MODIFIED REHABILITATION EXERCISES TO STRENGTHEN THE GLUTEAL MUSCLES WITH A SIGNIFICANT IMPROVEMENT IN THE LOWER BACK PAIN

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Abstract- Lower Back Pain (LBP) is highly prevalent in our society. Gluteal muscle weakness has been suggested to be associated with lower back injury. Exercises to strengthen the actual Gluteal muscles are frequently utilized in rehabilitation clinics. Therefore, strengthening of the Gluteal muscles can be helpful in arresting chronicity connected with low-back discomfort; beginning of success in improving strength, correcting faulty movement behaviors, and reducing injury rates. Hence, in this review, we have attempted to list all the effective workouts recommended for Gluteus in order to lessen the soreness as well as strengthen the Gluteal muscles.

Index Terms- About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

Low Back pain has been so common that 8 out of 10 people experience it in the certain period in their lives. Therapies that focus on exercises helps one to remain active and shorten the prolongation of time during which the back pain lasts and reduces the chance that it will recur [3],[4].

There are some physical therapists that provide treatments that are targeted to relieve that specific difficulty. When the pain becomes chronic, moderate-to high-intensity exercises as well as progressive exercises that focus attention on fitness and endurance are useful in the pain management. A physical therapist can help in customizing an exercise program for a person [3]. More than a decade ago, low back pain has been costing $26, while three billion in health care expenses [4]. Recurrences of low back pain are also popular, with 60% to three-quarters of patients experiencing a minimum of one relapse within 12 months [10], [11].

The Gluteal Muscles comprise of three muscles that make up the buttocks: Gluteus Maximus, Gluteus Medius and the Gluteus Minimus [29],[30]. Gluteus medius may play a role in the stability of the pelvis [15]. Equally, Gluteus medius, in particular, serves an important role in maintaining the actual trunk upright when the feet of the opposite side are actually raised from the ground in strolling and running, where the body weight tends to act by tugging the pelvis downwards within the unsupported side. This propensity is counteracted by gluteus medius and gluteus minimus on the supporting side that acts from below and applies a powerful traction on the stylish bone to cause a small rising of the pelvis around the unsupported side [24].

As previously stated, speculations are found in the literature regarding the relevance of Gluteus medius to low back pain (LBP) in spite of the obvious functional relationship of the spinopelvic system [25]. Gluteus maximus is the largest lean muscle in the body and is important in a great number of functional activities such as jogging, running and lifting.The actual Gluteus medius and minimus have proximal attachments within the external surface of the ilium beneath the gluteus maximus and are as well [26].

Attached to the lateral and anterior surface of the higher trochanter of the femur also.The particular tensor fascia that has proximal attachment to the informed superior iliac spine, stocks a common attachment via the actual iliotibial tract to the spectrum of ankle condyle of the tibia, along with which it acts to help the gluteus medius and minimus abduct and internally rotate the particular thigh, inserting the Gluteus maximus proximally into the sacrum, the dorsal sacral ligaments, the posterior part of the crest of the ilium and the sacrotuberous ligament [15],[16].

Due to the attachments, Gluteus maximus is primarily involved in hip extendable and lateral rotation [27].

In addition to these latter functions, the upper fibres abduct while the lower fibres adduct often at the thigh [26]. Theoretically, all the three muscles through their body structure and respective lines associated with action, play an essential role in stabilizing the hip typically, preventing hip affinity, and stabilizing the pelvis during single-leg stance and in walking in healthy people or patients [15], [16].

When a person spends a long time sitting on the chair, then the front of the hips (hip flexors rapid psoas) becomes short and tight, while the back of the hips (gluteal muscles) grows to be long and weak. Rapidly, the body forgets how to use the Gluteal muscles because it diverts the neural indication intended for them to a better muscle close by in order to make the position instead. [29],[30]. There is also a close association between lumbar pain and the muscles of the fashionable, as the muscle of the waist significantly and positively have an impact on low back pain. Hip-extensor strength and hip-adductor endurance might contribute to pain in the lumbar area [12],[13]. Hip abductor weakness is common within patients with low back pain (LBP). [17]

People who complain of low back pain encounter a decrease in muscle power, muscle endurance, and flexibility, as well as limitation of lumbar and also to lower limb joint mobility [14,12].

Individuals who suffer from low back pain often stay away from painful movements and eventually reduce activity resulting to Gluteus maximus and lowered muscle endurance due to disuse [25]. Gluteus maximus has also been found to be leading to fatigue faster in people with low back pain [27] and avoidance connected with aggravating movements of the degenerative spine is leading to the subsequent reconditioning of the back and hip dilator muscles. The finding associated with increased fatigue levels from Gluteus maximus highlights the requirement to incorporate this muscle into low back pain rehabilitation as a way to minimize the potential cycle regarding pain avoidance behavior [2].

Typically, the clinical course of low back pain could be described as acute, subacute, recurrent, or chronic. The high prevalence of continuing and chronic low back pain plus the associated costs, therefore, clinicians need to place high priority about interventions that prevent recurrences and the transition to serious low back pain [12].

Significantly, there are numerous treatments for low back pain (LBP), that include medications, anti-inflammatories, corticosteroids, paracetamol, dipyrone, tramadol, opioids, muscle relaxants, antidepressants, anticonvulsants, bodily measures (short waves, ultrasound, transcutaneous electrical stimulation, laser), infiltration, blockade, and acupuncture treatment. However, the effectiveness of the restorative interventions is not fully confirmed. [5],[6], [7],[8],[9].

Muscle mass weakness can be caused by the reduction in the number or size of muscle mass fibres, or because of an inability to fully activate the actual muscle which results to a reduced optimum voluntary contraction [22]. Discomfort and effusion, following a combined injury often lead to immobilization and decreased activity that may encourage muscle atrophy [23].

