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The Effects Of Slider And Tensioner Neural Mobilization Along With Lumbar Traction Among Sciatica Patients

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Abstract

Background: *Sciatica is a condition in which there is compression over the sciatic nerve that results in pain, numbness and tingling sensation over the course of the nerve. The lumbar traction is widely used to relieve the compression. But the latest studies show that neural mobilisation is helpful in treating sciatica. It alleviates the symptoms of nerve compression and reduces pain.*

Methodology: *In this study, 20 samples were taken under inclusion and exclusion criteria. Participants were evenly divided into 2 groups. Group A performs slider mobilisation along with traction and Group B performs tensioner mobilisation along with traction. This treatment protocol was followed 3 times per week for 2 weeks. Sciatica Bothersomeness Index (SBI) and Roland Morris Disability Questionnaire (RMDQ) were taken before and after intervention.*

Results: *Results showed that Group A (slider neural mobilization + lumbar traction) was better than Group B (tensioner neural mobilization + lumbar traction). The statistical analysis was conducted at 95% confidence level and $p < 0.0001$ was considered statistically significant.*

Conclusion: *The slider neural mobilization with lumbar traction (Group A) has reduced the symptoms and improved the activities of daily living of sciatica patients when compared to tensioner neural mobilization (Group B).*

Keywords: *Sciatica, slider & tensioner neural mobilization, lumbar traction, SBI, RMDQ, comparative.*

INTRODUCTION

Low back pain (LBP) is a very common problem worldwide that occurs in all age groups. In 2015, LBP was responsible for 60.1 million disability-adjusted life-years, and represented an increase of 54% since 1990.[1] The involvement of any one lumbar or sacral spinal nerve root in combination with dermatomal and reflex abnormalities called lumbar radiculopathy. It occurs in approximately 3-5% of the population, with the recurrence of signs and symptoms in 10-25% of affected populations.[2] Men are more likely to have lumbar radiculopathy in their 4th decade of life, while women have higher rates in their 5th and 6th decades of life. [3] Sciatic Nerve is the thickest nerve in the body. The point of origin is in the "pelvis of ventral rami of L4 to S3 spinal nerves" and leaves the pelvis through the sciatic foramen, below the piriformis muscle. It travels along the posterior thigh and innervates the hamstring muscles (hip extensors and knee flexors) and the adductor Magnus muscle (hip adductor and knee flexor). It is 1.5 to 2 cm wide at the beginning and it is divided into 2 parts, tibial nerve and common peroneal nerve. [4, 5] Sciatica, often called lumbar radiculopathy, which is the compression of the sciatic nerve that radiates downwards from the buttock along the course of the lumbosacral nerve roots with electric, burning, or sharp pain. It can be caused by a herniated lumbar disc, where the nerve root is compressed by disc material that has ruptured through its surrounding annulus. [3, 6] It can also be caused by a space-occupying lesion that can result in nerve root inflammation, impingement, or both. [7]In most entrapment neuropathies, the onset of the symptom is mostly slow, but it is often mild and chronic for neural injury.[8] The signs and symptoms are radiating pain over the dermatomal distribution, weakness with the myotomal distribution, numbness

or tingling sensation, and impaired deep tendon reflexes (DTR). [9] For normal daily activities, a nerve has its own capacity to withstand the mechanical stress applied and if the duration and the degree of stress increase above its capacity, it can cause changes in the integrity of the nerve. [10] In some studies, the report says that the working population with physically demanding jobs has higher rates of sciatica compared with studies in the general population. [11] Lumbar traction is a modality used to treat chronic low back pain. In this there is 40% of body weight used to put as a preload. [12] It reduces pressure on the vertebral foramen by releasing tension in the spinal muscles, improving the alignment and reducing the muscle spasms. It reduces tension in soft tissue and pressure on the vertebrae and also, it causes inward movement of the nucleus pulposus. [13] Traction can be classified as continuous (for 15 to 20 minutes or more) or intermittent (alternating traction and relaxation with a cycle of a few minutes) and it may vary for each individual and their conditions. [14] Neural Mobilization helps in improving pain and normal function of the sciatica patients. It has two techniques, one is slider mobilization in which a longitudinal force is applied at one end of the nerve while tension is released at the other and the other one is tensioner mobilization in which a longitudinal force is applied to increase the distance between each end of the nerve. Sliders may be more useful to reduce pain and improve excursion of the nerves, whereas the tensioners may be used to improve the viscoelastic and physiological functions of neural structure. [15] The LANSS (Leeds Assessment of Neuropathic Symptoms and Signs) Scale consists of five questions regarding pain presentation and two questions regarding sensory tests, totalling seven items. This scale is a 'yes or no' type of questions asked and filled by the therapist. A LANSS score ≥ 12 was classified as neuropathic pain and a score < 12 was classified as nociceptive pain. [16] The Sciatica Bothersomeness Index (SBI) used to investigate patient perceptions of the symptoms include leg pain and numbness or tingling in the 'leg/foot/groin', 'weakness in the leg/foot', 'back/leg pain while sitting'. Patients should give a rating to each symptom scale, the sum of all the ratings is considered as the total score. [17]

