

Effect of Myofascial Release with Targeted Gluteus Maximus and Medius Activation on Lumbar Pain, Pelvic Stability and Functional Mobility

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Abstract

Background: Mechanical low back pain (LBP) causes pain, disability, pelvic instability, and gait dysfunction. Myofascial release (MFR) may reduce soft tissue restriction, whereas gluteal strengthening may improve pelvic stability.

Case Presentation: A 62-year-old female presented with severe LBP radiating to the left lower limb, waddling gait, pelvic asymmetry, functional scoliosis, positive Trendelenburg test, restricted hip ROM, and gluteal weakness (3/5). The NPRS was 10/10 and MODI was 48 %.

Intervention: A six-week physiotherapy program that included MFR, hip ROM exercises, gluteal activation, strengthening, stretching, postural and gait training, electrotherapy, and patient education.

Outcome Measures: Pain and disability were measured using the Numerical Rating Pain Scale (NPRS) and Modified Oswestry Disability Index (MODI), respectively. Hip range of motion (ROM) was measured using a goniometer, and muscle strength was assessed using manual muscle testing (MMT). Apparent leg length, gait pattern, and the ability to perform activities of daily living were also assessed.

Results: The NPRS increased from 10/10 to 4/10 and MODI from 48% to 42%. The strength of the gluteals and iliopsoas in the patients improved from 3/5 to 4/5, and their hip range of motion, gait pattern, pelvic control and ability to perform activities of daily living improved.

Conclusion: The six-week physiotherapy program led to decreased levels of pain and dysfunction, as well as increased strength, mobility, gait, and overall performance.

Keyword: Mechanical low back pain; Myofascial release; Gluteus maximus; Gluteus medius; Pelvic stability; Waddling gait; Functional mobility; Physiotherapy.

1. BACKGROUND

Low back pain is a common health problem in the present day. It can cause difficulty in movements and activities of daily living. In the year 2017, people who suffered from lumbar pain were 577 million. Older adults are mostly affected, and women experience lumbar pain more frequently than men. The number of cases is rising each year. In Korea, 60% to 80% of people will have low back pain at some point. It is most common in people aged 30 to 50 years, and women over 40 years.

Most people with low back pain (60% - 90%) have no clear cause. This type of pain is called mechanical non-specific low back pain. It comes from problems in the spine, discs, joints, muscles, ligaments, nerves, or pelvis. Symptoms include pain, stiffness, difficulty in moving, muscle weakness, and difficulty in sitting, standing, walking, or bending. The way the lower back and pelvis work together can also be affected.

The gluteus maximus is the largest muscle in the hip region, comprising approximately 16% of the total cross-sectional area. It originates from several anatomical sites including the ilium, sacrum, and coccyx, and the sacrotuberous ligament. Approximately 80% of its fibers connect to the iliotibial band, while the rest insert into the gluteal tuberosity located on the distal part of the femur. It is widely recognized that all portions of the gluteus maximus contribute to hip extension and external rotation.

The gluteus medius is a fan-shaped muscle on the side of the hip, under the gluteus maximus, and above the thigh bone. Along with the gluteus minimus and tensor fasciae latae, it helps move and stabilize the hip and pelvis. If this muscle is weak, the pelvis may drop to one side during walking. This increases side bending of the spine and exerts extra pressure on the discs. These changes can alter walking patterns and lead to low back pain.

Myofascial release (MFR) is a technique in which soft tissue is mobilized to decrease pain and improve tissue function by reducing restrictions in the fascia tissue. Therapists work on this technique to improve the tissue's biological structure and maintain its physiological equilibrium. MFR can cause changes in the tissue's functional structure and collagen cross-linking. The myofascial release technique improves blood circulation in the tissue.

Strengthening the gluteal muscles has also been proved in past years for lumbar pain. Jeong et al. discovered that combining gluteal exercises with core stability rehabilitation improved muscle strength and balance in chronic lumbar pain patients. The clamshell exercise is a side-lying position strengthening exercise that targets hip abductors and rotators, especially the glutes. Selkowitz et al. showed that activating gluteal muscle while limiting the activity of the tensor fasciae latae. It makes the complete intervention for gluteal muscle strengthening.

2. Aim

This study aimed to assess the effectiveness of a combined physiotherapeutic intervention of myofascial release with targeted gluteus maximus and medius activation in a 62-year-old woman with mechanical low back pain, pelvic asymmetry, functionally limited mobility, and muscular weakness.

