

Effects of gluteal activation with and without traction straight leg raise technique among patients of sacroiliac joint syndrome

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Abstract- Background: The sacroiliac joint (SI) has long been thought to be a cause of lower back and/or buttock discomfort, with or without symptoms in the lower limb.

Objective: To determine the role of gluteus maximus strengthening with hamstring release by traction straight leg raise technique among subjects having sacroiliac joint dysfunction.

Methodology: It was a randomized clinical trial conducted at Sports and Spine professionals. Trial was registered in Clinical Trial Registry and the registration number is NCT04757415. Total 38 diagnosed patients with Sacroiliac joint (SI) syndrome were involved in this research with convenient sampling method. The subjects were divided randomly into two groups using the concealed envelope method. Group 1 patients got Gluteal activation exercises along with traction straight leg raise technique of Mulligan while Group 2 got just gluteal activation exercises. Heating pad was applied to both groups. The goniometry, the sphygmomanometer, NPRS Scale and Oswestry disability index are data collection tools to evaluate all patients before and after 5 weeks of treatment. Statistical examination was calculated by SPSS 20.0.

Results: There is statistically significant difference in results of NPRS in between group analysis. Pain decreased to greater extent in post treatment of Group 1 with mean value 2.15 ± 0.83 as compared to 9.10 ± 13.79 of Group 2. OSWESTRY Disability Index decreased to greater extent in post treatment of group 1 with mean value 11.31 ± 1.68 as compared to Group 2 with mean value 22.47 ± 2.36 . Hamstring range of group was increased to significant value with mean value 76.84 ± 9.71 as compared to mean value of group 2 which was 38.56 ± 3.70 . Gluteus muscle strength was noticed in group 1 with mean value 70.42 ± 8.68 as compared to group 2 with mean value 39.52 ± 4.11 .

Conclusion: Results of this study shows statistically as well as clinically significant results in terms of NPRS, OSWESTRY Disability Index, hamstring range and gluteal muscles strength. It was indicated that combination of gluteal activation along with straight leg raise technique by mulligan was helpful in pain relief, improving range of movement, strength and daily life activity status in patients with sacroiliac joint syndrome.

Index Terms- Sacroiliac Joint Dysfunction, Gluteal activation, Straight leg raise, Gluteal maximus strengthening.

I-INTRODUCTION:

The sacroiliac joint (SIJ) is a connection between two bones of pelvis, sacrum and ilium with strong ligament attachment (1). The joint is sturdy, capable of bearing the full weight of the upper body (2, 3).

Like all lower limb joints when these joint gets its tightly pack position the sacroiliac (SI) joint, has a mechanism that self-locks the joint and helps in firmness through push-off stage of walking (4). Sacroiliac joint syndrome is pain in the sacroiliac joint region caused by greater or little unusual movement in the sacroiliac joint (5). The discomfort may become more intense and severe when doing tasks such as stand- up up from a sitting posture or moving leg near to upper body while ascending stairs(6). The SIJ may cause pain in the buttocks, posterior of leg, and, in rare cases, the foot. Lower back discomfort and tension, generally unilateral, that worsens with sitting or walking for lengthy periods of time (7, 8).

Forces from the lower limb are shifted to the trunk via the sacrum. A lumbar motion segment can withstand six times the amount of medial focused force and seven times the amount of lateral bending force that the SIJ can (9). Chronic instabilities of functional movement patterns, such as hamstring muscle tightness, are a common cause of joint problems (10). Due to ligamentous tightening, the increased joint tension in lower back pain arose that may lead to ankyloses, consequent joint fixations, and limited movement(11).

Patients with low back discomfort frequently complain of short hamstring muscles. Some researchers believe that hamstring muscle shortness in LBP patients is an indemnify system for reducing the increased lumbar curve caused by certain muscle dysfunction patterns described as "pelvic cross syndrome" (12, 13). Short hamstrings and lower back pain are connected to the use of Mulligan technique for hamstring tightness as an investigative technique for lower lumbar facet plus sacroiliac joint dysfunction, as well as effect on short hamstrings on the sacroiliac joints and lumbar increased curve (14).

