



TO COMPARE THE EFFECTIVENESS OF IASTM WITH STRETCHING VS HOT FOMENTATION WITH POST ISOMETRIC RELAXATION IN PIRIFORMIS TIGHTNESS IN COLLEGE GOING STUDENTS

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ABSTRACT

Key words-piriformis tightness, sciatic nerve pain, IASTM, piriformis stretching, Post isometric relaxation.

INTRODUCTION

Piriformis muscle, an integral component of the deep gluteal region, exhibits a distinctive anatomical arrangement, coursing from the anterior sacrum to the greater trochanter of the femur. When the is stretched, the piriformis muscle act as an external rotator, and when hip is flexed it act as an abductor. IASTM and exercises play an important role rehabilitation of piriformis tightness. The aim of the study was comparing efficacy of IASTM and stretching vs conventional therapy and MET used in management of piriformis tightness in college going students.

Method-30 young subjects having tightness in piriformis muscle, were selected according to inclusion and exclusion criteria. Functional ability and range of motion of hip joint is evaluated by VAS and goniometer. The subjects of group A received IASTM technique along with stretching of piriformis muscle. Treatment time was approx. 20-30 minutes a day for 3 weeks and the subjects of group B received conventional treatment i.e. hydrocollator pack and muscle energy technique. The treatment duration was approx. 15 minutes in a session and for MET the duration of resistance was 7-10 second with 3 repetitions for 3 weeks.

Procedure-All the participants were explained about the purpose of study. The subjects were screened for inclusion and exclusion criteria and baseline



measurement was taken. Eligible subjects were randomly allocated into two groups. **GROUP A** underwent IASTM technique along with stretching of piriformis muscle. Treatment time was approx. 20-30 minutes a day for 3 weeks. (3 days in a week). **GROUP B**-Underwent hydrocollator pack and MET. The patients were treated with moist heat application over piriformis muscle for 15 minutes in a session and for the MET duration of resistance was 7-10 second with 3 repetitions for 3 weeks. The study was on three weeks, 3 days per week at a department of physiotherapy in DPMC.

Result- This study showed that both IASTM technique and conventional therapy were useful in improvement of pain and range of motion but the IASTM technique was more effective in improvement of range of motion and piriformis tightness than the conventional treatment.

Conclusion-The result of group A and group B showing significant difference at p test.as comparing the mean difference between both the groups, the mean difference in VAS for group A is 3.86 and group B is 2.215 this showed that group A is more effective in VAS as compared to group B.

INTRODUCTION

The greater sciatic foramen is where the piriformis muscle goes laterally after starting on the anterior aspect of the sacrum and the Sacro tuberos ligament. It then inserts on the inner surface of the superior greater trochanter. When the hip is stretched, the piriformis muscle acts as an external rotator, and when the hip is flexed, it acts as an abductor. (1,2)

Piriformis muscle tightness is frequently mistaken for Piriformis Syndrome, which is characterized as sciatic nerve neuritis brought on by an injured or inflamed piriformis muscle. In contrast, tightness is only the muscle's lengthening as a result of a sedentary lifestyle. Simple tightness of the Piriformis muscle can result in a number of incapacitating conditions, such as low back pain, sciatic nerve pain from muscle hypertrophy or a nearby anomaly because of its anatomical proximity to the sciatic nerve, and pain and aesthesia in the hip, thigh, calf, and foot. Reduced flexibility and limited range of motion are the results of piriformis tightness. If not identified in the early stages, it impairs a person's ability to function both physically and socially and can result in piriformis syndrome. (1,3)

The sciatic nerve is irritated by the tight piriformis muscle, which results in piriformis syndrome and sciatica, which is pain that radiates down the back of



the leg. Government officials, contact center employees, IT workers, and others are more likely to experience Piriformis tightness when seated in a long-sitting chair. Although its function varies according to the manner of sitting, the piriformis muscle is used in all sitting positions, whether high or cross. A prior study found that because the muscles are always under low-grade tension to maintain the sitting position, sitting in a chair for longer than eight hours may result in joint discomfort and stiffness in the back muscles. 79.5 percent of sedentary individuals have tension in their piriformis muscles. (4)

