

EFFECTIVENESS OF MUSCLE ENERGY TECHNIQUE VERSUS STRETCHING IN SUBJECTS WITH PIRIFORMIS SYNDROME

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ABSTRACT

Objective: The present comparative study isto find out the effectiveness between the muscle energy techniques versus stretching in patient with piriformis syndrome along with short wave diathermy.

Background: Piriformis syndrome is an uncommon neuromuscular condition misdiagnosed with sciatica because sciatic nerve may be compressed by the piriformis muscle. The signs and symptoms are similar to the sciatica. This study is helpful for the diagnosis of PS and to relieve pain, increase muscle length, decrease inflammation, increase range of motion using MET and stretching along with SWD.

Methodology: This comparison study setting was done in Physiotherapy Department of ACS Medical College And Hospital by Pre-Post interventional type. Female subjects aged between 30-55 who had a gluteal pain and a positive test of pace abduction test and freiburg's test were included. From the above criteria, subjects were divided into two groups by simple convenient sampling method. Treatment duration was 10-15 min/session for 14 sessions/week for two weeks. Visual Analog Scale (VAS), Lower Extremity Functional Scale (LEFS) were used as the outcome measures.

Procedure: Based on the inclusion and exclusion criteria and outcome measures, 30 female subjects were separated into two groups and Group A (15 subjects) were received MET and Group B (15 subjects) were received static stretching. Along with these, both group were received Short Wave Diathermy.

Result: On comparing the Mean values of Group A & Group B on VAS Scores& LEFS group A showed a highly significant difference in Mean values at $P \leq 0.001$.

KEY WORDS: Piriformis syndrome, Visual Analog Scale (VAS), Lower Extremity Functional Scale (LEFS), Muscle energy techniques (MET), static stretching.

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BACKGROUND

The term Piriformis Syndrome was first coined by Robinson in 1947 [1]. Piriformis is an uncommon painful neuromuscular disorder which occurs due to the compression and irritation of the sciatica nerve by the piriformis muscle [1,2]. Piriformis muscle is a deep muscle which is flat

pyramid shape that connects the sacrum and top of the femur. Its function is lift and rotates the hip joint away from the midline of the body which shifts the body weight from one foot to another foot and maintains balance. During weight bearing such as high eccentric load, adduction and internal rotation of hip undergoes excessively.

Due to the gluteus maximus and gluteus medius weakness high eccentric load transfers to the piriformis muscle in which eccentric demand may result in sciatic nerve compression or irritation. Piriformis syndrome is complex disorder (muscle and nerve involvement) thereby causes pain and instability due to the spasm or inflammation or shortened the muscle causes the sciatic nerve compression. So the symptoms are similar with sciatica, hence it is frequently unrecognized or misdiagnosed in clinical settings as common conditions such as lumbar radiculopathy, sacroilitis, trochanteric, bursitis and intervertebral discitis etc. PS are also known as the wallet syndrome (or) socket neuropathy [2] or wallet sciatica [1,3]. Female subjects are affected 6 times more than male. The ratio between male and female are 1:6 [1,2,4,5,6]. It is because of the different Q-angle femoris muscle differences in pelvic structure or some hormonal changes during pregnancy [7]. Sciatic nerve compression or irritation can occur due to the inflammation and spasm of the piriformis muscle [8-10]. It results from 1) overuse of piriformis muscle 2) prolonged sitting [10] 3) rowing in the sitting position. 4) Also weakness of hip adductor muscle [1].

Piriformis syndrome (ps) is often misdiagnosed and unrecognized with sciatica because of lack of definitive diagnostic test [1] Symptoms such as 1) pain behind the hip or in the buttock region along with tenderness. 2) Pain can radiate posterior aspect of leg into the hamstring and calf muscles [10]. Muscle energy technique is one of the manual technique in which the muscles uses its own energy in the form of isometric contraction to relax the muscle by the autogenic inhibition of reciprocal inhibition [11]. Sub maximal contraction of the muscle which is followed by the agonist muscle stretching is called autogenic inhibition [12]. Sub maximal contraction of the muscle which is followed by the antagonist muscle stretching is called reciprocal inhibition. MET in PS as been useful in which is described by David.c. So the purpose of the study is to find the effectiveness of MET on pain, joint range of motion [3,11,14].

