicensed for neuropathic pain, which may limit their use. These factors may lead to inadequate pain control with considerable morbidity (NICE, 2019). Good glycaemic control and multifactorial risk intervention is the first priority for both prevention and management of PDN. Nevertheless, even with good glycaemic control, up to 20% of patients will continue to develop PDN (Corbett, 2005). Patients are often dissatisfied with treatment (Jeon et al, 2014).

Clinicians should consider the patient's goals, functional status and potential adverse effects of medication when choosing a treatment for PDN (Snyder et al, 2016). PDN can be resistant to medication. Effective medication can also be associated with adverse effects, which the patient may find difficult to tolerate. It is very important to increase drug dosage to the highest effective dose (within the drug's therapeutic range) for each patient, while balancing the side-effects caused by the drug in the individual. PDN patients often require multiple pharmacological preparations to provide adequate pain relief (Tavakoli et al, 2008; Arora and Niraj, 2013; Rosenberg and Watson, 2015).

Drug interactions have to be carefully considered, given the frequent polypharmacy in people with diabetes (Ziegler, 2011). Nephropathy and neuropathy are complications of diabetes that are often concurrent; therefore kidney function needs to be factored in to the management plan. Drug doses may have to be significantly reduced, depending on chronic kidney disease and estimated glomerular filtration rate; and a lower-dose regimen can often reduce the effectiveness of pain management and may cause side-effects.

Ziegler (2008) proposed a treatment rationale for PDN based on four cornerstones:

1. Multifactorial intervention aimed at (near)-normoglycaemia and reduction in cardiovascular risk factors.

2. Treatment based on pathogenetic mechanisms.
3. Symptomatic treatment.
4. Avoidance of risk factors and complications.

While tight glycaemic control is the main pillar of prevention, drugs are the only proven treatment. Generally antidepressants and anticonvulsants are recommended (NICE, 2019). Duloxetine, gabapentin and pregabalin are popular choices; however, these are likely to be no better and are considerably more expensive than older ones (Rutkove, 2009; Majid, 2010). They require titration, and common side-effects include mood alterations, confusion, drowsiness and sleep disturbance. Coincidentally, these are the most common complaints from people with PDN. Patients then believe the drugs are unnecessary and do not improve their quality of life.

Acupuncture has shown benefit over control in the treatment of diabetic neuropathy and is well tolerated with no appreciable side-effects (Garrow et al, 2014; Dimitrova, 2017). Kasuya (2012) and Ahn et al (2007) found significantly positive changes in subjective symptoms (VAS) and reduction in pain using the McGill Short Form Pain Score.

Both Chao et al (2019) and Nash et al (2019) showed clinically relevant reduction in pain from PDN and quality of life improvements, with no differences based on frequency of acupuncture treatment. Dimitrova et al (2017) found acupuncture therapy appeared to improve nerve conduction study parameters in both sensory and motor nerves.

Acupuncture improves symptoms of aching pain, burning pain, prickling sensation, numbness, temperature perception, allodynia and pressure pain threshold, especially in pain conditions associated with tenderness (Baeumler et al, 2014; Nash et al, 2019). It is a safe and effective therapy for the long-term management of painful diabetic neuropathy, with studies showing up to 6 months. Although its mechanism of action remains speculative, it may reduce the need for pharmaceutical intervention (Abuaisha et al, 1998). Due to methodological limitations, there is limited understanding on the long-term effects of acupuncture. The effectiveness of the treatment is subjective and linked directly to the patient's own outcome beliefs. Therefore, authors have recommended acupuncture may be used as a safe, adjunctive therapy in diabetes-related

neuropathic pain, in conjunction with current evidence-based medicines and therapies (Joyce et al, 2016).

Nash et al (2019) found the application of acupuncture varies greatly and available studies have varying methodologies and different outcome measures. The lack of research has attributed to the lack of uptake of acupuncture therapy as well as inconsistent methods of acupuncture between Western and Eastern acupuncture therapy (Joyce et al, 2016). Larger randomised trials are needed to confirm the clinical and cost-effectiveness of acupuncture in the treatment of PDN (Dimitrova et al, 2017; Garrow et al, 2014; Jeon et al, 2014).

Approximately one in every three patients who suffer from non-cancer-related chronic pain use complementary and alternative medicine (CAM), particularly where medical and surgical interventions fall short of patient expectations (Joyce et al, 2016). Complementary and alternative therapies and medicines consist of a wide range of modalities, including acupuncture, herbs, massage and aromatherapy.

CAM is widely used by the general population. Smith (2005) found that more than 50% of the population had used one form of CAM during the previous 12 months. These therapies and medicines are provided in the private sector; this may be due to the lack of evidence-based research required to implement acupuncture therapy as part of a management plan in an NHS setting.

Individuals use these modalities to treat a wide range of acute and chronic health problems, particularly diabetes, as well as to maintain health and wellbeing. However, Smith (2005) found patients do not disclose their use of complementary therapies to health professionals.

