# Yogasanas as a Neurodynamic Mobilisation Tool in the Treatment of Sciatica

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**Abstract:** Background & objectives: Neurodynamic mobilisation tests are well established techniques for mobilising nerves. Yogasanas are also independently recognised for their benefits in various conditions and ailments. This study compares Paschimotanasana, which is similar in position to the Neurodynamic mobilisation tests for the sciatic nerve. Methods: 32 patients suffering from sciatica were enrolled in either of the two treatment groups- Neurodynamic mobilisation and Yogasanas. The Yogasana group has to perform 7 asanas, out of which only one Yogasana (Paschimotanasana) would be similar to slump test. Pain was assessed using the Visual analogue pain scale (VAS). Results: There was no statistically significant difference (P>0.05) between the VAS scores obtained between the two groups. However, the Yogasana group took more number of days (2 weeks) for pain relief compared to the Neurodynamic mobilisation group. Interpretation & conclusion: Yogasanas can be used for mobilizing peripheral nerves, and with regular use reduce their mechanosensitivity. While the patient can self mobilize the nerve, the role of physiotherapist will be in planning appropriate Yogasanas and teach the programme as a package initially, to instruct about overstretching and protect blood vessels travelling with nerves and supervise intermittently.[Gaurang B NJIRM 2017; 8(4):48-52]

**Key Words**: Paschimotanasana, Physiotherapy, Neurodynamic mobilisations, Neurodynamics, Sciatica, Yogasanas.

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**Introduction:** Sciatica is derived from a Greek word that essentially means 'leg pain' [1]. Symptoms include pain in the dermatome of lumbar or sacral spinal nerve roots that may be caused by general compression and/or irritation of nerve roots of the sciatic nerve, leading to radiating pain below the knee and into the foot and toes.[2,3] Sciatica along with back pain is a major cause of disability and social cost, affecting the quality of life in most patients. Life time incidence of low back pain is 50-70% and it varies from 13% to 40%.[4] Annual incidence of an episode of sciatica ranges from 1% to 5%.[5,6]

In approximately 90% of the cases, sciatica is caused by a posterolateral herniated disc involving nerve root compression. Other causes of sciatica are lumbar canal stenosis, spinal tumors, spondylolisthesis, piriformis syndrome, cyst of the hip or lumbar, vascular malformations and intrapelvic aneurysm.[2,3,7] Physiotherapy treatment interventions like electrotherapy (laser, mechanical traction, ultrasound, IFT, TENS), manual therapy (neural mobilization, manipulations, massage, stretching), therapeutic exercises and corsets are available for treatment of sciatica.

Neural tissue mobilization techniques are passive or active movements which focus on restoring the ability of the nervous system to tolerate the normal compressive, friction and tensile forces associated with daily activities.[7] Also known as 'Neurodynamic Mobilization' these are manual therapy techniques specifically for the peripheral nerves and connective tissues of the nervous system. The entire nervous system is able elongate, slide-angulate itself by adapting to changes in cross-sectional diameter via compression, mechanical load. If these dynamic protective mechanisms fail, the nervous system is vulnerable to neural edema, ischemia, fibrosis and hypoxia, which may cause altered neurodynamics.

Neural mobilization is used for treatment of adverse neurodynamics. The benefits from such techniques include facilitation of nerve gliding, reduction of nerve adherence, dispersion of noxious fluids, increased neural vascularity and improvement of axoplasmic flow. It contributes to restoring the ability of neural tissue itself to stretch and tension, and stimulates the reconstruction of normal physiological function of nerve cells.[7]

Other established treatment techniques for sciatica include yoga, which has been proven effective in other musculoskeletal disorders as well, including low back pain, carpal tunnel syndrome, etc.[8] Yoga means 'Union' and is a multifaceted practice, including exercise / movement (asana), breathing / breath control (pranayama) meditation and relaxation

techniques that aim to access the peripheral nervous system to create a positive state in the body and mind.[9,10,11]

**Objectives:** Neurodynamic mobilisation techniques are done by the physiotherapist, where the patient has a passive role. There is no activity done by the patient. The therapist only places the limbs in a position which will put the nerves to stretch.

This study compares the effect of a customised Yogasana programme with Neurodynamic mobilisation, in the treatment of sciatica.

The specific objective was to see if Yogasanas can exert a stretch on the nerve where the asana itself is similar to the position for neurodynamic testing.

**Method**: This interventional study was conducted in the out-patient department of Dr. D.Y. Patil College of Physiotherapy, Pune. Prior approval was taken from the institutional scientific and ethical committees. Patients complaining pain due to nerve entrapments, nerve root lesions, spinal canal stenosis, neuritis were included. Patients with sciatic radiating pain were subjected to intervention. Patients were assessed for pain on the Visual Analogue Scale (VAS) [12] at the beginning and at the end of the intervention period.

