The Effect of Self Stretching on Pain Levels Due to Piriformis Syndrome at Teras Health Center, Boyolali District

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ABSTRACT

Background: Pain in the lower back is a common case experienced by most people in the world and one of the global health problems and identified quite high prevalence among the productive age. Piriformis syndrome often cause of misdiagnosis of LBP and sciatica secondary to entrapment of the sciatic nerve in the piriformis muscle by the greater degree of sciatica. Piriformis Syndrome result the pain in the gluteal area, piriformis muscle spasm, decreases gluteal muscle strength and decreases functional activities. Physiotherapy management for Piriformis Syndrome can be done using stretching modalities.

Research Objectives: to determine the effect of self stretching on the degree of pain due to piriformis syndrome at Teras Health Center, Boyolali Regency.

Research Methods: This study used a case study. There were 5 people who met inclusion criteria. Pain was measured by VAS that confirmed after treatment. The demography data age, body mass, and bodymass index, gender, and grade of OA.

Result: The pain showed decreased between pre-test and post-test after treatment.

Conclusion: Self stretching was giving beneficial to reduce pain in individuals with piriformis syndrome.

Keywords: Self stretching, Piriformis Syndrome and Visual Analog Scale (VAS*).*

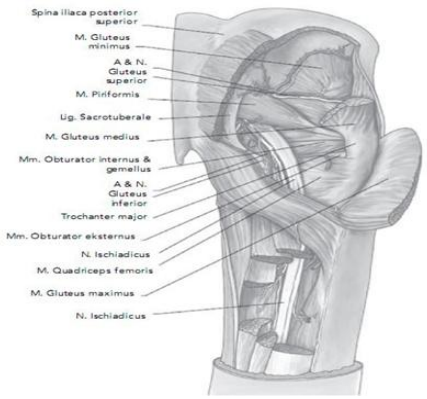
INTODUCTION

Pain in the lower back or Low Back Pain (LBP) is a common case experienced by most people in the world and one of the global health problems and identified quite high prevalence among the productive age. This often relates to a person's physical activity during work. Piriformis syndrome often cause of misdiagnosis of LBP and sciatica secondary due to entrapment of the sciatic nerve in the piriformis muscle by the greater degree of sciatica (Dey Samarjit., *et al*, 2013).

The prevalence of low back pain (LBP) is reported to range from 75% to 84% of the general population in developed countries, while the prevalence of piriformis syndrome among patients with LBP varies widely, from 5 to 36% (Gondal et al., 2015). Piriformis Syndrome is usually caused by trauma (falling in a sitting position), sitting too long, excessive exercise, leg length differences and a narrowed sciatic foramen (Mitra., *et al*, 2014).

The dominant problem in piriformis syndrome is pain in the gluteal area, follows as piriformis muscle spasm, decreased muscle strength in the gluteal and decreased ability of daily functional activities. The treatment for piriformis syndrome patients can be done by conservative methods or by operative methods. Treatment with conservative methods includes modification of daily activities (education to improve posture or physical activity), corticosteroids, and physiotherapy. If conservative methods are ineffective for symptom relief, surgical piriform release surgery and sciatic nerve decompression should be considered (Han., et al, 2017).

Piriformis Syndrome is a neuromuscular disorder that occurs because the sciatica nerve (sarafischiadicus) is compressed or irritated by the piriformis muscle causing pain, tingling, and numbness in the buttocks area until the sciatica nerve travels.



Picture1. Piriformis Muscle

The piriformis muscle originates from the anterior surface of the sacral vertebrae S2-S4, the capsule of the sacroiliac joint, and the gluteal surface of the ileum near the posterior surface of the iliac bones. It travels laterally through the greater sciatic foramen, becomes a tendon, and enters the piriform fossa on the medial trochanter of the greater femur. The piriformis muscle is innervated by spinal nerves L5, S1, and S2. The sciatic nerve, posterior femoral cutaneous nerve, gluteal nerve, and gluteal vessels pass under the Piriformis muscle (Syndrome & Review, N.D., 2013).

