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Comparison of Hamstring Stretching Versus Sciatica Nerve Gliding in Individuals with Sciatica

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Abstract: ***Aim: To assess the effect of hamstring stretching and sciatica nerve gliding in individuals with sciatica.Objective- To find the effect of hamstring stretching and sciatica nerve gliding on Pain (NPRS) in individuals with sciatica. Procedure: To find the effect of hamstring stretching and sciatica nerve gliding on ROM in individuals with sciatica. Experimental study done on 30 elderly people out of which 15 were in the hamstring stretching group and 15 were in the nerve gliding group. Pre and post assessment was done with NPRS for pain and goniometer for ROM. paired and unpaired t test was used both hamstring stretching and nerve gliding group shown improvement in reducing the NPRS and increasing the ROM with p> 0.0001.both the groups showed improvement with p value 0.0001 and t value of NPRS for group A and B is 2.312 and t value of ROM for group A and B is 5.745. Conclusion: After comparing both the groups i.e. A and B, the effect of hamstring stretching and nerve gliding is seen significant The study concluded by supporting treatment benefits neural mobilization for improving pain, hip flexion ROM, decreasing symptom distribution and there is better increment of nerve gliding as compared to hamstring stretching.***

Keywords: Nerve gliding, Hamstring stretching, numerical pain rating scale, range of motion

1. Introduction

Sciatic nerve is the thickest nerve in the body. It is the largest branch of the sacral plexus. Its root value is L4, L5, S1, S2, S3.Sciatica describes pain felt along the sciatic nerve, which runs from the lower back down through the buttocks, hamstrings and into the lower leg**.** Stretching a muscle with a long sustained stretch is optimal to provide "elongation of tissue beyond its extensibility resulting from a constant load". When gliding a nerve, you are trying to "separate the nerve from the surrounding structures by sliding the nerve that lengthen the nerve bed. Stretching a nerve, if injured, can actually irritate the nerve and possibly exacerbate symptoms. At some time, up to 40 percent of people experience sciatic pain, which occurs, when sciatic nerve is trapped or inflamed (Harvey Simon, 2003). Prevalence of sciatic symptoms did not differ between males and females (Kelsey & Ostfeld, 1975). It was 5.1% for men and 3.7% for women aged 30 years or over (Heliövaara et al., 1987 and AHCPR, 1994). The hamstring muscles play an important role in the performance of daily activities such as controlled movement of the trunk, walking, running, and jumping [1], and it is an important muscle involved in maintaining balance and posture in standing position [2]. Previously developed techniques to increase the flexibility of the hamstrings include static stretching, contract-relax stretching, thermo-therapy, massage, and neurodynamics [3,11–13]Neuromobilization is a set of techniques designed to restore plasticity of the nervous system, defined as the ability of nerve-surrounding structures to shift in relation to other such structures [7]. Neural mobilization was described by Maitland in 1985, Elvey in 1986 and Butler refined it in 1991 as an adjunct to assessment and treatment of neural pain syndromes including radicular low back pain. The goal of mobilization is to increase the flexibility of collagen that maintains the integrity of the nerve and movement of the nerve in relation to its surrounding structures. Neurodynamics is a manual method of applying force to nerve structures through posture and multi-joint movement [14]. Based on the principle that the nervous system should be also stretched and contracted properly to maintain normal muscle tension and ensure range of motion [15], this technique is used for the recovery of soft tissue mobility [16]. Movement of the body both increases the strain on nerves and moves nerves associated with the surrounding tissue [17]. Neurodynamic treatment consisted of passive or active movements, which aimed to 1 randomized the overly nervous system by restoring its ability to tolerate external forces such as movement and compression.[4] Passive movement is best to influence the nervous system as most of the interfacing tissues to nerve are muscles. To get the best nerve movement, it seems logical to move the nerve with the surrounding structures being relaxed as possible.

