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Effects of Myofascial Release Technique on Pain, Range of Motion and Functional Disability in Patients with Piriformis Syndrome

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KEYWORDS

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DECLARATIONS

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ABSTRACT

Background: Piriformis syndrome is characterized by pain due to compression of the sciatic nerve by the pressure of the piriformis muscle, leading to discomfort in the buttocks, sciatica, or a combination of both. Physical therapy is regarded as a crucial intervention for individuals experiencing piriformis syndrome. **Objective:** To evaluate the effectiveness of myofascial release technique in addition to conventional physical therapy on the pain, range of motion and functional disability in patients with piriformis syndrome. **Methodology:** A total of 46 patients (20 males and 46 females) who had been pre-diagnosed with piriformis syndrome by an orthopedic physician were evaluated at Surriya Azeem Surgical Hospital in Pattoki. After meeting the inclusion criteria, the participants were assigned randomly to two groups; one received standard physical therapy while the other was given myofascial release techniques in addition to conventional physiotherapy. The exclusion criteria encompass any injury of the lower extremity, lumbar radiculopathy, any systemic disease, sacroiliac joint dysfunction, lower extremity fractures, any congenital deformity, and any cognitive issues. The outcome measures like range of motion, pain, and functional disability were evaluated utilising the numerical pain rating scale, a goniometer, and the Lower Extremity Function Test, respectively. Data collection occurred at baseline, following six sessions, and again after twelve sessions. The non-parametric Friedman test was used for between-group analysis, and the Mann-Whitney U test was used for within-group analysis. **Results:** The average rank for the numeric pain rating scale at baseline, 6th and 12th sessions was 2.50, 2.35, and 1.15, respectively (p=0.00). The average rank of external rotation and abduction for baseline were 4.55 and 6.87 for the 6th session, 6.32 and 8.21, and for the 12th session were 6.32 and 8.21, respectively, (p=0.00). The average rank for LEFS at baseline, 6th and 12th sessions was 6.95, 9.08, and 10.19 (p=0.000). Based on the results, conventional physical therapy demonstrated a significant difference in pain, range of motion and functional disability at different sessions. **Conclusion:** Myofascial release, along with conventional physical therapy, is notably effective in relieving pain, enhancing the range of motion, and decreasing functional disability.

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INTRODUCTION

Piriformis syndrome can be described as a condition where a small muscle known as the piriformis, located deep within the buttock, leads to pain due to tightness, spasm, or extended compression.[1] The sciatic nerve from L4-L5 travels through the piriformis muscle to the big toe.[2] Because of the compression, tightness, or spasm of the piriformis muscle, the sciatic nerve that passes through it may also experience compression and irritation, causing the patient with this painful condition to exhibit neurological signs and symptoms that resemble sciatica; consequently, piriformis syndrome is usually incorrectly diagnosed as sciatica, making a careful and thorough examination essential for accurate diagnosis.[3,4] The potential causes of this syndrome include muscle spasm and irritation caused by different factors like bleeding, muscle tightness, and swelling of muscle due to an injury or compression.[5] People aged 30-49 are more likely to experience Piriformis pain.[6]

The prevalence rate of Piriformis syndrome, according to recent studies, is 12-27%, while the yearly prevalence ranges from 2.2-19.5%.[7] The level of physical exercise does not influence its incidence, and people from all occupations are equally represented in the group affected.[8] Some research indicates that females are more susceptible to experiencing piriformis muscle pain. This is attributed to the anatomical characteristics of females, including the wider pelvis, the increased angle, and the higher fat content.[9] The management of piriformis syndrome encompasses both non-pharmacological and pharmacological treatment approaches. In terms of pharmacological treatment, opioids and non-steroidal anti-inflammatory medications are taken into account.[10]

