



## Case Study

### AN AYURVEDA MANAGEMENT OF DIABETIC PERIPHERAL NEUROPATHY: A VIBROTHERM-BASED ASSESSMENT OF TREATMENT EFFICACY

**Chippy Soman<sup>1\*</sup>, Marykutty T.C<sup>2</sup>**

<sup>1</sup>PG Scholar, <sup>2</sup>Professor and HOD, Department of Kayachikitsa, Vaidyaratnam Ayurveda College, Ollur, Thrissur, Kerala, India.

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#### ABSTRACT

Diabetic Neuropathy (DN) is a peripheral nerve disorder in individuals with diabetes, characterized by neuropathic pain, which can lead to severe complications if untreated. Conventional treatments often offer only short-term relief and carry side effects, prompting exploration of alternative therapies. A 59-year-old woman with poorly controlled type 2 diabetes, COPD, and low bone density presented with acute low back pain, radiating to the legs, and numbness in both palms and left leg. Despite allopathic treatment, her symptoms persisted, leading her to seek Ayurvedic care. Clinical examination revealed signs of diabetic peripheral neuropathy, osteopenia, and degenerative spine disease. Ayurvedic intervention focused on balancing *Vata* and *Pitta doshas* through therapies like *Padabhyangam*, *Lepam*, *Dhanyamla dhara*, *Jambeerapinda swedam*, *Patrapota swedam*, and *Shastika pinda swedam*, combined with internal medications such as *Nishakatakadi kasayam*, *Pramehoushadi*, *Rasna Saptakam Kashayam*, *Kaisora Guggulu*, *Ksheerabala 101 cap*, and *Dhanwantharam Gritam*. Assessment was conducted using Vibrotherm, Diabetic Neuropathy Examination (DNE), Michigan Neuropathy Screening Instrument (MNSI), and Toronto Clinical Neuropathy Score (TCNS). Post-treatment assessments showed significant improvement in symptoms, including reduced pain, numbness, and burning sensations. Objective measures using various neuropathy assessment tools indicated decreased neuropathy severity. The Ayurvedic treatment demonstrated efficacy in managing diabetic neuropathy symptoms, offering a viable alternative to conventional therapies. Early diagnosis and integrated Ayurvedic care can provide substantial symptom relief and improve the quality of life for diabetic neuropathy patients.

#### INTRODUCTION

Diabetic Neuropathy<sup>[2]</sup> (DN) is defined as the presence of symptoms or signs of peripheral nerve dysfunction in individuals with diabetes, after excluding other potential causes. Neuropathic pain is one of the most challenging aspects of DN, as it is a progressive disorder of the nerve.<sup>[2]</sup> Diabetic neuropathy (DN) is a major microvascular complication of both type 1 and type 2 diabetes mellitus (T1DM and T2DM).

It may be present at T2DM diagnosis or develop around 10 years post-onset in T1DM.<sup>[3]</sup> DN affects both somatic and autonomic fibers of the peripheral nervous system, causing sensory-motor and neurovegetative multiorgan manifestations due to impaired sympathetic/parasympathetic conduction<sup>[4]</sup>. Hyperglycemia and reduced oxygen delivery through the vasa nervorum lead to inflammatory damage, altering nerve activity.<sup>[1]</sup> The most common manifestation is symmetrical painful somatic neuropathy in the lower limbs<sup>[1]</sup>. If left untreated, it can lead to loss of balance, loss of dexterity, and eventually, limb amputation<sup>[2]</sup>. Diabetic neuropathy can be approximately correlated with *Prameha* and its *Upadra* (complications) in Ayurveda.<sup>[5]</sup> Symptoms like *Karapada suptatadaha* (numbness and burning of limbs) and *Shatpadapipalika* (tingling sensation) are

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found in the *Purvarupa* (prodromal) stage of *Prameha*.<sup>[6]</sup> Additionally, *Daha* (burning), *Shoola* (pain), are symptoms found as *Upadrava* (complications) of *Prameha*. *Prameha* is considered a *Tridoshaj vyadhi* (involving all three vitiated *Doshas*) and with its complications, it becomes *Asadhy* (incurable). However, with early diagnosis and initiation of Ayurvedic treatment, it becomes *Yapya* (manageable).

*Prameha upadrava* requires a dual line of treatment: one for *Prameha*, which focuses on reducing *Kapha* and *Kleda*, and another for its complications,<sup>[7]</sup> which depend on the vitiated *Doshas*- in this case, *Vata-pitta*. The present case study highlights Ayurvedic treatment for pain and burning sensation in DN, where the patient exhibited symptoms of *Vata-pittaj prameha upadrava* and was treated according to the respective *Doshas*.

