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## Review

### Exploring The Effectiveness Of Physiotherapy Interventions On Piriformis Syndrome: A Literature Review



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	<b>Abstract</b>
Published on: 17 Apr 2025	<p><b>Objective:</b> To explore the effectiveness of various physiotherapy interventions on piriformis syndrome.</p> <p><b>Methods:</b> Searches were conducted in google scholar, pubmed. A literature review conducted of only randomized control trial that reported extractable data relevant to the study. The search included all study upto 2018 to 2024. Out of many articles only total of 10 randomized control trial studies were included.</p> <p><b>Results:</b> After segregation we have got 10 articles in tabular form and the search breakdown is made in flowchart which are randomized control trial study.</p> <p><b>Conclusion:</b> From all the studies the most common physiotherapy interventions are myofascial release, stretching, therapeutic ultrasound, strengthening exercises, etc.</p>
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<a href="https://creativecommons.org/licenses/by/4.0/">Creative Commons Attribution 4.0 International License.</a>	<p><b>Keywords:</b> Physiotherapy, Interventions, Piriformis, Syndrome, Muscle.</p>

## INTRODUCTION

Piriformis muscle is a deep, small pyramidal flat shaped muscle in gluteal region. The origin of the piriformis muscle is from sacrum between the first through fourth pelvic sacral foramina, margin of greater sciatica foramen and pelvic surface of the sacrotuberous ligament and the insertion is superior border of the greater trochanter of the femur and the nerve supply is sciatic nerve. The action of piriformis muscle is external rotation, weak abductor and weak flexor of the hip. It provides postural stability during standing and ambulation.<sup>11</sup>

Sciatic nerve is a peripheral nerve that combines of five spinal nerves that is L4, L5, S1, S2 and S3. It has both motor and sensory fibres. They merge together deep into gluteal region to form sciatic nerve. The nerve passes either above, below or between the piriformis muscle piercing it then transverse posterior of thigh. It gets divided into common peroneal nerve and tibial nerve before passing through popliteal fossa.<sup>13</sup>

Piriformis syndrome is a condition where piriformis muscle get tight or shorten and compresses the sciatic nerve which is passing through the muscle.<sup>12</sup> The symptoms will be pain in hip region, low back and back of the thigh along with radiating pain, numbness, tingling and burning sensation towards down the ipsilateral leg and side of foot.<sup>2</sup> Few specific disorders that can results in piriformis syndrome are entrapment of the surrounding muscles, nerves and vessels at the great sciatic foramen, trigger points within the taut band of piriformis muscle producing myofascial pain and decrease in range of motion. Causes such as overuse, trauma, prolonged sitting, and biomechanical imbalances.<sup>3</sup>

Physiotherapy is widely recognized as an effective approach in managing piriformis tightness, utilizing a variety of techniques to reduce muscle tension, alleviate pain, and restore functional mobility. Physiotherapy interventions like METs, ultrasound, stretching exercises, neural mobilization, correction of abnormal posture, strengthening of hip muscles, core training, myofascial release, etc.<sup>3</sup>

This study aims to evaluate the impact of physiotherapy interventions on piriformis tightness, providing evidence-based insights that can inform clinical practices and improve patient outcomes. Understanding the efficacy of these interventions will aid in optimizing treatment plans and enhancing the overall management of piriformis tightness.

### **Need Of The Study**

Pain in low back region is a getting common concern nowadays and one of the most common cause is piriformis syndrome which results from tightness of piriformis muscle. Physiotherapy seems better option to treat piriformis syndrome, so that's why here we are exploring the different types of physiotherapy interventions which can be used to treat piriformis syndrome.

### **Objective Of The Study**

This literature review will specifically examine the existing evidence regarding effectiveness of physiotherapy interventions on piriformis syndrome.

## **MATERIALS AND METHODS**

### **Inclusion Criteria**

1. This study will include randomized controlled trial publications that specifically investigate the effects of different kinds of physiotherapy interventions on patients with piriformis syndrome.
2. Only articles published in the English language will be considered.
3. The articles were published between 2018 and 2024.
4. The age range is from 19 to 60 years.
5. Both sexes are encompassed.