Regarding non-pharmacological treatment, methods such as patient education, correction of posture, lifestyle changes, and physiotherapy are employed, which includes modalities like electrotherapy, heating techniques such as ultrasound, infrared, heating pads diathermy, low-level laser therapy, and exercises like: stretching exercises, core strengthening, isometric, , along with myofascial release techniques.[11,12] Myofascial release is a hands-on soft tissue method that enables a stretch to a restricted fascia. This method enhances oxygen, blood, and lymphatic circulation to the affected muscle, triggers a stretch reflex within the muscle, and consequently reduces tightness in the muscle.[13] A sustained stretch has been applied by the therapist on the tightened tissue. The therapist persists in following the release into the newly established tissue barrier, and after several releases, the restricted tissue becomes softer and more pliable.[14] The pressure on soft tissue structures surrounding the muscle, such as blood vessels and nerves, is also alleviated, thus restoring the mobility and alignment of the joint.[15]

Stretching is the approach where the muscle or tendon is extended or flexed to enhance its muscle tone, flexibility, elasticity, muscle control, and reduced musculotendinous stiffness.[16] Consequently, the range of motion at the joint is also enhanced. Initially, stretching a spastic or tightened muscle may cause pain, but ongoing stretching typically alleviates discomfort.[17] The stretching of the piriformis muscle also alleviates its tension or spasm and aids in reducing the symptoms of piriformis syndrome.[18] Myofascial release (MFR) has been used as an effective measure to treat piriformis syndrome, but according to existing literature, the prior studies only involved a young female demographic. Therefore, this study seeks to assess the efficacy of MFR across individuals of different genders and age groups. The purpose of the study is to evaluate the effects of the MFR technique on pain, range of motion and functional disability in patients having piriformis syndrome.

METHODOLOGY

The study involves a randomized controlled trial carried out at Surayya Azeem Surgical Hospital, Pattoki, with a time frame of 9 months following the approval of the synopsis. Participants aged 25-45 years who had a positive FAIR test and pain intensity exceeding three points on the numeric pain rating scale were included in the trial. The exclusion criteria encompass any injury of the lower extremity, lumbar radiculopathy, any systemic disease, sacroiliac joint dysfunction, lower extremity fractures, any congenital deformity, and any cognitive issues. All participants in the study received appropriate consent before any testing. After the patient provided their consent, the entire treatment protocol was clarified, and data were gathered. A

universal goniometer, lower extremity functional scale (LEFS) and numeric pain rating scale were utilized to evaluate range of motion, functional disability and pain, respectively.

All participants completed a written informed consent form, and approval was obtained from the Ethical Committee of the University of Lahore. A total of sixty-six individuals experiencing piriformis syndrome, as diagnosed by the FAIRS test and meeting the inclusion criteria, were selected to participate in this randomized controlled trial. The patient was instructed to lie on their side. The affected leg was passively moved into 90° flexion, adduction, and internal rotation. Afterward, downward pressure was applied to the knee to adduct and internally rotate the hip, meanwhile maintaining hip stability. If the patient experienced pain in the hip or gluteal area, the test was deemed positive.[19] The research was conducted with a single-blind design. The evaluator remained unaware of group assignments. Participants were divided into two groups using random numbers generated by a computer. Information was gathered at the beginning, after six sessions, and after the twelfth session. The information was obtained through a questionnaire and a goniometer.

Both groups underwent standard physical therapy that involved patient education, along with thermal electrical modalities. A transcutaneous electrical nerve stimulator was utilized, having two electrodes placed over the piriformis muscle at a frequency of 110 Hz, 50 µ in a continuous mode for about ten minutes. Therapeutic ultrasound was administered at 2-2.5 watts/cm^2 for ten minutes, surrounding the affected piriformis muscle for 8 to 10 minutes. Hip full flexion to full extension, internal to external rotation and adduction to abduction exercises were performed with 10 repetitions.[20] Then stretching exercises focused on the piriformis muscle, where the participant was instructed to place the affected muscle in a stretched position for about 10 seconds and repeat this thrice. Following that, the strengthening exercises for the muscle required subjects to maintain isometric contraction on the affected side for about 10 seconds, with repetitions of 10. The exercise plan lasted for 20 minutes under the oversight of the physiotherapist.[21]

A total of thirty-three participants underwent conventional physical therapy. Another thirty-three participants received conventional physical therapy along with MFR for piriformis. The patient was instructed to lie in a prone position for MFR. The therapist stood on the side that was affected. This technique was then applied to the piriformis muscle, applying pressure on the trigger point by directly pressing and holding it for approximately 10 to 100 seconds using the palm. Afterwards, kneading strokes were performed, which were parallel to and aligned with the direction of the muscle fibers for about 5-10 minutes.[22] The treatment was provided to the subjects over four weeks (12 sessions on alternate days, with 3 sessions each week).

