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Efficacy of Neural Mobilisation in Sciatica

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Abstract

The study was conducted on 30 patients, between age group of 40-65 years who were diagnosed cases of radiating low back pain. Subjects were randomly allocated to either group A or B. The patients of group A (n = 15) were treated with neural mobilization along with conventional treatment whereas group B (n = 15) was administered only conventional treatment. ROM and pain were assessed using goniometer and Visual Analog Scale (VAS). Neural mobilization along with conventional treatment was found to be more effective in relieving low back pain (t = 7.643) as well as improving the range of SLR (t = 5.848) than conventional treatment alone.

Key Words: Neural Mobilization, Low Back Pain, ROM, VAS

Introduction

Sciatica is a symptom not a diagnosis. It 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 nerve. Due to the dynamics of the human spine, lumbar disc syndrome and accompanying complaints of sciatica are long standing afflictions of our species (*Ionnis Karampelas et al, 2004*). It was not until 1943, with land mark publication of *Mixter and Barr* that the herniated lumbar disc was shown to be a major cause of sciatica *(Ionnis Karampelas et al 2004).* 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*). It is occupation related also (*Magora, 1973, Videman Battie, 1999*). Traditional exercise therapy program for sciatica primarily focuses on pain relief. *Butler* (*1991*) recommends that neural mobilization be viewed as another form of manual therapy similar to joint mobilization. In order to pay heed to it manual methods should be used in order to restore the mechanical function of impaired neural tissue (intra-and extra neural impairment) in the lumbar-pelvic-lower limb complex. The focus of this study is to see the effectiveness of neural mobilization on individuals with sciatica and to judge its superiority over the conventional treatment.

Materials and Methods

Once the subjects registered themselves in the Out Patient Department with the complaint of radiating low back pain, they were assessed according to format given by *Andersson & Deyo (1996).* Differential diagnosis with other back conditions mimicking sciatica was established. If the subjects were found to have sciatica, all inclusion and exclusion criteria were checked. The subjects were included in the study if all the inclusion criteria were met and no exclusion criteria were found. 30 subjects were selected between the age group 40 to 65 years, of

which 14 were males and 16 were female, of these 20 had symptoms on right side and 10 had on left side. The subjects were told all about intervention and procedural details to be followed in the study and thereafter consent was obtained.

Range of motion was measured using goniometer. A Visual Analog Scale was used for assessing the pain. Patients were conveniently allocated either to group A or to group B

Group A (n=15) Experimental Group

- Sciatic Nerve Mobilization
- Traction
- TENS
- MHP

Group B (n=15) Control Group

- Traction
- TENS
- MHP

Before starting the intervention all the patients were checked for range of motion of SLR at the hip and pain with the help of standard goniometer and Visual Analogue Scale respectively. The control group (Group B) participated in a standard rehabilitation program or conventional physical therapy treatment (*Vroomen et al, 2000*) for the disease which included MHP for 10 min, traction for 10 min (intermittent) with 1/3 of body weight with the patient in supine and hip and knee flexed to 90^0. This was followed by High TENS for 10 min. The experimental group (Group A) participated in a standard rehabilitation program supplemented with neural mobilization program for sciatic nerve.

Neural mobilization was given for approximately 10 minutes per session including 30 sec hold and 1 min rest. The straight leg raise was done for inducing longitudinal tension as the sciatic nerve runs posterior to hip and knee joints.The leg was lifted upward, as a solid lever, while maintaining extension at the knee. To induce dural motion through the sciatic nerve, the leg was raised past 35 degrees in order to take up slack in the nerve. Since the sciatic nerve is completely stretched at 70 degrees, pain beyond that point is usually of hip, sacroiliac, or lumbar spine origin *(David, 1997).* The unilateral straight leg raise causes traction on the sciatic nerve, lumbosacral nerve roots, and dura mater. Adverse neural tension produces symptoms from the low back area extending into the sciatic nerve distribution of the affected lower limb.

