International Journal of Research in Medical Sciences
Skaria R et al. Int J Res Med Sci. 2026 Oct;14(10):4832-4837
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20263563

Case Report

Ayurvedic management of diabetic peripheral neuropathy assessed by vibrotherm (the neuropathy analyser): a case report

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Received: 30 July 2026
Accepted: 17 September 2026

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ABSTRACT

Diabetic peripheral neuropathy (DPN) is the most prevalent type of diabetic neuropathy and is a major complication associated with diabetes mellitus. Chronic hyperglycaemia, plays a major role in the development of diabetic neuropathy leads to cellular injury through multiple mechanisms. This is a case of 58-years-old female who consulted in Kayachikitsa OPD of Vaidyaratnam Ayurveda College Hospital on 12 August 25 presented with progressively worsening Numbness, Pain, Tingling and burning sensation in both feet for 2 years. She has been diagnosed with a case of DPN (Prameha Upadrava) based on clinical findings, neurological examinations and presence of impairment of Vibration perception threshold and hot perception threshold. Treated with Sundibaladi kashayam 48 ml twice daily along with 6 gms of Nisha amalaki choornam, Nishakatakadi kashayam as toya kashayam for frequent use, Pramehaushadi tablet 1 tablet twice daily after food and Pada abhyanga with Sahacharadi tailam externally for a period of 90 days. The patient was assessed with HbA1c level, vibration and thermal perception threshold test by neuropathy analyser Vibrotherm, toronto clinical neuropathy score (TCNS) and monofilament test on 0th day and 91th day of treatment. Significant improvements were observed in parameters like Vibration perception threshold (VPT), Cold perception threshold (CPT) and hot perception threshold (HPT) and TCNS score following the treatment. It suggests that internal administration of ayurvedic medicaments based on principles of Prameha chikitsa and Prameha upadrava chikitsa is effective in relieving the symptoms of DPN.

Keywords: Diabetes mellitus, Diabetic peripheral neuropathy, Vibrotherm, Prameha upadrava

INTRODUCTION

Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycaemia.[1] The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems and causes various complications. Diabetic peripheral neuropathy (DPN) is the most common complication of diabetes and affects nearly 50% of adults with diabetes and is associated with substantial morbidity including pain, foot ulcers, and lower limb amputation.[2] Current research suggests that diabetic peripheral neuropathy is common among people with diabetes. Studies have found that its prevalence can range from about 16% to as high as 66% across studies.[3] The development and progression of diabetic neuropathy are influenced by many factors. These include the duration of diabetes, the level of glycaemic control, and increasing age. And also the factors such as obesity, dyslipidaemia, insulin resistance, and chronic low-grade inflammation, lifestyle factors also play important roles.[4] Research shows that higher levels of glycated haemoglobin (HbA1c), are linked to a more risk of developing neuropathy.[5] DPN affects the sensory neurons of the peripheral nervous system, particularly those supplying the skin. Later gradual degeneration and loss of peripheral nerve endings occur. The classical feature of DPN is the “stocking-and-glove” distribution of sensory

impairment, in which symptoms first appear in the feet and later involves the hand. This pattern reflects the involvement of longer sensory axons, which are typically affected earlier in the disease process.[6] Impairment of sensory functions are the main clinical manifestation of the diabetic peripheral neuropathy. DNP patients commonly experience positive sensory symptoms (Hyperalgesia and Allodynia) such as burning sensation, tingling sensation or shooting type of pain. These symptoms arise due to damage to small nerve fibres, leading to abnormal excitability of the affected nerves.[7] Motor symptoms are comparatively less than sensory symptoms, but can lead to significant disability. Motor nerve involvement in diabetic peripheral neuropathy lead to weakness of the distal lower limb muscles, especially the muscles which controlling ankle and foot movements.[8] Another important clinical feature of DPN is impairment of deep tendon reflexes, particularly the ankle jerk reflex. This is one earliest clinical sign of DPN and also the sign of large-fibre neuropathy. Gait abnormalities may develop like "steppage gait" characterised by exaggerated lifting of the legs while walking in order to compensate for foot drop and impaired proprioception. Prolonged abnormal gait mechanics can place undue stress leading to complications like foot deformities and joint damage.[9]

