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To compare the effectiveness of core strengthening with slump sciatic nerve glides and core strengthening with sciatic nerve glides in straight leg raise position in women with low back pain and unilateral lower extremity radicular symptoms to reduce pain and disability

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Abstract
Introduction: Low Back Pain is leading cause of disability and is frequently accompanied by tingling in the lower extremity, most prevalent in women.
Aim : To compare the effectiveness of core strengthening with slump sciatic nerve glides and core strengthening with nerve glides in straight leg raise position in women with low back pain and unilateral lower extremity radicular symptoms to reduce pain and disability.
Method: 40 women in 2 groups of 20 in each group of the age 40-55.
Outcome measures: NPRS, Oswestry low back pain disability questionnaire.
Results: Core strengthening with slump sciatic nerve glides was more effective than with nerve glides in SLR position. $P < 0.05$ for both outcome scales.
Conclusion : Core strengthening with Slump sciatic nerve glides is more effective than given with nerve glides in SLR in women with low back pain and lower extremity radicular symptoms in reducing pain and disability.

Keywords: low back pain, core strengthening, nerve gliding, disability, and women

1. Introduction

Low back pain is a cause of disability all over the world when, accompanied by tingling, burning sensation in feet and tingling in the lower extremities, it could be unilateral or bilateral. Low back pain is prevalent in women and also in people coming under age group of 40 to 80 years. Restrictions in social activities and lifestyle alterations are usually caused by low back pain and lower extremity radicular symptoms [1].

Pathophysiological mechanisms, wrong postural adaptations, trauma or degenerative changes in spine are the most common causes of low back pain.

Low back pain is usually classified under one of the three following categories-

Nonspecific low back pain, lumbar radiculopathy or stenosis of spinal cord, or back pain in association with other spinal cause [1].

Core strengthening and stability- Core strengthens targets the deep muscles within the trunk which are connected to spine, pelvis and shoulders [2]. The core has been described as a box with abdominals in front, Para spinals,gluteal in back, diaphragm as a roof, pelvic floor muscles and hip girdle muscles as a bottom [3]. The term core refers to the muscles in lower trunk area that work together to provide support and mobility, enabling all bodily movements.

Core strengthening exercises are those movements and physical positions that help to build a strong core [3]. The muscle that has received the most attention currently is the transverses abdominus muscle, as it has ability to provide stiffness to the spinal segments during functional postures and movements. It has been proved that transverses abdominus is activated selectively prior to limb movements with different speeds, but its activation is inhibited in patients with history of low back pain. Remaining abdominals produce mass spinal movements and they contract to maintain intraabdominal pressure needed for stable lumbar spine [4].

Nerve gliding-It is an attempt to restore the dynamic balances between relative reduced intrinsic pressures on neural tissue so that to promote optimum physiological function of the nerve. Movement of neural tissue and surrounding mechanical interfaces, which will result in facilitation of gliding movement of the nerve, reduced neural tissue adherence,dispersion of noxious fluids, increase in neural vascularity, improved exoplasmic flow are the benefits we get from nerve gliding techniques [6].

Combining core strengthening with nerve gliding are proved to be effective in women with low back pain and lower extremity radicular symptoms [1]. Here we are giving nerve glides to the subjects in straight leg raise positions and in slump positions along with core strengthening and comparing the effectiveness of both the nerve gliding positions.

2. Need of study

Less research articles are there regarding physiotherapy techniques on women with low back pain and unilateral lower extremity radicular symptoms. The use of nerve gliding techniques to treat lower extremity radicular symptoms with

core strengthening has received less attention.
Straight leg raise and slump tests are frequently used for the primary diagnostic physical examination tests in patients with low back pain and unilateral or bilateral lower extremity radiating pain. Neural tissue mobilization given in these positions is found to be effective in patients with low back pain with adverse neural tension [6].
Low back pain is prevalent in women still less studies are done in which effectiveness of core strengthening and nerve gliding exercises are studied and compared in women.
But there are no studies have been done in which effectiveness of slump sciatic nerve glides versus straight leg raise are compared by combining with core strengthening exercises in women with low back pain and lower extremity radicular symptoms.