Stretching restores range of motion and alleviates the excruciating sensations of Piriformis syndrome. In order to prevent potential sciatic compression, stretching affects the rest period of a tight muscle caused by tension in the Piriformis. The most popular method for treating piriformis syndrome is stretching. By releasing the muscle, stretching the piriformis relieves strain on the sciatic nerve. (4,16)

A professional intervention known as instrument assisted soft tissue mobilization (IASTM) uses specialized tools to manipulate the skin, myofascial, muscles, and tendons using a variety of direct compressive stroke techniques. It has a neurophysiological effect because it uses an instrument to distort the skin, stimulating mechanosensitive neurons. By increasing blood flow, decreasing stress and strain on the injured soft tissue, reducing inflammation, increasing muscle strength and flexibility, breaking up scar tissue, promoting proper tissue repair, improving functional movements, and accelerating fibroblast activity, IASTM influences the vascular response to the soft tissue injury. (5)

By reducing muscular hypertonicity and improving neuromuscular coordination, MET helps to relieve pain and improve Hip ROM. Post isometric relaxation (PIR) starts with an isometric contraction of the piriformis muscle, followed by passive stretching. This sequence triggers autogenic inhibition, a reflex mechanism that reduces muscle tone, thereby relieving a tension within the piriformis. As a result, patients experience less pain because their muscles are relaxed. Additionally, it improves blood flow to the muscle, which aids in the removal of metabolic waste products and promotes tissue healing, which leads to increased hip joint flexibility and range of motion. (6,7)

SAMPLE



A total of 30 subjects were included in this study. The subjects were assigned accordingly to the inclusion and exclusion criteria into two groups with 15 subjects in each group.

PLACE

The study was concluded in students of doon P.G. paramedical college Dehradun.

INCLUSION CRITERIA

- Patients having piriformis tightness.
- Age 18-25 years.
- Prolong cross leg sitting more than 4-5 hours daily.
- Piriformis tightness with no specific pathology.
- Any three tests positive among piriformis test, FAIR test, Freiberg test.

EXCLUSION CRITERIA

- Any pathology and recent injury around hip, knee and SI joint.
- Age above 25 years.
- History of recent surgeries.
- Any known metabolic disease.

VARIABLES

INDEPENDENT VARIABLES

- IASTM technique.
- Conventional therapy.
- Passive stretching.
- Isometrics exercise.

DEPENDENT VARIABLES



- Pain.
- Range of motion of hip joint.

OUTCOME MEASUREMENT

- Goniometer.
- Visual analog scale.

MATERIALS

- Consent form
- Assessment sheet.
- Goniometer.
- Couch.
- Pen and paper.
- IASTM tool.



PROCEDURE

Subjects who fulfill the inclusion and exclusion criteria was randomly allocated into two groups A and B. individuals selected for the study were prior and post intervention program with outcome measure like VAS and hip range of motion for lateral rotation and abduction with flexed hip was measured by goniometer.

Special test-

FAIR TEST- the patient is positioned in side-lying on the unaffected side. The symptomatic leg is positioned in 60 to 90 degrees of flexion in the hip and 90 degrees flexion in the knee joint. The patient should be lying with the face directed towards the examiner, the examiner's hand is placed on the pelvis to stabilize it, the other hand is placed on the lateral side of the knee. The examiner gives hand pressure on the lateral side of the knee and tries to stretch the part as far as possible. The examiner performs horizontal adduction while putting pressure on the knee in the direction of the table. During the stretch, the patient may feel pain or discomfort. This test is also named as the FAIR test (Flexion Adduction and Internal Rotation).

FREIBERG TEST-Freiberg's test elicits pain by passively internal rotation of the extended hip, when the patient is in supine. The purpose of this test is on the one hand stretching of the irritated PM, on the other hand provoking sciatic nerve compression.

GROUP A underwent IASTM technique along with stretching of piriformis muscle. Treatment time was approx. 20-30 minutes a day for 3 weeks. (3 days in a week).