Given the high prevalence of use of CAM in the community, it is important that all members of the healthcare team become aware of the different methods of complementary medicines and increase their understanding of the possible benefits and limitations. Smith (2005) concluded with the suggestion that complementary medicine and allied health practitioners should be working together towards a common goal of improving patient care and outcomes. More research and education into CAM for both professionals and patients is required for its safe use.

## Conclusion

Many patients with diabetes suffer with PDN but have limited treatment options. Acupuncture can be effective for the treatment of PDN in selected individuals, has fewer side-effects and may be more cost-effective than pharmacological treatment. However, larger studies are required to demonstrate the efficacy of acupuncture. ■

- Abuaisha BB, Costanzi JB, Boulton AJ (1998) Acupuncture for the treatment of chronic painful peripheral diabetic neuropathy: a long-term study. *Diabetes Res Clin Pract* 39(2): 115–21
- Ahn AC, Bennani T, Freeman RR et al (2007) Two styles of acupuncture for treating painful diabetic neuropathy – a pilot randomised control trial. *Acupunct Med* 25(1-2): 11–7
- Arora N, Niraj G (2013) Management of painful peripheral diabetic neuropathy. *Br J Med Practitioners* 6(1): a606
- Baeumlner PI, Fleckenstein J, Takayama S et al (2014) Effects of acupuncture on sensory perception: A systematic review and meta-analysis. *PLoS One* 9(12): e113731
- Bailey A, Wingard D, Allison M et al (2017) Acupuncture treatment of diabetic peripheral neuropathy in an American Indian community. *J Acupunct Meridian Stud* 10(2): 90–5
- Basic-Kes V, Zavoreo I, Rotim K et al (2011) Recommendations for diabetic polyneuropathy treatment. *Acta Clin Croat* 50(2): 289–302
- Bouhassira D, Attal N, Alchaar H et al (2005) Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4). *Pain* 114(1–2): 29–36
- Chao M, Schillinger D, Nguyen U et al (2019) A randomized clinical trial of group acupuncture for painful diabetic neuropathy among diverse safety net patients. *Pain Med* 20(11): 2292–302
- Corbett CF (2005) Practical management of patients with painful diabetic neuropathy. *Diabetes Educ* 31(4): 523–30
- Dimitrova A, Murchison C, Oken B (2017) Acupuncture for the treatment of peripheral neuropathy: a systematic review and meta-analysis. *J Altern Complement Med* 23(3): 164–79
- Garrow A, Xing M, Vere J et al (2014) Role of acupuncture in the management of diabetic painful neuropathy (DPN): a pilot RCT. *Acupunct Med* 32(3): 242–9
- Jeon E, Kwon H, Shin I et al (2014) Effect of acupuncture on diabetic peripheral neuropathy: an uncontrolled preliminary study from Korea. *Acupunct Med* 32(4): 350–2
- Joyce C, Watterson D, McIntosh C (2016) Is acupuncture an alternative or adjunctive treatment option for diabetes-related neuropathic pain? A feasibility study. *The Diabetic Foot Journal* 19(2): 75–83
- Kasuya D (2012) Acupuncture for painful diabetic neuropathy. [Article in Japanese] *Clin Neurol* 52(11): 1290–3
- Majid N (2010) Painful diabetic neuropathy. *J Pain Manage* 3(2): 105–23
- Meyer-Hamme G, Friedemann T, Greten HJ et al (2018) ACUDIN - ACUpuncture and laser acupuncture for treatment of Diabetic peripheral Neuropathy: a randomized, placebo controlled, partially double-blinded trial. *BMC Neurol* 18(1): 40
- Nash J, Armour M, Penkala S (2019) Acupuncture for the treatment of lower limb diabetic peripheral neuropathy: a systematic review. *Acupunct Med* 37(1): 3–15
- National Institute for Health and Care Excellence (2019). *Neuropathic pain in adults: pharmacological management in non-specialist settings. Clinical guideline CG173*. London: NICE. Available at: <https://www.nice.org.uk/guidance/cg173> (accessed 06.10.2020)
- Rosenberg CJ, Watson JC (2015) Treatment of painful diabetic peripheral neuropathy. *Prosthet Orthot Int* 39(1): 17–28
- Rutkove S (2009) A 52-year-old woman with disabling peripheral neuropathy: review of diabetic polyneuropathy. *JAMA* 302(13): 1451–8
- Smith C (2005) Can acupuncture contribute to the multidisciplinary care of the patient with diabetic peripheral neuropathy? An overview of the current literature. *Br J Podiatr* 8(3): 83–6
- Snyder M, Gibbs L, Lindsay T (2016) Treating painful diabetic peripheral neuropathy: an update. *Am Fam Physician* 94(3): 227–34
- Tavakoli M, Mojaddidi M, Fadavi H, Malik RA (2008) Pathophysiology and treatment of painful diabetic neuropathy. *Curr Pain Headache Rep* 12(3): 192–7
- Ziegler D (2008) Painful diabetic neuropathy: treatment and future aspects. *Diabetes Metab Res Rev* 24(Suppl 1): S52–7
- Ziegler D (2011) Current concepts in the management of diabetic polyneuropathy. *Curr Diabetes Rev* 7(3): 208–20