3. Objectives

- To assess pain and functional mobility associated with lumbar pain
- To assess the effect of myofascial release on the gluteus maximus and medius
- To assess the effect of targeted gluteus maximus and medius activation on pelvic asymmetry and ROM of the patient
- To assess the changes in the gait pattern, particularly the identified waddling gait and pelvic control during gait

4. Case Description

A 62-year-old female housewife visited a physiotherapy clinic with complaints of acute mechanical lumbar pain. The patient reported severe acute lumbar pain that radiated to the buttocks, posterior thigh, and leg on the left side. She had difficulty walking, sleeping on the affected side and breathing difficulty in the prone position. She reported that sitting with a lumbar corset was comfortable. She also complained of bilateral gluteal muscle tightness and pain, which was severe at night and extended to the morning. After the pain arose, her activities of daily living were also affected, such as washing clothes and preparing food. The patient's medical history included hypertension, diabetes, grade III osteoarthritis and urinary incontinence. Initially, she rated her pain intensity as 10 out of 10 on the numerical pain rating scale. The patient reported restrictions in walking, sitting, standing, sleeping, travelling, and housekeeping. Her modified Oswestry disability index score was 24/50 and the MODI was 48%.

On observation, the patient has a waddling gait and a scoliotic posture. The patient stood on the right side with the right pelvis up and the left pelvis down and anteriorly rotated. On clinical examination, the patient presented with limb length discrepancy: from the ASIS to the medial malleolus, the left leg was 29 cm, and the right leg was 28.5 cm. From the umbilicus to the medial malleolus, the left leg was 35 cm, and the right leg was 34 cm. The patient also had tenderness and tightness on palpation over the gluteus maximus, gluteus medius, and iliotibial band. The patient presented with palpable tightness on the upper part of the thigh over the quadriceps and upper part of the calf.

Special tests to assess pelvic alignment revealed a positive Trendelenburg test. A left lateral shift was also observed during hip joint examination. The active range of motion of the left hip was 40° degrees in flexion and of right hip 30°, and 15° degrees in extension for left hip and for right hip 20°, and 25 degrees in abduction for left hip and for right hip 30°. The patient had decreased strength in the lower limb muscles, namely, the gluteus maximus (3/5) grade, gluteus medius (3/5) grade, and psoas major (3/5). The X-ray of the lumbar spine showed signs of degenerative changes in the spine at multiple levels, deformation of the lumbar lordosis, narrowing of some intervertebral gaps, and marginal osteophytes.

5. Baseline measurement-

Range of Motion of Hip Joint -By Goniometry

Movement	Left Side ROM	Right Side ROM
Flexion	Pain free till 40°	Pain free till 30°
Extension	Pain free till 15° above painful	Pain free till 20° above painful

Abduction	Till 25°	Till 30°
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Muscle Strength – By Manual Muscle Testing Oxford Grading Method for left hip joint

Muscle	Oxford Grading
Psoas major	3/5
Gluteus maximus	3/5
Gluteus medius	3/5

Limb Length Measurement – Measure by inchtape

Location	Left side	Right side
From ASIS to medial malleolus	29 cm	28.5 cm
From umbilicus to medial malleolus	35 cm	34 cm

6. Uniqueness of the Study

The uniqueness of this study is the individual approach to the patient with a combination of myofascial release and targeted gluteus maximus and gluteus medius activation training for the treatment of mechanical low back pain, pelvic asymmetry, a positive Trendelenburg test, gluteal muscle weakness, functional scoliosis, and bilateral knee osteoarthritis.

7. Intervention

Physiotherapy intervention was designed to reduce pain intensity, improve gluteal activation, and restore lumbopelvic control. The patient was educated about her condition and treatment. The patient was advised to avoid heavy lifting and prolonged sitting. The treatment sessions lasted for six weeks, with six supervised sessions per week, each lasting approximately 70 minutes. Therapeutic exercises were stopped or modified if the patient's pain increased during the session. The patient was educated about posture correction and walking for 10 minutes regularly.

Initially, in the first week the goals were pain management and mild range of motion, and subsequently, the session progressed to targeted gluteal muscle strengthening with myofascial release technique to increase the strength of the gluteal muscle along with lumbopelvic stability and posture correction.

(i) Electrotherapy for Pain Management & Tissue Preparation

(a) Therapeutic Ultrasound:-

Frequency – 1 MHz, Duration – 5 mins

Intensity : 1.3 W/cm², Mode : Continuous.

Area of application – Lumbar region with gluteal muscle.