The Roland Morris Disability Questionnaire (RMDQ) is a simple, sensitive and reliable method of measuring disability in back pain patients. It consists of 24 items; the patient should mark the item, if it is applicable for that day. A total score is obtained by counting the marked items. [18]

MATERIALS AND METHODS

In this comparative study, a total of 20 samples were taken from Prema Physiotherapy Clinic, Chennai. They were divided into 2 groups - Group A and B (each containing 10 subjects). Prior to the study, all participants received an explanation of the goals and procedure of the study, and they took an informed consent and information form. Pretest results for the Sciatica Bothersomeness Index (SBI) and Roland Morris Disability Questionnaire (RMDQ) were obtained before and following the two-week intervention. Group A received slider mobilization along with lumbar traction and Group B received tensioner mobilization along with lumbar traction for 2 weeks - 3 days a week. The exercises were taught and demonstrated by the researcher and then the subjects were made to do. The exercises were repeated on the same days after the treatment given.

Slider Neural Mobilization

Group - A, 10 subjects underwent Slider neural mobilization 2 weeks - 3 days a week (10 repetitions over 2 sets), along with lumbar traction.The patients were made to sit at the edge of the couch in a slump posture with the thighs parallel to each other and arm crossing behind the back. With neck and trunk flexion, the involved side hip and knee in 90° flexion and the ankle in resting plantar flexion. The patients were asked to move the neck into extension, the involved side of the knee into extension and the involved side ankle into dorsiflexion simultaneously.

Tensioner Neural Mobilization

Group - B, 10 subjects underwent tensioner neural mobilization for 2 weeks - 3 days a week (10 repetitions over 2 sets), along with lumbar traction. The patients were made to sit at the edge of the couch in a slump posture with the thighs parallel to each other and arm crossing behind the back. With the neck and trunk flexion, involved side hip and knees in 90° flexion and the ankle in resting plantar flexion. The patients were asked to move the neck into flexion, the involved side of the knee into extension, and the involved side ankle into dorsiflexion simultaneously.

Lumbar Traction

Group A and Group B, The patients were asked to lie in dorsal decubitus on the traction table. The dorsal spine rested on the fixed part of the table, and the lumbar spine segment to be treated was placed at the junction of the fixed and movable parts of the table. If discomfort or excessive pain was experienced by the patients, they were able to activate a safety switch to stop the traction. The force of pull was fixed accordingly and the rest period fixed, before starting the treatment. The duration of intermittent traction was 20 mins per session.

Sciatica Bothersomeness Index and Roland Morris Disability Questionnaire were used as an outcome measure. Descriptive Statistics such as mean and standard deviation were calculated to describe all the variables. The t-test was used to verify differences between pre and post interventions. The statistical analysis was conducted at 95% confidence level and p-value less than 0.0001 was considered statistically significant and thus we reject the null hypothesis.

RESULT

There is a significant difference between two groups A and B in terms of average decrease in Sciatica Bothersomeness Index and Roland Morris Disability Questionnaire. In addition, the mean decrease in the value of Sciatica Bothersomeness Index by intervention given for Group A (4.9) is lesser than intervention given for Group B (7.9) and mean decrease in the value of Roland Morris Disability Questionnaire by intervention given for Group A (3.1) is lesser than intervention given for Group B (5.9). Hence, we conclude that Intervention (Slider neural mobilization + lumbar traction) is significantly effective than Intervention (Tensioner neural mobilization + lumbar traction) in terms of mean decrease in the value of Sciatica Bothersomeness Index and Roland Morris Disability Questionnaire.

Table 1 This Table Shows The Difference Between The Pre And Post Test Values Of The Sciatica Bothersomeness Index For Group A (Slider Group) And Group B (Tensioner Group)

TABLE 1	MEAN VALUES		STANDARD DEVIATION		t-VALUE	p-VALUE
	PRE VALUE	POST VALUE	PRE VALUE	POST VALUE		
GROUP A	18.1	4.9	1.29	0.99	45.4243	<0.0001
GROUP B	18.6	7.9	1.17	0.88	41.0998	<0.0001

From TABLE 1, the descriptive statistics such as the mean value and standard deviation of pre and post test of the Sciatica Bothersomeness Index were calculated. It is found that pre and post test values of Group A are significant when compared to Group B.