METHODOLOGY

This comparative study setting was done in Outpatient Physiotherapy Department,

ACS Medical College And Hospital by Pre-Post interventional type. 30 patients were selected and assorted into two groups by simple random sampling method.

Inclusion criteria: Female subject age between 30-55 who had a gluteal pain and a positive tests of pace abduction test and freiburg's test were included.

Exclusion criteria: SLR tests negative, Imagings with negative results of herniated disc problems, Osteoporosis, spondylolisthesis, history of vertebral fracture and spinal surgery, systemic disorder, stroke, leprosy, amputation are excluded. From the above criteria, subjects were divided into two groups by simple convenient sampling method. Treatment duration was 10-15 min/session for seven sessions / week for two weeks. Visual Analog Scale (VAS), Lower Extremity Functional Scale (LEFS) were used as the outcome measures.

Procedure: As per the selection criteria, 30 patients who fulfill Lower extremity functional scale below 20 were included in this study. After obtaining Informed Consent from the patients, they were divided into 2 groups by random sampling. Group A comprised of 15 patients and were received muscle energy technique along with shortwave diathermy and Group B comprised of 15 patients were receive stretching along with shortwave diathermy

Short wave diathermy: Subjects from both groups were positioned in supine lying. Electrodes placed in gluteal region and the lateral side of the thigh with frequency about 27.12 MHz for 10 minutes.

Muscle energy technique: Group A: 15 subjects received MET for two weeks, seven sessions per week. Muscle energy technique is one of the manual technique in which the muscles uses its own energy in the form of isometric contraction to relax the muscle by the autogenic inhibition of reciprocal inhibition [4,11].

Static stretching: Group B receives static stretching for two weeks, 7 sessions per week. Stretching technique is the form of physical exercise to stretch the specific muscle and it is commonly used to relax the tightened muscle, to achieve the normal muscle tone and increase the range of motion [14-17].

Data analysis: The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24. Paired t-test was adopted to find the statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find the statistical difference between the groups.

Table 1: Comparison of VAS score between group – A and group - B in pre and post test (intergroup test).

#VAS	#GROUP - A		#GROUP - B		t - TEST	df	SIGNIFICANCE
	MEAN	S.D	MEAN	S.D			
PRE TEST	7.15	0.812	7.4	0.753	-1	38	.320*
POST TEST	3.65	0.489	4.35	0.745	-3.51	38	.000***

GROUP A – METS, GROUP B – STATIC STRETCHING (***- P ≤ 0.001).

This table shows that there is no significant difference in pre test values of the VAS between Group A & Group B (*P > 0.05).

This table shows that statistically highly significant difference in post test values of the VAS between Group A & Group B (***- P ≤ 0.001).

Table 2: Comparison of LEFS between group – A and group - B in pre and post test (intergroup test).

#LEFS	#GROUP - A		#GROUP - B		t - TEST	df	SIGNIFICANCE
	MEAN	S.D	MEAN	S.D			
PRE TEST	14.15	1.89	13.6	1.78	0.943	38	.352*
POST TEST	55.35	3.73	47.85	3.6	6.46	38	.000***

GROUP A – METS, GROUP B – STATIC STRETCHING (*- P > 0.05) (***- P ≤ 0.001)

This table shows that there is no significant difference in pre test values of the LEFS between Group A & Group B (*P > 0.05).

This table shows that statistically highly significant difference in post test values of the LEFS between Group A & Group B (***- P ≤ 0.001).

Table 3: Comparison of VAS within group – A & group – B between pre & post test values (intragroup test).

#VAS	PRE TEST		POST TEST		t - TEST	SIGNIFICANCE
	MEAN	S.D	MEAN	S.D		
GROUP- A	7.15	0.812	3.65	0.489	17.61	.000***
GROUP- B	7.4	0.753	4.35	0.745	13.65	.000***

GROUP A – MUSCLE ENERGY TECHNIQUE, GROUP B – STATIC STRETCHING (***- P ≤ 0.001)

The above table shows, In VAS, there is a statistically highly significant difference between the pre test and post test values within GROUP A and GROUP B (***- P ≤ 0.001).

Table 4: Comparison of LEFS within group – A & group – B between pre & post test values (intragroup test).

