EFFECT OF TARGET AREA ORIENTED INTERVENTION IN MANAGEMENT OF LOW BACK PAIN AND LEG PAIN ASSOCIATED WITH GLUTEUS MEDIUS SYNDROME

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***Abstract*- Background: The main cause of disability and monetary issues is low back pain. According to prevalent hypothesis, this pattern of muscle activation is adapted to low back discomfort. Few studies have been done on the patterns of muscle activation before the onset of low back pain in non-symptomatic persons. Hence, the purpose of this study is to find the prevalence of gluteus medius syndrome association in low back pain and leg pain as well as its target area oriented treatment.**

Objective:

1. **To find the prevalence among patients with leg pain and back pain in GMeds**
2. **To Analyze the effect of target oriented therapy around LBP and leg in GMeds patients.**
3. **To Analyze the effect of target oriented therapy around low back in Gluteus Medius Syndrome patients**
4. **To Analyze the effect of target oriented therapy around leg in Gluteus Medius Syndrome patients**

Material & Method: IFT machine, questionnaire, scale and basic patient assessment tools. A total of 100 gluteus medius syndrome participants were identified via the purposive sample method according to the inclusion and exclusion criteria from the Saveetha Physiotherapy College , Saveetha Medical Hospital . The subjects were advised about the study. The participants included in the study were asked to fill the subjective questionnaire and followed by Oswestry low back pain disability index and NPRS . Patients were treated using weight-bearing, non-weight- bearing, strengthening and stretching exercises and IFT based on their pain area . Therapy was delivered for 30 minutes a day , four days a week . At the end of the treatment pain intensity was measured.

Result: Among the 100 individuals , group I included 48 individuals had both lbp and leg pain, group II included 22 individuals with lbp only and group III included leg pian only , the mean intensity of pre and post of group I is 7.69 and 3.23 respectively, group II is 6.91 and 3.18 and group III is 7.50 and 2.77 respectively .

According to the results, GMS was discovered in approx 1.8% of patients at a primary clinic and 20% among those with hip or lbp . So, there are various pathophysiologies or definitions of GMS. It was statistically significant because the p value was less than 0.001.

Conclusion: This study emphasizes on the effectiveness of target area oriented therapy in gluteus medius syndrome.

Keywords: **The Severity measure of pain. Numerical pain rating scale (NPRS). Oswestry low back pain disability questionnaire and IFT.**

1.Introduction

Gluteus medius syndrome refers to the Numbness in the buttocks is caused by muscle weakness that pulls, pinches, or compresses nerves (gluteal muscles). It can result in hip and lower back pain due to the weak gluteus' inability to adequately support the hips and pelvis, which is accompanied by a loss of strength and stiffness in the hips and legs. Balance and stability as a whole may be impacted by this.[1]

GMS occurs in runners and high-impact sports, gluteus medius muscle rips and ruptures are common.

The muscle is flat and triangular, and it is located anterior and below the maximus muscle. It starts from the hip bone's ext. face, which is located between the anterior and posterior gluteal lines, the iliac crest's ext. lip, the gluteal fascia, and the ant. superior iliac spine. The fan-folding downward movement of the muscle bundles makes the tendon that inserts on the proximal aspect of the

greater trochanter. The gluteal muscle, the large gluteus, and the tensor of the lata fascia form a thick sheet across the muscle, which is tightly attached to both the small gluteus and the hip bone[2].
About 70–90% people with subacute back pain have MPS, whereas 38–68% of people with chronic low back pain or non-specific low back pain, also known as GMedS. Physiotherapy and manual trigger point therapy are used to treat GMedS.[2,3]
One of the primary pelvic stabiliser muscles, the gluteus medius, is important in regulating the femur and hip's mobility in the frontal and transverse planes stabilising the lumbo pelvic-hip complex[13].
The muscle most frequently linked to the diagnosis of MPS and leg pain ,leg pain was named "gluteus medius syndrome" (GMedS) .[4]
However, there are many different reasons for back pain, making a diagnosis based solely on the confirmation of trigger sites challenging. Degeneration of the lumbar disc, facet joints, or other disorders are frequently present along with low back discomfort.[4,5]
Although the occurrence of GMS complications in pain treatment is relatively high, it is still unclear how GMS and degenerative diseases are related. Various GMS hypotheses have been concluded based on the muscle sliding theory , nerve compression theory, and muscular energy theory.[1,2]
The GTPS or trochanteric bursitis, which are similar to GMedS, are related disorders. Hip pain is the primary symptom of GTPS, which is frequently accompanied by lbp or leg discomfort. Hip OA or lumbar degenerative disease may be linked to GTPS (LDD).[1,14] More than 90% of herniated discs that impinge on the Lumbar or Sacral nerve root are found at the L4-L5 or L5-S1 disc spaces.[14]

