

Original Research Article

Effectiveness of Sciatic Nerve Gliding with Hip Abductor Muscle Strengthening in Software Professionals Suffering from Piriformis Syndrome

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Abstract: Background: Piriformis syndrome is a neuromuscular disorder where the sciatic nerve is compressed or irritated by the inflammation of piriformis muscle representing pain, tingling and numbness in the buttock region and in the course of sciatic nerve. Piriformis syndrome can be painful, but it is very rarely alarming and needs surgical interventions. It can be managed effectively by conservative means such as NSAIDs, analgesics and physiotherapy interventions like stretching, electro therapeutic modalities, myofascial release, thermo therapies, etc. The purpose of this study is to compare the effect of sciatic nerve gliding exercise with hip abductor strengthening exercises versus piriformis stretching exercises in software professionals who are sitting for prolong hours in office and diagnosed with piriformis syndrome. **Materials & Methods:** 30 patients with piriformis syndrome, reporting at the OPD of Physiotherapy Department were evaluated according to the inclusion and exclusion criteria and were divided into Group A (experimental) N=15, Group B (control) N=15 randomly. Their baseline data with respect to age, sex, pain in VAS, hip internal rotation range by goniometer, and disability evaluation by MODQ were taken on day 1 of the treatment and day 15 of the treatment. Data analysis was done by Mann Whitney 'u' test for subjective data and unpaired 't' test for objective data analysis with 95% confidence interval. **Results:** The patients treated with sciatic nerve sliding exercise and abductor strengthening (Group A) showed statistically significant decrease in pain (p=0.00), increase in range of motion for hip internal rotation (p=0.00) and decrease in disability level according to MODQ (p=0.00) after 15 days of interventions as compared to Group B who were treated by piriformis stretching exercises. **Conclusion:** This study has shown significant improvement in the experimental group (group A) in respect to pain relief, hip internal rotation range of motion, and level of disability of the patients. The patient reached their goal of returning to their prior level of activity with no complaints of pain during long sitting hours in office. In addition to the buttock pain or piriformis syndrome, the patient also has solved their low back pain.

Keywords: Piriformis syndrome, Sciatic nerve, stretching exercises, strengthening exercises, sciatic nerve gliding, VAS, MODQ.

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INTRODUCTION

The sciatic nerve has a root value of L4, L5, S1, S2, and S3 [1]. It has both motor and sensory fibres. The sciatic nerve passes the greater sciatic notch below the piriformis muscle piercing through it, and then passes transversely through the posterior aspect of the thigh. The piriformis muscle originated from the anterior aspect of the sacrum and gets attached to the superior border of the greater trochanter (GT) of the femur [2]. When there

is spasm of piriformis muscle, it compresses the sciatic nerve producing symptoms like pain, tingling, and numbness in the sciatic nerve course, which is similar to sciatica symptoms [3, 4]. The term Piriformis Syndrome was introduced by Robinson in 1947. Piriformis syndrome is defined as inflammation of the branches of sciatic nerve due to injury, irritation or overuse or over pressure to the piriformis muscle. The pain and symptoms get aggravated with prolong sitting, squatting, and experiences aggravated pain during walking,

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running and other functional activities. Piriformis is a lateral rotator of the femur while the hip extension and internal rotator during hip flexion. It also acts as a weak flexor and abductor of the hip joint. It gives control or balance during standing and ambulation. The muscle is active during sitting posture (both high sitting and crossed leg sitting). About the prevalence of piriformis syndrome was 17.2% of the population having low back pain is because of piriformis tightness. Piriformis syndrome in females is more common than compared to males i.e. 3:1 due to wider quadriceps femoris muscle angle. In male the symptom is aggravated because of putting wallet in the back pocket of the pant while sitting which causes pressure over the sciatic notch. It is most common in patients between 30-40 years of age and occasionally in younger patients less than 20 years. The diagnosis criteria for the evaluation of piriformis syndrome includes specific special test like putting on the piriformis muscle like Freiberg's sign, Pace sign, Beatty's manoeuvre, stretch test, palpation test, etc. The main aim of the special test is to reproduce the symptoms during the examination [5] and an external pressure is applied by the therapist manually in order to assess the symptoms clearly. The management includes rest, medications like muscle relaxants, non-steroidal anti-inflammatory drugs, corticosteroids injections, etc and physiotherapy. Most commonly used interventions in physiotherapy for piriformis syndrome includes therapeutic ultrasound, soft tissue mobilization, piriformis stretching, strengthening of leg muscles around the hip, neural mobilization techniques, deep transvers friction massage, hot packs or cold spray, and various other treatments like spinal mobilization, osteopathy, etc.