Patients were divided into two groups by tossing a coin. The first group was subjected to treatment as per neural tissue mobilization techniques, as given by Butler. The second group was given a Yoga program consisting of the following Yogasanas: Anulom-Vilom Pranayam, Paschimotanasana, Ardha-Matsyendrasana, Trikonasana, Gomukhasana, Dhanurasana, Pawanmuktasana and Shavasana.

Among the above asanas, Paschimotanasana is similar to the neurodynamic slump test done for the sciatic nerve, as shown in fig. 1 below.

**Fig- 1: Paschimotanasana similar to Slump test**

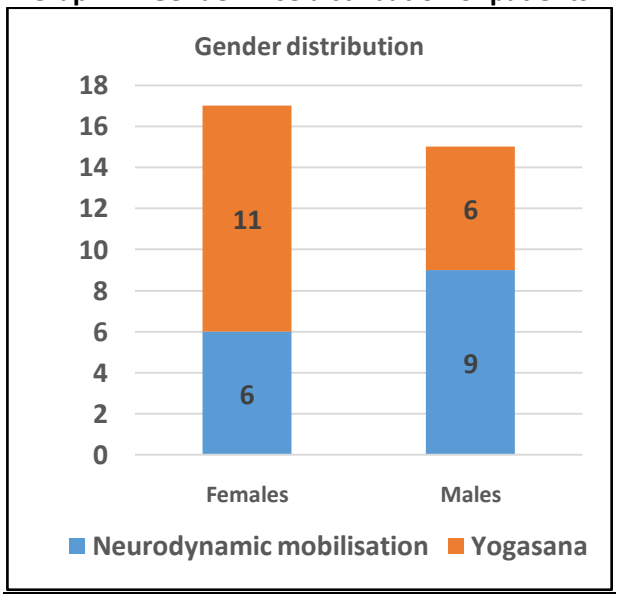
**a) Paschimotanasana**

**b) Neurodynamic mobilisation test for Sciatic nerve (Slump test)**

Yoga, being a holistic program, it has effects on various body systems other than any single system alone. Therefore, as a holistic package, a Yoga programme was delivered, rather than individual yogasanas for overall health benefit than relief of a single nerve problem. In performing such pain free asanas, compliance in performing a particular asana was likely to increase. The duration of treatment for both groups was identical, around 20 minutes. Treatment was done daily, until patients felt better and have pain relief. Student's t-test was applied for comparing the VAS scores. Significance level was kept at 5 % (i.e. $p \leq 0.05$).

**Results:** 32 patients were enrolled for the study, 15 in the Neurodynamic mobilisation group and 17 in the Yogasana group. Gender wise distribution is given in graph 1.

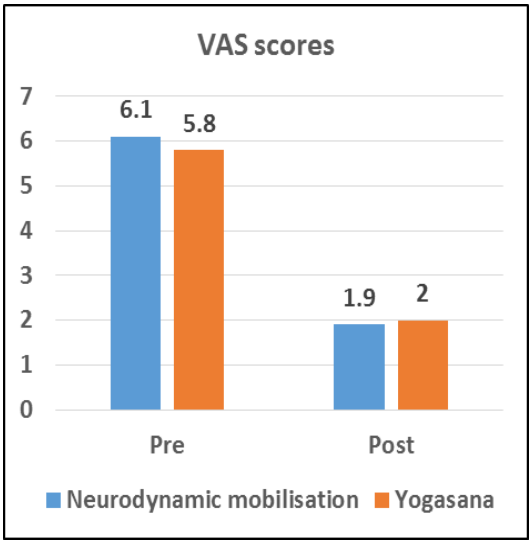
**Graph- 1: Gender wise distribution of patients**



The number of women were more in the Yogasana group, while men were more in the Neurodynamic mobilisation group.

Analysis of pre and post treatment pain scores on VAS for both groups is given in graph 2.

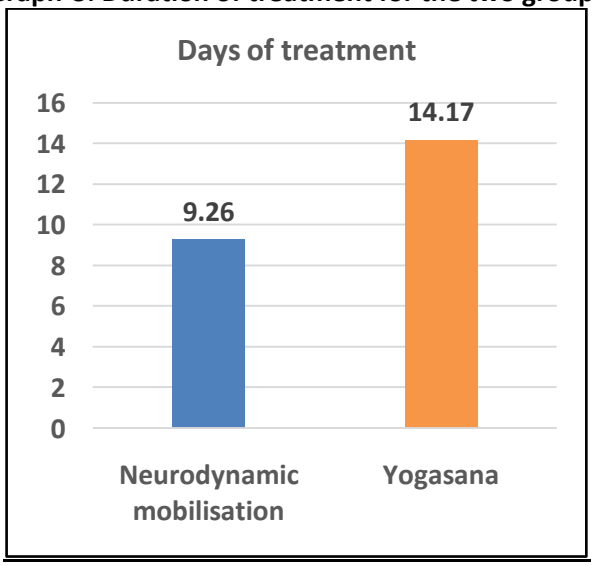
**Graph- 2: Analysis of pre and post treatment pain scores on VAS**




From graph 2 above, it is seen that there is a definite reduction of pain in both the groups after treatment, as depicted by the VAS score. Also, the scores under Butler group are slightly higher than that of Yoga group. However, this difference between the two groups is not statistically significant (P>0.05).