Trochanteric bursitis or gluteal tendinopathy may be the pathophysiology. Low back discomfort is a symptom of both GMedS and LDD, which has been linked to GTPS, and some LDD symptoms may also be caused by GMedS. Numerous studies have shown a connection between decreasing GMed strength or GTPS and hip osteoarthritis. Thus, GMedS may be responsible for some hip osteoarthritis symptoms.[13,14]
Hip stiffness, discomfort, and strength loss are the most typical signs of DBS. Running, walking, or other weight-bearing exercises, such as climbing, usually make the pain worse. Many patients experience discomfort that travels down the thigh, which is comparable to the signs of hamstring tendinopathy and sciatica[12] .

2. Method

2.1 Participants and selection criteria:
The study was conducted as a purposive sampling method , randomly chosen based on inclusion and exclusion criteria. Subjects of both genders. In Patients who were diagnosed with gluteus medius syndrome were included.
Pregnant women, Abuse of drugs or alcohol in the 4 weeks prior to enrollment, Invasive and non-invasive methods of treatment, Patients with metal implants. With no other problem associated with neurological disorder were not included for the study . The study setup was Saveetha physiotherapy OPD, Saveetha medical college, and hospital, Thandalam, Chennai. The informed consent was given to the patient before the treatment began and explained about the procedure.

2.2 Procedure:
A total of 100 participants with gluteus medius syndrome were identified using the Purposive sampling technique based on the inclusion and exclusion criteria , prevalence of low back pain and leg pain were analyzed. The study setting was Saveetha Physiotherapy Clinic, SMCH, Chennai. They were screened using questionnaire for site of pain and NPRS for intensity of pain . The 100 participants were screened and divided into 3 groups, I group included 48 patient with both low back pain and leg pain, II group included 22 patient with low back pain alone and III group included 30 patient with leg pain alone. For participants in each group, target area oriented therapy was prescribed, group I was given stretching and strengthening exercises, group II was given stretching , strengthening and IFT and group III was given IFT and stretching . IFT was delivered for 10 minutes, followed by two sets of strengthening exercises with 10 repetitions each, and two cycles of stretching with 10 second holds and 3 second relax times. Their pre and post NPRS and Oswestry disability index were checked. Oswerty low back pain disability questionnaire included ten section, each of which is ranging from zero to six, weighted equally.

STATISTICAL ANALYSIS:

The 100 participants were screened and formed into 3 groups, I group included 48 patient with both low back pain and leg pain, II group included 22 patient with low back pain alone and III group included 30 patient with leg pain alone.
As needed, descriptive statistics, frequency, and means (SD) were calculated. At <0.001, all P values were considered significant. The 95% of confidence interval was used to report all of the results. The correlation was determined using Pearson's correlation .