To introduce additional traction (i.e., sensitization) into the proximal aspect of the sciatic nerve, hip adduction was added to the straight leg raise. The average total treatment time was approximately 30-40 minutes per session and the whole treatment was given for 9 sessions. Pain free ROM at hip and VAS was recorded at the end of every 3^{rd}, 6^{th} and 9^{th} sessions. The patients were instructed not to do any type of exercise at home or take any medications.

Data was analyzed using the SPSS version 14 for Microsoft Windows. Independent t-test was performed to compare the ROM and pain on VAS scale between groups A & B at 0, 3^{rd}, 6^{th} and 9^{th} sessions. Paired t test was also performed to compare improvement on 0-3^{rd}, 3^{rd}-6^{th}, 6^{th}-9^{th} and 0-9^{th} sessions within the two groups. The significance (Probability-P) was selected as 0.05.

Results

Fifteen subjects were taken in each group A and B with the mean age of 56.1 and 58.3 years respectively (Table 1).

Table 1: Subject information

Serial No.	Group	N	Age, yrs (Mean ± S.D.)
1	A	15	56.1 ± 4.95
2	B	15	58.3 ± 4.37

At zero session the mean of ROM of group A was 39.67 and that of group B was 42.33. When comparison of mean ROM was done between Group A and Group B at zero session the t value was found to be 0.794 which was insignificant. Thus there was no disparity in ROM at the starting of the treatment session between the two groups (Table 2).

Table 2: Comparison of mean values of ROM between group A and group B

S. No	Group	N	ROM Mean ± SD			
			S 0	S 3	S 6	S 9
1	A	15	39.67 ±7.90	53.00 ±6.49	71.00 ±7.37	86.33 ±6.67
2	B	15	42.33 ±10.33	50.00 ±11.80	59.33 ±11.16	67.33 ±10.67
3	T Value		0.79	0 .863	3.38	5.85

S Stands for Seesion Number

At the end of 3rd session mean of ROM of group A was 53.00 and that of group B was 50.00, the difference in the means was insignificant. At the end of 6th session mean of ROM of group A was 71.00 and that of group B was 59.33, the t value was 3.38 and was significant. At the end of 9th session mean of ROM of group A was 86.33 and that of group B was 67.33 the t value was 5.85 and was significant (Table 2).

Similarly the reduction in pain was noted through VAS score and was evaluated using independent t test. At zero session the mean of VAS of group A was 7.4 and that of group B was 7.13 and the t value was found to be 0 .587 which was insignificant (table 3).

Table No 3: Comparison of mean of VAS score between group A and group B

S. No	Group	N	VAS Mean ± SD			
			S 0	S 3	S 6	S 9
1	A	15	7.40 ±1.24	5.27 ±1.22	3.47 ±0.99	1.67 ±0.98
2	B	15	7.13 ±1.25	6.20 ±1.42	5.53 ±1.13	4.60 ±1.12
3	T Value		0 .59	1.926	5.34	7.64

S Stands for Seesion Number

At the end of 3rd session the mean±SD of VAS of group A was 5.27±1.22 and that of group B was 6.20±1.42 and the t value was found to be 1.926 which was insignificant. At the end of 6th session the mean±SD of VAS of group A was 3.47±0.99 and that of group B was 5.53±1.13 and the t value was found to be 5.34 which was significant. Similarly at the end of 6th session the mean±SD of VAS of group A was 1.67±0.98 and that of group B was 4.60±1.12 and the t value was found to be 7.64 which was significant. Thus ROM and VAS showed significant results only by the end of 6th and 9th sessions, whereas the results at the end of 3rd session were insignificant (table 3).