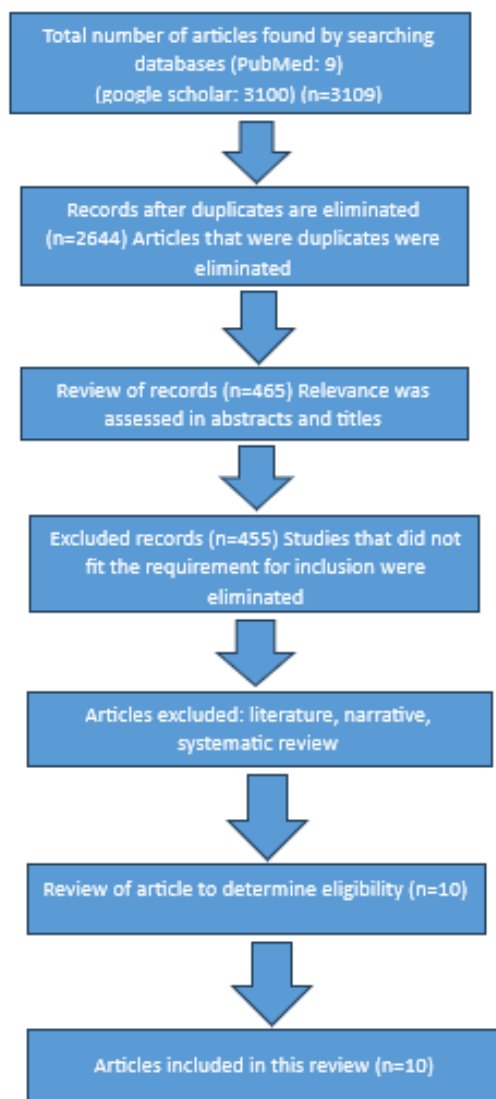
### **Exclusion Criteria**

1. Articles published in languages other than the regional language were omitted.
2. Narrative review, literature other than systematic review articles were excluded.
3. Articles published prior to 2014 were excluded.
4. Studies those are not relevant to the specified keywords.

## **METHODOLOGY**

The evidence was gathered from online web publications obtained from different search engines, including Google Scholar, PubMed. A tailored search was conducted using key words such as “piriformis syndrome”, “physiotherapy intervention” to retrieve relevant publications. The time period was designated as 2018 to 2024 in order to gather precise and current facts from throughout the globe over the course of the past decade. We have identified a total of 10 articles that meet our specific criteria for inclusion and exclusion. All 10 publications were obtained in their entirety to be analysed and continued with further analysis. The results are derived using a systematic approach from all articles and displayed in a tabular format for enhanced comprehension.

**Flow chart**



**REVIEW OF LITERATURE**

Author, Year	Total No. of Samples	Duration of the study	Intervention	Outcome measures	Significant Findings
Pavithra M.P. et.al 2024	220	8 months	Interferential Therapy with Hip Muscle Strengthening Exercises. Ultrasound Therapy with Hip Muscle Strengthening Exercises.	Visual Analog Scale (VAS), FAIR test.	Interferential therapy group was found to be more effective than the ultrasound therapy group.
Shahzadi B et.al 2023	30	6 weeks	Sacroiliac joint manipulation.	Numerical Pain Rating Scale (NPRS), Digital Goniometer,	Conventional physical therapy with and without

			Therapeutic ultrasound. Moist hot pack. Piriformis muscle stretching. Myofascial release of paraspinal muscles. Gluteal strengthening. Sciatic neurodynamics.	Algometer/Doloriometer, Inclinator.	sacroiliac joint manipulation were equally effective.
Gizem Ergezen et.al 2023	63	4 weeks	Stretching. Self-Myofascial Relaxation Exercises.	Goniometer, Numeric Pain Rating Scale (NPRS).	Stretching and myofascial releasing applied in addition to conventional exercises might improve pain and range of motion as alternative methods.
Naveed Ahmad et.al 2022	30 All males	6 weeks	Myofascial release technique for 3-4 minutes. Post Facilitation Stretch Technique 3-5 times.	Numeric Pain Rating Scale (NPRS), Lower Extremity Functional Scale (LEFS), Goniometer.	Both myofascial release and post facilitation stretch technique were effective
Attiq Ur Rehman et.al 2022	30 17 females 13 males	3 weeks	Active Release Technique (ART). Post Isometric Relaxation (PIR).	Lower Extremity Functional Scale (LEFS), Visual Analog Scale (VAS), Goniometer.	ART compared to PIR is more effective in improving functional disability in piriformis syndrome.
Musa S Danazumi et.al 2020	48 39 males 9 females	4 months	Integrated Neuromuscular Inhibition Technique (INIT). Positional Release Technique (PRT).	Visual analog scale (VAS), Sciatica Bothersomeness Index (SBI), Timed Up and Go (TUG) test, Short Form Health Survey (SF-36) questionnaire, Simple long arm goniometer.	INIT was more effective than PRT in the management of individuals with piriformis syndrome.
Azzam Alarab et.al 2020	32	4 weeks	Soft Tissue Mobilization- Cross fiber friction-Positional release therapy. Stretching exercises.	Visual Analogue Scale (VAS), Rolland Morris Questionnaire (RMQ), Hamilton Anxiety Rating Scale (HAM-A).	Stretching exercise is effective more than tissue mobilization techniques.
Rajendran et.al 2020	20 All females	4 weeks	Myofascial release 3 sets of 5 minutes each. Piriformis stretch for 20-30 seconds for 5 times.	Numerical Pain Rating Scale (NPRS), FAIR Test.	Both these treatments are beneficial in reducing pain and improving range of motion.
Hiya A. Kukadia et.al 2019	30 All females		Passive Stretching 3 times for 30 seconds.	Hip ROM	Myofascial release on piriformis