Table 2 This Table Shows The Difference Between The Pre And Post Test Values Of The Roland Morris Disability Questionnaire For Group A (Slider Group) And Group B (Tensioner Group)

TABLE 2	MEAN VALUES		STANDARD DEVIATION		t-VALUE	p-VALUE
	PRE VALUE	POST VALUE	PRE VALUE	POST VALUE		
GROUP A	12.9	3.1	1.2	0.74	22.1611	<0.0001
GROUP B	12.7	5.9	1.49	0.88	13.2793	<0.0001

From TABLE 2, the descriptive statistics such as the mean value and standard deviation of pre and post tests of the Roland Morris Disability Questionnaire were calculated. It is found that pre and post test values of Group A are significant when compared to Group B

Table 3
This table shows the difference between the post test values of the sciatica bothersomeness index for group a (slider group) and group b (tensioner group)

Table 3	Mean values	Standard deviation	T-value	P-value
Group a sbi post value	4.9	0.99	45.4243	<0.0001
Group b sbi post value	7.9	0.88	41.0998	<0.0001

From TABLE 3, the descriptive statistics such as the mean value and standard deviation of the post test of the Sciatica Bothersomeness Index were calculated for both Group A and B. It is found that post test values of Group A are significant when compared to Group B.

Table 4
This Table Shows The Difference Between The Post Test Values Of The Roland Morris Disability Questionnaire For Group A (Slider Group) And Group B (Tensioner Group)

TABLE 4	MEAN VALUES	STANDARD DEVIATION	t-VALUE	p-VALUE
GROUP A RMDQ POST VALUE	3.1	0.74	22.1611	<0.0001
GROUP B RMDQ POST VALUE	5.9	0.88	13.2793	<0.0001

From TABLE 4, the descriptive statistics such as the mean value and standard deviation of the post test of the Roland Morris Disability Questionnaire were calculated for both Group A and B. It is found that post test values of Group A are significant when compared to Group B.

DISCUSSION

This study mainly focused on comparing the effects of slider neural mobilization and tensioner neural mobilization along with lumbar traction among sciatica patients. It focused on comparing both techniques in reducing symptoms of sciatica and improving the functionality of the life for sciatica patients. The patients were taken from the age group of 18 to 65 years old. The patients were selected by assessing for LANSS, straight leg raise and slump test. A score of more than 12 in LANSS and a positive sign of tingling, numbness and radiating pain across the nerve pathway for SLR and Slump test.

After assessing for sciatica, the patients were provided with the Sciatica Bothersomeness Index and Roland Morris Disability Questionnaire to identify the degree of limitation and disability. Patient's score of pre-

intervention on SBI ranged between 16-20 and a range of 10-15 score for RMDQ.
Then the patients were divided into 2 groups with 10 patients each, Group-A patients underwent slider neural mobilization with lumbar traction whereas Group-B underwent tensioner neural mobilization with lumbar traction. These interventions were given for 3 days per week for 2 weeks.
In a previous study showed that both slider and tensioner neural mobilization equally improved ROM and reduced pain significantly and progressively in patients having low back-related leg pain with peripheral nerve sensitization and Patients in the tensioner group had the advantage of an immediate reduction in pain after the first session unlike the slider group. Ali M. Alshami et al. [14]
In another study, both Slider and tensioner neurodynamic mobilization techniques were more effective than stretching exercises in terms of reducing pain intensity, increasing ROM of hip flexion, knee extension, and lumbar flexion, and improving functional capabilities for patients with chronic disco genic sciatica but, the slider technique had a greater effect than the tensioner technique in enhancing ROM of hip flexion, knee extension, and lumbar flexion. Haytham Ibrahim et al. [19]
In other study, lumbar mechanical traction in supine position had a better effect in treating pain and disability of patients with lumbar radiculopathy, Carla Vanti et al. [20] In this study, both the slider and tensioner neural mobilization techniques were given to the patients along with lumbar traction, which improved the functional ability and reduced the symptoms. But the slider neural mobilization significantly improved better when compared to tensioner neural mobilization.

CONCLUSION

From the present study, we can conclude that both Slider neural mobilization with lumbar traction and Tensioner neural mobilization with lumbar traction have better effects on reducing Sciatica. From the mean difference value, it is visible that Slider neural mobilization with lumbar traction is more effective than Tensioner neural mobilization with lumbar traction.

Conflicts Of Interest

The authors declare no conflict of interest.

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