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Effect of Butler's sciatic nerve mobilisatision in low back pain patients with sciatica

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ABSTRACT

Lumbar-spine disorders rank fifth among disease categories and the health care. Intervention in patients with a disease requires that the intervention has to be more beneficial, safer, and cost-effective. This dilemma is particularly important in patients with low back dysfunction (LBD) with radiculopathy. [1]

Methodology

30 patients as diagnosed cases of low back pain radiating to posterior or lateral aspect of the lower limb with positive Straight Leg Raise Test (SLRT). Subjects were randomly allocated to the Experimental and the Control group. Both the groups (n=30) were treated with conventional physiotherapy treatment and Butler's sciatic nerve mobilisation, given to the experimental group only. All the subjects were assessed at pre-treatment & post-treatment sessions using ROM of hip with SLRT, numerical rating scale (NRS) and Rolland Morris questionnaire.

Data analysis

Pre & post data was analysed using paired T test.

Result

Rolland Morris scores at the end of the treatment session showed an 85.46% improvement and t value of hip ROM showed 3.207, hence neural mobilisation was found to be more effective in the treatment of sciatica.

Keywords: Neural mobilisation, Butler's, Low back pain, Sciatica

INTRODUCTION

Lumbar-spine disorders rank fifth among disease categories and the health care expenditures among individuals with LBD are also 60% greater than those without LBD with 37% of the costs a direct increase of physical therapy services.[1]

Intervention in patients with a disease requires that the intervention has to be more beneficial, safer, and cost-effective. This dilemma is particularly important in patients with low back dysfunction (LBD) with radiculopathy. [1]

Conservative treatment for sciatica is primarily aimed at pain reduction, but improving the range of SLR further has a beneficial effect in restoring

normal movement and reducing the degree of impairment due to low back dysfunction. [1, 3, 4] Unfortunately, there is a dearth of research evidence to support these conjectures. [1]

Neural mobilization techniques are passive or active movements focussing on facilitation of nerve gliding, reduction of nerve adherence, dispersion of noxious fluids, increased neural vascularity and improvement of axoplasmic flow. This helps in restoring the ability of the nervous system to tolerate the normal compressive, friction and tensile forces associated with daily activities. [2]

Neural mobilization is used for treatment of adverse neurodynamics, to restore the dynamic balance between the relative movement of neural tissues and surrounding mechanical interfaces, thereby allowing reduced intrinsic pressures on the neural tissue and thus promoting earlyoptimum physiologic function. [2]

The study was conducted to investigate the effect of Butler's sciatic nerve mobilization technique on sciatic pain, functional disabilities, and centralization of symptoms in patients with LBD with radiculopathy.

Hence to find out effectiveness of the Neural mobilisations treatment in improving range of motion, pain and functional impairment in order to incorporate it in the conventional treatment norms. SOURCE OF DATA: Hospital IPD. and Physiotherapy OPD Patients diagnosed with sciatica. Purposive sampling was done. SAMPLE SIZE: 30 Group A (Experimental Group): 15, Group B (Control Group): 15 TYPE OF STUDY: Experimental study .DURATION OF STUDY: 4 months MATERIALS: Pen, paper. Consent form. Numerical rating scale(NRS) ,Goniometer. & Rolland morris questionnaire.

INCLUSION CRITERIA

- Patients with complains of low back pain with radiation along the posterior or lateral aspects of the lower limb.
- Patients with a positive SLRT.
- Male and female patients.

EXCLUSION CRITERIA

- Subjects diagnosed as having tumours, infection or inflammatory disease affecting the spine.
- Spinal or lower limb surgery.
- Spinal fractures or structural deformity such as spondylolisthesis and spondylosis.
- Patients contraindicated to exercise therapy.
- Patients with sensory loss or motor defects.

METHODOLOGY

Subjects falling into the inclusion criteria were selected with the informed consent and were randomly allocated into two groups: Group A (Experimental group) and Group B(control group).. Both the groups were treated with conventional treatment protocol of:

- Intermittent lumbar traction for 10 min with 1/3 of body weight with the patient in supine and hip and knee flexed to 90 degrees. [3]
- IFT for 10 min. [3]
- Hot packs for 10 min. [3]
- Isometrics for the back, progressing to prone on elbows and hands, abdominals and glutei, bridging, pelvic tilts depending on the patient's symptoms. [1]

Experimental group was also treated with:

Butlers sciatic nerve mobilization protocol

- Neural mobilization was given for approximately 10 minutes per session including 30 sec oscillations at all the components 30 sec hold and 1 min rest.
- The nerve was initially mobilized through its most distal components and progressed to the most proximal ones. Most commonly used and useful sensitizing additions are: Ankle dorsiflexion, ankle plantar flexion/inversion, hip adduction, hip medial rotation.
- The SLR was done for inducing longitudinal tension as the sciatic nerve runs posterior to hip and knee joints.
- The average total treatment time was approximately 30-40 minutes per session .[1,3,7]

All the subjects were assessed at the first pre-treatment and post-treatment using: ROM of SLR, NRS and Rolland Morris Questionnaire

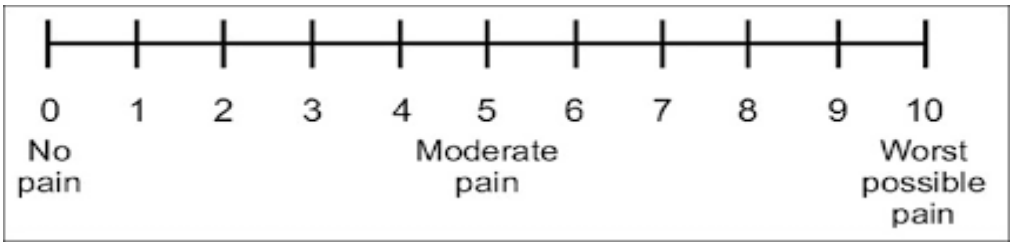
Straight leg raise test (SLRT)

Also known as Lasegue's test, the SLRT is done when the patient is completely relaxed. With the patient in supine position, the hip medially rotated and adducted and the knee extended, the hip is

flexed until the patient c/o pain or tightness in the back or back of the leg. Pain experienced between 30 – 70 degrees of hip flexion is said to be positive for sciatica.[5]

Numerical rating scale

It is a self-reported 11-point pain scale used to report pain which is used for adults. [5]



Roland Morris pain questionnaire

The RDQ is a 24 item validated health status measure designed to be completed by patients to assess physical disability due to low back pain. [11] Patients completing the RDQ are asked to place a check mark beside a statement if it applies to them that day The RDQ focuses on a limited range of physical functions, which include walking, bending over, sitting, lying down, dressing, sleeping, self-care, and daily activities. [16] Clinical improvement over time can be graded based on the analysis of serial questionnaire scores. [6]

RESULTS

DEMOGRAPHIC DATA

30 subjects participated in the study out of which 20 were females and 10 males were included.

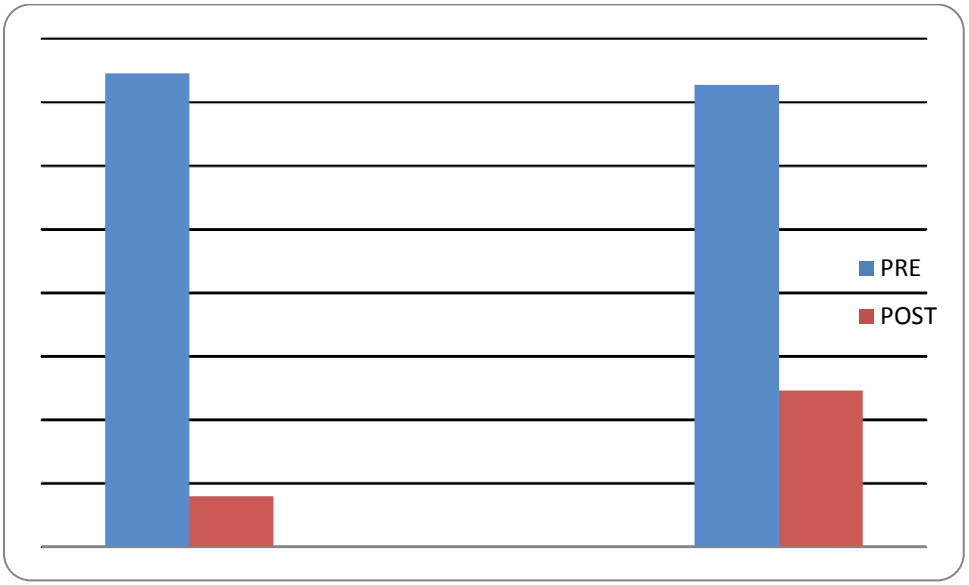
15 subjects were taken in each group with mean age of 53.92 and 50.33 in Groups A and B respectively.