			Myofascial Release for 3 minutes.		flexibility is more effective than passive stretching.
Raheela Kanwal et.al 2018	47 females 26 males	1 year	Stretching exercises for 10 reps 30 secs. Deep Friction Massage for 10 reps 10 secs.	Oswestry disability index (ODI), FAIR test,	Cross Friction Massage is more effective than compare to stretching exercises.

## DISCUSSIONS

The aim of this literature review was to gather and categorize papers focused on reducing or treating the piriformis syndrome by physiotherapy interventions. We are doing this research to gain more exposure of what more techniques are there related to physiotherapy to treat piriformis syndrome.

We have found many articles in a variety of reputable journals that correspond to our keywords. After examining the inclusion and exclusion criteria, we were able to gather 10 articles in the form of randomized controlled trials (RCTs) from the years 2018 to 2024. There are other articles also with interventions like cupping, dry needling for this condition but here we are focusing on physiotherapy interventions only.

These articles will be further analysed. Randomized controlled trials (RCTs) were selected due to their inclusion of exercise protocols and the author's perspectives or findings, as compared to review articles. All 10 articles had a distinct outcome measures to confirm diagnosis and all interventions routine tailored to fit the individual needs were there in their respective test groups.

After analysing 10 papers, we discovered that all of them shown a beneficial impact. Furthermore, the impact is optimized when participants receive a combination intervention rather than a single intervention.

The research duration ranged from 3 weeks to 1 year, which is considered sufficient for reducing low back pain and piriformis syndrome. It is evident that a longer training period would yield even better results for the participants.

The prevalent outcome measures consisted of Visual Analogue Scale (VAS), Rolland Morris Questionnaire (RMQ), Hamilton Anxiety Rating Scale (HAM-A), FAIR test, Oswestry disability index (ODI), Numerical Pain Rating Scale (NPRS), Lower Extremity Functional Scale (LEFS), Goniometer, Inclinator, Sciatica Bothersomeness Index (SBI), Timed Up and Go (TUG) test, Short Form Health Survey (SF-36) questionnaire.

Physiotherapy interventions were used like Myofascial release, Soft Tissue Mobilization- Cross fiber friction-Positional release therapy, Stretching exercises, Integrated Neuromuscular Inhibition Technique (INIT), Active Release Technique (ART), Post Isometric Relaxation (PIR), Sacroiliac joint manipulation, Interferential Therapy with Hip Muscle Strengthening Exercises, Ultrasound Therapy with Hip Muscle Strengthening Exercises, etc.

In a research study Pavithra M.P. et.al in 2024 was the Effectiveness of Interferential Therapy with Hip Muscle Strengthening Exercises and Ultrasound Therapy with Hip Muscle Strengthening Exercises for Piriformis Syndrome. The trial lasted for 8 months and involved interventions like Interferential Therapy with Hip Muscle Strengthening Exercises, Ultrasound Therapy with Hip Muscle Strengthening Exercises. This study concluded that the Interferential therapy group was found to be more effective than the ultrasound therapy group in patients with Piriformis Syndrome.

A study conducted by Shahzadi B et.al in 2023 was the Sacroiliac joint manipulation helps to improve pain pressure threshold in chronic piriformis syndrome. The trial lasted for 6 weeks and the involved interventions were Sacroiliac joint manipulation, Therapeutic ultrasound, Moist hot pack, Piriformis muscle stretching, Myofascial release of paraspinal muscles, Gluteal strengthening, Sciatic neurodynamics. Addition of the sacroiliac joint thrust manipulation technique and conventional physical therapy alone were equally effective in decreasing pain intensity and normalizing length of Piriformis and Straight leg raise. But SIJ manipulation showed promising results on pain pressure threshold.