2. Method / Approach

Ethical clearance was taken from the committee. Samples were collected by purposive sampling method. The details of the treatment were explained to the subjects and written consent was taken. Total 30 subjects (n-30) between the age group of 40-60 years participated in the study. 30 subjects were divided in two groups i.e. group A for Hamstring stretching (n-15) and group B for Nerve gliding (n-15). Pre-assessment was done with NPRS for pain and goniometry for ROM. Goniometer was used to assess range of motion of hip flexion with knee extension. Group A was given hamstring stretch in pain free range for 30 seconds hold with 5 repetitions. Group B was given sciatica nerve gliding (Grade II) with 30 repetitions in 20-30 seconds. The treatment was continued with 3 sessions per week for 4 weeks. Post-assessment was done with NPRS for pain and goniometry for ROM after 4 weeks and values were recorded.


Hamstring stretching


Nerve Gliding

3. Result

Data was analyzed by using paired t test and unpaired t test. There was no drop out of patients from this study.

NPRS

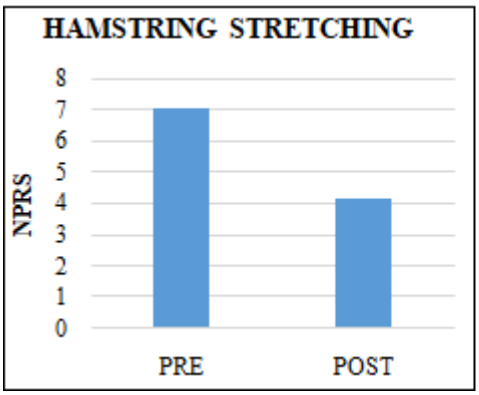
Table 1: Paired t test used for pre and post values for NPRS of group A and group B

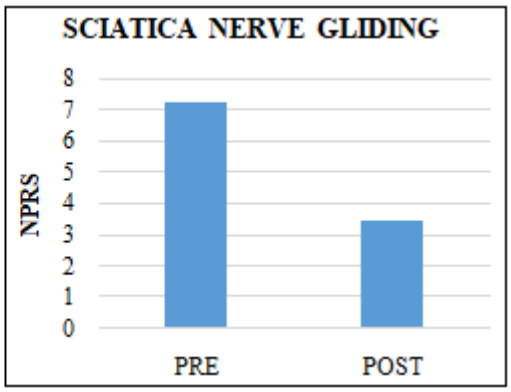
Outcome Measure	Group	Training	Mean±Sd	Significance P Value	Mean Difference	Paired T Value
NPRS	A (HAMSTRING Stretching)	Pre	7.06±0.96	<0.0001	2.93	16.14
		Post	4.13±0.74			

The data has passed the normality test. Paired t test was performed within group A i.e. pre and post NPRS of hamstring stretching. P<0.0001, is considered extremely significant.

Paired t test was performed within group B i.e. pre and post NPRS of nerve gliding. P<0.0001, is considered extremely significant.

Both the techniques are clinically significant to reduce pain, but statistically group B is more effective in pain reduction.





ROM

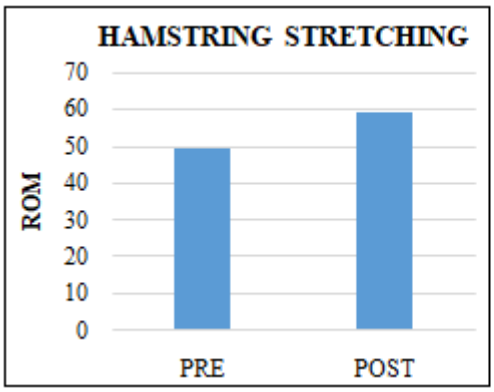
Table 2: Paired t test used for pre and post values for ROM of group A and group B

