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Effectiveness of classical strain/counterstrain technique on pain and functional disability among piriformis syndrome patients associated with sciatica: An experimental study

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Abstract
Objective: To relieve pain on the tender points on piriformis muscle & to reduce the functional disability caused by piriformis syndrome by the treatment of strain/ counterstrain technique for 4 weeks.
Materail and Method: Total 38 subjects having piriformis syndrome were selected as per inclusion & exclusion criteria. Subjects were explained about the intervention& written consent was taken. The Initial evaluations of the subjects were done by using Lower Extremity Functional Disability Scale. Subjects were given Classical Strain/Counter strain technique.
Result: The strain counter strain technique was effective in reducing functional disability associated with piriformis syndrome.
Conclusion: The strain counterstrain technique was effective in reducing functional disability & tenderness of tender points in the piriformis muscle associated with piriformis syndrome.

Keywords: piriformis syndrome, strain/counterstrain technique, tender points

Introduction

There is increased prevalence of piriformis syndrome nowadays and frequently goes unrecognized or misdiagnosed in clinical settings. There are many upcoming new techniques in the field of physiotherapy for treatment of Piriformis Syndrome one of which is Strain/Counterstrain technique. The classical description of this technique was made by Jones who stated that Strain/counterstrain reduces sensibility to palpation in subjects presenting with tender points in the hip musculature[1]. There is no study found which checks the long-term effect of the classical strain/counterstrain technique on piriformis muscle. The purpose of the study is to check the long-term effect, on pain threshold, following the treatment on tender points in the piriformis muscle involving classical application of strain/counterstrain technique. Strain/Counterstrain (SCS) technique or positional release therapy is a passive positional intervention aimed at relieving musculoskeletal pain and related dysfunction. The strain/counterstrain technique was effective in reducing pain and improving function in patients with localized myofascial pain syndrome. Strain/counterstrain reduced sensibility to palpation and increased strength in subjects presenting with tender points in the hip musculature [1].
Piriformis Syndrome (PS) is a painful musculoskeletal condition resembling sciatica, secondary to sciatic nerve entrapment in piriformis muscle at the greater sciatic notch. Itmimics common clinical entity like lumbar radiculopathy, sacroiliitis, trochanteric bursitis, intervertebral discitis etc. It usually occurs due to abnormality in piriformis muscle such as hypertrophy, inflammation and anatomic variations such as accessory piriformis muscle or tendon resulting in irritation and sciatic nerve entrapment. Predisposing factors includes trauma, excessive exercise, leg length discrepancy (altered biomechanics causes stretching and shortening of piriformis muscle), cerebral palsy and narrowed sciatic foramen etc. Common clinical findings in PS are hip and buttock pain, pain over the piriformis muscle when palpated/touched, limited lateral rotation of ipsilateral lower limb & hip abductor weakness. On examination the sacroiliac joint region, greater sciaticnotch and piriformis muscle may be tender. Asymmetrical weakness of the limb may occur.

Materials and Methods

Type of Study: Experimental study
Selection of subjects: Total 38 subjects 20 females, 18 males having piriformis syndrome were selected. Subjects were screened and after finding their suitability as per inclusion and exclusion criteria subjects will be included in the study. Participants were explained about the intervention. Written consent was taken from the subjects. The Initial evaluations of the subjects were done by using Lower Extremity Functional Disability Scale. Subjects were given Classical Strain/Counter strain technique. To be included subjects had to exhibit tender points in the Piriformis muscle, either on the left or right side, generalized pain on movement, or by palpation of the priformis muscle. Diagnostic criteria: FAIR test[6], Patients not under medical treatment (analgesics and anti-

inflammatory), subjects who are willing to participate in the study, subjects who are able to understand commands.

Subjects were excluded if they exhibited any of the following, history of any fracture or surgery near the spine or hip, diagnosis of Lumbar radiculopathy or myelopathy determined by their primary care physician, presence of referred pain provoked by the compression of the tender spot, overweight person as Waist Hip Ratio greater than 0.85,symptoms of vertigo or dizziness, cardiopulmonary disease with decreased activity tolerance, pregnant women, any sensory or neurological disturbance, Back pain caused by viscerogenic causes, who have undergone any therapy in the lumbar and pelvic region within the past month before the study.

Selection of Area: The study was conducted from OPD in and around Pune.

Conduct of Study: The consent to conduct the study and interview the patients and caretakers were obtained from the hospital authorities, the subjects, and the caretakers.

Outcome measures

Visual analogue scale [1, 10]: The VAS is an instrument that has been widely used to quantify the intensity of pain. The subject placed a vertical mark on a continuous 10 cm line to indicate his/her pain, ranging from no pain or discomfort (0), to the worst pain you could possibly feel (10). In the present study, diagnosis was based on the presence of pain (greater than 3/10 on a 10 cm visual analogue scale)

Lower Extremity Functional Scale (Lefs) [2, 13]: The LEFS consists of 20 items, with scores ranging from 0 (extreme difficulty/ unable to perform activity) to 4(no difficulty) The total score can be obtained by summing the scores of the individual items. the maximum score of 80 indicates no functional limitations and the minimum score of 0 indicates extreme limitations.