IASTM technique-Participants in group A was instructed by lay down in a prone position for the application or cream to reduce friction between skin and IASTM tool.

Therapist position-walk standing on the affected side of the patients.

Technique- The handlebar was then applied using the scraping technique to the posterior aspect of affected side. The direction of the application of IASTM tool was based on direction of muscle fibers of piriformis.

Thus, the IASTM tool was applied in a transverse horizontal direction from the proximal to distal and then distal to proximal. After that, another 2 min of rest were given before taking hip abduction and lateral rotation measurement again.



Manual passive stretching- instructed to patients lay down in a supine position.

Therapist position- on the side of the leg where the stretch is to be given.

Technique-

Step 1- flexion of hip at 90 degrees.

Step 2- adduction of the hip.

Step 3- external rotation of hip.

Duration- stretch was sustained for 30 second and repeated 3 times in a session.

GROUP B-Underwent hydrocollator pack and muscle energy technique.

The patients were treated with moist heat application over piriformis muscle for 15 minutes in a session.

post- MET for hip-patients was lying in supine position, with the treated leg is placed into flexed hip and knee, so that the foot rests on the table lateral to the contralateral ASIS to prevent pelvic movement. While other hand is placed against the lateral flexed knee as this is pushed into resist adduction to contract antagonists or to inhibit piriformis muscle.

The starting position was on the 1st sign of resistance towards end range. The therapist force was same as the patient's force. Duration of resistance was 7-10 second with 3 repetitions for 3 weeks.

RESULT

The data was analysed using statistical software JASP version 0.17.3.

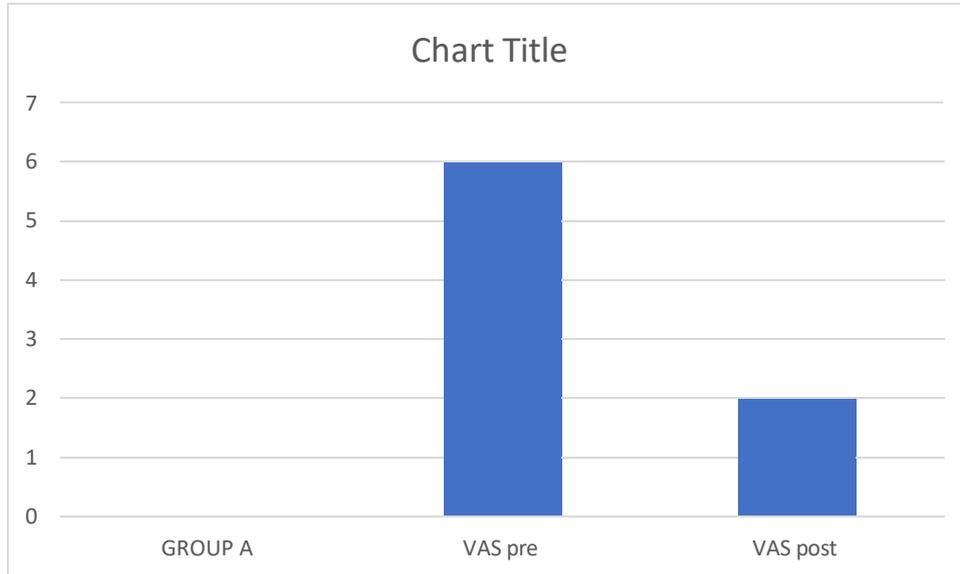
To analyse the difference of VAS in group A and group B paired t test was applied. The p values < 0.001 in group A and group B were extremely significant.