There are two types of causes of piriformis syndrome, namely primary and secondary:

a. Primary Piriformis Syndrome

The primary cause has an anatomical background, such as a split Piriformis muscle, a split sciatic nerve, or anomalous sciatic nerve pathways (Syndrome & Review, n.d., 2013).

b. Secondary Piriformis Syndrome

Secondary causes occur as a result of precipitating causes, including macrotrauma, microtrauma, ischemic mass effect, local ischemia, limb length discrepancy, cerebral palsy and narrowed sciatic foramen etc. Macrotrauma to the buttocks, causing soft tissue inflammation, muscle spasm, or both causing nerve compression. Microtrauma can occur due to overuse of the piriformis muscle such as long distance walking or running, excessive exercise. It could also be due to direct pressure from keeping

your wallet in the back pocket of your pants or jeans.

Physiotherapy management includes heat therapy, cold therapy, strengthening, stretching and the use of Ultrasound (US) therapy (Mitra et al., 2014).

The Ultrasound (US) therapy has the potential effect for piriformis syndrome cases accurately. This is due to the depth of US to break the myofacial trigger in the piriformis muscle (Fusco et al., 2018). However, self stretching perfomed significantly to reduce pain in piriformis syndrome (Mitra et al., 2014). While physiotherapy treatment by stretching on the piriformis muscle helps for reducing the pain.

Pain assessment using the Visual Analog Scale (VAS) with a total score of 10 points consisting of a number between 0 to 10, where 0 indicates 'no pain at all' and 10 indicates 'maximum pain'. Details on the NRS are as follows: 0: No pain, 1-3: mild pain, 4-6: moderate pain, 7-9: severe pain, 10: very severe pain that cannot be described (referensi). Hence, this study efforted to overview more the effect of self stretching in individuals with piriformis syndrome at Teras Health Center, Boyolali Regency.

RESEARCH METHODS

This research has been approved by the Faculty of Health Sciences, University of Muhammadiyah Surakarta (1299/C.8-III/FIK/VIII/2021). This research conducted at the Teras Health Center, Boyolali Regency. And this research is a case study to determine the effect of self-stretching modality on pain reduction in individuals with piriformis syndrome.

Sampling used inclusion and exclusion criteria that have been set by the researcher with a total of 5 samples. Started July 1, 2021 to July 27, 2021. Inclusion criteria in this study were: a) Willing to be a research subject, b) Obtaining a diagnosis of piriformis syndrome, while the exclusion criteria were: a) Moderate lower extremity injury, b) Presence of post fractures in the pelvis, hip and knee, c) Burns on the lower extremities.

A field survey was conducted to find out the problems and conditions regarding the place to be used as a research site on 28 June 2021 to 25 July 2021. Pain scale measurements were measured by Visual Analog Scale (VAS).

CASE REPORT

Table 1 shows the treatment group with a total of 5 respondents, the number of respondents were all female. The age range is 48-52 years. The body mass index showed 3 people were underweight, 1 person was normal, and 1 person was overweight. The Pain before treatment showed 4/10, and maximum pain scale of 6/10.

Table 1. Characteristics of Respondents

Age	Patient				
	A	B	C	D	E
Marital status					
Yes	Yes	yes	yes	yes	yes
No					
Education					
Junior high school					
Senior high school	yes	yes	yes	yes	yes
College					
BMI	22,72	20,89	24,65	20,89	24,53
Underweight					
Normal	yes	yes	yes	yes	
Overweight			yes		yes

Obesity					
Duration of pain					
<1year	yes	yes	yes	yes	yes
>1 year					

From the patient data, various complaints were obtained which were grouped into 1, including:

a. Pain with sitting, standing, or lying down for more than 15 to 20 minutes.
b. Pain and paresthesias radiate from the sacrum through the gluteal region and the posterior aspect of the lower thigh, usually stopping above the knee.
c. Pain improves with ambulation and worsens without movement.
d. Pain when rising from a sitting or squatting position.
e. Changing position does not completely relieve pain.
f. Contralateral sacroiliac pain.
g. Difficulty walking (antalgic gait and foot drop).
h. Numbness in the legs.
i. Weakness in the ipsilateral lower extremity.