Stretching can help you regain normal movement while also reducing pain (15). Stretching has been advised in sports medicine to prevent injury and increase performance nevertheless, stretching is utilized in rehabilitation to improve general function and reduce pain (16). Mulligan has developed a physiotherapy method called the traction Straight leg lift, which

he claims improves mobility in those who have lumbar leg discomfort or tight hamstrings (17).

The purpose of this study was to investigate link between gluteal muscle weakness and hamstring muscle tension among people who have sacroiliac joint syndrome.

II- MATERIAL AND METHODOLOGY: It was a randomized clinical trial conducted at Sports and Spine professionals. Trial was registered in Clinical Trial Registry and the registration number is NCT04757415. Total 38 diagnosed patients with Sacroiliac joint (SI) syndrome were involved in this research with convenient sampling method. The study was completed within the time duration of 6 months (April 2021 to September 2021) after the approval of the synopsis. The subjects were divided randomly into two groups using the concealed envelope method. Females with low back pain downward to the level of L5, with and without above knee, pain over the back side of SI joint around posterior superior iliac spine (PSIS) and buttock were included in this study. Pregnant females, any vertebral column surgery, spinal fracture, pelvic fracture, any crack/break in bone of legs; hospitalized for jolt or else any motor injury were excluded from the study. Group 1 patients got Gluteal activation exercises along with traction straight leg raise technique of Mulligan while Group 2 got just gluteal activation exercises. Heating pad was applied to both groups. The goniometry, the sphygmomanometer, NPRS Scale and Oswestry disability index are data collection tools to evaluate all patients before and after 5 weeks of treatment. Statistical examination was calculated by SPSS 20.0.

III- INTERVENTIONAL APPROACH: Group 1 (gluteal activation exercises with traction straight leg raise technique for hamstring): Heating pad for 7-10 minutes was applied as a baseline treatment. Subjects attended physical therapy session of 30 minutes twice a week. Over the course of 5 weeks, each subject will receive ten treatments over 5 weeks comprising of 5 exercises meant to strengthen the gluteus muscles along with traction straight leg technique to the hamstring muscle. Strengthening exercises for the gluteus maximus. A) Bilateral bridge, B) Unilateral bridge, C) Quadruped hip abduction, D) Prone hip extension (with knee flexed), E) Dead lift First three exercises will be performed during first five sessions and last two exercises will be combined in last five sessions (18).

Group 2 (gluteal activation exercises without traction straight leg raise technique for hamstring: Heating pad for 7-10 minutes was applied as a baseline treatment. This control group will undergo only basic physiotherapy session along with gluteal activation exercises with 10 treatments over five weeks. Heating pad was applied to both groups as a baseline treatment.

IV- RESULTS: There is statistically significant difference in results of NPRS in between group analysis. Pain decreased to greater extent in post treatment of Group 1 with mean value 2.15±0.83 as compared to 9.10±13.79 of Group 2. OSWESTRY Disability Index decreased to greater extent in post treatment of group 1 with mean value 11.31 ±1.68 as compared to Group 2 with mean value 22.47± 2.36. Hamstring range of group was

increased to significant value with mean value 76.84±9.71 as compared to mean value of group 2 which was 38.56±3.70. Gluteus muscle strength was noticed in group 1 with mean value 70.42±8.68as compared to group 2 with mean value 39.52±4.11.