Prameha, a disease which is described in Ayurvedic classics, closely correlated with DM. The clinical manifestations resembling DPN are mentioned in the context of both Upadrava (complications) and Purvarupa (premonitory symptoms) of Prameha Roga.[10] Among the complications, symptoms such as daha (burning sensation), dourbalya (generalized weakness), sula (pricking or piercing pain), and suptata (numbness) are frequently described, many of which resemble the clinical features of DNP. The symptoms of diabetic peripheral neuropathy, tingling sensation can be because of vata, burning sensation can be because of pitta and numbness can be because of both vata and kapha. The treatment plan for DPN should consist of vata hara and pramehaghna drugs and formulations which are also ojo vardhaka, bala vardhaka. dhatu vardhaka, jeevaniya and rasayana gunas along with tridosha hara property.[11]

CASE REPORT

A 58 old female patient with the following presenting complaints was consulted in Kayachikitsa OPD of Vaidyaratnam Ayurveda College Ollur on 12 October 2025 and underwent Ayurvedic management for a period of 90 days.

Primary concerns and symptoms of the patient

The primary concerns included progressively worsening numbness of lower limbs, pain in bilateral lower limbs, tingling and burning sensation in both feet for duration of 2 years. Additionally, the patient was associated with reduced appetite, constipation and generalised weakness.

Case history

A 58-year-old female patient, a house wife having a history of DM for 8 years and under allopathic medication, having no other comorbidities developed with progressively worsening numbness of both lower limbs, pain in bilateral lower limbs, tingling and burning sensation in both feet along with reduced appetite, constipation and generalised weakness for 2 years. Regarding medical history, she is under tablet Metformin 500 mg twice daily for the past 8 years and 6 months back she consulted an allopathic doctor and prescribed with some medicines but was not noticed much relief (medicines details were not available). So, she consulted in Kayachikitsa OPD of Vaidyaratnam Ayuveda College on 12 October 2025. She had a significant family history of type 2 diabetes mellitus, with her mother having the type 2 mellitus. On psychosocial assessment, she was found to be cooperative and well-oriented. She was a homemaker by occupation. Based on the Modified Kuppuswamy Socioeconomic Status Scale (2021), she belonged to the lower middle socioeconomic class.

Patient followed a mixed diet with a history of delayed intake for breakfast and lunch. Bowel was irregular, once in two days, unsatisfied and constipated. Appetite was reduced with early satiety; abdominal bloating was present. Increased frequency of micturition was noted. Sleep was interrupted for last 6 months and day sleep was present. History of addition and allergy were absent.

General examination

The patient was overweight, with a height of 155.5 cm and a weight of 82.5 kg, BMI of 34.1 kg/m^2. Appearance was neat and tidy. As for vitals, the pulse rate was 76 beats/min, the respiratory rate was 17 breaths/min, and the blood pressure was 100/70 mm Hg. The patient was cooperative, oriented to time, place, and person, and intelligent.

Systemic examination

Sensory examination

Pin prick test was normal. In Vibration perception threshold (VPT) examination, tuning fork kept over medial malleolus-senses only mild vibration. Motor examination deep tendon reflex in Achilles tendon reflex was diminished. Regarding balance-Romberg test was negative. Muscle strength-manual muscle testing (MMT) in knee extensor muscles, ankle dorsiflexion muscles and ankle plantarflexion muscles was normal with grade 5.

Ayurvedic diagnostic assessment

Nidana-Aahara-guru madhura amla lavana rasa ahara,snigdha aahara Vihara-avyayama, alasya Divaswapna Manasika-krodha, stress Sahaja –hereditary causes Poorvarupa-karapada daha padayor suptata

Roopa-Supthi Ruja harsha and daha of PadaUpasaya - laghu tikta Kashaya rasa aahara,vyayama Anupasaya- Madhura amla lavana rasa aahara, snighha guru ahara, divaswapna. Samprapthi.