TEST (n = 48)	Mean	SD	t-value	p value
PRE TEST	7.49	1.19	22.8	≤0.001

POST TEST	3.23	1.40		

TABLE 1:GROUP 1 PRE TEST AND POST TEST PAIN ANALYSIS

Graph 1 : GROUP 1 PRE AND POST TEST PAIN

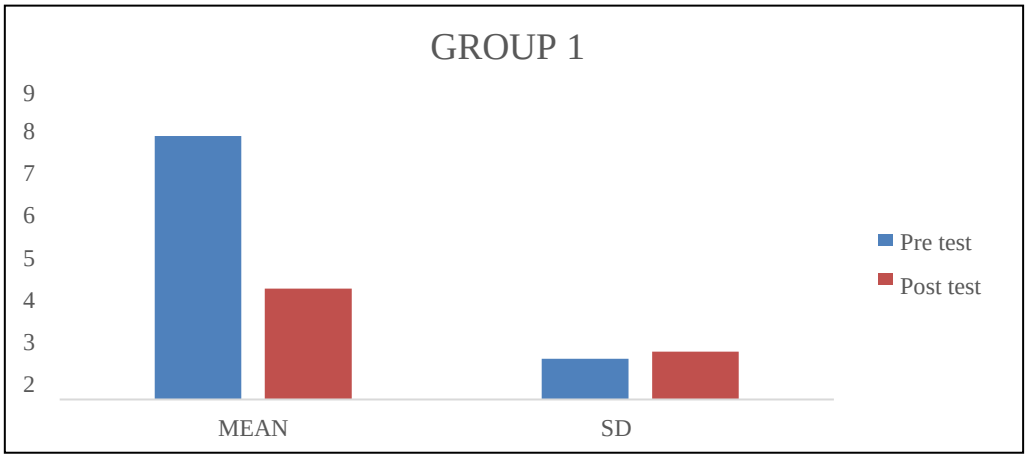
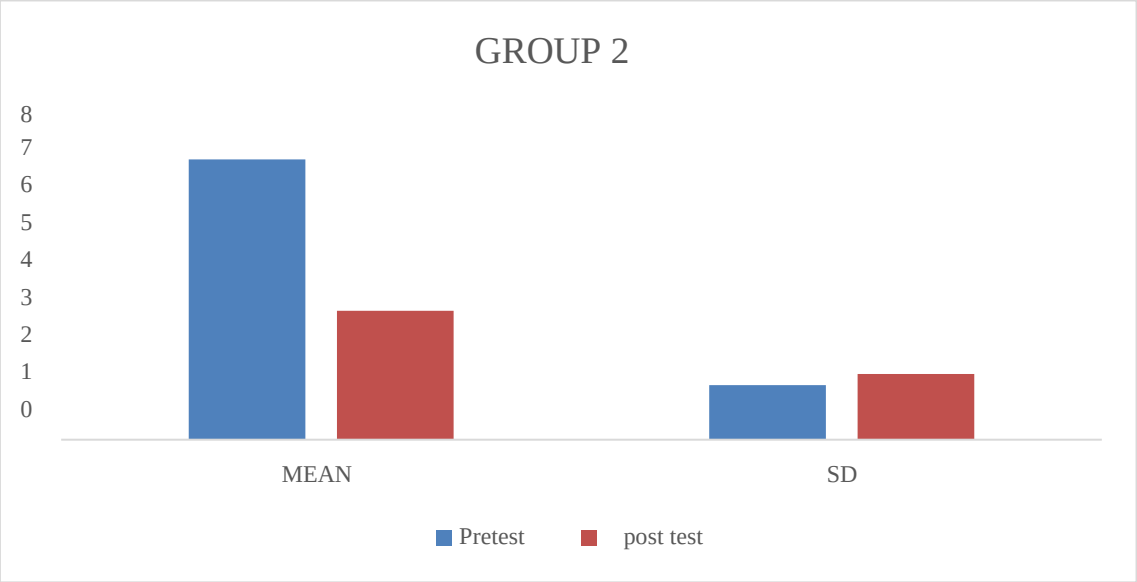


TABLE 2: GROUP 2 PRE TEST AND POST TEST PAIN ANALYSIS

TEST (n=22)	MEAN	SD	t-value	p-value
PRE TEST	6.91	1.34	11.5	≤0.001
POST TEST	3.18	1.62		