In a research study Gizem Ergezen et.al in 2023 was the Comparison of self-myofascial release and stretching exercises in individuals with piriformis syndrome. The trial lasted for 4 weeks and the involved interventions were Stretching, Self-Myofascial Relaxation Exercises. Stretching and myofascial releasing methods applied in addition to conventional exercises might improve pain intensity and range of motion as alternative methods for treating piriformis syndrome.

In 2022, Naveed Ahmad et.al conducted a study the Effectiveness of post facilitation stretch technique versus myofascial release in piriformis syndrome. The trial lasted for 6 weeks and the involved interventions were Myofascial release technique, Post Facilitation Stretch Technique. Both myofascial release and post facilitation stretch technique were effective in the treatment of piriformis syndrome.

In 2022, Attiq Ur Rehman *et.al* did research study on the Comparison of Active Release Technique and Post Isometric Relaxation in Patients with Piriformis Syndrome. The trial lasted for 3 weeks and involved interventions were Active Release Technique (ART), Post Isometric Relaxation (PIR). ART compared to PIR is more effective in improving functional disability in piriformis syndrome.

In a research study, Musa S Danazumi *et.al* in 2020 was the effect of integrated neuromuscular inhibition technique compared with positional release technique in the management of piriformis syndrome. The trial lasted for 4 months and involved interventions were Integrated Neuromuscular Inhibition Technique (INIT), Positional Release Technique (PRT). INIT was more effective than PRT in the management of individuals with Piriformis Syndrome.

A study was conducted by Azzam Alarab *et.al* in 2020 was the Stretching Exercise Versus Tissue Mobilization Technique in Piriformis Syndrome. The trial lasted for 4 weeks and involved interventions were Soft Tissue Mobilization-Cross fiber friction-Positional release therapy, Stretching exercises. The study proved which the stretching exercise was more efficient than the tissue mobilization technique on the pain outcome measures. It's reported that stretching exercise improves low back function more than tissue mobilization technique. In the end, the study indicated that significantly there was no difference between both groups on the anxiety outcome measure.

Rajendran *et.al* in 2020 did research study on the effectiveness of myofascial release over stretching on pain and range of motion among female college students with piriformis syndrome. The trial lasted for 4 weeks and the involved interventions were Myofascial release, Piriformis stretch. There are no significant effects of myofascial release found over stretching between the two groups.

A research study conducted by Hiya A. Kukadia *et.al* in 2019 was the Effect of Passive Stretching v/s Myofascial Release in Improving Piriformis Flexibility in Females. The involved interventions were Passive Stretching, Myofascial Release. The study concluded that the effect of Myofascial release on piriformis flexibility is a more effective than passive stretching.

In their study, Raheela Kanwal *et.al* in 2018 was the stretching exercise versus deep friction massage for the management of piriformis syndrome. The trial lasted for 1 year and involved interventions were Stretching exercises, Deep Friction Massage. It is concluded that cross friction massage is more effective in reducing pain and improving functional abilities in patients with piriformis syndrome as compare to stretching exercises.

### **Limitation And Recommendation**

The main limitation of this study is we retrieved articles only from 2018 to 2024, so time frame could be slightly higher. Future researchers can utilize this article for intervention regarding for piriformis syndrome and they can conduct RCTs and systematic reviews in future.

## **CONCLUSION**

Based on this literature review, there are physiotherapy techniques used as interventions to treat piriformis syndrome. All data indicated improvements in all groups; however the effect size was more prominent in the combination intervention compared to a single intervention given to the individuals. We suggest conducting additional studies on this topic like systematic review or scoping study can be done. This study can be conducted as additional randomized controlled trials focusing on many physiotherapy interventions implemented by different researchers.

## **DECLARATIONS:**

Ethics approval and consent to participate: NA

Availability of data and material: Data openly available in a public repository that issues datasets with DOIs.

Competing interest: None

Funding: NA

Authors contribution:

Shristi Navinkumar Maurya - Conceptualization, design, data collection, implementation, monitoring, data analysis, interpretation and manuscript writing.

R Sedhunivas - Title formation and final manuscript review.

Arnold Nikhilesh - Title formation and final manuscript review.

## **ABBREVIATION**

RCT- Randomized Controlled Trial

MET- Muscle Energy Technique

VAS- Visual Analog Scale

NPRS- Numerical Pain Rating Scale

LEFS- Lower Extremity Functional Scale  
RMQ- Rolland Morris Questionnaire  
HAM-A- Hamilton Anxiety Rating Scale  
SBI- Sciatica Bothersomeness Index  
TUG- Timed Up and Go  
SF-36- Short Form Health Survey  
ODI- Oswestry disability index  
INIT- Integrated Neuromuscular Inhibition Technique  
PRT- Positional Release Technique  
PIR- Post Isometric Relaxation

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