(b) TENS with Hydrocollator Pack Technique:-

Mode – Continuous, Frequency – 150 Hz,

Pulse – 300 µs, Intensity – As comfortable and tolerable to the patient.

Application places – Over the lumbar region, left glutes, hamstring, and calf muscle with a time duration of 15 minutes.

The TENS helped the decreased the pain by blocking pain signals , and a hydro collator pack (HCP) was also provided with the TENS to decrease the muscle tightness and increased flexibility.

(c) Ice Therapy:-

The patient was advised to take ice packs three times a day for 10 minutes over the lumbar region, both gluteal muscles, IT band, quadriceps, and the calf muscle after myofascial release if there was any pain.

(ii) Myofascial Release (MFR)

The MFR was applied over the lumbar region with bilateral hip gluteal muscles, left IT band, left upper quadriceps and left calf muscle .

1. Bilateral Gluteus Maximus and Medius Muscle – The tight and painful tissue was assessed in the side-lying position. The therapist's fingertips apply slow, gentle pressure and move in a sustained rhythmic oscillation in a proximal to distal direction over the gluteal maximus and medius until the tissues start to loosen and gradually reduce the pressure to release the restriction. It was also released in a circular motion and with the forearm technique over the gluteus.

2. Iliotibial Band (IT Band) – In a side-lying position, the therapist assesses the tight and tender area of tissue and uses the forearm MFR technique in the distal-to-proximal direction over the lateral condyle of the femur to the proximal tibia and iliac crest using the longitudinal release on the left side IT band . This was done to free the tension in the IT band and mobilize the soft tissue.

3. Quadriceps Muscle – The therapist assesses the area of the painful taut band in the supine lying position. Multiple tight bands were present on the left side quadriceps, and these were released with slow gentle pressure. The pressure was gradually increased and maintained for the patient's comfort and then slowly released in a circular motion. This technique helped in reduced the tension in the upper thigh muscle and increased its flexibility.

4. Calf Muscle – In a prone or side-lying position depending on the patient's comfort level, the therapist assesses the palpable taut band over the upper proximal part of the calf muscle below the popliteal area in left side calf muscle and then releases it with slow gentle pressure applied , gradually increasing the pressure in a circular direction and then slowly releasing.

Duration – About 10 – 12 minutes with 3 minutes per area. The release of the tissue provided a calming sensation to the patient, and the muscles relaxed and became more flexible.

(iii) Exercise Therapy

(a) Range of Motion Exercise (ROM) – After a week of pain management, the treatment progressed to Range of Motion Exercise.

- **Ankle toe movement** – 10 reps bilaterally.
- **Heel slides** – 10 reps initially progressed to two sets each side.
- **Active hip flexion** – 10 reps (Initially, with no sets, later two sets of 10 reps) each side.
- **Active hip abduction** – 10 reps initially, progressed to two sets of 10 reps each side.
- **Side-lying hip abduction** – 5 reps initially progressed to two sets of 10 reps each side.
- **Prone active-assisted SLR** – 10 reps, progressed to two sets of 10 reps each side.

(b) **Strengthening of Targeted Gluteal Muscle** – From the above-mentioned ROM exercise, the strengthening exercise progressed from isometrics to dynamic exercise.

• **Isometric exercise** → Quadriceps, hamstring, vastus medialis oblique, adductor, abductor muscles: 5 reps progressed to 10 reps x 2 sets each side.



Hamstring isometric strengthening exercise

• **Weight-cuff exercise** (hip flexor in supine, abductors, side-lying abduction with weight-cuff): 10 reps progressed to 10 reps x 2 sets.

(c) **Trunk Mobility Exercise** – Cat and camel exercise: 10 reps; cobra pose: 5 reps initially progressed to 10 reps x 2 sets; unilateral spinal rotation exercise (To the opposite side to the concave curve): 10 reps initially progressed to 10 reps x 2 sets.

(d) **Stretching** : Quadriceps, calf muscle, IT band, abductors, adductors, piriformis (right side only), gluteus maximus, and hamstring: 4 reps×15 sec hold .



Hamstring stretching

(e)For gait training, the patient was encouraged to walk from the third week with weight-bearing on the left side to improve pelvic stability and alignment. The duration of walking progressed from 5 to 10 min.

Targeted Clamshell exercise

Initially without a loop or resistance band, then progressed to loop or resistance band. Patient position was side lying with knee flexed at 60° and the loop band was over the both thighs and the therapist stabilized the pelvis to avoid compensatory movement of muscles. Without loop band: 10 reps each side → With loop band: 10 reps x 2 sets each side → Then progressed to 10 reps x 3 sets for targeted strengthening of gluteus maximus and medius.



