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Yoga for management of piriformis syndrome

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Abstract

Piriformis syndrome is a condition in which compression of the sciatic nerve by the piriformis muscle. The sciatic nerve forms the roots of L4, L5, S1, S2 & S3 segments of the lumbosacral plexus. The sciatic nerve will pass under the muscle of piriformis, in the direction of the lower leg where it divides into common tibial and fibular nerves. Symptoms may include pain and numbness in the gluteal region (buttocks) and down the leg. The symptoms are getting worsened while standing, sitting and running. To incorporate Yoga practices specifically designed Yoga practices to target the piriformis muscle can bring relief from tightness, pain in the condition of piriformis syndrome.

Keywords: Yoga, piriformis syndrome, piriformis muscle spasm and sciatica

Introduction

Piriformis syndrome is a condition in which compression of the sciatic nerve by the piriformis muscle (Cass, 2015) [2]. Sciatic nerve is the longest and bulkiest nerve in the human body. The sciatic nerve forms the roots of L4, L5, S1, S2 & S3 segments of the lumbosacral plexus. The sciatic nerve will pass under the muscle of piriformis, in the direction of the lower leg where it divides into common tibial and fibular nerves (Barbosa *et al.*, 2019) [1]. Symptoms may include pain and numbness in the gluteal region (buttocks) and down the leg (Hopayian & Danielyan, 2018) [4]. The symptoms are getting worsened while standing, sitting and running.

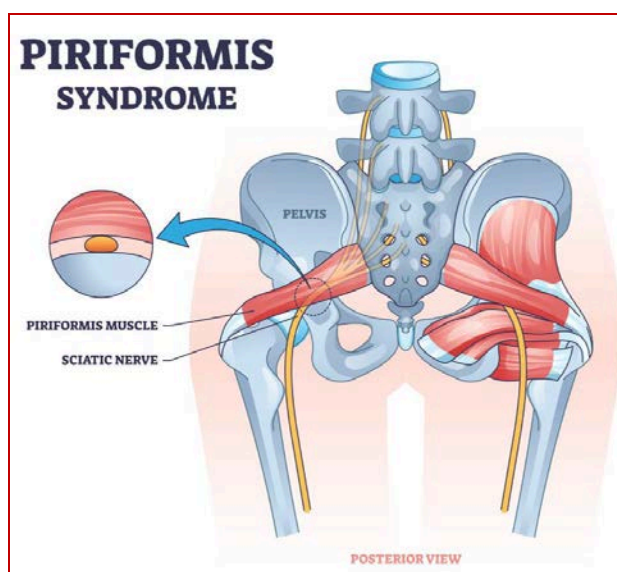


Fig 1: Piriformis syndrome

The Piriformis Muscle

The piriformis muscle is situated deep in the gluteal /buttock region (behind the gluteus maximus).

The piriformis muscle:

- Starts at the lower spine (sacrum) and connects to upper surface (Greater trochanter) of each femur.

- Functions to assist hip joint (thigh) external rotation & abduction (from flexed hip); Stabilizes head of femur in acetabulum.
- Runs diagonally, with the sciatic nerve running vertically directly beneath it.

Difference between piriformis syndrome versus sciatica

Although the both conditions are sometimes related which affect the sciatic nerve, they are different.

- Conditions of disk herniation or spinal stenosis can cause sciatica. The symptoms tend to affect the lower back and can travel down through the gluteal region (buttocks) and leg.
- In Piriformis syndrome, the piriformis muscle to press on one area of the sciatic nerve in the gluteal region (buttock). It can feel like sciatica but in a more specific area.

Causes of piriformis syndrome include the following

- Piriformis muscle spasm.
- Tightening or Swelling of the piriformis, due to injury or spasm. Sitting for prolonged periods (office workers, drivers, bicycle riders)
- Overuse syndromes: Piriformis muscle hypertrophy (*viz.*, in athletes)
- Trauma/injury to gluteal (buttock) region
- Lifting heavy objects
- Extensive stair climbing or walking
- Abnormal spine alignment (Scoliosis, Kyphoscoliosis, Lordosis & Kyphosis)
- Leg-length discrepancy (legs are of different lengths)
- Prolonged sitting, especially if carrying a thick wallet in a pocket directly behind the piriformis muscle
- Unusually vigorous exercise

Any one or combination of the above problems can affect the piriformis leads to pain in gluteal/buttock region and may also affect the adjacent sciatic nerve leads to pain, tingling, or numbness in the back of the thigh, calf, foot.

Risk factors for Piriformis syndrome

Sit for long time, such as people who sit at a chair throughout a day or drive vehicle for long time, are at a higher risk for piriformis syndrome.

Symptoms of Piriformis Syndrome: Most commonly, acute

tenderness in the gluteal area and sciatica-like pain down the back of the thigh, calf and foot. Piriformis syndrome symptoms may include:

- A dull ache in the gluteal (buttock)
- Pain down the back of the thigh, calf and foot (sciatica)
- Pain while walking upstairs or inclines
- Increased pain after prolonged sitting
- Reduced range of motion of the hip.

Symptoms often become worse after prolonged sitting, walking or running, and may feel better after lying down on the back.