Nidana sevana leads to Tridoshakopa, stanasamsraya in vasthi, leads to Prameha roga utpathy chirakari dhatukshaya leads to Upadrava-prameha janya Upadrava.

Table 1: Ayurvedic diagnostic assessment chart.

Prakriti	Kapha pitta Prakriti
Doshas vitiated	Vata pradhana tridosha
Dhatu	Rasa Rakta Mamsa Meda Asthi Majja
Upadhatu	Vasa Lasika Twak
Sara	Madhyama
Samhanana	Madhyama
Pramana	Madhyama
Satwa	Madhyama
Satmya	Madhura amla lavana ahara
Abhyavaharana sakthi	Madhyama
Jarana sakthi	Madhyama
Vyayama Sakthi	Madhyama
Vaya	Vridha

Diagnostic assessment included

HbA1C value of 8.4

Vibrotherm (the neuropathy analyser) analysis

The vibrotherm sensory analyzer is a non-invasive diagnostic instrument used for the assessment of peripheral sensory neuropathy, in patients with diabetes mellitus. It is designed to evaluate the functional integrity of peripheral nerves by measuring VPT, thermal perception threshold, and protective touch sensation. The instrument also includes computerized analysis software that can automatically interpret results according to predefined parameters and generate printed reports.[12] This automated interpretation improves standardization and assists clinicians in grading neuropathy severity efficiently. The normal reference values in Vibrotherm are shown below.

Table 2: Normal reference values of Vibrotherm.

Range	Vibration (VPT)	Cold (CPT)	Hot (HPT)
Normal	<15	> 20	< 42
Mild	15 – 20	19.9 – 15	42.1– 45
Moderate	21 – 25	14.9 – 10	45.1 – 48
Severe	>26	< 10	> 48

In this case there is a severe loss of vibration perception threshold indicating large fibre neuropathy and mild loss of hot perception threshold indicating small fibre neuropathy.

Table 3: The Vibrotherm analysis of patient on 0th day.

Vibrotherm	Right	Left
Vibration	43-severe loss	45-severe loss
Cold	23.8-normal study	25.4-normal study
Hot	44-mild loss	45-mild loss

Table 3: Ayurvedic interventions given to patient.

S. no.	Medicine	Method of administration	Duration (days)
1	Sundibaladi kashayam	48 ml of kashaya (10 gm kashaya power boiled in 48 ml water) twice daily before food	90
2	Nishamalaki choornam	6 gm of power along with kashaya	90
3	Nishakadakadi kashayam	As Thoya Kashaya for frequent use (10 gm power boiled in 1 litre water)	90
4	Pramehaushadi tablet	1-0-1 after food	90

Outcome assessments included toronto clinical neuropathy score (TCNS), vibrotherm (The Neuropathy Analyser) test and HbA1C.

Toronto clinical neuropathy score

The Toronto clinical neuropathy score (TCNS) score was 9 in both right and left foot before treatment (BT) and it has been changed to 6 in both foot after treatment (AT).

As an objective parameter the analysis with Vibrotherm (The neuropathy analyser) shows improvement in all parameters. The VPT has changed from 43 (severe loss) to 25 (moderate loss) in right foot. In left foot VPT has changed from 45 to 40, even though both are in severe loss category there exists a reduction of 5 units. The Cold Perception Threshold (CPT) is in both right and left foot were normal before and after the treatment. The Hot Perception Threshold (HPT) shows a decrease of 1 unit (from 44 to 43) in right foot even though both readings are with the category of mild loss. The HPT of left foot has changed from 45 to 41.9 which means that the mild loss of hot perception threshold has been changed to a normal conduction.

Table 5: TCNS score.