- Numerical Rating Scale

Comparison of mean of NRS between groups A and B

SR.NO	GROUP	N		
			PRE	POST
1	A	15	7.46	0.8
			±0.9	±1.146
2	B	15	7.27	2.467
			±1.100	±1.246
3	T VALUE		1.09	3.812

At the first session, mean ± SD of NRS in group A was 7.46 ± 0.9 and in group B was 7.27 ± 1.100. Comparison of mean of NRS gave t value of 1.09 which was insignificant (p value 0.2849Mean ± SD at the end of session was 0.8 ± 1.146 and 2.47 ± 1.246 in groups A and B respectively, comparison showed t value 3.812 which was extremely significant (p value 0.0007).



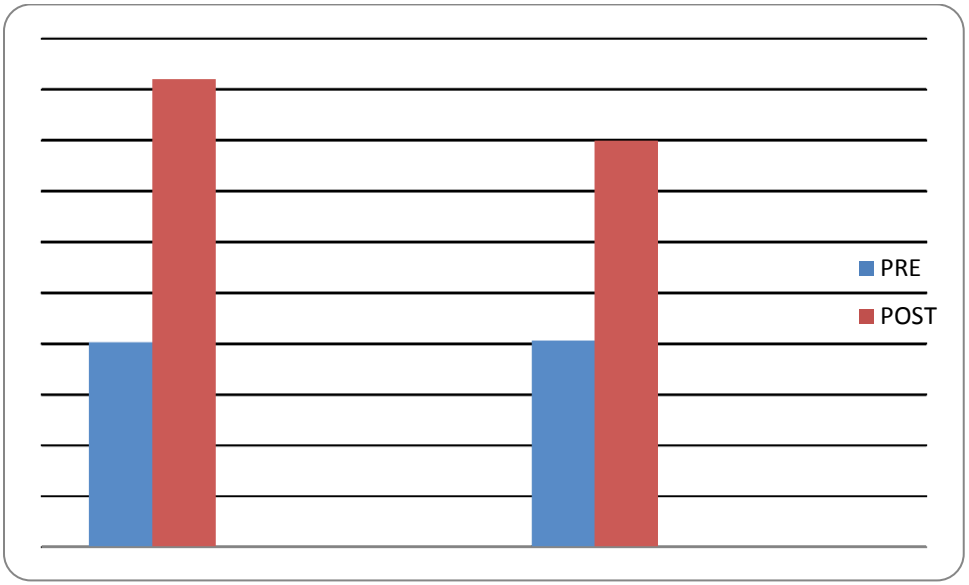
Graph showing Comparison of mean of NRS between groups A and B

Hip ROM of SLR

Comparison of mean of ROM between groups A and B

SR.NO	GROUP	N		
			PRE	POST
1	A	15	40.33	92
			±11.412	±9.964
2	B	15	40.67	80
			±10.1	±10.522
3	T VALUE		0.081	3.207

At first session, mean ± SD of hip ROM in group A was 40.33 ± 11.412 and in group B was 40.67 ± 10.1. Comparison of mean of ROM gave t value of 0.081 which was insignificant (p value 0.9357). Mean ± SD at the end of session was 92 ± 9.964 and 80 ± 10.522 in groups A and B respectively, comparison showed t value 3.207 which was very significant (p value 0.003).



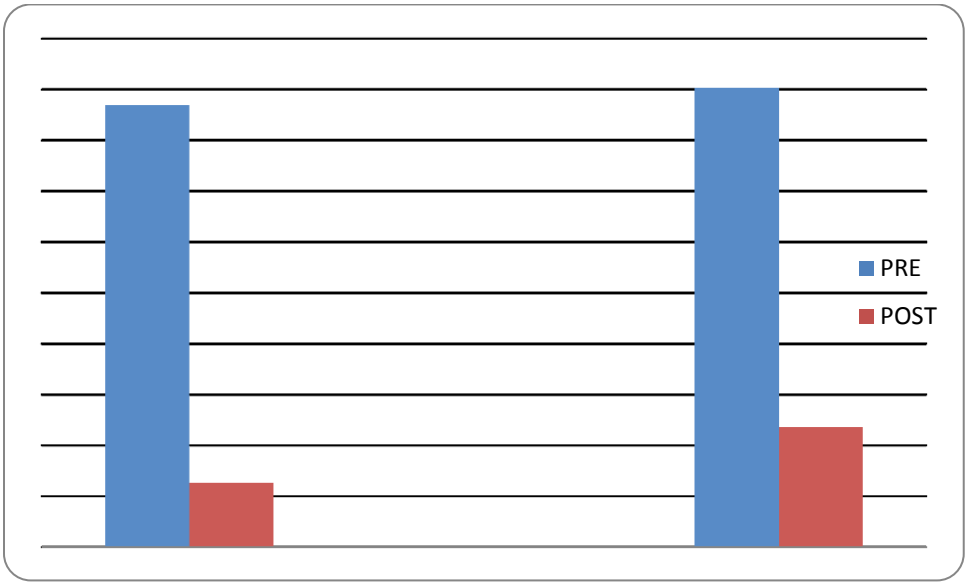
Graph showing comparison of mean of ROM between groups A and B