GROUP A (IASTM WITH CONVENTIONAL THERAPY)

DESCRIPTIVE ANALYSIS	VAS (PRE)	VAS(POST)
MEAN	6.143	2.286
SE OF MEAN	0.345	0.221
STANDARD DEVIATION	1.292	0.825



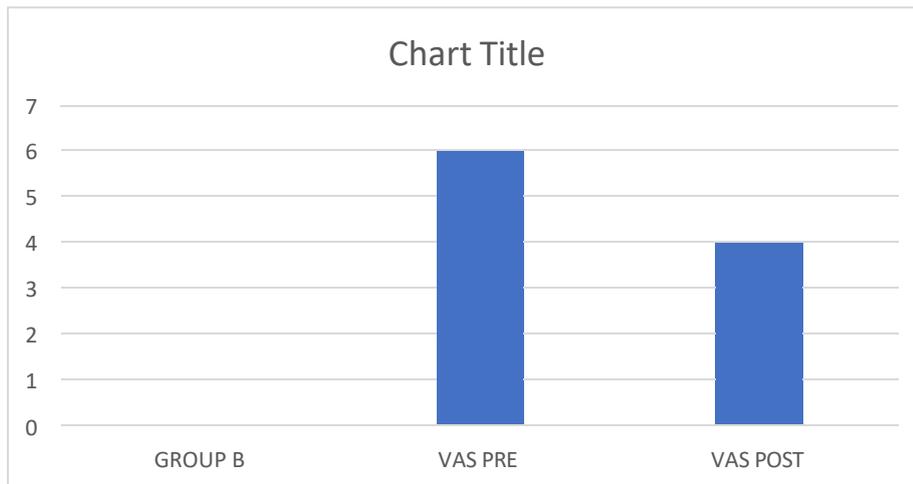
MEAN DIFFERENCE OF GROUP A = 3.86



GROUP B (POST ISOMETRIC RELAXATION WITH CONVENTIONAL THERAPY)

DESCRIPTIVE ANALYSIS	VAS(PRE)	VAS(POST)
MEAN	6.286	4.071
SE OF MEAN	1.326	1.542
STANDARD DEVIATION	0.354	0.412

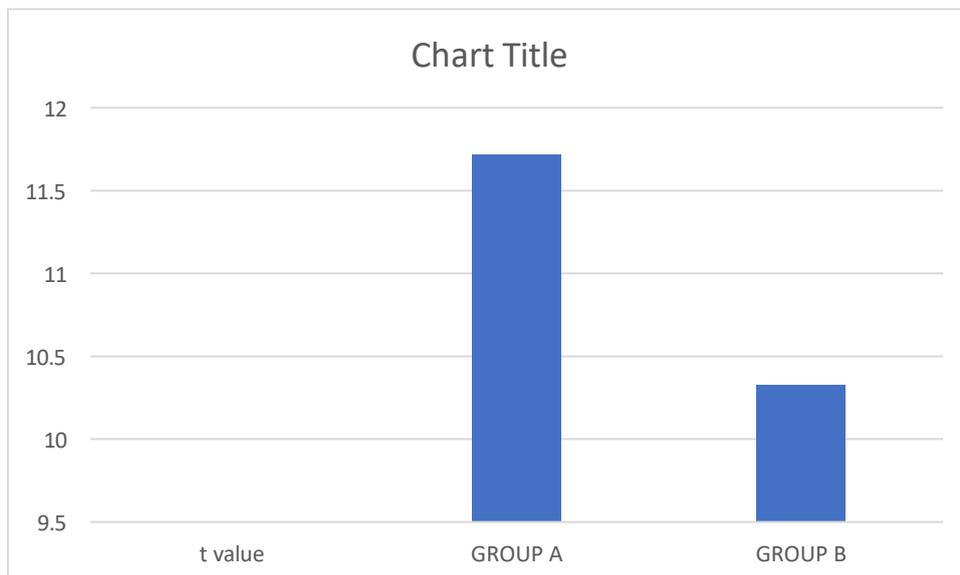
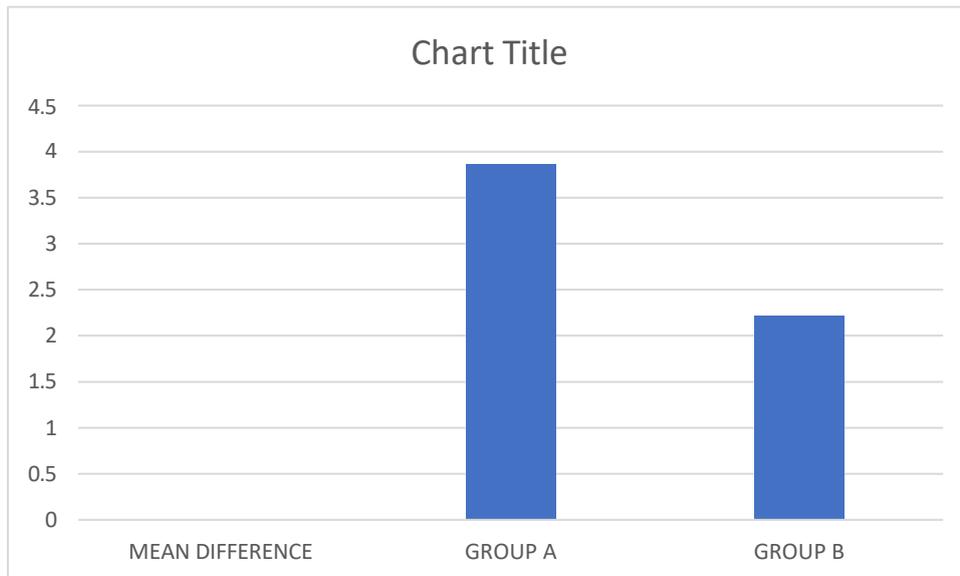
MEAN DIFFERENCE FOR GROUP B = 2.215