TABLE 1: Between Group Comparison of Numeric Pain Rating Scale (NPRS), OSWESTRY disability Index, Hamstring Range, Gluteus Strength (Independent Sample T test)

Variables	Group 1 (Mean ± S.D) (n=19)	Group 2 (Mean ± S.D) (n=19)	P Value
Pre NPRS	7.15±1.16	6.84±0.76	0.331
Post NPRS	2.15±0.83	4.10±9.79	0.035
Pre Oswestry	31.2105±1.68585	29.5263±2.26981	0.14
Post Oswestry	11.3158±1.68585	22.4737±2.36569	0.000
Pre-treatment hamstring range	36.5789±5.49056	36.6316±3.83276	0.973
Post-treatment hamstring range	76.8421±9.17886	38.5623±3.70238	0.00
Pre-treatment gluteus strength	39.9474±6.81072	32.8947±3.69326	0.256
Post-treatment gluteus strength	70.4211±8.68150	39.5263±4.11459	0.000

TABLE 2: Within group comparison of NPRS, OSWESTRY Disability index (Paired Sample T test):

NPRS		Paired Difference (Mean±S.D) (n=19)	P-value
Group 1	Pre-treatment	7.15±1.16	0.00
	Post-treatment	2.15±0.83	
Group 2	Pre-treatment	6.84±0.99	0.00
	Post-treatment	5.10±0.78	
Oswestry disability index			
Group 1	Pre-treatment	31.21±1.68	0.00
	Post-treatment	11.31±3.66	
Group 2	Pre-treatment	29.52±2.26	0.00

	Post-treatment	22.47±2.36	
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TABLE 3: Within group comparison of hamstring range and gluteus strength (Paired Sample T test):

Hamstring range		Paired Difference (Mean ± S.D) (n=19)	P-value
Group 1	Pre-treatment	36.57±5.49	0.00
	Post-treatment	76.84±9.17	
Group 2	Pre-treatment	36.63±3.83	0.00
	Post-treatment	38.52±3.70	
Gluteal strength			
Group 1	Pre-treatment	34.94±6.81	0.00
	Post-treatment	70.42±8.68	
Group 2	Pre-treatment	32.89±3.69	0.00
	Post-treatment	39.52±4.11	

V- DISCUSSION: In people with sacroiliac joint dysfunction, a study was done to examine if there was a link between hamstring stretch and gluteal muscle weakness. All of participants had tested with their gluteal muscle strength and hamstring muscle range. When compared to those with LBP who did not have SI joint dysfunction, the number of people who had weak gluteus was considerably higher in those with SI joint dysfunction. They discovered that people with Sacroiliac joint dysfunction (who had gluteal weakness) had a little shorter hamstring muscle length than those who did not have gluteal weakness (19). In our study when we checked patient with SIJ syndrome they also had hamstring shortness with gluteus weakness and this hamstring tightness is actually related to gluteus weakness. A lot of other researcher had been conducted to increase hamstring range of motion like one study revealed that PNF technique can be used to increase range of motion of hamstrings in eight session followed by eight sessions of passive stretch, but the most effective technique was traction SLR (20, 21). In contrast to this study, my study discovered traction straight leg raise technique is effective in increasing flexibility of hamstring. A systematic review was conducted to check role of gluteus in rehabilitation. It showed that gluteus maximus is an important muscle having several diverse roles such as providing Sacroiliac joint (SIJ) strength, power for lifting and control of gait. Both the quadruped exercise and full squat exercise attained high levels of activation precisely to gluteus maximus as compared to other exercises. It is suggested, though, that the full squat exercise should be done with a wide stance and more loads to target gluteus maximus optimally (22). But in our study, we did not try to do squat we used some different exercise protocol that also had some significant clinical values.

VI- CONCLUSION: The results of this study concluded that Gluteus activation with straight leg raise technique is more effective to lessen pain and increase range of movement in patients with sacroiliac joint syndrome. Without straight leg raise technique gluteus activation does not give such significant results in sacroiliac syndrome patients.

VII- CONFLICT OF INTEREST: There was no conflict of interest.

VIII- FINANCIAL STATEMENT: No fundings were given by any authorities; it was a project thesis of Masters of Science in Orthopedics Manual Physical Therapy.

IX- DATA AVAILABILITY: Data will be provided on the demand by corresponding author.

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