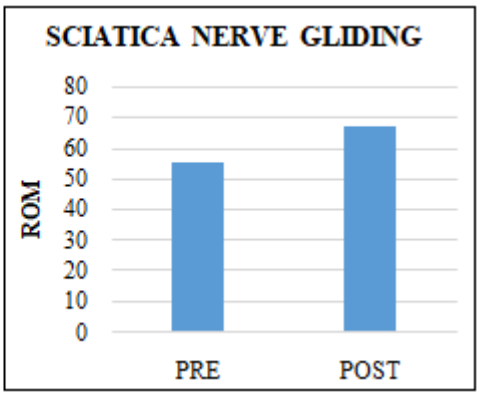
Outcome Measure	Group	Training	Mean±Sd	Significance P Value	Mean Difference	Paired T Test
ROM	A (HAMS Stretch)	Pre	49.4±3.22	<0.0001	-9.60	12.62
		Post	59±3.74			
ROM	B(Nerve Gliding)	Pre	55.26±5.59	<0.0001	-11.600	12.92
		Post	66.86±3.75			

The data has passed the normality test. Paired t test was performed within group A i.e. pre and post ROM of hamstring stretching. P<0.0001, is considered extremely significant.

Paired t test was performed within group B i.e. pre and post ROM of nerve gliding. P<0.0001, is considered extremely significant.

Both the techniques are clinically significant to increase range, but statistically group B is more effective in better improvement of range.

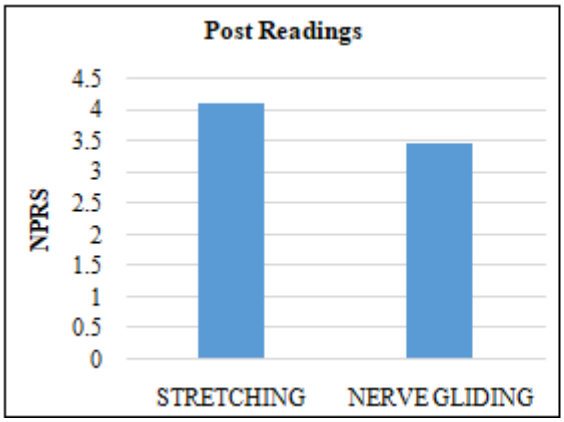


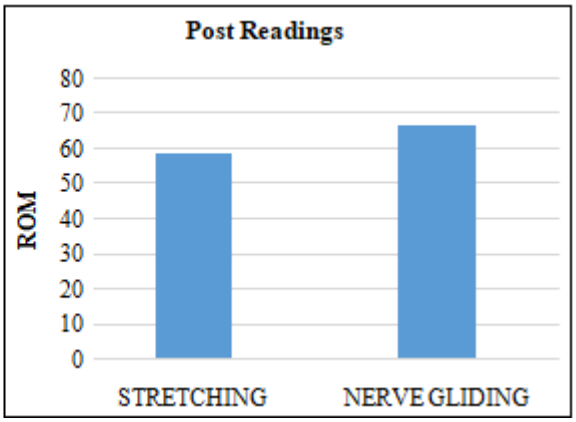


Post Readings

Outcome Measure	Group	Training	Mean±Sd	Significance P Value	Mean Difference	Unpaired T Value
NPRS	A (HAMS Stretch)	Post	4.13±0.74	<0.0284	-0.6667	2.312
	B(Nerve Gliding)	Post	3.46±0.83			
ROM	A (HAMS Stretch)	Post	59±3.74	<0.0001	7.867	5.745
	B(Nerve Gliding)	Post	66.86±3.75			

Table 3: Unpaired t test used for post NPRS and ROM between group A and group B. Unpaired t test was performed for post NPRS between group A and B i.e. hamstring stretching and nerve gliding. P value is 0.0284, which is considered significant. Unpaired t test was performed for post ROM between group A and B i.e. hamstring stretching and nerve gliding. P value is <0.0001, is considered extremely significant. Both the techniques are clinically significant to increase range and decrease pain, but statistically group B is more effective in NPRS and ROM.