3. Aim
To compare the effectiveness of core strengthening with slump sciatic nerve glides and core strengthening with sciatic nerve glides in straight leg raise position in women with low back pain and unilateral lower extremity radicular symptoms to reduce pain and disability.

4. Objectives
1. To study the effectiveness of core strengthening with sciatic nerve glides in slump test position in women with low back pain and unilateral lower extremity radicular symptoms to reduce pain and disability.
2. To study the effectiveness of core strengthening with sciatic nerve glides in straight leg raise position in women with low back pain and unilateral lower extremity radicular symptoms to reduce pain and disability.
3. To study and compare effectiveness of core strengthening with sciatic nerve glides in slump test position over core strengthening with sciatic nerve glides in straight leg raise position in women with low back pain and unilateral lower extremity radicular symptoms to reduce pain and disability.

5. Materials and outcome measures
Materials used were Consent letter, Data collection sheet, pen to note down the readings, goniometer, Inchcape
Outcome measures used were Numerical Pain Rating Scale (r =0.95) for pain and Oswestry low back pain disability questionnaire (r =0.82) for disability.

6. Method
6.1 Participation
Experimental study was done with 40 female samples selected by random method. They were divided into 2 groups with 20 women in each group by random method. Study setting was out patient departments of hospitals in and around Pune. Study population was women with low back pain and unilateral lower extremity radicular symptoms. All study participants provided written consent form.

6.2 Criteria
The inclusion criteria were a) women with low back pain and unilateral lower extremity radicular symptoms between the age 40-55 years. b) Women with severe disability on Oswestry low back pain disability questionnaire score. c) Women with numerical pain rating scale score more than 5/10.
Subjects were excluded if a) women with the history of surgical reconstruction of nerve or any spinal surgery. b) Women with mechanical low back pain without lower extremity radicular symptoms. c) women with bilateral lower extremity radicular symptoms d) women with PIVD e) women with osteoporosis f) women with spinal fractures g) women with Sacroiliac joint Dysfunction h) women with tumors or infections affecting spinal cord i) Muscle tightness causing lower extremity radicular symptoms j) women with diastasis recti k) women with ankylosing spondylosis l) women with dystonia and progressive neurological deficits.

6.3 Intervention
Study began after the clearance of ethical committee. The intervention was planned of 10 sessions of 1 hour each; 3-4 sessions per week; for 3 weeks. Each session included core strengthening for both the groups and slump sciatic nerve glides in one group and sciatic nerve glides in straight leg raise position in the other group. Core strengthening exercises such as supine abdominal draw in, abdominal draw in with knee to chest, prone bridging, supine bridging,supine twist, press ups, core activation in superman position and quadruped position etc. were performed by the patients for 10-20 times with the hold for 10 secs. Slump sciatic nerve gliding and nerve gliding in SLR position was given in the same position as that of the Ne- urodynamic test procedure but, the component of the test which causes production of pain in lower extremity is observed and that position of the limb was held down by few degrees and 20 oscillations of that movement was performed in 3 sets.

7. Results
In Wilcoxon's signed rank test for NPRS score and paired t-test for Oswestry low back pain disability questionnaire, both the outcome measures showed significant reduction in pain and disability post treatment for Group 1 as well for Group 2.
Table 1 shows-GROUP 1 average mean NPRS score- pre and post treatment. Analyzed by Wilcoxon's signed rank test and shows extremely significant result with the p-value < 0.05.This proves treatment given in GROUP 1 is effective in reducing pain on NPRS post treatment.

Table 1: pre and post NPRS score of GROUP 1-Core strengthening with Slump sciatic nerve glides

Table 1	Mean	SD	Wilcoxon's statistical value	p-value	t-value
Pre	7.95	0.82	210	<0.05	29
Post	2.15	0.81			

Table 2 shows GROUP 2 average mean NPRS score - pre and post treatment. Analyzed by Wilcoxon's signed rank test and shows extremely significant statistical difference with p-value < 0.05. This proves treatment given in GROUP 2 is effective in reducing pain on NPRS score post treatment.