### Assessment Criteria

#### Objective Parameters

- Neuropathy Analyser - Vibrotherm<sup>[8]</sup>
- Diabetic Neuropathy Examination
- Michigan Neuropathy Screening Instrument (MNSI)
- Toronto Clinical Neuropathy Score (TCNS)<sup>[9]</sup>
- Diabetic Neuropathy Symptom Score (DNS)<sup>[10]</sup>

These instruments were used to assess the patient's condition before and after treatment. The diagnosis of the case was *Prameha Upadrava* (complication of diabetes - diabetic peripheral neuropathy).

#### Case Report

A 59-year-old woman presents with acute low back pain that radiates down both legs, more prominently on the left side characterized by a persistent pricking and burning sensation exacerbated at night, hindering her ability to walk and stand for extended periods since 2 months. She also reports numbness in both palms and discomfort during knee movements. Diagnosed with type 2 diabetes a decade ago, she has been managing it with Metformin 1000mg, Galvusmet 50/500 (1-0-1), Glimepiride 2mg (1-0-1) daily. Since April 2024, she has experienced lba and progressive weakness and tingling in her lower limbs, initially overlooked until symptoms intensified, prompting consultation with an orthopedic specialist who prescribed allopathic medications, but without satisfactory relief.

Attributing her symptoms to the strain of household chores, she notes exacerbation of pain with prolonged standing, relieved only by rest. Her diabetes management history reveals an HbA1c level of 8.6 despite long-term medication compliance. Following retirement from government service in 2020, she

noticed a 6kg weight loss alongside increased fatigue from extensive gardening and household responsibilities. Additionally, she has coped with COPD since age 24, managing symptoms with Aerocort inhalers, but symptom worsened during winter months.

Compounding her discomfort, she describes localized skin thickening on the fifth metatarsal head of her foot, significantly impacting mobility and causing additional pain during weight-bearing activities. Seeking more effective management, she has turned to Ayurvedic care, hoping to alleviate her symptoms and enhance her overall quality of life.

#### Clinical Findings

On general examination, clinically stable, normal peripheral pulse, no generalized lymphadenopathy, no pallor, no pedal oedema, she is having fatigue and generalized weakness, tenderness in the lower back, pain radiating down both legs (more prominently on the left side), pricking and burning sensation in the lower limbs especially exacerbated at night, discomfort and pain during knee movements, reduced range of motion in the lumbar spine, localized skin thickening on the fifth metatarsal head of the foot, decreased sensation (numbness) in both palms and lower limbs, signs of peripheral neuropathy (e.g., reduced vibratory sense, altered reflexes in lower extremities), weakness in lower limbs (potentially more on the left side), positive fabers test, and FNST test indicating nerve root irritation or compression.

Elevated HbA1c level (8.6) indicating poor glycemic control, symptoms suggestive of diabetic peripheral neuropathy (e.g., burning, tingling, and numbness), signs of COPD (e.g., wheezing, decreased breath sounds, prolonged expiration) with potential exacerbation during the winter months, and low bone density in L1-L4 suggesting osteopenia or osteoporosis. Knee joint and ankle joint reflexes were reduced. Cranial examinations were evaluated as normal. In the sensory examination, the patient was unable to tolerate even light pressure applied on lower limbs. Vibration and temperature perception were present but decreased. Vibration perception was delayed in the lower limb by 3-4 seconds than the upper limb. Lower limb deep tendon reflexes of knee and ankle joints were reduced. The patient could not walk without the support and after 50-60 meters of walking she would feel the urge to take rest. The patient had difficulty in performing his daily routine activities. Systemic examination was normal with cardiovascular system S1 S2 Heard.

#### Treatment History

At the time of admission, she was taking Telmiget, Atorvastatin, Galvusmet 50/500 (1-0-1),

Glimepiride 2 mg (1-0-1), Metformin Hydrochloride 1000 mg, and using an Aerocort Inhaler 200, Ayurvedic treatment was administered alongside these medications.

### Personal History

A 59-year-old female, belonging to the upper middle class, with known history of diabetes, hypertension, hyperlipidemia, and COPD, presented to the OPD of Vaidyaratnam Ayurvedic Hospital. She reported severe low back pain radiating to her left lower leg for the past two months, accompanied by heaviness and numbness in the back of her thigh. She has no history of addiction but is allergic to dust. Her diet is mixed, with a preference for sour and sweet foods, and she has a good appetite. Her sleep quality has been disrupted due to tingling and heaviness in her lower limb, contributing to feelings of anxiety. There is no relevant family history noted. She consumes a mixed diet, preferably non-vegetarian, and her bowel movements are satisfactory, occurring twice a day. Micturition frequency is 4-5 times during the day and 1-2 times at night. Sleep is disturbed due to numbness and obstructive airway disease.