GRAPH 2: GROUP 2 PRE AND POST TEST PAIN ANALYSIS

TABLE 3 : GROUP 3 PRE TEST AND POST TEST PAIN ANALYSIS

TEST (n=30)	MEAN	SD	T- VALUE	P-VALUE
PRE TEST	7.50	0.97	17.4	≤0.001
POST TEST	2.77	1.04		

GRAPH 3 : GROUP 3 PRE AND POST TEST PAIN ANALYSIS

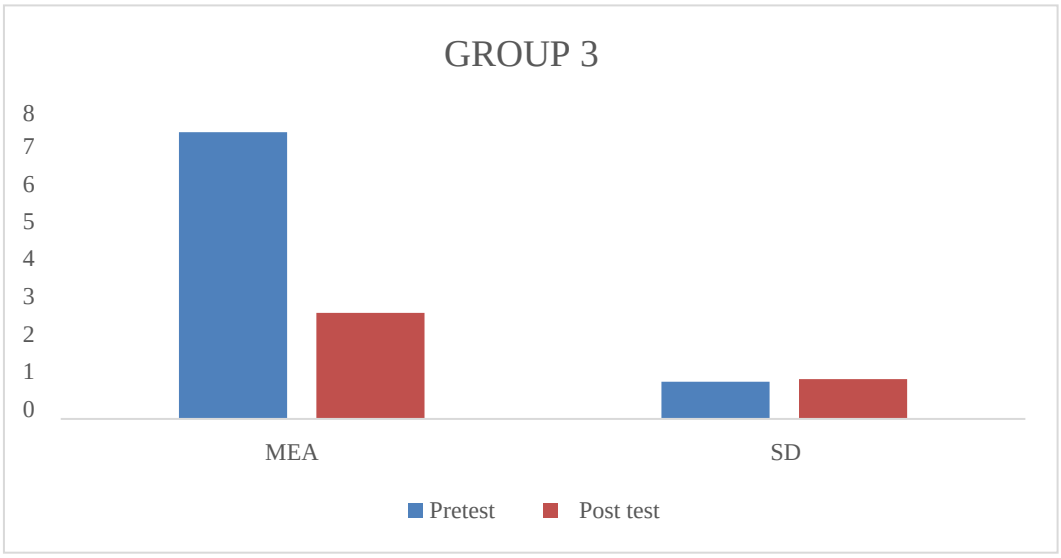


TABLE 4 : PERCENTAGE OF GROUP 1 PRE TEST AND POST TEST OSWESTRY QUESTIONNAIRE SCORE

TEST (n=48)	MEAN	SD	T-VALUE	P-VALUE
PRE TEST	70.5	17.48	18.27	≤0.001
POST TEST	23.54	11.11		

GRAPH 4 : PERCENTAGE OF GROUP 1 PRE TEST AND POST TEST OSWESTRY QUESTIONNAIRE SCORE

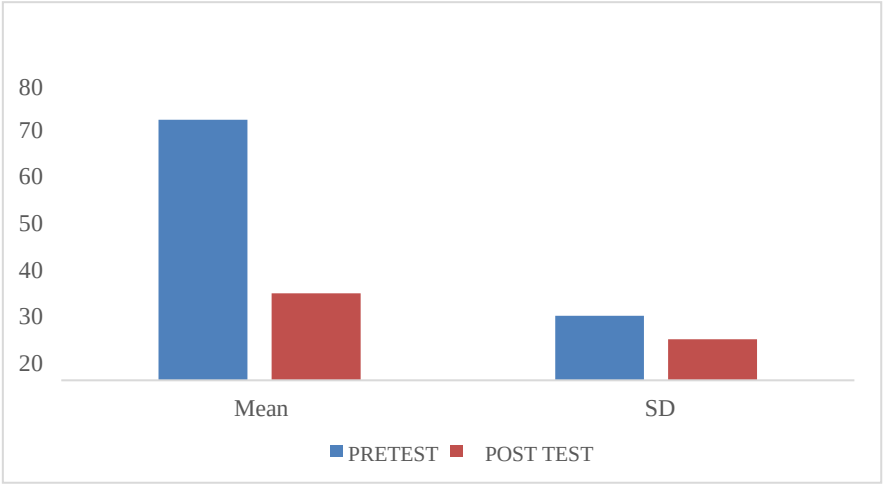
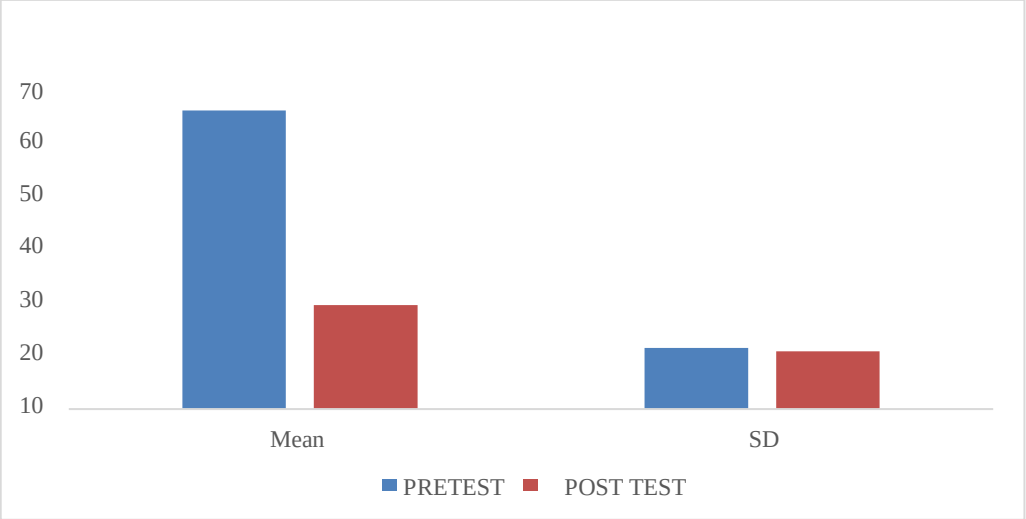