Table 2: pre and post NPRS score of GROUP 2- Core strengthening with sciatic nerve glides in straight leg raise position

Table 2	Mean	SD	Wilcoxon's statistical value	p-value	t-value
Pre	7.85	0.74	210	<0.05	23.13
Post	2.65	0.98			

Table 3 shows comparison of pre and post treatment NPRS score average mean values of GROUP 1 and GROUP 2. Analyzed by Wilcoxon's rank sum test. It shows extremely significant result with p-value <0.05.Table 3 shows treatment given in GROUP 1 is more effective in reducing pain on NPRS than in GROUP 2. Core strengthening with slump sciatic nerve glides is more effective in reducing pain in women with low back pain and unilateral lower extremity radicular symptoms on NPRS score than core strengthening with sciatic nerve glides in straight leg raise position.

Table 3: comparison of pre and post treatment NPRS score average mean values of GROUP 1 and GROUP 2.

Table 3	Group 1	Group 2	Wilcoxon's statistic value	p-value
Pre	7.95	7.85	260	0.04
Post	2.15	2.65		

Table 4 shows pre and post treatment average mean of Oswestry Low back pain disability questionnaire score for GROUP 1.Analyzed by paired-t test and shows extremely significant statistical difference with p value <0.05 in reducing disability on Oswestry low back pain disability questionnaire score post treatment.

Table 4: Pre and post treatment Oswestry low back pain disability questionnaire score for GROUP1 Core strengthening with slump sciatic nerve glides

Table 4	Mean	SD	p-value	t-value	df
Pre	48.17	5.77	0.04	25.19	19
Post	19.37	6.42			

Table 5 shows-GROUP 2 average mean Oswestry low back pain disability questionnaire score- pre and post treatment. Analyzed by paired-t test and shows extremely significant statistical difference with the p-value < 0.05.This proves treatment given in GROUP 2 is effective in reducing disability on Oswestry low back pain disability questionnaire score post treatment.

Table 5: pre and post Oswestry low back pain disability questionnaire score of GROUP 2-Core strengthening with sciatic nerve glides in straight leg raise position

Table 5	Mean	SD	p-value	t-value	df
Pre	49.19	5.81	0.01	2.16	36.24
Post	24.34	5.23			

Table 6 shows comparison of pre and post treatment Oswestry low back pain disability questionnaire score average mean values of GROUP 1 and GROUP 2. Analyzed by unpaired-t test. It shows extremely significant statistical difference with p-value <0.05. Table 6 shows treatment given in GROUP 1 is more effective in reducing disability on Oswestry low back pain disability Questionnaire than in GROUP 2.

Core strengthening with slump sciatic nerve glides is more effective in reducing disability in women with low back pain and unilateral lower extremity radicular symptoms on Oswestry low back pain disability questionnaire score than core strengthening with sciatic nerve glides in straight leg raise position.

Table 6: comparison of pre and post treatment Oswestry low back pain disability questionnaire score Average mean values of GROUP 1 and GROUP 2.

Table 6	Group 1	Group 2	p-value	t-value	df
Pre	48.17	49.19	0.01	2.16	36.24
Post	19.37	24.35			