### Physical Examination

On physical examination no abnormalities were detected in head, neck, thorax, abdomen, and extremities.

### Integumentary System Examination

Foot examination revealed localized skin thickening and a corn-like appearance on the fifth metatarsal head of both feet, more pronounced on the left foot.

### Systemic Examination

The patient has a history of bronchial asthma for the past 30 years. No abnormalities were detected in the gastrointestinal system there is no tenderness and organomegaly, appears soft. The cardiovascular system is normal, with normal heart sounds and no cardiac murmurs heard. The central nervous system is intact, no focal neurological deficits, but the locomotor system is affected.

### Vitals

- Pulse Rate: 72 bpm
- Heart Rate: 78 bpm
- Blood Pressure: 130/90 mmHg
- Respiratory Rate: 16 breaths per minute
- Temperature: 98.6°F

### Relevant Past Interventions with Outcomes:

- H/O Type 2 Diabetes: Diagnosed a decade ago, managed with Metformin 500mg daily, with an HbA1c level of 8.6 despite long-term medication compliance.

- h/o Hyperlipidemia since 2 years
- H/O COPD: Managed since age 24 with Aerocort inhalers, with symptom exacerbation during winter months.
- H/O Orthopedic consultation: Consulted an orthopedic specialist for progressive weakness and tingling in lower limbs and hands in April 2018, and prescribed allopathic medications managed.
- H/O Weight loss and fatigue: Noticed a 6kg weight loss and increased fatigue following retirement from government service in 2020, potentially related to extensive gardening and household responsibilities.
- Low Bone Density: according to bone density report done on 9/5/23. The BMD measured at AP spine L1-L4 IS 0.981g/cm<sup>2</sup> which indicate Low bone density in L1-L4 suggesting osteopenia or osteoporosis.

### Nervous System Examination

The patient appeared neat, well-dressed, and cooperative, with a pleasant emotional state and orientation to time, date, and person, indicating intact general intelligence. There was no muscle wasting observed. Sensations of soft touch, pain, cold touch, and vibration were intact in both upper limbs. However, a hot touch sensation was absent in the left palm within dermatomes C6, C7, and C8, and soft touch sensation was absent in the L5 and S1 regions of the left foot. Cold and hot touch sensations, along with pain sensations, were diminished up to the middle of both thighs. Vibration perception was delayed in the left limbs, while proprioception was impaired but graphesthesia remained intact.

### Locomotor System Examination

#### Examination of Spine

**Inspection-** No swelling, kyphosis absent, scoliosis absent, no colour change antalgic gait, discomfort in walking and sitting for long duration, no localized swelling no varicosities, reflexes are intact.

**Palpation-** Tenderness 2 + at L4-L5 region Muscle tone- Good. Muscle power grade- Right extremities (upper and lower)- 5/5 left extremities (upper)- 5/5 left lower extremities - 5/5. Range of movement of Lumbar spine (ROM) Forward flexion of the lumbar spine is limited to 30cm above ground. Right lateral flexion is limited to 40° with pain. Left lateral flexion is limited to 30° with pain. The extension is limited to 30° with pain.

#### Knee Joint

Inspection revealed no swelling or deformity in both knee joints. Palpation indicated no tenderness or localized temperature increase. Grade 2 crepitus was

present in both knee joints, and all movements were slightly restricted due to pain.

**SI joint-Inspection:** No swelling and deformity

**Palpation:** No local raise of temperature Grade 2-Tenderness present Muscle power of the left lower limb is reduced (4/5) Reflex of the lower limb was diminished. Gait: Antalgic gait, short step. Spinal and hip movements restricted

### Sensory Examination

The superficial sensation of pain, touch, temperature, deep sensation of vibration and proprioception,

cortical sensation Two-point discrimination Steriognosis and grapaesthesia are examined it shows mild loss in left S1 S2 L4 to L5 dermatome in left leg.

### Diagnostic Testing

#### X-ray findings

The X-ray reveals translucent appearance in L1-L4 Vertebrae. Additionally, degenerative changes such as osteophytes, at the margins of L3-L4 vertebrae be observed. Sclerotic changes, at the margin of L3, L4, L5, also present.