SPSS version 26 was utilized for data input and analysis. Quantitative variables were described using mean±SD, while qualitative variables were described using percentages and frequency. The Shapiro-Wilk normality test was employed to evaluate the normality of the data. Since the data was not normally distributed, non-parametric tests were utilized; the Friedman test was used for between-group analysis, and the Mann-Whitney U test was used for within-group analysis. The research was authorized by the ethical committee of the University of Lahore (453-XX1V) on 05-05-2023. The data collection document was sourced from the research environment. The confidentiality of the participants was upheld. The data acquired was stored on a laptop with password security. Before the data collection, informed consent was signed by the participants.

RESULTS

The average age of the participants in the conventional physical therapy and MFR group was 35.18±6.42, while in the conventional physiotherapy group, it was 35.99±7.48. Among the 66 participants, they were 12 males and 21 females in the physical therapy group, and in the

Table 1: Demographics

Groups		MFR+ Conventional physical therapy	Conventional physical therapy
Age	Mean±SD	35.99±7.48	35.18±6.42
Gender	Male	36.36	24.2
	Female	63.63	75.7

Table 2: Friedman test for NPRS, ROM, and functional disability

Variables		Follow-up	Mean Rank	Mean± SD	p-value
NPRS		Baseline	2.50	2.96±0.17	0.000
		6th Session	2.35	2.87±0.34	
		12th Session	1.15	2.03±0.31	
ROM	External Rotation	Baseline	4.55	21.54±7.15	0.000
	Abduction		6.87	31.54±12.25	
	External Rotation	6th Session	6.32	29.38±6.75	
	Abduction		8.21	35.96±9.07	
	External Rotation	12th Session	9.32	38.93±4.78	
	Abduction		9.50	39.83±5.84	
LEFS		Baseline	6.95	32.48±12.52	0.000
		6th Session	9.08	42.25±14.56	
		12th Session	10.19	56.06±17.04	

MFR group combined with conventional therapy, there were 8 males and 25 females (Table 1). The non-parametric Friedman test was utilized for comparison within the conventional group based on pain score, mobility and LEFS. The average rank for NPRS at baseline, 6th and 12th sessions was 2.50, 2.35, and 1.15, respectively (p=0.000). The average rank of external rotation and abduction for baseline were, 4.55 and 6.87 for the 6th session were 6.32 and 8.21, for the 12th session were 6.32 and 8.21, respectively (p-value=0.000). The average rank for LEFS at different sessions was 6.95, 9.08, and 10.19 (p-value=0.000). Based on the results, the conventional treatment demonstrated a significant change in pain, functional disability and ROM during follow-ups (Table 2).

DISCUSSION

A total of sixty-six individuals diagnosed with piriformis syndrome through a physical assessment were recruited to participate in this randomized controlled study. The chosen patients were separated into two groups using a random allocation method. Thirty-three individuals were treated with only routine physical therapy, while the other 33 individuals received myofascial release in addition to conventional physical therapy for 45 minutes per session over 12 sessions on alternate days. The outcome measures included pain, assessed using a numeric pain rating scale, range of motion measured with a universal goniometer, and functional disability evaluated with the lower extremity functional scale. The findings indicated that MFR combined with traditional physiotherapy was comparatively more effective in alleviating pain and reducing functional disability.

Gopal Nambi assessed the effectiveness of the muscle energy technique compared to MFR in participants diagnosed with piriformis syndrome. He categorized the patients into three groups, each receiving MFR, muscle energy technique, and routine treatment. In his research, he noted that women are more likely to experience piriformis syndrome than men, with a ratio of 6:1. He reported that the groups receiving the muscle energy technique and myofascial release demonstrated improvement in pain, hip range of motion, and functional disability.[23] However, the current research indicated that the group of patients who received both MFR and conventional physiotherapy exhibited improvements in pain and functional disability, while regarding the hip joint's range of motion, there was no difference between the two groups that received physiotherapy treatment with and without MFR.