Rolland Morris questionnaire (RMQ)

GROUP A				
	MEAN	**SD**	**t VALUE**	**%IMPROVEMENT**
PRE	17.4	2.165	31.132	
POST	2.53	2.56	3.833	85.46%

GROUP B				
	MEAN	**SD**	**t VALUE**	**% IMPROVEMENT**
PRE (1st)	18.06	1.944	35.985	
POST	4.73	2.251	8.144	73.81%

Mean ± SD of Rolland Morris questionnaire at PRE session of group A and B were 17.4 ± 2.165 and 18.06 ± 1.944 showing a 0% improvement. Mean ± SD of group A and group B at the end of the session was 2.53 ± 2.56 and 4.73 ± 2.251 giving a 85.46% improvement in group A and 73.81% improvement in group B thus showing a very significant improvement in group A.



Graph showing improvement in functionality in the Rolland Morris scores.

DISCUSSION

The results of the study confirm that sciatic nerve mobilization is beneficial in the management with low back pain patients with sciatica. The results show that there was significant improvement in the scores of NRS, hip ROM of SLR and Rolland Morris scores at the end of session given by the t value 3.812., t value 3.207and 85.46% as compared to group B. The reasons could be as follows:

The pathophysiology of spinal nerve root or radicular pain is unclear.[8] Proposed etiologies include neural compression with axonal dysfunction, ischemia, inflammation, and demyelination due to hypoxia and biochemical influences. [8] Spinal nerve roots lack a well - developed intra-neural blood – nerve barrier, and this lack makes them more susceptible for injury. [8]

Butler Mobilization technique for the nervous system has a mechanical effect that affects the vascular dynamics, axonal transport systems, and mechanical features of the nerve fibers and connective tissues. [7]

It is easy to envisage that the 'stuck' sciatic nerve or dura mater surrounded by fresh blood and oedema benefits from mobilization. [7]

Dispersion of an intra-neuraloedema is enhanced by alteration of the pressure in the nerve during the oscillatory movements. This movements normalizes these pressure gradients and the blood supply to the hypoxic nerve which explains the relief experienced by many patients suffering from sciatica. [4, 7]

As half of the nerve root's metabolic requirements come from the CSF, the circulation and percolation of the CSF is assisted in being restored by neural tissue mobilization. [7]

Intra-neural blood vessels take a tortuous course through nerve tissue in order to provide continuous adequate blood flow. [7] When tension is applied to the nerve, the vessels straighten out until their slack is taken up, still permitting on going circulation. This vascular configuration is present in the neuraxis, nerve roots and peripheral nerves. However, excessive tension reduces intra-neural microcirculation by stretching and strangulation of the vessels. [7] Thus, daily movements and many physical techniques are likely to induce at least temporary changes in axonal transport. [7]

Normalization of the interface affects axoplasmic flow, the afferent bombardment from facilitated nerve segments deprives nerve fibres related to that segment some of the energy required for axonal transport. [7]

Thus manipulation of that nervous segment and improvement of joint ROM optimizes the axonal transport systems by altering the mechanical restraints on the axoplasm and by improving the blood supply which in turn increases energy available for axonal transport. [7]

In addition, increased vascular permeability caused by the mechanical nerve root compression can induce endoneural oedemas.[1] Furthermore, elevated endoneural fluid pressure due to an intraneural oedema can impede capillary blood flow and cause intraneural fibrosis.[1]Perineural fibrosis interferes with CSF mediated nutrition, renders the nerve roots hyperaesthetic and sensitive to compressive forces. [1]

As seen from all of the above, the effectivity of neural mobilization is also thought to be due to neural "flossing" effect, neural mobilization is very effective in breaking up the adhesions and bringing about mobility. [9] The results of this study also depict the same.

It is also seen from the results of experimental and control group that for the standard rehabilitation protocol of neural mobilization to be completely effective in relieving pain, improving hip range and functional improvement to carry out daily activities.

CONCLUSION

Butler's sciatic nerve mobilization is very effective in the treatment of low back pain with sciatica and can be used as an adjunct to the conventional rehabilitation programme. Post sessions there is complete effectiveness in pain, range and functionality in low back patients with sciaitca

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