	BT		AT		Scoring
	Right	**Left**	**Right**	**Left**	
Symptom score					
Pain	1	1	1	1	Present=1 Absent=0
Numbness	1	1	1	1	
Tingling	1	1	1	1	
Weakness	1	1	0	0	
Ataxia	0	0	0	0	
Reflexes					
Knee reflex	0	0	0	0	Absent=2 Reduced=1 Normal=0
Ankle reflex	1	1	1	1	
Sensory test score					
Pin prick	0	0	0	0	Abnormal=1 Normal=0
Temperature	1	1	0	0	
Light touch	1	1	1	1	
Vibration sense	1	1	1	1	
Position sense	1	1	0	0	
Total score	9	9	6	6	

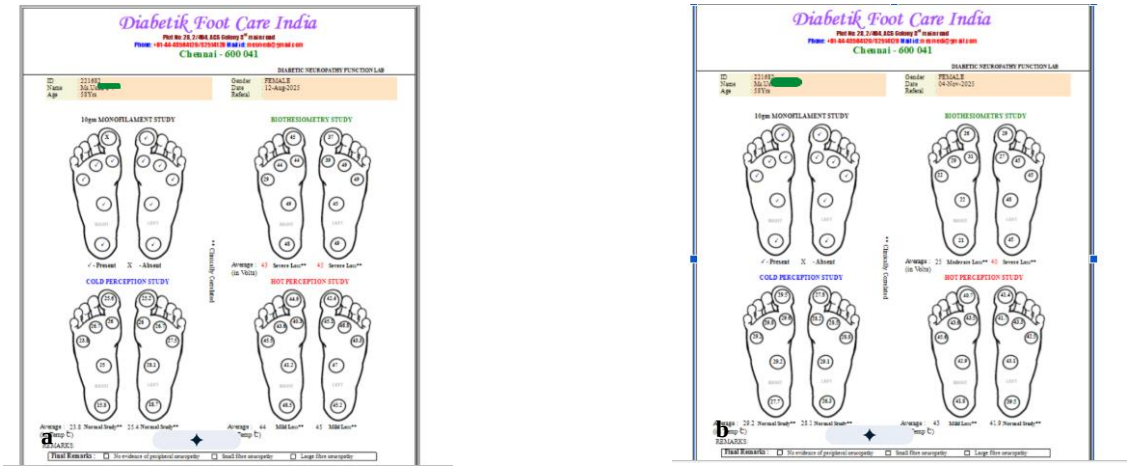

Figure 1: Vibrotherm (a) BT (0th day), (b) AT (9th day).

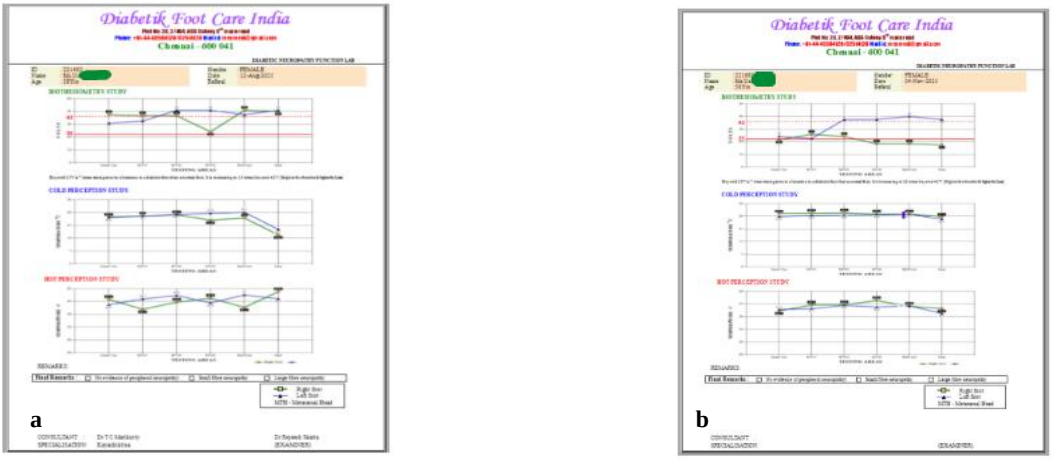

Figure 2: Graphical representation of Vibrotherm analysis (a) Before treatment, (b) After treatment.