The aim of this study is to see the effectiveness of sciatic nerve gliding with strengthening of hip abductor muscle on pain, hip internal rotation and disability level in software professionals who sits for long working hours.

MATERIALS & METHODS

Source of Data

- A) **Population:** Subjects from physiotherapy department OPD in Bhubaneswar
- B) **Sample Size:** 30 subjects ranging from 30-60 years satisfying the criteria.
- C) **Duration of Study:** 3 weeks (5days per week)

Method of Collection of Data:

- A) **Study Design:** Randomized experimental study
- B) **Sampling Method:** Block randomization
- C) **Sample Size:** 30 subjects
Experimental Group (Group A)- 15 Subjects
Control Group (Group B)- 15 Subjects
- D) **Tools Used:** Modified Oswestry Disability Questionnaire (MODQ), Visual Analogue Scale (VAS), Universal Goniometer.

Inclusion Criteria

- Age group- 30-60 years, both male and female subjects
- Subjects showing positive sign for piriformis syndrome
- Pain ≥ 4 in VAS
- Subjects willing to participate voluntarily
- Subjects with 1-3 grade of tenderness at the piriformis muscle just at the junction of sciatic nerve.

Exclusion Criteria

- Any disc or facet joint pathology
- Pain arising from hip joint
- Congenital or acquired spinal column abnormalities
- History of spinal trauma
- SI joint dysfunction
- Fixed deformities of lower limb and spine
- Chronic inflammatory disease
- CVA
- Malignancy
- Pregnancy
- Parkinsonism

Procedure

30 patients fulfilling the inclusion criteria were taken in this study and were divided into two groups (15 subjects in each group). After briefing, informed consent was taken from the patients. Their demographic data was collected. The pre and post treatment assessment i.e. pain profile by using VAS, hip range of motion (internal rotation) by using universal goniometer and disability level using Modified Oswestry Disability Questionnaire (MODQ) were recorded on 1st day of the treatment session and at the end of 15th treatment session.

Group A (experimental group) were treated with hip abductor strengthening exercises and sciatic nerve gliding exercises followed by hot pack for 15 sessions in 3 weeks 5days per week. For abductor strengthening side lying clams is done and for sciatic nerve stretch, sciatic nerve glides and done. For side lying clam exercise the hip and knee in 45° of flexion with his feet together and a resistance is added using a Thera-Band wrapped around the thigh just proximal to the knee and the patient was instructed to raise his knee up which was achieved through hip abduction. The patient was advised to do 20 times with a hold of 10 seconds then relax for 2 seconds. Sciatic nerve glide was done while the patient lying supine and holding the affected side knee, attempts to straighten the knee and holds at this position and then does dorsiflexion and plantar flexion of the ankle. It is repeated 10 times with a hold of 3 seconds. After this hot pack is applied for 10 minutes on the piriformis muscle in prone position.

Group B (Control group) were treated with Piriformis stretch followed by hot pack for 15 sessions in

3 weeks 5days per week. The patient is in supine lying position and the affected leg crossed on top of the opposite knee, the patient holds the affected knee with the opposite hand and pulls the knee and over across the midline towards the opposite shoulder till a stretch felt in the buttock region. It is repeated 10 times with a hold of 20 seconds and a rest period of 5 seconds followed by hot pack for 10 minutes on the piriformis muscle in prone position.

Statistical Analysis

The statistical analysis was done by SPSS-version 22. The statistical analysis for both the group to

find out the mean, SD and statistically significance between the groups. The sex ratio of the two groups was analysed by Chi-square test, baseline features were compared between the groups using unpaired T test. Inner group comparison was done by Mann Whitney ‘U’ test for subjectively assessed data such as VAS score and MODQ values. A p-value of less than 0.05 was used to determine significance.