#LEFS	PRE TEST		POST TEST		t - TEST	SIGNIFICANCE
	MEAN	S.D	MEAN	S.D		
GROUP- A	14.15	1.89	55.35	3.73	-44.95	.000***
GROUP- B	13.6	1.78	47.85	3.6	-32.98	.000***

GROUP A – MUSCLE ENERGY TECHNIQUE, GROUP B – STATIC STRETCHING (***- P ≤ 0.001)

The above table shows, In LEFS, there is a statistically highly significant difference between the pre- test and post test values within Group A and Group B (***- P ≤ 0.001).

RESULT

On comparing the Mean values of Group A & Group B on VAS Score, it shows significant decrease in the post test Mean values but (Group A - Muscle Energy Technique) shows (3.65) which has the Lower Mean value is more effective than (Group B - Stretching) (4.35) at P ≤ 0.001. Hence Null Hypothesis is rejected. On comparing the Mean values of Group A & Group B on LEFS, it shows significant Increase in the Post Test Mean values but (Group A - Muscle Energy Technique) shows (55.35) which has the Higher Mean value is more effective than (Group B - Stretching) (47.85) at P ≤ 0.001. Hence Null Hypothesis is rejected. On comparing Pretest and Posttest within Group A & Group B on VAS & LEFS shows highly significant difference in Mean values at P ≤ 0.001.

DISCUSSION

The purpose of this study was to investigate the effectiveness of the muscle energy technique versus stretching in subjects with piriformis syndrome. The outcome was measured using VAS and LEFS. The outcome measures were assessed on one day prior to treatment and after two weeks post treatment for both groups. It showed that muscle energy technique is effective compared to the stretching and there is a significant difference in pre and post test values.

In table-1, VAS score between Group A and Group B shows that statistical difference exist between post test value (.000***) when compare to the pre test value (.328). In table-2, LEFS score between Group A and Group B also shows that the statistically difference between post test value (.000***) when compare to the pre test value (.352*). In table 3&4, shows that VAS

score and LEFS score within the Group A and Group B shows statistically high significant difference between pre-test and post- test (.000***).

Leon chaitow (2006) considered that Reciprocal Inhibition in Muscle energy technique was succeeded in relieving pain and achieving flexibility. This study also led to improvement of lower limb function in this participant with acute piriformis syndrome. The RI-MET procedure involved isometric contraction of muscle which are antagonist to piriformis muscle. It leads to inhibition of its antagonist muscle hence it is reducing the muscle tone immediately [11].

It is proved that stretching methods of the piriformis muscle to normal male adults to improve rehabilitation of lower back pain and piriformis muscle syndrome. Stretching improves physical performance ability, prevents injury, reduces muscle pain, and increases flexibility. In general, static stretching exercise is implemented more than other types of stretching methods in many sports [10,18].

Gulledge et al (2014) investigated an effective stretching method by applying piriformis muscle stretching in the order of 115° flexion, 25 -30° adduction, and 40- 50° external rotation of the coaxial articulation and in the order of 90° flexion, external rotation, and adduction and they reported that there was no significant difference between the two orders [7].

Jun Chul Park et al (2007) has showed the comparison of thickness change and the medial rotation angle by applying three different kinds of stretching methods did not produce a major difference [13]. With this result and our current study, we can understand that different postures can be applied for stretching the piriformis muscle [7,9,10].

MET is a therapy method that can effectively provide positive neuro-physiological and mechanical influences for the strengthening of a shortened or contracture muscle, oedema reduction, and the treatment of joints that have a restricted range of motion or a functionally fixated joint) [19]. Choi and Yoon applied MET to women in their twenties who complained about buttock and lower extremity pain due to piriformis muscle syndrome. Their study reported that

pain decreased from 4 points to 2 points [12,20]. Current study revealed that both muscle energy technique and stretching along with physiotherapy interventions has shown significant improvement in reducing pain and lower extremity function and increase range of motion. Limitation of this study was only female subjects has been taken. Research related to the management of piriformis syndrome is very limited. Further studies will be required to address these limitations.

CONCLUSION

This study reveals that is more significant difference in the muscle energy technique along with shortwave diathermy is effective when compare to the stretching with shortwave diathermy on subjects with piriformis syndrome.

Conflicts of interest: None

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