PAIN ACTION

The VAS is a reliable, valid, responsive, and frequently used pain outcome measure. It consists of a two-way 10 cm straight line with two labels, namely, “no pain” and “worst” possible pain”, located at either end of the line. Patients are instructed to draw a vertical mark on a line indicating their level of pain. vase is a 10-point scale consisting of: numbers from 0 to 10; 0 indicates "no pain", and 10 indicates "worst pain imaginable". Patients were instructed to choose a number from the scale that best represents their level of pain. The VAS is a valid scale consisting of a list of descriptors used to represent various levels of pain, including none, mild, moderate, and severe. Patients were instructed to choose the one descriptor that best indicated their level of pain. The following assessment was doing before the 3rd therapy.

Table 2. Pain scale

Patient	Pain Scale (VAS)			
	Pre-Test	1st therapy	2nd therapy	Post-Test
S	5	4	2	1
H	4	2	1	0
W	6	4	3	1
P	5	3	2	1
D	4	3	1	0
Mean	4,80	3,2	1,8	0,60

In this pain management, self-stretching is carried out and a form of exercise in the form of active stretching which is an exercise method that is carried out independently by the patient with exercises that are instructed in advance by the physiotherapist (Kisner and Colby, 2012). Active stretching exercise therapy on the piriformis muscle aims to release adhesion and increase flexibility in the piriformis muscle. The force generated by this contraction results in a longitudinal contraction of the piriformis muscle, resulting in gradual stretching of the piriformis muscle and surrounding tissue.

Stretching Exercise Procedure:

1) Piriformis Stretch 1

The patient is supine lying on the bed. One of the patient's hands is placed on the knee and the other on the ankle. The

therapist instructs the patient to perform full flexion of the knee and hip until the knee is close to the chest, hold for a count of 30 until the stretch is felt in the piriformis muscle. The movement is performed in 3 sets.

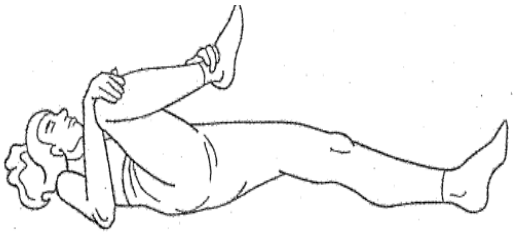


Figure 1. Piriformis Stretch 1

2) Piriformis Stretch 2

The patient is supine lying on the bed. One of the patient's hands is placed crossed on the lateral side of the thigh of the problematic piriformis muscle. Pull your thighs across from your midline, until you feel a stretch in the piriformis muscle. Hold for 30 seconds, slowly place your feet in the starting position. This movement is performed in 3 sets.

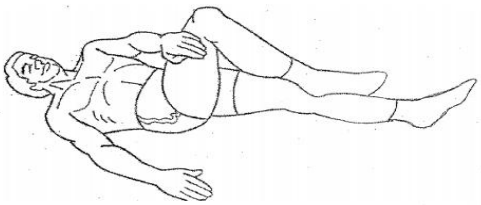


Figure 2. Piriformis Stretch 2

3) Piriformis Stretch 3

The patient is supine lying on the bed with the legs crossed. Both hands are placed posterior to the thigh on the lower leg, and the patient moves both legs until the knee is pointing at the same side of the shoulder. Hold for 30 seconds until you feel a stretch. This movement is performed in 3 sets.