VAS	t value	df	P
Group A	11.720	13	<0.001
Group B	10.333	13	<0.001

COMPARISON WITHIN GROUP

The t values of group A(IASTM WITH CONVENTIONAL THERAPY) was found to be greater than that of group B(POST ISOMETRIC RELAXATION WITH CONVENTIONAL THERAPY) indicating a major difference in pre and post analysis of mean within the group where $p < 0.05$ is preferred as statistically significant and here p is < 0.001 which is considered as statistically highly significant .Hence it rejects the null hypothesis and supports the alternative hypothesis. Further the mean difference in group A was found to be more than that of group B indicating better results.



DISCUSSION

The study's purpose was to see how IASTM with conventional therapy and post isometric relaxation with conventional therapy affected pain and function in patients with piriformis tightness. Sitting with one leg crossed or walking with a stride can aggravate symptoms. (15)

Since they sit for extended periods of time due to their sedentary lifestyle of attending lectures, sedentary people frequently complain of low back pain brought on by muscular imbalance. The prevalence of piriformis muscular tension was 79.5 percent in sedentary individuals. Sedentary people often suffer from low back pain due to muscular imbalances caused by their daily routine, which involves sitting for extended periods of time and occasionally standing



and walking. Spending more than eight hours sitting in what feels like a chair can strain joints that stay in one position for a long time and tighten hip and back muscles like the piriformis, iliopsoas, and hamstrings. (16)

The effects of IASTM, post isometric relaxation and conventional therapy were seen on the VAS were investigated in our study for both groups before and after therapy, and a statistically significant difference was found between the two treatments. After a comparison, the pain thresholds of groups A and B were discovered to be significantly different, with group A experiencing the greatest pain reduction when compared to group B.

CONCLUSION

Both IASTM with conventional therapy as well as post isometric relaxation with conventional therapy were effective in reducing tightness and improving ROM, but IASTM with conventional therapy gave faster relief of pain, improving ROM and decreasing tightness of piriformis and disability and had lasting effects in terms of duration than simple stretching.

LIMITATIONS

The limitations of the study includes the following:

- Lesser number of subjects
- No group had similar patients with same degree of involvement
- Age variation from 18-25 years
- Patient's built was variable
- Study was not focused on any particular occupation or athletic population
- The study has been conducted on small sized sample only.
- Home programme has not been prescribed along with the treatment protocol.

FUTURE RESEARCH

It includes multicentric studies with large sample size to further strengthen my study findings for future. Further studies can include other outcome measures. Treatment should be carried out with regular follow ups.

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