Pathophysiology

While the piriformis muscle shortens or spasms due to trauma or overuse, it can compress the sciatic nerve beneath the muscle and it is referred to as nerve entrapment or as entrapment neuropathies; the particular condition known as piriformis syndrome refers to sciatica symptoms not originating from spinal roots or spinal disc compression, but involving the overlying piriformis muscle (Robinson, 1947) [7].

MRI findings have shown that both hypertrophy (unusual largeness) and atrophy (unusual smallness) of the piriformis muscle correlate with the supposed condition (Pope, T., Bloem, H. L., Beltran, J., Morrison, W. B., & Wilson, 2014) [6].

Piriformis syndrome may also be associated with direct injury /trauma to the piriformis muscle, such as in a fall or from a knife wound (Kuncewicz, E., Gajewska, E., Sobieska, M., & Samborski, 2006) [5].

Preventing piriformis syndrome

Regular practices of Yoga can help reduce the risk of Piriformis syndrome. Muscles need physical activity to stay strong and healthy. To prevent piriformis syndrome, one should do the following:

- Warm up and practicing stretches before run or engage in a vigorous workout
- Gradually increasing the intensity of whatever physical activity or sport
- To avoid running up and down hills, or over uneven surfaces
- Avoid sitting or lying down too long without some activity

Table 1: Mechanism of Yoga practices on Piriformis Syndrome

Purpose	Practices	Effects
Preparatory practice for Yogasana	Loosening Practices	<ul style="list-style-type: none"> ▪ To reduce stiffness in inter vertebral joints
Yogasanas for alignment of the body and prana	<p>Yogasanas</p> <ul style="list-style-type: none"> ▪ Tadasana (Palm Tree Pose) ▪ Trikonasana (Triangle Pose) ▪ Gomukhasana (Cow face pose) ▪ Sasankasana (Hare Pose) ▪ Marjariasana (Cat & Camel pose) ▪ Vakrasana (Spinal Twisting Pose) ▪ Bhujangasana (Cobra Pose) ▪ Pavanamuktasana (Wind Releasing Pose) ▪ Sethubandhasana (Bridge Pose) 	<ul style="list-style-type: none"> ▪ To reduce back pain symptoms ▪ improved flexibility and muscular strength ▪ To strengthen lower trunk muscles and ligaments ▪ Reduce the tenderness and trigger points in para spinal, gluteal (piriformis syndrome) region. ▪ Reduce the degenerative changes in disc and improve lumbar mobility (Wieland <i>et al.</i>, 2017) [9]. ▪ Reduces nerve compression in the lower back (Williams <i>et al.</i>, 2003) [10].

	<ul style="list-style-type: none"> ▪ Markatasana (Spinal twist pose) ▪ Savasana (Corpse Pose) 	<ul style="list-style-type: none"> ▪ Relieve compression of the Sacro iliac joints and the sciatic nerve
Pranayama for Channelizing the energy and prana	<p style="text-align: center;">Pranayama</p> <ul style="list-style-type: none"> ▪ NadiShodhana ▪ Bhramari 	<ul style="list-style-type: none"> ▪ To reduces stress, anxiety, and depression in patients with Chronic Low Back Pain (Tekur <i>et al.</i>, 2012) [8].
Calmness to the mind	<p style="text-align: center;">Dhyana (Meditation) - Breath Awareness</p>	<ul style="list-style-type: none"> ▪ To reduces anxiety in patients with Chronic Low Back Pain. ▪ Increased mental and physical relaxation (Daubenmier <i>et al.</i>, 2012) [3].

Table 2: Yoga protocol for management of Piriformis Syndrome

S. No.	Yoga practices	Rounds	Duration
1.	Yogic sukshma vyayama: (micro circulation practices)		3 minutes
	▪ Shoulder rotation (forward & backward)	5 rounds	
	▪ Trunk twisting (katishaktivikasak)	5 rounds	
2.	Yogasanas		10 minutes
	a. Standing postures		
	- Tadasana (palm tree pose)	2 rounds	
	- Trikonasana (triangle pose)	1 round	
	b. Sitting postures		
	- Gomukhasana (cow face pose)	1 round	
	- Sasankasana (hare pose)	1 round	
	- Marjariasana (cat & camel pose)	5 rounds	
	- Vakrasana (spinal twisting pose)	1 round	
	c. Prone postures		
	- Bhujangasana (cobra pose)	1 round	
	d. Supine postures		
	- Pavanamuktasana (wind releasing pose)	1 round	
	- Sethubandhasana (bridge pose)	1 Round	
	- Markatasana (spinal twist pose)	1 round	
	- Savasana (corpse pose)	1 round	
	Pranayama:		4 minutes
	- Nadi-sodhana or anulomaviloma pranayama (alternate nostril breathing)	5 rounds	
	- Bhramari pranayama	5 rounds	
	Dhyana		3 minutes
	Total time		20 minutes

Conclusion

To incorporate Yoga practices specifically designed Yoga practices to target the piriformis muscle can bring relief from tightness, pain in the condition of piriformis syndrome. By practicing these Yoga poses regularly, one can experience improved flexibility, reduced pain, discomfort, and a greater sense of overall well-being.

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