Paired T test was done to compare the improvement between 0-3rd, 3rd-6th, 6th-9th and 0-9th sessions. The mean difference of ROM of group A between 0 to 3rd session was 13.33±4.87 whereas that of group B was 7.67±4.17 and their t values were 4.82 and 4.32 respectively. Thus group A showed more significant improvement than group B from 0 to 3rd session. Similarly between 3rd and 6th session the mean difference of group A was 18.00±2.50 whereas that of group B was 9.33±4.58 and the t values were 5.28 and 4.47 respectively. Between 6th to 9th sessions the mean difference of group A

was 15.33±4.42 and that of group B was 8.00±4.14. The t values were 5.01 and 4.39 respectively. Between 0 and 9th session the mean difference of group A was 46.67±4.49 and of group B was 25.00±8.45. The t values were 5.33 and 4.89 respectively (table 4)

Table No 4: Comparison of Mean Difference of ROM within Group A and B

S.No	Session	Group	Mean ± SD	T Value
1	0-3	A	13.33 ± 4.87	4.82
		B	7.67 ± 4.17	4.32
2	3-6	A	18.00 ± 2.50	5.28
		B	9.33 ± 4.58	4.47
3	6-9	A	15.33 ± 4.42	5.01
		B	8.00 ± 4.14	4.39
4	0-9	A	46.67 ± 4.49	5.33
		B	25.00 ± 8.45	4.89

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Table No 5: Comparison of Mean Difference of VAS within Group A and B

S.No	Session	Group	Mean ± SD	T Value
1	0-3	A	2.13 ± 0.35	5.25
		B	0.93 ± 0.70	3.75
2	3-6	A	1.80 ± 0.56	4.96
		B	0.67 ± 0.82	0.76
3	6-9	A	1.80 ± 0.41	5.14
		B	0.67 ± 1.23	1.98
4	0-9	A	5.73 ± 0.88	5.27
		B	2.27 ± 1.58	3.9

Comparison of improvement in VAS score was calculated similarly using the paired t test. The mean difference of VAS for group A between 0 to 3rd session was 2.13±0.35 and that of group B was 0.93±0.70, their t values were 5.25 and 3.75 respectively. Thus group A demonstrated more significant improvement than group B. Similarly between 3rd and 6th sessions the mean difference of group A was 1.80±0.56 whereas that of group B was 0.67±0.82 and the t values were 4.96 and 0.76 respectively. Between 6th and 9th sessions the mean difference of group A was 1.80±0.41 whereas that of group B was 0.67±1.23 and the t values were 5.14 and 1.98 respectively. Between 0 and 9th session the mean difference of group A was 5.73±0.88 and of group B was 2.27±1.58. The t values were 5.27 and 3.9 respectively (table 5).

Discussion

The result of this study shows that neural mobilization technique is effective in increasing range of motion at hip and decreasing pain thus reducing the symptoms of sciatica. The mean value of group A where neural mobilization was given shows more significant increase as compared to group B. When the comparison of means of ROM and VAS was done between group A and B by the end of 3rd session there was no significant increase in the ROM (t=0.863) or decrease in the VAS (t=1.926) scores. Thus it is concluded that the effectiveness of neural mobilization was observed only by the end of 6th session for ROM (t=3.379), as well as pain (t= 5.339). By the end of 9th session again there was a significant increase in ROM (t= 5.84) and decrease in VAS score (t= 7.634). Thus neural mobilization technique given to group A proved more effective than the conventional treatment for sciatica administered to group B.

Effectivity 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. The results of this study also depict the same. The conventional treatment effectively reduces pain and increases ROM at the joint but is unable to eliminate the root cause of the problem. According to *Carey et al (1995),* it helps in providing symptomatic relief only.

Limitations

- Lesser number of subjects
- No group had similar patients with same degree of involvement
- Age variation from 40-50 years
- Patient's built was variable
- Proper strengthening program was not followed after neural mobilization sessions due to lack of time

Clinical Implication

This study provides some evidence for use of Neural Mobilisation as an adjunct to conventional exercise therapy regime in Sciatica. This study suggests that Neural Mobilisation is effective in the treatment of Sciatica.

This study provides preliminary evidence that neural mobilisation is effective in the treatment of Sciatica.

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