Strain/counterstrain technique

- The patient was prone position, the therapist will be sitting on the tender point side.
- The ipsilateral leg was suspended off the table with the bent knee resting on the therapist's thigh.
- The hip was flexed to 60 to 90 degree and abducted; rotation will be used to fine-tune the position.
- The tender point was found in the belly of the muscle approximately halfway between the inferior lateral angle of sacrum and the greater trochanter.
- Once the tender point was located, the therapist would apply gradual increasing pressure until the sensation of pressure becomes one of pressure and pain.
- Pressure was applied interiorly held for 90 seconds, and then slowly, passively return the patient’s leg to neutral.

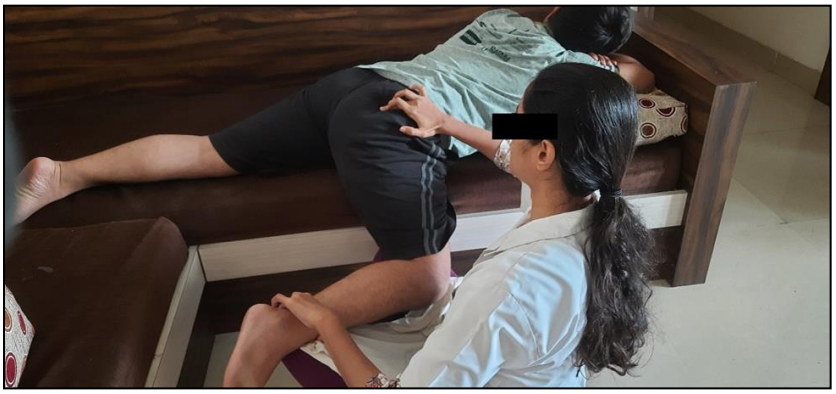

Fig 1

Fig 2

Fig 3

Data Analysis

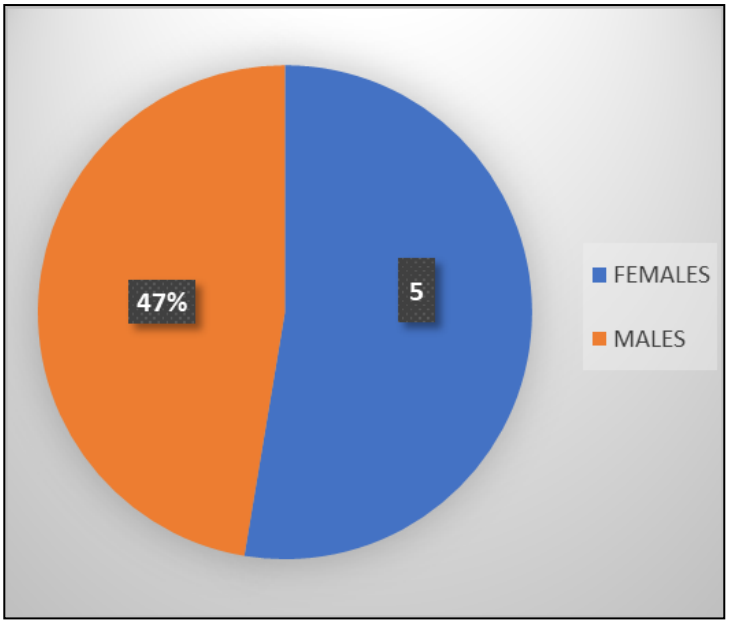

Fig 4: gender wise distribution

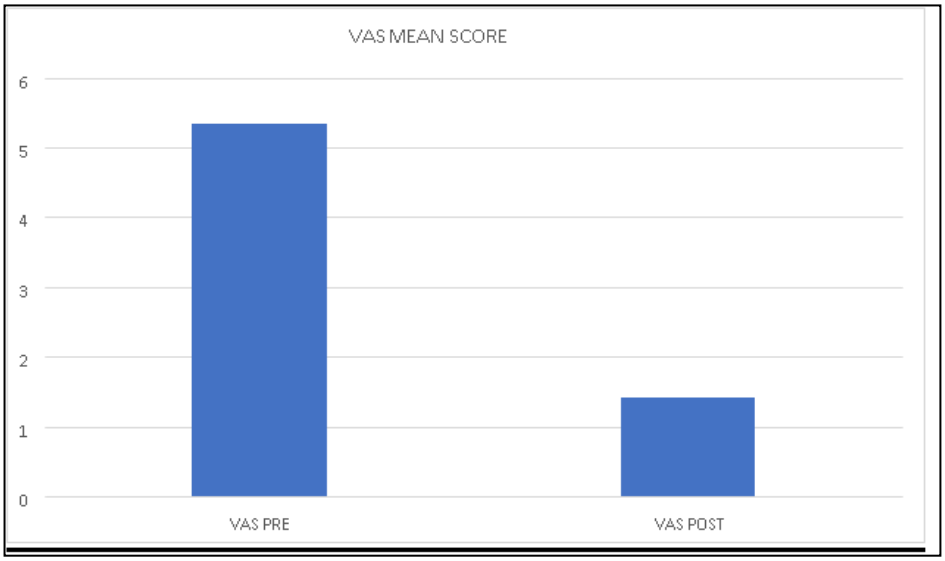

Fig 5: visual analog scale (vas)