Bone densitometry report 9/5/23

**Table based on the data of bone densitometry report**

Region	BMD (g/cm <sup>2</sup> )	YA T-score	AM Z-score	WHO Classification
AP Spine	0.981	-1.7	-0.5	Osteopenia
Total Left	0.992	-0.1	0.9	Normal
Total Right	1.119	1.0	1.9	Normal
Total Mean	1.056	0.5	1.4	Normal
Total Diff	0.127	1.1	1.1	N/A

### Vibrotherm Analysis

The vibrotherm analysis for this patient before treatment indicates a severe loss in vibration perception, which is consistent with large fiber neuropathy commonly associated with advanced diabetes. Despite this, both the hot and cold perception studies returned normal results, suggesting that small fiber function remains intact. After Treatment: Average voltage readings have decreased to around 27-29 Volts.

### Lab Investigation

Lab investigation conducted on 09/05/23: ESR was 32mm/hr, HbA1c was 8.6%, fasting blood sugar (FBS) was 146.0 mg/dl, and postprandial blood sugar (PPBS) was 221.0 mg/dl. Hemoglobin (Hb) levels were recorded 13.2g/dl. The RBC count was 5.24 million/cmm, the platelet count was 2.55 lakhs/cmm, and the WBC count was 5700/cmm. Blood sugar levels were measured at 126mg/dl (fasting) and 260mg/dl (postprandial). Blood urea level (BUL) was 15 mg/dl, uric acid was 5.5mg/dl, serum creatinine was 0.7mg/dl, and blood urea was 18.2mg/dl. Calcium levels were 8.9mg/dl, vitamin D was 38.2ng/ml, TSH was 2.420μIU/ml, globulin was 3.6g/dl, SGOT was 21.0 U/L, and SGPT was 17.0 U/L.

### Ayurveda Parameters

Patient's *Nadi* (pulse) was *Vata* dominant, *Mutra* (urine) burning micturition, *Mala* (bowel) constipation, *Jivha* (tongue) coated, *Shabda* (speech) normal speech, *Sparsha* (touch) *Asamyak* sparsha (impaired sensation) in lower limbs, *Druk* (eyes) normal, *Akruti* (built) lean.

### Diagnosis

The patient has poorly controlled diabetes mellitus, evidenced by an HbA1c of 8.6%, fasting blood sugar of 146.0mg/dl, and postprandial blood sugar of 221.0mg/dl. These elevated levels have led to Diabetic Peripheral Neuropathy (DPN), characterized by several sensory and motor deficits. The patient has lost hot touch sensation in the left palm within dermatomes C6, C7, and C8, and soft touch sensation in the L5 and S1 regions of the left foot. Additionally, cold and hot touch sensations, along with pain sensations, are diminished up to the middle of both thighs, and vibration perception and proprioception are impaired in the left limbs. Motor deficits are also present, with reduced muscle power (4/5) in the left lower extremity, indicating possible motor nerve involvement. An elevated ESR of 32 mm/hr suggests an inflammatory process that may be exacerbating the neuropathic symptoms. In addition to DPN, the patient shows signs of osteopenia and degenerative spine disease, with a T-score of -1.7 and X-ray findings of translucent vertebrae and osteophytes in the lumbar region.

In Ayurvedic perspective, patient was diagnosed as *Prameha upadraava* with manifestation of *Daha* (burning), *Shoola* (pain). And it was mainly *Vata-pitta* in type, as the *Daha*, *Shoola* were one of the persistent symptoms. Also, major *Vata* vitiation was there, as the patient was in *Vridhavastha* (old age), *Krusha* (lean) and *Durbala* (weak).

**Diabetic Neuropathy Examination**

Symptom	Before	After
Quadriceps femoris: Extension of the knee	1	0
Tibialis anterior: Dorsiflexion of the foot	1	0
Reflex: Triceps surae	1	1
Index finger: Sensitivity to pinpricks	0	0
Big toe: Sensitivity to pinpricks	0	0
Big toe: Sensitivity to touch	1	0
Big toe: Vibration perception	1	0
Big toe: Sensitivity to joint position	0	0

**Diabetic Neuropathy Symptom Score**

Symptom	Before	After	Scoring Criteria
Unsteadiness on walking	1	0	1 = Present, 0 = Absent
Numbness	1	0	1 = Present, 0 = Absent
Burning and aching pain	1	1	1 = Present, 0 = Absent
Pricking sensation	0	0	1 = Present, 0 = Absent