4. Discussion

Sciatica is a non-specific term commonly used to describe symptoms of pain radiating downward from the buttock over the posterior or lateral side of the lower limb. It is usually assumed to be caused by compression of nerves. Due to the dynamics of the human spine, lumbar disc syndrome and accompanying complaints of sciatica (Ionnis Karampelas et al, 2004). Effectively of neural mobilization is thought to be due to neural "flossing" effect, that is, its ability to restore normal mobility and length relationship, and consequently, blood flow and axonal transport dynamics in compromised neural tissue. Neural mobilization is very effective in breaking up the adhesions and bringing about mobility. According to Carey et al (1995), it helps in providing symptomatic relief only. It has been suggested that stretching of the hamstring musculature to improve tissue flexibility may reduce the number of leg overuse injuries after exercise [44], although further high quality studies are needed [55]. While some theories explaining the therapeutic effects of muscle stretching suggest there is alteration of the viscoelastic properties of muscles .In the present study, the aim was to analyze and compare two techniques in individuals with sciatica. Neural mobilization and stretching were used because the research indicates significant results for pain processes due to peripheral nerve lesion[12-15].

In addition, there is the hypothesis that nerve movement within pain-free variations can help to reduce nerve compression, friction and tension, therefore decreasing its mechanosensitivity. At the beginning of the study, the two groups were not significantly different in terms of NPRS score i.e. Group A 7.06± 0.96 and Group B 7.20 ± 1.01 and ROM with goniometer Group A 49.4 ± 3.22 and Group B 55.26 ± 5.59. After the therapy, there was significant improvement between groups in both NPRS scores Group A 4.13 ± 0.74 and Group B 3.46 ±0.83 and ROM with goniometer Group A 59 ± 3.74 and Group B 66.86 ± 3.75. The graph shows post readings with p value <0.0001 for

NPRS and ROM which reflects significant increase in ROM and reduction in pain.

Treatment was of 4 weeks but if continued for more than the value of NPRS would have come down and ROM would have increased. Sarkari1 , E. And Multani2 , N.K in 2007 has done a study on Efficacy of Neural Mobilization in Sciatica, in this study 30 patients, between age group of 40-65 years who were diagnosed cases of radiating low back pain were included and was divided into two groups. Group A was treated with neural mobilization along with conventional treatment whereas group B was administered only conventional treatment. Neural mobilization along with conventional treatment was found to be more effective in relieving low back pain. Chaitali shah, Hiral Amin, Monic Siyani has done a study in 2019 on Effect on eccentric hamstring stretching exercise and sciatic nerve gliding technique, in this study 40 subjects were divided into two groups i.e. Group A stretching and Group B nerve gliding. Both groups were treated for 6 days in a week for 2 weeks. The study showed that both the groups have significant improvement in ROM but statistically and clinically subjects with hamstring stretching showed more improvement in ROM. Mobilization of nerves has a mechanical effect that must affect the vascular dynamics, axonal transport, nerve fibers and connective tissues. Dispersion of a nerve compression could be enhanced by alteration of the pressure in the nerve during movement. Compression will surely alter the circulation, lessening the diameter of the nerve, although the mechanism is not fully understood [(9)]. The results of this study suggest that neural mobilization has significant improvement in radicular low back pain. Both forms of statistical analysis revealed that both treatment groups have meaningful results in pain and ROM, but group B which included neural mobilization improved significantly.

5. Conclusion

After comparing both the groups i.e. A and B, the effect of hamstring stretching and nerve gliding is seen significant. The study concluded by supporting treatment benefits neural mobilization for improving pain, hip flexion ROM, decreasing symptom distribution and there is better increment of nerve gliding as compared to hamstring stretching.

6. Future Scope

Study duration can be longer, Clinical studies with adequate follow up (6 months to 1 year) should be undertaken to assess the carry over effects of these techniques, Treatment can be based on occupation of patient and Homogeneity of gender can be done.

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