Analysis of number of days of treatment for both groups is given in graph 3.

**Graph-3: Duration of treatment for the two groups**




Graph 3 above shows that more number of days were required for the Yogasana group, compared to the Neurodynamic mobilisation group.

**Discussion:** The United Nations General Assembly, recognising the holistic approach of Yoga to health and well-being, has declared June 21 as "International Day of Yoga".[13] This underlines importance of Yoga in human health broadly. Present study explores a previously unexplored territory, where Yogasanas are compared with Neurodynamic mobilisations, based on the similarities in anatomical positions used.

Neurodynamic tests for mobilizing nerves given by Butler and Elvy are well established as passive nerve mobilization techniques. [14,15] These tests not only produce an increased tension in the nerves, but also help mobilize nerves in relation to its surrounding structures.16 The presence of a 'positive' neurodynamic test indicates increased mechanosensitivity across the neural tissue tract.[14,17]

We have selected matching yoga postures, which match the movements for performing the Butlers neurodynamic tests, which allow active mobilization of the nerves. [18]

By a yoga program containing specific elements of detecting neural tissue tension and providing a means of mobilizing nervous tissue over the course of the nerve, our objective was achieved. Out of a regime of 7 Yogaasanas, only 1 was likely to be pain provoking, whereas the remaining asanas offered general benefits.

In performing such pain free asanas, patients' compliance in performing a particular asana was likely to increase. Thus, the patient from yoga group was more committed with active involvement. The onus of improvement was shared by the patient and the therapist both, patient management was less paternistic.

Pre-treatment scores of pain on VAS are higher for Neurodynamic mobilisation group. This could be due to the fact that in Neurodynamic mobilisation, there is an external intervention by the Physiotherapist while assessing the pain; as against in Yoga method, it was patient who was his own judge. In another words, patient is active in Yoga method but is passive in Butler method.

Yogasana group took more number of sessions, probably because it does not target the nerve directly. The mobilization effect with Yoga was statistically slightly better, though the number of days of treatment required were more in the Yoga group. This can be because Neurodynamic mobilisation is by the therapist.

Whereas with yoga, mobilisation is active; there is self monitoring by the patient. Therefore, the patient's perception is called upon. The patient will search point of discomfort and plays around it.

Yoga can thus be a method of self management. It could be suitable where the therapist is unavailable, or patient cannot have access to a therapist, or is not affording.

While performing yoga, the difference in pain is due to activity. Performing active movements by the patient has shown a favourable but slower effect in the reduction of pain. Neural tissue mobilization techniques, whether active or passive, help restore the ability of the nervous system to tolerate normal compressive, frictional and tensile forces associated with daily activities.17 This may be because of improvement in intra-neural circulation and reduced hypersensitivity.[19]

Conservative management incorporating Neurodynamic mobilization techniques can be effective in addressing musculoskeletal presentations of peripheral neuropathic pain. Thus, Yogasana individually can be used as supervised indirect forms of self-mobilisation via slow, low amplitude sustained stretch comfortable, at the terminal range of active movements in closed chain.

Yogasanas have been effective as home exercise programme, which have been a domain of physiotherapy from the beginning. Repetitions within limits makes patient compliance possible as a known secret for successful outcomes in Physiotherapy.

Being a holistic program, yoga has effects on various body systems other than any single system alone. Patients might be having other risk factors as well, which yoga will help reduce. Therefore, there is overall benefit as a health measure, and a volunteer subject may readily accept a proposition for overall health benefit than relief of a single nerve problem.

**Conclusion:** There is no significant difference in the mobilisation done by Neurodynamic mobilisation method and Yoga method. Yogasanas can be used for mobilizing peripheral nerves, and with regular use reduce their mechanosensitivity.

Patient can self mobilize the nerves, will be in-charge for his own treatment and health. A therapist role will be in planning appropriate Yogasanas and teach the programme as a package initially, to instruct about overstretching and protect blood vessels travelling with nerves and supervise intermittently.

Neurodynamic mobilisation requires passive stretching by a trained therapist all along the treatment time. Yoga is a self mobilisation method with active role of a patient; a physiotherapist has to plan treatment and educate a patient initially. However, since Neurodynamic mobilisation and Yoga mobilisation methods nerves studied are equally effective, credit can be given to Yoga method as a home programme.

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| Conflict of interest: None |
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| Funding: None |
| Cite this Article as: Gaurang B, Madhav M, Nirmala B, Tushar P, Rasika P. Yogasanas as a Neurodynamic Mobilisation Tool in the Treatment of Sciatica. Natl J Integr Res Med 2017; 8(4):48-52 |