TABLE 5 : PERCENTAGE OF GROUP 2 PRE TEST AND POST TEST OSWESTRY QUESTIONNAIRE SCORE

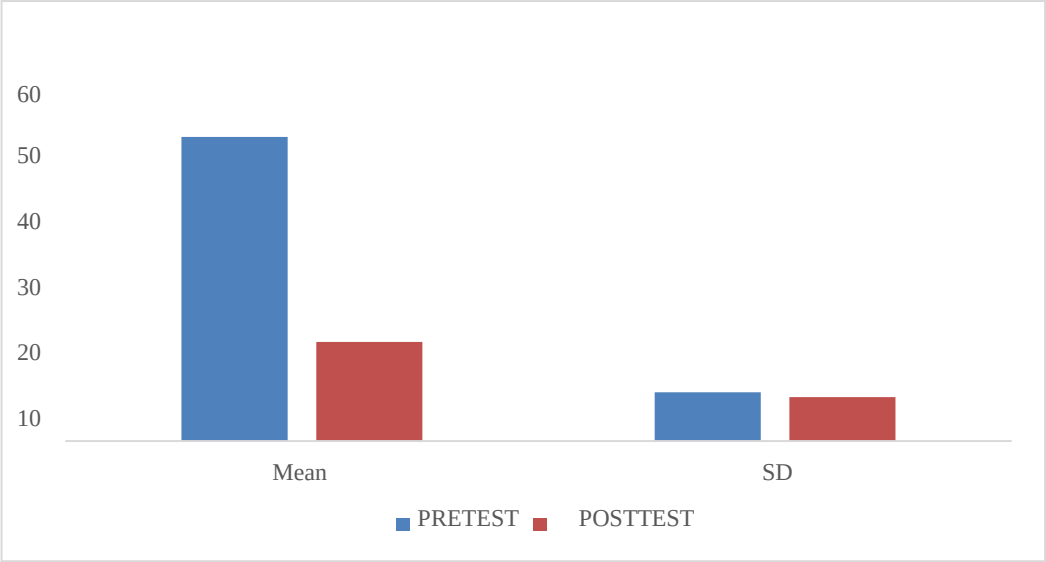
TEST (n=22)	MEAN	SD	T- VALUE	P- VALUE
PRE TEST	65.36	13.35	9.71	≤0.001
POST TEST	22.73	12.63		



GRAPH 5 : PERCENTAGE OF GROUP 2 PRE TEST AND POST TEST OSWESTRY QUESTIONNAIRE SCORE

TABLE 6 : PERCENTAGE OF GROUP 3 PRE TEST AND POST TEST OSWESTRY QUESTIONNAIRESCORE

Test (n=30)	**MEAN**	**SD**	**T- VALUE**	**P- VALUE**
PRE TEST	52.45	8.39	16.7	≤0.001
POST TEST	17.1	7.58		



GRAPH 6 : PERCENTAGE OF GROUP 3 PRE TEST AND POST TEST OSWESTRY QUESTIONNAIRE SCORE

3. **RESULT:**
Among the 100 individuals , mean intensity of pre and post test of group I is 7.69 and 3.23 respectively, group II is 6.91 and 3.18 and group III 7.50 and 2.77 respectively [Table 1,2&3 and graph1,2&3].

