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# Use of *Pipal* tree (*Ficus religiosa*) extract in Lumbar Disc Lesion - Induced Neuropathy

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## ABSTRACT

Incidences of neuropathic pain can occur following a lesion in or a disease of the somatosensory nervous system leading to problems of poor physical, cognitive, and psychosocial health. Roots of neuropathic pain can be in a number of diseases like diabetes mellitus, herpes zoster, cancer, spinal disorders, and human immunodeficiency virus infection as well as in some clinical interventions like chemotherapy and surgery, and in physical injuries like accidents and related trauma resulting in spinal cord injuries. Therefore, regimen of treatments varies according to the etiology and chronicity. Various types of treatments and medications are prevalently being used to alleviate neuropathic pain. These medicines have varying analgesic effects with frequent side effects including dependency issues. The idea of using herbal extract of *Pipal* tree (*Ficus religiosa*) for neuropathic pain was developed after extensive study of *Ayurveda* literature, discussion with *Ayurveda* experts while keeping in mind the descriptions about it in Indian ancient literature like *Puranas* and *Shastras*. So far specific chemicals extracted from *Pipal* are not scientifically studied for their effects on neurological conditions. However, recently it was reported that its biochemical contents have some neurotrophic effects. In order to assess the neurotrophic effects of *Pipal* extract and its beneficial effects in chronic neuropathic pain of lower limbs induced by lumbar disc lesions, we carried out a study. Our findings demonstrate that the herbal extract helped the patients without inciting any unwanted side effects.

**Key words:** *Pipal* (*Ficus religiosa*), Plant Extract, Phytochemicals, Neuropathy, Lumbar disc herniation.

## INTRODUCTION

Neuropathic pain can occur following a lesion in or a disease of the somatosensory nervous system which can result in problems of poor physical, cognitive, and psychosocial health.<sup>[1]</sup> Neuropathic pain can be caused by a number of different diseases like diabetes mellitus, herpes zoster, cancer, spinal disorders, and

human immunodeficiency virus infection as well as by some clinical interventions like chemotherapy and surgical procedures and due to trauma causing spinal cord injuries. It already affects 7-10% of the general population of the US,<sup>[2]</sup> and its incidences are likely to increase because of various everyday factors like accidents and undesired outcomes of increasing medical interventions. Increasing number of aging population also seems to contribute to the number of patients suffering from neuropathic pain. Because of the varying nature of the root cause of the disease, treatment plans vary according to the etiology and chronicity.

Since times immemorial, plants have been sources of medicines for treating almost all diseases which should have increased with increased social interaction among people. In modern times, focus on plant research has increased all over the world in quest for therapeutic agents which do not have side effects while imparting

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the curative properties. In this effort, extensive studies have demonstrated and verified immense potentials of medicinal plant products for treating various medical conditions.<sup>[3]</sup>

*Pipal* (*Ficus religiosa*), known as *Ashvattha* in Sanskrit, is a very large evergreen tree having lifespan of up to 3,000 years. Its leaves, bark, fruits or mixture of those has been used as healing agents for thousands of years as these were frequently used in traditional medicine. It has been also observed that animals like chimpanzees instinctively turned to *Pipal* trees for their curative purposes. Its bark is light grey, smooth and peels in patches while its heart-shaped leaves have long, tapering tips. Each and every part of this tree is used in treating one or other ailment. All the parts of the tree exhibit a wide spectrum of medicinal activities such as anticancer, antidiabetic, antimicrobial, anticonvulsant, antihelminthic, antiulcer, and anti-asthmatic activities.<sup>[4,6,7,9]</sup> In addition, the parts of the tree have been reported to possess antioxidant properties. Parts of the tree or mixture of those have been used traditionally in the treatment of neurodegenerative disorders (including Parkinson's disease) also.<sup>[4]</sup> It is logical to anticipate that antioxidant properties<sup>[6,8]</sup> in combination to specific combination found in parts of this tree may prove to be effective in the remedy of neuropathic pain, nerve injuries and paraplegia like paralytic conditions. Hence, medicinal values of *Pipal* need to be evaluated for its effects in these conditions.