TARGETED GLUTEAL MUSCLE STRENGTHENING EXERCISES – Clamshell exercise

Result

The structured physiotherapy program showed the patient's measurable improvement in reducing pain intensity and improving the patient's lumbar spine mobility, hip muscle strength, lumbopelvic control, posture correction, and functional movement. The patient's confidence throughout therapy was also evident. At first, she avoided heel slides and adductor muscle stretches on the affected leg due to fear of pain during movement. After several sessions, she was able to complete these exercises without anxiety or difficulty. The results were noticeable, because not only was the pain intensity reduced, but also the patient's lumbopelvic stability, posture, and strength of the targeted gluteal muscle improved with increased trunk mobility slightly.

Range of Motion – Hip Joint

Movement	Pre rehabilitation left side	Pre rehabilitation Right side	Post rehabilitation left side	Post rehabilitation right side
Flexion	Pain free till 40°	Pain free till 30°	Pain free till 70°	Pain free till 50°
Extension	Pain free till 15° above pain increases	Pain free till 20° above pain increase	Pain free till 30°	Pain free till 35°
Abduction	Till 25°	Till 30°	Till 40°	Till 45°

Left Side Hip Muscle Strength Assessment (Grade)

Muscle	Pre rehabilitation grade	Post rehabilitation grade
Psoas major	3/5	4/5

Gluteus maximus	3/5	4/5
Gluteus medius	3/5	4/5

Limb Length Measurement Assessment

Location	Pre rehabilitation left side	Pre rehabilitation right side	Post rehabilitation left side	Post rehabilitation right side
From ASIS to medial malleolus	30 cm	28.5 cm	30 cm	29.5 cm
From ASIS to umbilicus	35 cm	34 cm	36 cm	35 cm

NPRS Assessment – Left Lumbar Area

Pre-rehabilitation	Post rehabilitation
10/10	4/10

MODI Assessment- Lumbar pain

Pre rehabilitation MODI	Post rehabilitation MODI
48 percent	42 percent

Outcome Measures

- Pain: Numerical Pain Rating Scale (NPRS).
- Range of Motion: Goniometric measurement of hip flexion, extension, and abduction with functional observation of trunk mobility.
- Tenderness: Taut band on the quadriceps and calf muscles palpated with irritability and symptoms.
- Muscle Strength: Manual muscle testing of hip flexors, extensors, and abductors.
- Limb Length Measurement: Using an inch tape from the ASIS to the medial malleolus and umbilicus.
- Functional recovery: walking and bending.
- Disability: The Modified Oswestry Disability Index was used to assess changes in the daily and routine activities .

8. Discussion

After six weeks, the patient reported that her pain dropped from 10 to 4. Hip movement increased. Glute strength, pelvic control, walking pattern, and daily function got better. These results match those of other studies : Arguisuelas et al. (2017) found that MFR reduces pain and disability. Sadler et al. (2019) showed weak gluteus medius in patients with LBP and the need for its rehabilitation. Together, MFR and strengthening likely helped reduce pain and improve stability and function.

9. Limitations of the Study

- Only one patient, no comparison group – hard to know if results were due to treatment.
- Many treatments used simultaneously – difficult to determine which one worked.
- Follow-up was only six weeks long ; unknown if benefits lasted.
- Few measures were not exact : muscle strength was tested by manual method, not by EMG.
- Health problems, such as osteoarthritis and spinal degeneration, influenced the results.

10. Conclusion

Overall, the present case showed that a six week physiotherapy intervention combination of myofascial release and targeted gluteal muscle strengthening can be effective in mechanical lumbar pain because it reduces patient pain, increases muscle strength and range of motion, improves lumbopelvic control, gait, and functional mobility. Therefore, the results of the present case support the need of further research with large sample and control group to confirm the advance findings.

11. Future Scope

- Recognize big groups with control groups.
- Use interventional study techniques in different groups, such as myofascial release, muscle strengthening, combined, and standard care.
- Add advanced equipments such as biomechanical assessment analysis, force platform, electromyography and gait analysis.
- Study long- time results after treatment ends.
- Add individuals with gluteal weakness, pelvic tilt, functional scoliosis or gait disturbance.
- Use standard tools like the modified Oswestry Disability Index to measure function.
- Study links between pelvic misalignment, leg-length differences, and walking problems.

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