Beginning of success is in improving durability, correcting faulty movement habits, and reducing injury charges [36], [37], [38], [39], [40], [41].

Elevated hip strength leads to diminishing pain and advancements in function. With exercise therapy programs with regard to low back pain patients, adding stylish muscle strengthening exercise that may include lumbar exercise will be ideal for rehabilitation and maintenance of sleek daily life [13].

Many researchers have suggested that future studies should show strong evidence with regard to exercise as an intervention regarding LBP and thus recommend physical exercise for the management of acute and chronic low back pain [12], [18], [19].

We are able to use surface electromyography with Gluteal muscles (maximus and medius) which allows us to see the muscle activity when we are performing the exercises, a lot of studies which done before using the surface Electromygraghy (SEMG) to identify the exercises. [46], [47], [44], [34], [33],[35], [39].

Surface Electromyography (SEMG)

Surface Electromyography (SEMG) is a non-invasive technique for measuring muscle power activity that occurs during muscles contraction and relaxation method [45].

Surface Electromyography is widely used in various applications, such as:

- Physical Rehab (physical therapy/physiotherapy, kinesitherapy, chiropractic and orthopaedics)
- Urology (treatment of incontinence)
- Function (sport training, motion evaluation, research)
- Ergonomics (studies in the workplace, career danger analysis, product design and style as well as certification) [45].

Gluteal s' placement of electrodes

The electrodes for the Gluteus medius muscle will be placed anterosuperior to the Gluteus maximus muscle and just inferior to the iliac crest on the lateral side of the pelvis [46], 47], [44].

In the Gluteus Maximus muscle, electrodes will be placed in the center of the muscle, belly between the lateral edge of the sacrum and the posterosuperior edge of the greater trochanter.

A reference electrode will be placed over the anterior superior iliac spine. [46], [47], [44].

A number of exercise interventions have been analyzed in randomized controlled tests and have been shown to improve discomfort and disability in people suffering from LBP [17], [20], [21].

There are seven common strengthening exercises of varying difficulty. Exercises that are specific to Gluteus muscles were chosen. Meanwhile, a wide variety of exercises have been utilized for the progressive strengthening of the gluteus muscles. The exercises that were chosen have specific movements for Gluteus and recruit the Gluteal muscles most effectively to function. Significantly, for the significant function and in order to decrease the severity of low back pain different exercises have been reported for the strengthening of the Gluteus. In this article, we have summarized all the exercises. Therefore, Table 1 below shows the procedure on how to perform these exercises More importantly, 30-second rest period between repetitions and a 1-minute rest period should be taken in between exercises in 3 complete sets daily for over a 3-week period [43], [44].

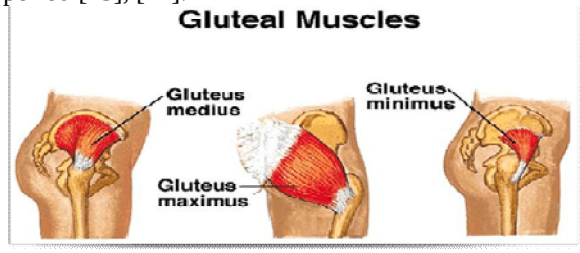


Fig A. Gluteal muscles

Exercises	How to perform
Hip extension (FIG 1) [31, 35]	While lying face down with your knee straight, slowly raise up leg off the ground, while keeping the knee straight and gradually raise the leg by tightening the Gluteals.
Plank hip abduction (FIG 2) [32]	Start with a side plank, place. You are reminded to keep shoulder blades, hips, knees, and shins in line bilaterally, and then to raise to plank position together with your hips lifted off the ground to attain a neutral alignment along with your trunk, hips, and legs. While balancing on your hand and feet, raise the best leg into abduction (right) for one beat and then lower your leg for one beat.
Hip abduction (FIG 3) [33], [35], [36]	Rest on your side with your head backed, Knees straight and lift your leg of your bottom lower leg as high as possible without rotation. Return to the start position. Ensure your pelvis does not rotate backward during the rise.
Plank hip extension (FIG 4) [34], [35]	Begin by lying prone on your hand in planks with trunk area, hips, and knees within neutral alignment (left). Raise your dominant leg off the floor, flex the knee of the dominant leg, and lengthen the hip past the natural hip alignment by taking the heel in.
Single-Limb Deadlift (FIG 5) [34], [35]	Maintaining your spine straight and stability on one leg, slim your upper body forward as the raised leg extends away from you. This suggests touching your odds to the opposite foot grounded at the bottom so that your hips usually do not rotate wrongly
Single-limb squat (FIG 6) [34]	Being sure to keep your torso upright and your knee about even with your toes. While you are doing these squats, glance down on your knee.
Single Leg Bridge (FIG 7) [35]	Suppose the start position as demonstrated by. Lift butt off the floor by pushing off the right foot and lifting hips toward the ceiling. Then, bending the right knee and lifting the left limb up toward ceiling.



Fig 1. Hip extension



Fig 2. Plank hip abduction



Fig 3. Hip abduction



Fig 4. Plank hip extension



Fig 5. Single- limb deadlift



Fig 6. Single-limb squat



Fig 7 Single- leg bridge

CONCLUSION

The rehabilitation exercises which found from the studies that had done before more appropriate than others to control as well as increase the Gluteal muscles durability and this study may be of great help for physical therapists in picking out exercises when progressing people with low back pain (LBP) from low-intensity exercises for those that require far more muscle activity.

The Surface Electromyography (SEMG) can be used to identify the particular exercises which more appropriate to be able to strengthen muscles and handle pain.

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