Graphs

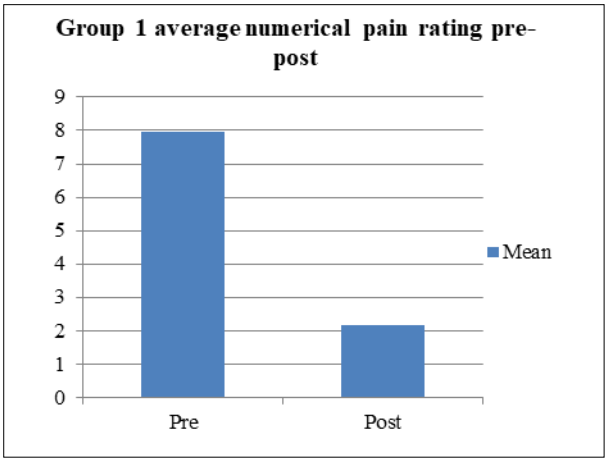

Fig 1: Pre and post NPRS of GROUP 1

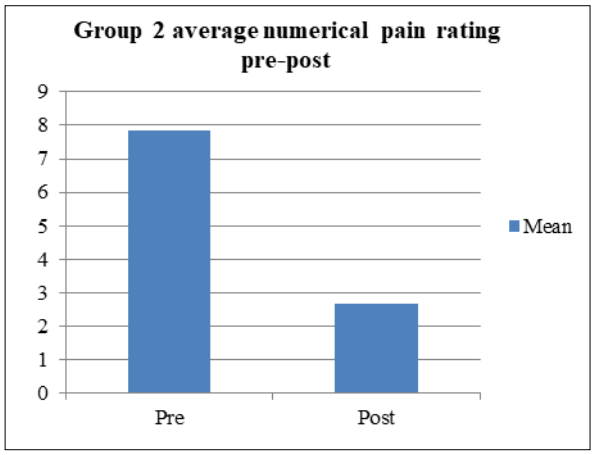

Fig 2: Pre and post NPRS of GROUP 2

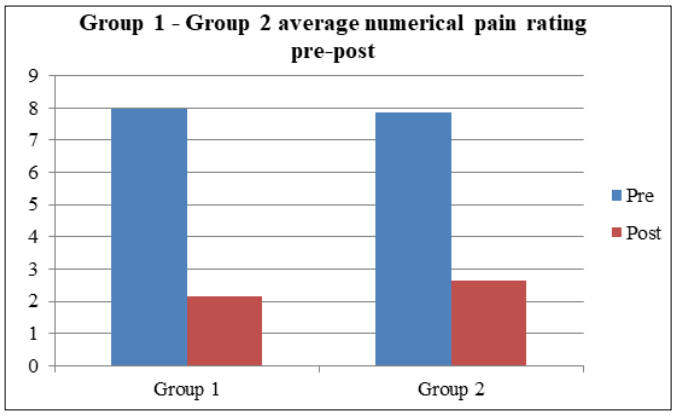

Fig 3: Comparison between pre and post treatment NPRS scores of GROUP 1 and GROUP 2

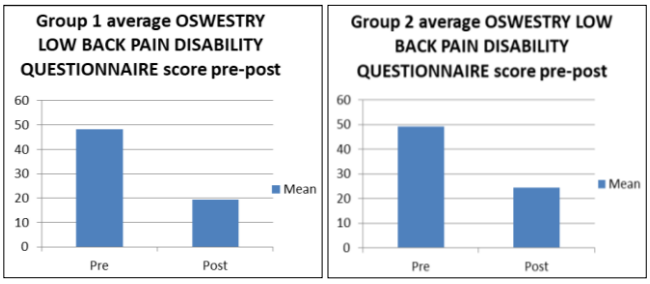

Fig 4: Pre and post Oswestry Disability index of GROUP 1 and, Graph 5-Pre and Post Oswestry Disability Index of GROUP 2

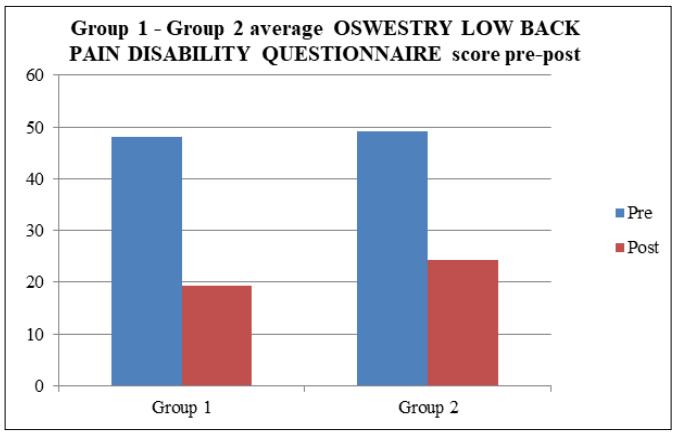

Fig 6: Comparison between Pre and Post treatment score of Oswestry disability index of GROUP 1 and GROUP 2

8. Discussion

The present study was done to see the effectiveness of core strengthening combined with slump sciatic nerve glides and core strengthening combined with straight leg raise position in women with low back pain and lower extremity radicular symptoms to reduce pain and disability.