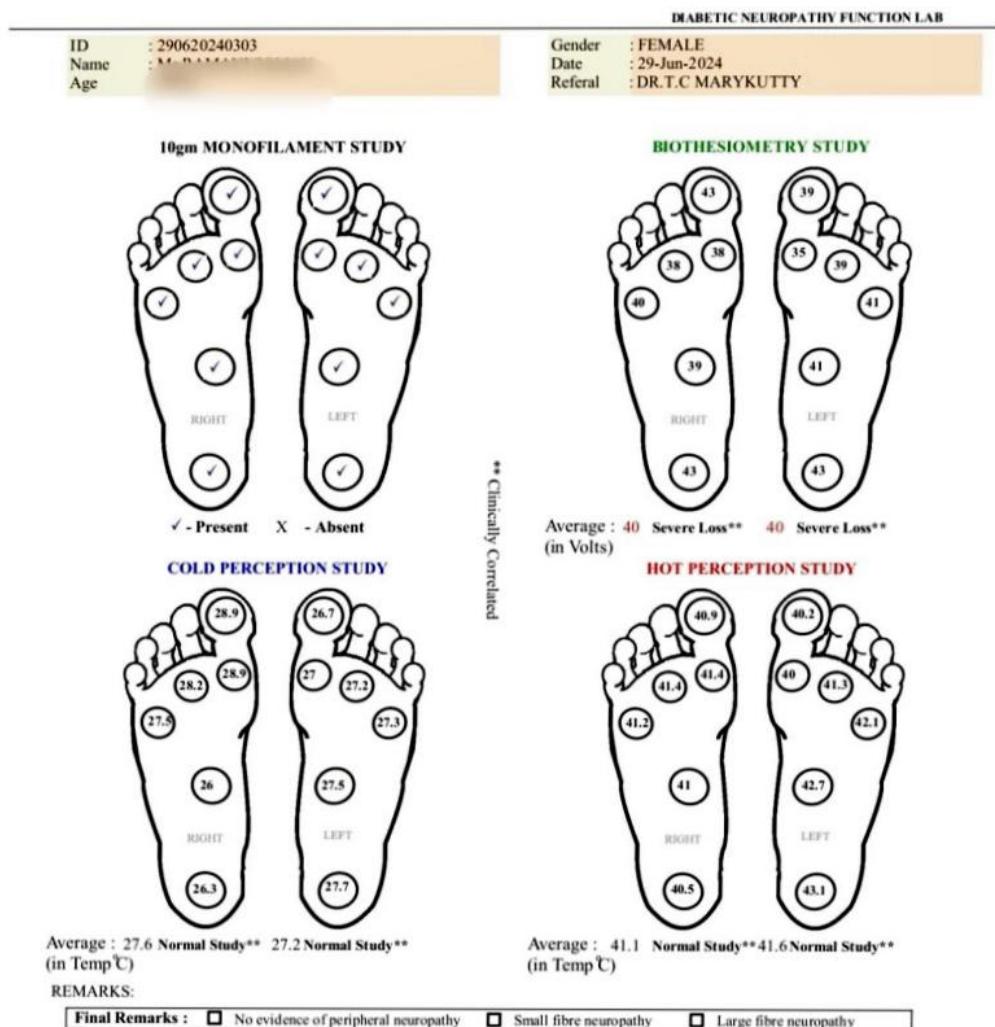
**Michigan Neuropathy Screening Instrument**

Symptom	Before	After	Scoring Criteria
Appearance of feet	1	1	0 = Normal, 1 = Abnormal
Ulceration	0	0	0 = Normal, 1 = Abnormal
Ankle reflexes	0.5	0	0 = Present, 0.5 = Reduced, 1 = Absent
Vibration perception	0.5	0	0 = Present, 0.5 = Reduced, 1 = Absent

**Table 7: Toronto Clinical Neuropathy Score**

Symptom	Before Treatment	After Treatment	Scoring
<b>Pain</b>	1	0	0 = Absent, 1 = Present
<b>Numbness</b>	1	1	0 = Absent, 1 = Present
<b>Tingling</b>	1	0	0 = Absent, 1 = Present
<b>Weakness</b>	0	0	0 = Absent, 1 = Present
<b>Ataxia</b>	0	0	0 = Absent, 1 = Present
<b>Reflex Score</b>			0 = Normal, 1 = Reduced, 2 = Absent
Knee reflex right	0	0	
Knee reflex left	1	1	
Ankle reflex right	0	0	
Ankle reflex left	1	1	
<b>Sensory Test Score</b>			0 = Normal, 1 = Abnormal
Pinprick	0	0	
Temperature	1	0	
Light touch	1	1	
Vibration sense	1	1	
Position sense	0	0	