*Pipal* has been used in the treatment of neurodegenerative disorders (including Parkinson's disease).<sup>[3]</sup> Extract of this tree may prove to be an effective remedy for neuropathic pain, nerve injuries and paraplegia like paralytic conditions. The important phytochemicals in *Pipal* extract are namely Beta-sitosterol, D-glucoside, Vitamin-K, n-octacosanol, kaempferol quercetin and myricetin etc.<sup>[5]</sup>

In this study, we evaluated effects of *Pipal* extract for treating neuropathic pain, specifically originating from lumbar disc lesions. *Pipal* extract for this study was developed by our group under supervision of Ayurveda experts. It was prepared as a mixture from different parts of the tree like leaf, bark and root in determined

percentages added in a fixed proportion to "*Panchgavya*" (a concoction of cow products).

## MATERIALS AND METHODS

### Preparation of the extract

Tender leaves, bark and roots of *Pipal* tree were collected and dried in a shaded area. Coarsely powdered plant material (1,000g) was extracted with 5 litres of *Panchagavya*. After the extraction, water was distilled off, concentrated extract was transferred into a pre-weighed petri dish, and further dried at ambient temperatures to obtain dried extract. The dried extract was weighed and the percentage yield of the extracts was calculated.

### Subjects

In order to assess the neurotrophic effects of *Pipal* extract and its beneficial effects in chronic neuropathic pain of lower limbs induced by lumbar disc lesions, we enrolled patients in India from October 2021 to April 2022. Total 6 patients suffering from chronic backache with radicular pain in one or both lower limbs, due to lumbar disc herniation, were selected without restrictions of age or sex. Table 1 enlists the demographic characteristics of the participating population. There were 4 male and 2 female patients between 40 to 66 years with an average age of 51.5 years. The minimum pain duration was of 3 months with an average pain duration of 12.8 months in these patients. Aetiology of the pain was non-traumatic disc lesion in any of the patients which was confirmed by clinical examinations and further MRI findings. Visual analog scale (VAS) pain score in all of the patients ranged between 6 to 9 on a scale of 1 to 10 (Table 1). All patients were under symptomatic conventional medications before they were enrolled in the study. Also, all of those except one either previously had or were having ongoing physiotherapy sessions.

Most of the medicines taken by the patients before participating in this study were analgesics with or without gabapentin, pregabalin and tramadol etc. Physiotherapy gadgets of different kinds were also used in addition. Target areas of the deployed gadgets were the lower vertebral column and lower limbs. However, these regimens of therapeutic interventions

were not yielding any noteworthy improvements in VAS pain score in any of the included patients.

Patients were clinically examined by an orthopaedic - spine surgeon before prescribing the *Pipal* extract and they were re-examined by the same doctor at stipulated intervals of time to assess its efficacy. Table 2 enlists clinical parameters pertaining to participating patients. All patients were asked to discontinue their analgesics, other neurotropic medicines, and physiotherapy while taking this *Pipal* extract through the course of 3 months. It is important to mention that the final product was prepared in a tablet form containing 2 grams of the extract which was to be taken 2 times a day on empty stomach.

## RESULTS AND DISCUSSION

Traditional medicines in the form of crude herbal extracts of a single plant or combination of a number of plants, with or without additional minerals have been used in alleviating and curing diseases affecting the nervous system across the globe.

Neuropathic pain in disc lesion cases is primarily rooted in mechanical, biochemical, and neurotropic causes which are many a time refractory to allopathic medicines and even to minimal or even to standard surgeries of lumbar discs. One of the authors of this article, who has been performing spinal surgeries for the last 40 years, was enthused by the idea to use *Pipal* extract in patients suffering from neuropathic pains of lower limbs after seeing its importance in Ayurvedic literature.