RESULTS

Fig. 1: Demographic Profile of Patients (Gender)

SL No.	Gender	Group A (Experimental Group) n=15	Group B (Control Group) n=15
1.	Females	10	11
2.	Males	5	4

Fig. 2: Demographic Profile of Patients (Age)

SL No.		Group A (Experimental Group, N=15)		Group B (Control Group, N=15)	
		Mean	SD	Mean	SD
1	Age	43.6	11.35	43.6	10.10

Fig. 3: Analysis of VAS (in cms)

SL No.	Study Parameter (VAS)	Group A (Experimental Group) Mean ± SD	Group B (Control Group) Mean ± SD	“p” value
1	Pre-treatment	8.2 ± 0.88	7.9 ± 1.57	0.51
2	Post-treatment	2.5 ± 1.05	5.7 ± 1.38	0.00
3	VAS Difference	5.7 ± 0.96	2.2 ± 0.94	0.00

Fig. 4: Analysis of Hip Internal Rotation ROM (in degree)

SL No.	Study Parameter Hip Internal Rotation ROM	Group A (Experimental Group) Mean ± SD	Group B (Control Group) Mean ± SD	“p” value
1	Pre-treatment	12.9 ± 2.38	13.3 ± 2.69	0.61
2	Post-treatment	3.7 ± 1.95	8.4 ± 2.38	0.00
3	Hip internal Rotation Difference	9.2 ± 3.14	4.9 ± 2.01	0.00

Fig. 5: Analysis of Disability level by MODQ (in %)

SL No.	Study Parameter MODQ (in %)	Group A (Experimental Group) Mean ± SD	Group B (Control Group) Mean ± SD	“p” value
1	Pre-treatment	68.2 ± 7.85	68.7 ± 8.47	0.83
2	Post-treatment	17.7 ± 7.83	48.6 ± 8.91	0.00
3	MODQ Difference	50.5 ± 6.78	20.1 ± 4.94	0.00

Out of 30 patients 21 were female and 9 were male (fig: -1). Patient’s average age was 43.6 years (fig: - 2). The pain parameter measured by VAS (fig: -3), the mean and standard for both the treatment groups were 5.72±0.96 for group A and 2.2±0.94 for group B. there was a statistically significant reduction in VAS score in group A as compared to group B(p=0.00).

The internal rotation of hip measured by goniometry (fig: - 4) the mean and standard deviation for both the treatment groups were 9.2±3.14 for group A and 4.9±2.01 for group B. There was a statistically significant increase in internal rotation of the hip in

group A as compared to group B (p=0.00). The disability evaluation measured by MODQ (fig: - 5) the mean and standard deviation for both the treatment groups were 50.5±6.78 for group A and 4.9±2.01 for group B. There was a statistically significant increase in internal rotation of the hip in group A as compared to group B (p=0.00).

DISCUSSION

The main purpose of the study was to find out the effects of sciatic nerve gliding with hip abductors strengthening on pain, hip internal rotation and functional status in patients diagnosed with piriformis syndrome. The result of this study showed significantly

reduction in pain intensity, increased internal rotation of hip and improvement in functional status in patients treated with sciatic nerve gliding exercise along with hip abductor strengthening in software professionals who have long sitting hours at work place. Barzu *et al.*, [12] stated in a case study about the diagnosis of piriformis syndrome for patients who cannot do MRI, CT scan, etc, mentioning the main part of the assessment should consist gait and posture analysis, FAIR test, Beatty manoeuvre, Freiberg test, SLR, and piriformis muscle stretch. Laha *et al.*, [13] did a study on 30 patients who were divided into two groups, group A received strengthening exercises for hip extensors and abductors, piriformis release, and nerve mobilization, while group B was treated with piriformis stretching and nerve mobilization. This study showed including hip strengthening exercises is very effective in treating piriformis syndrome. In studies we have seen patients with piriformis syndrome who responded well when focused on strengthening of hip muscles and correcting gait patterns, clinically significant improvements were reported in piriformis syndrome, physiotherapy procedures must include strengthening hip muscle along with other techniques [14, 15]. In current study, result showed that group A which received the treatment of hip abductor strengthening and sciatic nerve gliding exercise showed significant results as compared to group B which received piriformis stretching. Lundborg & Dahlin [16] in 1996 in his study kept the nerve bed in stretched position at 6% for an hour that causes about 70% reduction in nerve conduction. The longer duration the stretch is maintained, the longer time period is needed for complete recovery. It is justified to state that repeated distortion of the sciatic nerve produces harmful mechano sensitivity and endoneural defects. This study has shown significant improvement in the experimental group (group A) in respect to pain relief, hip internal rotation range of motion, and level of disability of the patients. Our patient reached their goal of returning to their prior level of activity involvement with no complaints of pain during long sitting hours in office. In addition to the buttock pain or piriformis syndrome, the patient also has solved their low back pain.

CONCLUSION

On the basis of result of this study we conclude that sciatic nerve gliding and hip abductor muscle strengthening were effective in treating piriformis syndrome in software professionals who sits for prolong period of time and have shown significant improvement on pain, internal rotation range of motion of hip joint and disability index.

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Informed Consent: Informed consent was obtained from all participants.

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