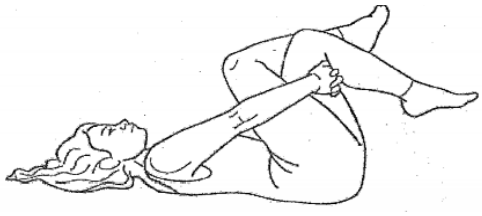


Figure 3. Piriformis Stretch 3

The stretching tecniques was repeated 3 times with 8 repetions for each stretching, starting from Piriformis Stretch 1 to 3 and the duration of this stretching is 15-20 minutes. And this exercise can be done every day, and done at least 2 to 3 times a day.

DISCUSSION

Based on the characteristics of the respondents, age is one of the factors for a person to carry out daily activities. Age conditions affect a person's physical work ability or muscle strength. A maximum physical ability is achieved at the age of 25-40 years and will continue to declineby increasing of age (Susanti et al., 2015).

According to the existing data on the characteristics of the respondents, it can be concluded that women experience piriformis syndrome more than men. There were 2 participants had overweight of BMI. It can be a factor inducing piriformis syndrome.

Among patients with piriformis syndrome, less than 15% of cases have a primary cause. A history of trauma is usually elicited in about 50% of cases (Mitra et al., 2014). The trauma is usually not dramatic and may occur several months before the onset of symptoms. It may occur after total hip replacement surgery or laminectomy. Trauma to the buttocks causes inflammation and muscle spasm.

Inflammatory substances such as prostaglandins, histamine, bradykinin, and serotonin are released from the inflamed muscle and can irritate the sciatic nerve resulting in a pain-spasm-inflammation-irritation cycle. The stretched, spastic, inflamed piriformis muscle can compress the sciatic nerve between the muscle and the pelvis, with compression occurring between the softer part of the muscle and the pelvic bone (Mitra et al., 2014).

Based on the data, all the participants reduce pain after three times did self stretching. Patient C had higher score, reduced pain 6 to 1. But, for 4 patients had the same trend.

The additional treatment such as ultra sound give positive effect to increase muscle flexibility, reduce spasm, and can strengthen muscles, vasodilate blood vessels, and regenerate damaged tissue so that muscles can easily mobilize. This is in accordance with the statement expressed by that stretching aims to reduce muscle tension that experiences shortening so that it can increase muscle flexibility and reduce spasm and can increase muscle strength so as to reduce the risk of trauma to the muscles by using inhibition techniques to help facilitate muscle elongation. Muscle fibers that experience spasm if for a long time can form nodules that cause ischemia in the blood vessels below, this makes the metabolism around the muscle not smooth, causing pain. With hold relax stretching the muscles can move and elongate again easily so that the metabolism around the muscles can smoothly reduce pain (Destyana el al., 2013). And Ultrasound itself is a sound wave that has longitudinal properties and requires a medium for penetration such as water or gel. The frequency used in therapy is usually between 1 to 3 MHz. With the effects of micromassage and heating it can reduce pain, where the heat generated can help vasodilate blood vessels and result in increased blood circulation to the area so that irritant substances that cause pain can be lifted properly and enter the bloodstream so that pain is reduced (Hayes, 2014).

CONCLUSIONS AND SUGGESTIONS

The self stretching is one of techniques of physiotherapy that give positive impact reducing the pain symptom in individuals with piriformis syndrome.

It is very necessary to have good cooperation between the patient and the physiotherapist so that success in the treatment of this case can obtain maximum results. Suggestions for physiotherapists are to pay more attention to assessment before determining the goals and therapeutic interventions given. In addition, the physiotherapist should always reevaluate the patient's condition to minimize errors during therapy. Suggestions for patients are to do a home program, as piriformis stretching techniques that can be done for patients at home. The exercise can be done every day, with 8 reps/set and performed at least 2 to 3 times a day. In addition, patients are advised to reduce activities that do not support the healing process such as being in a static position such as sitting and standing for too long. If it feels too long to sit or stand, the patient can do light stretching or take a short walk to relax stiff muscles. For further research, it is hoped that it can be used as a reference for future research. And for

educational institutions it is suggested as input and reference for additional discussions to increase knowledge about reducing pain in piriformis syndrome.

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