All of the patients participating in this study had tried different medications and physiotherapy options for a considerably long time without any significant relief. The chronicity and intensity of pain was eventually leading to the need for a surgical intervention for the lumbar disc lesions. However, after using the *Pipal* extract, all patients showed moderate to significant improvements in neuropathic pain and other clinical parameters. Patterns of relief varied among those in terms of time duration. On one hand, one of the patients had improvement within the first week itself, while others required at least one month or more for

recording improvements in their conditions (Table 3). None of the patients had any intolerance like GI problem or allergy or other side effects during the course of 3 months or even after its discontinuation. Drug dependency was also not observed at all in any of the participants.

It is very natural that any therapeutic material of natural origin has a great number of molecules. It is quite logical to explore for the active therapeutic molecule in the preparation used for the indication. However, this endeavour might not be very practical for a few reasons. One of them could be that the combination of those compounds had to be there to make the therapeutic agent to be efficiently absorbed by the intestinal tract or to form the active nature of the molecule. In addition, those accompanying molecules could be a very important factor in minimizing possible side-effects possibly caused by the active ingredient.

## CONCLUSION

The extract derived from the *Pipal* tree (*Ficus religiosa*), used in this study, showed very promising results for the management of chronic and refractory lumbar disc related neurological pains. These findings have opened up one more possibility in the field of non-surgical treatment of neuropathic pains due to or caused by lumbar disc lesions. These preliminary findings urge for further studies in this field to increase the scope of treatment for such patients and for others suffering from similar neuropathic disorders. This *de novo* study is in focused the field of neuropathic pain management. It is anticipated that with targeted research into the bioactive composition and mode of actions of the chemical contents of *Pipal* (*Ficus religiosa*) tree, with a goal for finding important active compounds for treatment of neurogenic pain due to disc-related or other disorders in near future.

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**Table 1: Demographic characteristics of the participating population.**

Patient No.	Age (Yrs)	Sex	Duration of pain (Months)	Pain score	On medications	On physio	On both (med + physio)	Any surgery	Co- morbidity
1	55	M	12	7	Yes	No	No	No	DM*
2	58	M	18	8	Yes	Yes	Yes	No	DM+HTN**
3	39	F	03	9	Yes	Yes	Yes	No	None
4	66	F	30	6	Yes	No	No	No	None
5	40	M	08	7	Yes	No	No	No	None
6	51	M	06	7	Yes	No	No	No	None

\*DM- Diabetes Mellitus, \*\* HTN- Essential hypertension

**Table 2: Clinical findings of the patients before taking the Pipal extract.**

Pat. No.	Clinical findings
1	Tender L4-5 spines, no spasm, SLR-normal, reflexes-normal, no muscle weakness, FFD**-5cm
2	Tender L4-5-S1 spines, no spasm, SLR+ by 50 degree bil., reflexes-both ankle jerks reduced, no muscle weakness, FFD-7cm
3	Tender right sciatic course, right hamstrings spasm +, right SLR + by 40 degree, reflexes-right ankle jerk absent, weak right EHL* having muscle power grade 4, FFD -20cm.
4	Tender L4-5 spines, no spasm, SLR-normal, reflexes-normal, no muscle weakness, FFD-10cm
5	Tender L4-5 spines, no spasm, SLR-normal, reflexes-normal, no muscle weakness, FFD-12cm
6	Tender L5-S1 spines, back spasm+, SLR-normal, reflexes-normal, no muscle weakness, FFD-8cm

\*EHL- Extensor Hallucis Longus, \*\*Finger to floor distance

**Table 3: Subjective and clinical findings after taking the Pipal extract**

Duration (days)	Pain score-VAS	Finger to floor Distance in cm	SLR Improvement (2 Pat.)	Muscle spasm (2 Pat.)	Tenderness Reduction (6 Pat.)	Reflex Improvement (2 Pat.)	Muscle power Improvement (1 Pat.)	Side effects
01	6 to 9	5 to 20	0	0	0	0	0	none
02	6 to 9	5 to 20	0	0	0	0	0	none
07	3 to 7	5 to 15	0	0	1	0	0	none
15	3 to 6	3 to 10	1	1	2	0	0	none
30	2 to 5	0 to 7	1	1	4	0	1	none
90	0 to 4	0 to 5	2	2	6	1	1	none

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