A study carried out by Gopal Nambi examined the effectiveness of the muscle energy technique in comparison to myofascial release on individuals with piriformis syndrome. He categorized the subjects into three groups receiving muscle energy technique, MFR, and traditional

physiotherapy. He stated in his research that women generally experience piriformis syndrome more frequently than men, with a ratio of 6:1. The groups undergoing muscle energy technique and MFR exhibited progress in pain, hip ROM, and functional disability.[24] However, the present study found that the group of subjects who received both MFR and physiotherapy showed improvement in pain and functional activity; regarding the hip ROM, there was no distinction between the two groups.

A research study was carried out to evaluate the efficacy of oriental medical treatments and myofascial release for patients diagnosed with piriformis syndrome. The individuals were identified as having piriformis syndrome and received treatments that included acupuncture, herbal medicine, physical therapy, and myofascial release. Following the treatment, there was a reduction in pain levels for patients who underwent myofascial release.[25] This research corroborates the findings of the current study, which also determined that the group receiving myofascial release in conjunction with standard physical therapy demonstrated greater pain reduction in comparison to the group receiving solely conventional physical therapy.

A study conducted in 2020 focused on patients suffering from piriformis syndrome. The patients were separated into two groups, one receiving deep friction massage and myofascial release and the other a control group receiving standard physical therapy. The outcome of this study aligns with that of the current study, revealing that the experimental group receiving MFR along with standard physical therapy and deep friction massage reported a greater improvement in pain and functional disability compared to the control group that received only routine physical therapy.[26,27,28]

CONCLUSION

The current study concludes that conventional physical therapy with and without myofascial release is significantly effective in reducing pain, increasing range of motion and reducing functional disability. The study also impasses that conventional physical therapy with myofascial release is comparatively more beneficial in improving pain, range of motion and functional disability than physical therapy alone.

DECLARATIONS

Consent to participate: Written consent was obtained from patients. All methods were performed following the relevant guidelines and regulations.
Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.
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CONSORT guidelines: All methods were performed following the relevant guidelines and regulations.

REFERENCES

1. Varenika V, Lutz AM, Beaulieu CF, Bucknor MD. Detection and prevalence of variant sciatic nerve anatomy about the piriformis muscle on MRI. Skeletal Radiology. 2017;46:751-7.
2. Poutoglidou F, Piagkou M, Totlis T, Tzika M, Natsis K. Sciatic nerve variants and the piriformis muscle: a systematic review and meta-analysis. Cureus. 2020;12(11).
3. Siddiq MAB, Hossain MS, Uddin MM, Jahan I, Khasru MR, Haider NM, et al. Piriformis syndrome: a case series of 31 Bangladeshi people with literature review. European Journal of Orthopaedic Surgery & Traumatology. 2017;27:193-203.
4. Han SK, Kim YS, Kim TH, Kang SH. Surgical treatment of piriformis syndrome. Clinics in Orthopedic Surgery. 2017;9(2):136-44.
5. Koh E, Webster D, Boyle J. Case report and review of the potential role of the Type A piriformis muscle in dynamic sciatic nerve entrapment variant of piriformis syndrome. Surgical and Radiologic Anatomy. 2020;42(10):1237-42.
6. Vij N, Kiernan H, Bisht R, Singleton I, Cornett EM, Kaye AD, et al. Surgical and non-surgical treatment options for piriformis syndrome: A literature review. Anesthesiology and Pain Medicine. 2021;11(1).
7. Probst D, Stout A, Hunt D. Piriformis syndrome: a narrative review of the anatomy, diagnosis, and treatment. PM&R. 2019;11:S54-S63.
8. Mondal M, Sarkar B, Alam S, Das S, Malik K, Kumar P, et al. Prevalence of piriformis tightness in healthy sedentary individuals: a cross-sectional study. International Journal of Health Sciences &