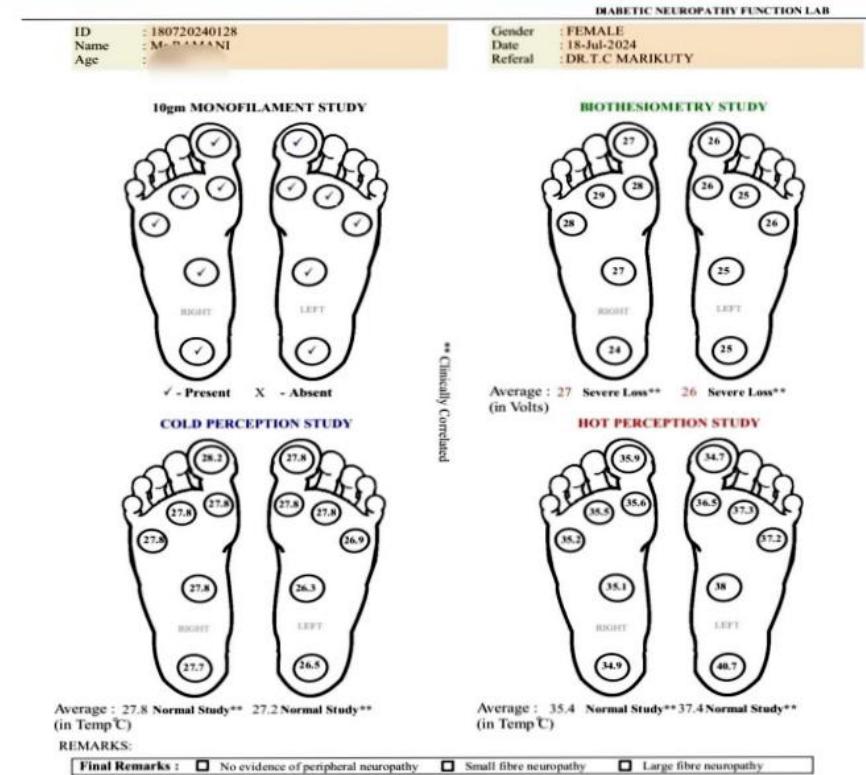
<b>Total Score</b>	8 (moderate DPN)	5 (mild DPN)	
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**Before Treatment**

CONSULTANT : DR.T.C MARIKUTTY  
 SPECIALISATION : KAYACHIKITSA

DR.CHIPPIY SOMAN  
 (EXAMINER)

**After Treatment**



CONSULTANT : DR.T.C MARIKUTTY  
 SPECIALISATION : KAYACHIKITSA

DR.CHIPPIY SOMAN  
 (EXAMINER)

## Therapeutic Interventions

After assessing her strength (*Bala*) and digestive fire (*Agni*), the treatment was primarily focused on alleviating her clinical symptoms, particularly addressing complications (*Upadrava Vyadhi*). The protocol included *Rookshana* and *Snigdha rooksha sweda* therapies to balance *Vata* and *Pitta doshas*. Externally, *Choorna pinda swedam* (dry herbal bolus fomentation) was employed for effective *Rookshana*. In the second stage, therapies such as *Jambeerapinda swedam* (lemon bolus fomentation), *Patrapota swedam* (leaf bolus fomentation), *Matravasti* (medicated enemas), and *Shastika pinda swedam* (rice bolus fomentation) were administered. Initially internal medications like *Rasna Saptakam Kashayam*,<sup>[11]</sup> *Kaisora Guggulu*,<sup>[12]</sup> and *Sinduvara Erandam* to reduce pain, and *Pramehoushadi* and *Nishakatakadi Toyam*<sup>[13]</sup> to manage diabetes. In second stage, *Guggulutiktakam kashayam*<sup>[14]</sup> and *Laksha Guggulu*<sup>[15]</sup> were prescribed. Considering her *Vata* predominance, chronic condition, advanced age, lean build, and nerve demyelination, capsule *Ksheerabala 101*<sup>[16]</sup> and *Dhanwantharam Ghritam*<sup>[17]</sup> (12g in the morning) were given for nourishment. Her allopathic medication for glycemic control was continued throughout the treatment.

## DISCUSSION

In this case study of diabetic neuropathy, the patient exhibited symptoms of *Vata-pittaj prameha upadrava*, with *Vata* vitiation manifesting more prominently through pain, numbness, and Tiredness. Therefore, the treatment focused on pacifying the dominant *Vata dosha*. The treatment for *Prameha vyadhi* is divided into two categories: *Sthoola pramehi* (obese and strong) and *Krusha pramehi*<sup>[18]</sup> (emaciated and weak). For *Krusha pramehi*, *Brumhana* therapy, which aims to increase body bulk and nourishment, is recommended. Considering the patient's old age (*Vridhavastha*), weakness (*Durbala*), and lean build (*Krusha*), a *Brimhana* treatment plan was chosen to enhance strength (*Bala*) and pacify both *Vata* and *Pitta doshas*.