Table 6: The analysis of Vibrotherm before and after treatment.

	BT		AT	
Vibrotherm	Right	Left	Right	Left
Vibration	43-severe loss	45-severe loss	25-moderate loss	40-severe loss
Cold	23.8-normal study	25.4-normal study	29.2-normal study	28.1-normal study
Hot	44-mild loss	45-mild loss	43-mild loss	41.9-normal

Follow up

Patient continued the medicaments for a period of 1 month and no assessment was done after follow up.

Mode of action of drugs

Studies shows Nishakatakadi kashayam elicit antihyperglycemic effects in streptozotocin induced hyperglycaemic rats and positive effect on the histopathological changes of the pancreatic beta cells in streptozotocin induced diabetic rats.[13]

Nishamalaki choornam: Haridra, rich in curcumin, exhibits anti-inflammatory and insulin-sensitizing effects.[14] Amalaki improves insulin sensitivity and reduces oxidative stress due to its high antioxidant and vitamin C content.[15]

The ingredients Bala and Atibala possess Balya, Bṛṃhaṇa, and Vātahara properties as described in Ayurvedic classics.[16] Modern studies have demonstrated antioxidant, anti-inflammatory, and neuroprotective activities of these herbs, suggesting their role in supporting nerve function and alleviating peripheral neuropathy.[17]

Sahacharadi tailam is Vatahara ahd rejuvenating in nature.

DISCUSSION

Objective assessment demonstrated improvement in VPT, CPT and HPT after 90 days of treatment. These findings were consistent with the patient's subjective improvement in pain, burning sensation, tingling, and numbness. The TCNC Score also shows reduction in the value. The observed improvement may be attributed to the combined effects of glycaemic regulation antioxidant activity, Vata shamana, neuroprotective actions of the Ayurvedic formulations, and the local therapeutic effect of Abhyanga. [18,19,20] Previous studies evaluating diabetic peripheral neuropathy using Vibrotherm, along with subjective clinical parameters, have reported significant improvements in both subjective symptoms and objective measures of sensory function.[21] These findings are consistent with the improvements observed in the present study also. And there is a change in HbA1c level (From 8.4 to 8.2). Optimal glycaemic control plays an important role in preventing or slowing the progression of DPN.[22] Here Premeha, Prameha upadrava and Supthivatahara treatment were adopted. It shows controlling Premeha (Pradana Vadhi) along with treatment for Upadrava Vyadhi (DNP) gives a significant result.[23] In this case patient got satisfactory relief and is advised for exercises, diabetic diet and further continuation of the medicaments.

The HbA1c was evaluated before and after treatment, this single case report cannot establish a relationship between glycaemic improvement and neuropathy outcomes. Being a single-case observation without a control group or long-term follow-up, the findings cannot be generalized. The favourable clinical and objective outcomes indicate the potential role of Ayurvedic management in diabetic peripheral neuropathy and further studies are needed in this aspect.

CONCLUSION

It indicates that long term use of ayurvedic medicaments is very much useful in controlling diseases like premeha and premeha upadrava which are anushangi in nature.

Improvement was observed in neuropathy-related symptoms, vibration and thermal perception thresholds, and Toronto Clinical Neuropathy Score, indicating increased peripheral nerve function and symptomatic relief. It indicates that Ayurvedic management may act as safe and effective therapeutic option for diabetic peripheral neuropathy. Larger controlled clinical studies with longer follow-up are required to confirm these observations and establish the efficacy and safety of this treatment approach. More studies are needed in this aspect.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Skaria R, Marikutty TC. Ayurvedic management of diabetic peripheral neuropathy assessed by vibrotherm (the neuropathy analyser)- a case report. Int J Res Med Sci 2026;14:4832-7.