Research. 2017;7(7):134-42.
9. Vassalou EE, Katonis P, Karantanas AH. Piriformis muscle syndrome: A cross-sectional imaging study in 116 patients and evaluation of therapeutic outcome. European Radiology. 2018;28:447-58.
10. Hogan E, Vora D, Sherman JH. A minimally invasive surgical approach for the treatment of piriformis syndrome: a case series. Chinese Neurosurgical Journal. 2020;6:1-6.
11. Fishman LM, Wilkins AN, Rosner B. Electrophysiologically identified piriformis syndrome is successfully treated with incobotulinum toxin a and physical therapy. Muscle & Nerve. 2017;56(2):258-63.
12. Ro TH, Edmonds L. Diagnosis and management of piriformis syndrome: a rare anatomic variant analyzed by magnetic resonance imaging. Journal of Clinical Imaging Science. 2018;8.
13. Brandl A, Egner C, Schleip R. Immediate effects of myofascial release on the thoracolumbar fascia and osteopathic treatment for acute low back pain on spine shape parameters: A randomized, placebo-controlled trial. Life. 2021;11(8):845.
14. Terlemez R, Ercalik T. Effect of piriformis injection on neuropathic pain. Agri. 2019;31(4):178-82.
15. Chen Z, Wu J, Wang X, Wu J, Ren Z. The effects of myofascial release technique for patients with low back pain: A systematic review and meta-analysis. Complementary therapies in medicine. 2021;59:102737.
16. Kisner C, Colby LA, Borstad J. Therapeutic exercise: foundations and techniques: Fa Davis; 2017.
17. Shahzad M, Rafique N, Shakil-ur-Rehman S, Ali Hussain S. Effects of ELDOA and post-facilitation stretching technique on pain and functional performance in patients with piriformis syndrome: A randomized controlled trial. Journal of Back and Musculoskeletal Rehabilitation. 2020;33(6):983-8.
18. Hicks BL, Lam JC, Varacallo M. Piriformis syndrome. 2017.
19. Islam F, Mansha H, Gulzar K, Raza A, Raffique A, Haider S. Prevalence Of Piriformis Muscle Syndrome Among Individuals with Low Back Pain: Piriformis Muscle Syndrome Among Individuals with Low Back Pain. Pakistan Journal of Health Sciences. 2022:48-52.
20. Bahat P, Turan G, Okur S. A missed syndrome in chronic pelvic pain: Piriformis syndrome. South African Journal of Obstetrics and Gynaecology. 2019;25(3):72-4.
21. Awan WA, Babur MN, Ali S, Janjua U. The effectiveness of electrotherapy with manual therapy in the treatment of piriformis syndrome. Int J Rehabil Sci. 2018;1(1):16-9.
22. Rajendran S, Sundaram SS. The effectiveness of myofascial release over stretching on pain and range of motion among female college students with piriformis syndrome. Malaysian Journal of Movement, Health & Exercise. 2020;9(2):45.
23. Bose G, Dusad G. Effect of reciprocal inhibition and post isometric relaxation; types of muscle energy technique in piriformis syndrome–a comparative study. EJPMR; 2018.
24. Khakneshin A, Javaherian M, Attarbashi Moghadam B. The Efficacy of Physiotherapy Interventions for Recovery of Patients Suffering from Piriformis Syndrome: A Literature Review. Journal of Rafsanjan University of Medical Sciences. 2021;19(12):1304-18.
25. Choi Y-H, Yoon I-J. A clinical case study on piriformis syndrome with oriental medical treatment and muscle energy techniques. Journal of Korean Medicine Rehabilitation. 2010;20(2):209-17.
26. Kutty NN, Siddeeque S, Tamphaibema H, Othayoth N, Bineesh C. Effect of Muscle Energy Technique with Deep Friction Massage on Pain, Disability and Internal Rotation Range of Motion of Hip Joint in Individuals with Piriformis Syndrome. Indian Journal of Physiotherapy & Occupational Therapy. 2020;14(1).
27. Shoukat F, Ahmed A, Fatima A, Shoukat H, Fatima M. Effects of core stabilization with and without conventional physical therapy for the management of non-specific low back pain. Annals of King Edward Medical University. 2014;20(4):309-313.
28. Shahzad H, Fatima A, Ahmad A, Khan ZA, Gilani SA. Effectiveness of routine physical therapy with and without muscle energy technique in patients with upper crossed syndrome. Rawal Medical Journal. 2022 Sep 2;47(3):654.