Treatment modalities in Ayurveda can be broadly classified under three headings: *Antar Parimarjana Chikitsa*, *Bahir Parimarjana Chikitsa*, and *Shastra Praneedana*. In this condition, dual management lines directed towards both *Pradhana vyadhi* and *Upadrava* are needed. *Antar Parimarjana Chikitsa* plays a role in treating the *Pradhana Vyadhi* as well as the *Upadrava*, while *Bahirparimarjana Chikitsa* plays a vital role in symptomatic management, especially in conditions where *Upadrava* dominates the picture of *Pradhana*.

*Vyadhi*. Based on the *Lakshanas*, *Dosha*, *Prakruti*, and *Rogi Bala*, the suitable treatment modality and drug may be selected. Initially, *Padaabhyanga* (application of oil to the feet followed by massage) was done to improve blood circulation, one of the reasons for impaired sensation, as the altered blood flow causes improper oxygen and nutrient supply to the nerves. Microvascular injuries involving small blood vessels that supply the nerves, i.e., *vasa nervorum*, are responsible for diabetic peripheral neuropathy. *Padaabhyanga*,<sup>[18]</sup> by its mechanical maneuver, produces heat and causes vasodilation, improving circulation and thereby giving symptomatic relief. According to Ayurveda, *Vata* dominates *Sparshanendriya*, and through *Padaabhyanga*. For *Padaabhyanga*, *Dhanvantara Taila* and *Ketakimuladi Taila* are used. *Suptata* and *Makshikopasarpana* are symptoms due to *Kapha* or *Aavarana*; hence initially, *Rukshana* should be adopted. Medicines in the form of paste, used for external application, are called *Lepas*. The *Veerya* of the *Dravya* used in *Lepa* enters the body through *Sookshma Srotas* after undergoing absorption through *Bhrajaka Pitta* abided in the skin. *Lepa* with *Bala moola thila* with *Dhanyamlam* was advised to apply on left leg. *Swedana* is indicated in the management of many diseases, particularly those of *Vata* and *Kapha Dosha* origin. *Swedana* (*Tikshna Sweda*) is contraindicated in *Prameha* condition as it causes *Deha Visheeryana* due to *Medhobahulyata*. However, *Mrudu Sweda* can be advised as *Shodhana Poorva Sweda* and as *Laakshanika Chikitsa* for *Prameha Upadrava*, and *Sthanika Sweda* can be adopted. Indications of different *Swedas* include pain that occurs when there is reduced blood circulation to a particular area. By *Swedana*, *Ushna Guna* stimulates circulatory channels and causes vasodilation, increasing blood circulation and reducing pain. Hence, *Parisheka sweda* in the form of *Dhanyamladhara*<sup>[19]</sup> is useful in *Pittaanubandha Vata* condition given initially. *Choorna Pinda Sweda* and *Patra Pinda Sweda* were given for symptomatic relief for 3 days course. *Shashtika Shali Pinda Sweda*, a *Vatahara Bruhmana Sweda*, was given for *Upadravas* like *Kampa* and *Shosha* during the course of 7 days.

*Rasnasaptakam Kashayam* is used for, effectively balancing the *Vata* and *Kapha* elements in the body, alleviating pain and swelling associated with inflammation, and enhancing the function of the *Vata dosha* to aid in restoring mobility and stability to bones and joints. *Kaisora Guggulu*, an Ayurvedic formulation, can be beneficial in the management of diabetic neuropathy due to its potent anti-inflammatory and antioxidant properties, which help alleviate pain and reduce inflammation in nerves affected by diabetes, and it balances the *Vata* and *Pitta doshas*, thereby