In terms of intensity of pain table 1,2 &3 reveals the mean and standard deviation of 50 individual suffering from gluteal pain and leg pain.
According to the results, GMS was discovered in about 1.8% of patients at a primary clinic and 20% among those with hip or lbp. So, there are various pathophysiologies or definitions of GMS. It was statistically significant because the p value was less than 0.001and the 95 percent confidence interval (CI) group I was 4.07 – 4.85 [Table 1], group II was 3.05 - 4.40 [Table 2] & group III was 4.18 – 5.29 [Table 3]

4. DISCUSSION:

This study was carried out among 100 individuals with both low back pain and leg pain and further screening was done using oswestry disability questionnaire . The 100 participants were screened and divided into 3 groups, I group included 48 patient with both low back pain and leg pain, II group included 22 patient with low back pain alone and III group included 30 patient with leg pain alone. For participants in each group, target area oriented therapy was prescribed, group I was given stretching and strengthening exercises, group II was given stretching , strengthening and IFT and group III was given IFT and stretching . Thus the sarcomere, a muscle fiber's fundamental unit of contraction, is where stretching a muscle fiber starts. The region of overlap between the thick and thin myofilaments grows as the sarcomere shrinks. This area of overlap narrows with stretching, allowing the muscle fiber to lengthen. Additional stretching puts pressure on the surrounding connective tissue once the muscle fiber reaches its maximal resting length (all of the sarcomeres are fully stretched). The collagen fibers in the connective tissue line up along the same line of force as the tension as it builds.
Masahiro Kameda, Hideyuki Tanimae, et al. proposed that accurate diagnosis and treatment of gluteus medius syndrome could aid in lumbar disease, hip and knee oa, hip-spine syndrome, and failed back surgery syndrome, among other conditions, in 2020.According to Nathan Patrick et al. in 2014, low back pain ranks second only to upper respiratory illnesses as the leading global cause of activity restriction and missed work, making it a significant financial crisis on individuals, families, communities, business, and governments.
The most prevalent joint ailment in the world, according to Anna Litwic's 2013 theory, primarily affects people in their later years. It progresses slowly and can result in substantial pain and impairment. It has been linked to considerable handicap, such as decreased movement and daily life tasks. Simple weight-bearing exercises like clam shells, side-lying hip abductions, standing hip abductions, and single-leg balance basics are examples of non-weight-bearing exercises, according to Presswood, in 2008. When a patient can stand on one leg for 30 seconds while keeping their pelvis level, they have made progress.
For identifying patients with hip joint osteoarthritis Trendelenburg test was used which was concluded in 2010 by Youdas JW. Practice and theory of physical therapy.
Sadler, Sean, with his team . proposed in 2019 that the findings of this systematic study should be taken into consideration when evaluating and treating people with LBP on a clinical level. Future studies are needed to properly define the kind and course of LBP as well as to compare patients with and without LBP prospectively in terms of how well their gluteus medius muscles function.
In the year 2019, Kameda M, Tanimae H, proposed the efficiency of active tissue release and trigger point release for locating and treating low back pain and leg discomfort mostly brought on by the gluteus medius .
Patients with low back pain may benefit from using the Pressure pain thresholds, according to Imamura M et al's 2016 study. In 2013, Angela M. Fearon et al. proposed that GTPS is likely to be present in individuals with LHP who also had discomfort with increased trochanter palpation and LHP with an FABER test. This was based on the ease with which the shoes could be manoeuvred.
5. Limitation of the study is it consisted of smaller sample size. The study was done in a short time period with a small number of subjects.
6. Conclusion :The study concludes that the results obtained from this research was statically significant and can be concluded that there was a definite and positive effect of intervention targeted on lbp and leg pain patients in patients with gluteus medius syndrome.
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8. Acknowledgement: Sincere thanks to SMCH for providing with resources and facilities to conduct research..
9. Conflict of interest: There is no potential for a conflict of interest.

REFERENCES:

1. Kameda M, Tanimae H, Kihara A, Matsumoto F. Does low back pain or leg pain in gluteus medius syndrome contribute to lumbar degenerative disease and hip osteoarthritis and vice versa? A literature review. Journal of physical therapy science. 2020;32(2):173-91.
2. Shah A, Bordoni B. Anatomy, Bony Pelvis and Lower Limb, Gluteus Medius Muscle. [Updated 2022 Jan 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-.Available from: https://www.ncbi.nlm.nih.gov/books/NBK557509/
3. Meucci, Rodrigo Dalke et al. “Prevalence of chronic low back pain: systematic review.” Revista de saude publica vol. 49 (2015): 1.doi:10.1590/S0034-8910.2015049005874
4. Bewyer, Kathryn J., et al. "Pilot data: association between gluteus medius weakness and low back pain during pregnancy." The Iowa orthopedic journal 29 (2009):97.
5. Cooper NA, Scavo KM, Strickland KJ, Tipayamong kol N, Nicholson JD, Bewyer DC, Sluka KA. Prevalence of gluteus medius weakness in people with chronic low back pain compared to healthy controls. European Spine Journal. 2016Apr;25(4):1258-65.
6. Suzuki H, Kanchiku T, Imajo Y, et al. : Diagnosis and characters of non-specific low back pain in Japan: the Yamaguchi Low Back Pain Study. PLoS One, 2016, 11: e0160454. [PMC free article] [PubMed] [GoogleScholar]

7. Shah JP, Gilliams EA: Uncovering the biochemical milieu of myofascial trigger points using in vivo microdialysis: an application of muscle pain concepts to myofascial pain syndrome. J Bodyw Mov Ther, 2008, 12: 371–384. [PubMed] [Google Scholar] [Reflist]
8. Segal NA, Felson DT, Torner JC, et al. Multicenter Osteoarthritis Study Group: Greater trochanteric pain syndrome: epidemiology and associated factors. Arch Phys Med Rehabil, 2007, 88: 988–992. [PMC free article] [PubMed] [Google Scholar] [Reflist]
9. Reiman, M. P., Bolgla, L. A., & Loudon, J. K.. A literature review of studies evaluating gluteus maximus and gluteus medius activation during rehabilitation exercises. Physiotherapy Theory and Practice,2012: 28(4): 257–268.
10. Borja F, Latta LL, Stinchfield FE, Obreron L. Abductor muscle performance in total hip arthroplasty with and without trochanteric osteotomy. Radiographic and mechanical analyses. Clin Orthop Relat Res. 1985 Jul-Aug;(197):181–190. [PubMed] [GoogleScholar]
11. Presswood, L., Cronin, J., Keogh, J. W. L., & Whatman, C. . Gluteus Medius: AppliedAnatomy, Dysfunction, Assessment, and Progressive Strengthening. Strength and Conditioning Journal. October 2008 : 30(5):41–53.
12. Nelson-Wong E, Gregory DE, Winter DA, Callaghan JP. Gluteus medius muscle activation patterns as a predictor of low back pain during standing. Clinical Biomechanics. 2008 Jun1;23(5):545-53.
13. Lee D. An approach to examinations and treatment of lumbo-pelvic-hip region. 2nd ed. New York: Churchill Livingstone;1999.
14. Donnally III, Chester J., et al. "Lumbar Degenerative Disk Disease." StatPearls, StatPearls Publishing, 4 September2022
15. Yang, Haiou et al. "Low Back Pain Prevalence and Related Workplace Psychosocial Risk Factors: A Study Using Data From the 2010 National Health Interview Survey." Journal of manipulative and physiological therapeutics vol. 39,7 (2016): 459- 472.doi:10.1016/j.jmpt.2016.07.004
16. Presswood, laura1; cronin, john phd2,3; keogh, justin w l phd3; whatman, chris mappsc3. gluteus medius: applied anatomy, dysfunction, assessment, and progressive strengthening. strength and conditioning journal: october 2008 - volume 30 - issue 5 - p 41-53 doi:10.1519/ssc.0b013e318187f19a
17. Youdas, James W et al. "Usefulness of the Trendelenburg test for identification of patients with hip joint osteoarthritis." Physiotherapy theory and practice vol. 26,3(2010):184-94.doi:10.3109/09593980902750857
18. Wáng, Yì Xiáng J et al. "Informed appropriate imaging for low back pain management: A narrative review." Journal of orthopaedic translation vol. 15 21-34. 27 Aug. 2018,doi:10.1016/j.jot.2018.07.009
19. Imamura, Marta et al. "Changes in pressure pain threshold in patients with chronic nonspecific low back pain." Spine vol. 38,24 (2013): 2098-107. doi:10.1097/01.brs.0000435027.50317.d7
20. Fearon, Angela M et al. "Greater trochanteric pain syndrome: defining the clinical syndrome." British journal of sports medicine vol. 47 ,10 (2013):649-53.