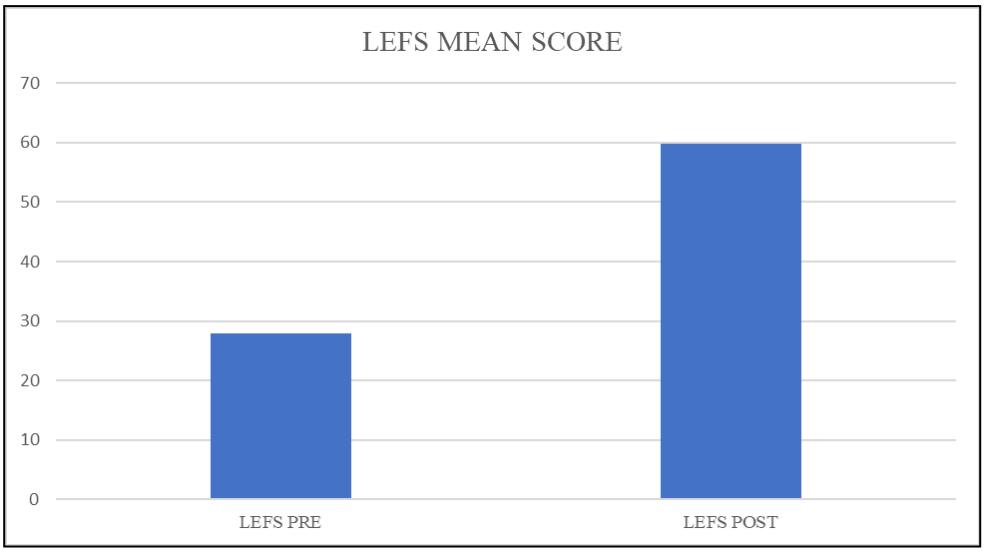

Fig 6: lower Exremity functional scale (Lefs)

Result

- The data was entered in Excel spread sheet, tabulated and subjected to statistical analysis.
- GRAPHPAD PRISM software was used to test the significance of results obtained.
- Pre and post treatment values of VAS & LEFS were taken.
- Paired T test was done to compare the pre and post values of VAS& LEFS.
- Within-group changes showed a significant improvement in the VAS& LEFS following classical application of the strain/counterstrain technique for 4 weeks. (P value < 0.001).

Discussion

- The objective of the current study was to relieve pain on the tenderpoints on piriformis muscle and to reduce functional disability caused by piriformis syndrome by the treatment of strain/counterstrain technique for 4 weeks.
- The present study demonstrated that there is reduction in pain after 4-week application of the strain/counterstrain technique.
- The strain/counterstrain technique obtained a similar decrease in the visual analogue scale in response to 4-week treatment protocol.
- Significant improvement was see in the functional disability associated with piriformis syndrome such as squatting, sitting for an hour without pain, running on even and uneven ground, hopping.
- Chee Kean Chen…… *et al* reported the prevalence of piriformis syndrome varies widely, between 5% and 36%.
- Kristina Fritz….*et al* reported the proprioceptive theory for explanation of SCS effectiveness. The theory argues that in response to the stretch reflex, the antagonist muscle spindles will activate muscle counter-contraction creating a perpetual muscle spasm resulting in neuromuscular imbalance, hypertonicity, and referred pain, termed the tender-point. The neuromuscular imbalance caused by the proprioceptive reflex results in an increase in intrafusal muscle tone inside the muscle describes the "rope-like" quality of some tender points. Underlying muscle imbalance/tender-points are considered an active process/injury and can last long after strain has occurred because the muscle is actively shortening as if it were being stretched.
- The shortened muscle limit the jointrange of motion. Counterstrain treats the somatic dysfunction by slowly shortening the muscle to reset the muscle spindle gamma-motor neuron output and decrease the intrafusal and extrafusal fiber disparity so that the muscle spindle is no longer activated and decreases its firing frequency (contraction reflex) when the muscle resets to resting length.
- Strain counterstrain is thought to achieve its benefits by means of an automatic resetting of muscle spindles which would help to dictate the length and tone into the affected tissues.
- Wong and Schauer – Alvarez *et al* also reported that strain/counterstrain reduced sensitivity to palpation in subjects exhibiting tender points in the hip musculature. Pain relief from strain/counterstrain technique which result from the stimulation of A *delta* fibers

Conclusion

- Strain/counterstrain was effective in reducing tenderness of tender points in the piriformis muscle&reducing functional disability associated with piriformis syndromein subjects.

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3. **Conflict of intrest:** There are no conflicts of interest.

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