addressing symptoms such as numbness, tingling, and burning sensations commonly experienced in diabetic neuropathy. Its detoxifying effects aid in the elimination of *Ama* (toxins) from the body, contributing to improved metabolic function and glycemic control. *Sinduvara Erandam* is an Ayurvedic formulation primarily used to treat pain and inflammation associated with various musculoskeletal and neurological conditions, including diabetic neuropathy, with key ingredients like *Sinduvara* (*Vitex negundo*) and *Eranda* (*Ricinus communis*) known for their potent anti-inflammatory, analgesic, and *Vata*-balancing properties. *Nishakatakadi Toyam*<sup>[20]</sup> offers multiple benefits for individuals with diabetic neuropathy by not only helping to control blood sugar levels but also by reducing inflammation, protecting nerve cells, and improving overall nerve function, and it reduces *Kapha* and *Medas* due to its combination of herbs with astringent (*Kashaya*) and bitter (*Tikta*) tastes, supporting weight management and metabolic health. It manages diabetes with herbs like *Vairi* and *Dhatri*, helping control blood sugar levels and improve insulin sensitivity, supports digestive health with ingredients such as *Haritaki*, *Mustaka*, and *Patha*, enhancing digestion and alleviating gastrointestinal issues, promotes skin health with herbs like *Khadira* and *Samanga*, which aid in treating skin disorders, and provides anti-inflammatory and antioxidant effects with herbs like *Rajani* and *Darvi*, supporting overall health and immunity. To prepare it as *Toyam*, *Lakshadi Guggulu* addresses bone-related issues by supplying ample calcium to aid conditions like osteoporosis and expedite healing in fractures and joint pain, while *Ganda Thailam*<sup>[21]</sup> gel capsules target the *Vata dosha* and bone tissues, containing strengthening herbs such as *Bala*, *Devadaru*, and *Rasna*, along with black sesame seeds processed in cow's milk to fortify bones, prevent deterioration, and are useful for nerve damage and osteopenia. *Dhanwantaram Ghrutam*<sup>[7]</sup> is mentioned in the "Sushruta Samhita," *Chikitsa Sthana*, where it is recommended for managing complications of diabetes (*Prameha Upadrava*) effectively treating nerve damage by nourishing and strengthening the nervous system, alleviating symptoms such as tingling, numbness, and burning sensations. It helps reduce muscle weakness and cramps, enhances muscle strength, and improves joint flexibility and mobility, providing relief from joint pain and stiffness, while also promoting the healing of diabetic ulcers, maintaining skin health, improving blood circulation, and preventing complications like diabetic foot. Its anti-inflammatory properties help manage chronic inflammation while also boosting overall energy and vitality to combat fatigue and lethargy.

## RESULT

Following treatment, the Diabetic Neuropathy Examination showed significant improvement in multiple areas. Deficits in quadriceps femoris extension of the knee and tibialis anterior dorsiflexion of the foot improved from mild/moderate (score of 1) to normal (score of 0). Sensitivity to pinpricks in the index finger and big toe remained normal, while sensitivity to touch and vibration perception in the big toe improved to normal. Unsteadiness in walking and numbness were initially present but were absent after treatment. The Michigan Neuropathy Screening Instrument indicated that although the appearance of the feet remained abnormal, ankle reflexes and vibration perception showed improvement. The Toronto Clinical Neuropathy Score improved from 8 (moderate DPN) to 5 (mild DPN), with pain, tingling, and temperature sensitivity scores decreasing, indicating reduced symptoms.

Comparing the two Vibrotherm reports for this patient, the post-treatment vibration study demonstrates a significant improvement, with voltage readings reduced from approximately 40 Volts to 27-29 Volts, indicating enhanced nerve function. Although the hot perception study average temperatures decreased from 41.1°C-41.6°C to 35.4°C-37.4°C, they remained within the normal range. The cold perception study consistently showed average temperatures, maintaining values around 27.2°C-27.8°C in both reports. Importantly, the final clinical remarks in both reports consistently indicated changes in the symptoms of peripheral neuropathy.

## CONCLUSION

Type 2 diabetes mellitus (T2DM) is a growing global health concern, with its prevalence expected to surge from 366 million in 2011 to 552 million by 2030. (20) Diabetic complications, including neuropathy, osteomyelitis, and ulcers, significantly impact patients' quality of life. Diabetic neuropathy, affecting about 30% of diabetes patients, is characterized by nerve dysfunction, leading to symptoms like tingling, burning sensations, and deep aching pain, progressively affecting the limbs and sometimes the trunk. (8) In India, where the diabetes prevalence is 4.3%, the condition is compounded by higher susceptibility to insulin resistance and cardiovascular issues. Despite medical advancements, effective long-term solutions for neuropathic complications remain elusive. In Ayurveda, diabetes and its complications fall under *Prameha*, requiring treatments that address the underlying *Dosha* imbalances, categorized by *Dosha*-specific symptoms, requiring treatments to alleviate *Vata* obstruction and emphasizing dietary and lifestyle adjustments to manage diabetes effectively. Ayurvedic

management, including therapies like *Choorna pinda swedam*, *Jambeera pinda swedam*, *Patra potali swedam*, *Matra vasti*, *Shastika pinda sweda*, alongside specific Ayurveda medicine, dietary and lifestyle adjustments, has shown promise in alleviating symptoms and improving patient well-being. By integrating Ayurvedic approaches with modern medicine, we can better manage this chronic condition and enhance the quality of life for those affected.

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**\*Address for correspondence**

**Dr. Chippy Soman**

PG Scholar,  
Department of Kayachikitsa,  
Vaidyaratnam Ayurveda College,  
Ollur, Thrissur.

Mail id -  
[dr.chippysoman@gmail.com](mailto:dr.chippysoman@gmail.com)

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