In this study total 40 female patients, of age above 40 years were included with 20 participants in each group. Patients were divided into two groups. Women with the history of any spinal surgery, Osteoporosis, Sacroiliac joint Dysfunction, PIVD etc. were excluded.

Women with bilateral lower extremity radicular symptoms were excluding to achieve uniformity while treating the patients.

In this study, we found that core strengthening combined with slump sciatic nerve glides was more effective in reducing pain and disability in female patients with low back pain and lower extremity radicular symptoms than core strengthening combined with nerve gliding in straight leg raise position.

Alex Bennett from Governors State University in his case study reported that Core Strengthening Exercises and Sciatic Nerve Glides are found effective on Females with Low Back Pain and Lower Extremity Radicular Symptoms. So our results are in account with study.

Effectiveness of straight leg Raise and Slump Stretching in subjects with Low Back Pain with adverse neural tension. - A Study by Neha malik, Chitra Kataria, Nidhi Bhatia, Sachdev from ISIC Institute of Rehabilitation Sciences, New Delhi, proved that both straight leg raise and slump stretching are effective in reducing pain in patients with low back pain with associated adverse neural tension or lower extremity radicular symptoms. They found both of the techniques of SLR and slump stretching effective in treating low back pain when combined with lumbar stabilization exercises compared to those treated with only lumbar stabilization exercises. So our study results are in account with this study as it proves the effectiveness of nerve gliding in SLR and slump position combined with core strengthening in patients with low back pain and lower extremity radicular symptoms.

Outcome measures taken are NPRS to study the improvement caused by the given treatment to reduce Pain component. Oswestry low back pain disability questionnaire was taken to study the improvement caused by the given treatment to reduce disability.

The result of our study shows core strengthening combined with slump sciatic nerve glides is more effective in reducing pain and disability in females with low back pain and lower extremity radicular symptoms than core strengthening combined with nerve gliding in straight leg raise position. The reason may be due to, the depression of the intraneural oedema believed to be caused by slump sciatic nerve gliding. The repeated pumping action performed by giving oscillations while maintaining the whole cervical and thoracic spine under overpressure which may temporarily increase the intraneural pressure followed by a period of relaxation in slump position causing pain relief.

The slump sciatic nerve gliding has also been associated with inhibitory effects on sympathetic nervous system, a stimulation of which affects the capability of nerve to stretch. So it results in improving neural flexibility causing reduction in disability as well.

Thus, overall findings of this study suggest that 3 weeks of core strengthening combined with slump sciatic nerve glides given in women above 40 years with low back pain and lower extremity radicular symptoms is more effective in reducing pain and disability than treatment involving core strengthening combined with nerve glides given in straight leg raise position.

9. Conclusion

In this study both the groups i.e. Group 1 (core strengthening combined with slump sciatic nerve glides) and Group 2 (core strengthening combined with nerve gliding in straight leg raise position) showed reduction in pain and disability in women

with low back pain and unilateral lower extremity radicular symptoms.

But on comparing both the treatment groups statistically, core strengthening combined with slump sciatic nerve glides proved to be more effective than core strengthening combined with nerve gliding in straight leg raise position assessed by NPRS and Oswestry low back pain disability questionnaire.

Core strengthening with slump sciatic nerve glides is more effective in reducing pain and disability in women with low back pain and unilateral lower extremity radicular symptoms than core strengthening combined with nerve gliding in straight leg raise position.

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