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Moderation of Back pain by Rehabilitation Exercises; Multifidus Muscle' Perspective

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Abstract: *Low back pain (LBP) is highly prevalent in our society and the multifidus muscle is the most important muscle for lumbar segment stability as per its relationship its atrophy and recurrences of low back pain besides, its recovery to normal size in patients undergone an exercise program resulting in stress, deterioration of the lumbar multifidus muscle tissue leading to impaired function. Nevertheless, particular important risk factor regarding low back pain is the weakness of multifidus muscle and conditioning of this muscle is connected with significant improvements on a chronic low back (CLBP), as well as with decreased useful disability. Strengthening of multifidus muscle can be helpful for preventing chronic low back pain (CLBP). Beneficial exercises are wide use in the treatment of lower back pain. In this review, we have tried to list all the effective exercises for the low back pain (LBP) to decrease pain and strengthening of multifidus muscles.*

Keywords: *Multifidus muscle; Low Back Pain; Rehabilitation exercises; strengthening of trunk muscles.*

I. Introduction

Low back pain (LBP) is considered to be a common problem and it is largely thought of as a difficulty confined to Western countries nonetheless, since a long time an increasing amount of numerous reports demonstrated that low back pain is now a significant problem in Asian communities with a prevalence of low back pain (LBP) to be 28. 5%. [29],[7],[47]. The lifetime prevalence of low back pain (LBP) was reported to be over 70 percent in industrialized countries [9], [48]. Many studies have shown that the multifidus is the most important muscle regarding lumbar segmental stability, with its origin in the posterior sacrum and superior iliac and it is inserted the spinous process of the vertebrae except cervical 1 (C1) and this muscle acts trunk lateral flexion and assists in trunk extension. Assistant muscles in trunk extension are multifidus, rotator, semispinalis, Interspinalis, and Stabilizers the hip extensor, especially in the prone lying. The nerve supply spinal nerve roots [40], [26], [42].

People who suffered from low back pain (LBP), have weaker trunk area muscles than healthy individuals. Therefore, trunk exercises are commonly recommended to patients with low back pain(LBP) [33], [3]. The lumbar multifidus muscle, which is thought to be particularly necessary for stability of lumber, the multifidus has demonstrated to be atrophied in different reports with infiltration of fats in patients with long-term low back pain (LBP) [12],[17],[18],[25],[28]. Besides the low back pain (LBP) another term referred to as chronic low back pain (CLBP) is sometimes defined as back pain that lasts for longer than 7–12 weeks. These pains cause the atrophy of the paraspinal, isolated multifidus, quadratus lumbar, psoas, and the gluteus maximus muscles to varying degrees, with most prominent in the multifidus to be affected [4],[10].A number of literature reviews and recommendations for the treatment of low back pain (LBP) indicate that exercise therapy constitutes an effective intervention with regard to patients with acute low back pain [21],[1],[16],[24], [5],[41],[6]. Exercise is safe for individuals suffering from back pain because it does not boost the risk of future back accidents or work absence [24]. However, providing positive effects in treating individuals with chronic low back pain (CLBP), despite the fact that, there is a lack of good proof for exercise therapy with regard to patients with acute low back pain, there are reports, that every patient with either severe or chronic low back pain (CLBP) might benefit from an appropriate specific exercise program [21].

The decrease in strength of trunk area muscles can be expected in persistent low back pain. Raising muscle strength can help in supporting the degenerative spine [23] and with reduced trunk muscle strength has been found to be directly related to chronic low back pain (CLBP), in addition, being overweight and decrease in trunk muscle mass, strength are important factors in chronic low back pain (LBP), along with a trunk muscle strengthening system to be helpful in reducing pain. Therefore, the majority of researchers has discovered that the trunk muscle strength is an important factor in chronic low back pain (CLBP) [13].

The actual association between trunk muscle mass, strength and low back pain (LBP) continues to be widely studied, but the reports are conflicting [39], besides to know that the strengthening of lumbar paraspinal

muscles could be helpful for preventing chronic low back pain (CLBP) [32]. Probably, with stronger back muscle mass the risk of vertebral fractures will probably decrease [43]. There is absolutely no evidence that one exercise program is preferable to another for the rehabilitation associated with patients with low back pain (LBP). For that reason, a wide variety of exercises have been useful for a progressive strengthening of the lower back [21]. Electromyography (EMG) offers a means by which the back muscle mass activation levels can be examined during exercises, which can support a therapist in choosing appropriate exercises [21].

Surface Electromyography

Surface area Electromyography (SEMG) is a noninvasive technique for measuring muscle electrical activity that occurs during muscle mass contraction and relaxation process.

Surface area Electromyography is widely used in numerous applications, such as:

- Physical Rehabilitation (physical therapy/physiotherapy, kinesiotherapy chiropractic, and orthopaedics')
- Urology (treatment of incontinence)
- Function (sports training, motion evaluation, research)
- Ergonomics (studies in the workplace, job danger analysis, product design as well as certification) [49].

Multifidus s' placement of electrode

There was a study demonstrated good reliability in the use of surface electrodes for the lumbar multifidus [17]. Sites of electrode placement will be prepared by abrading the skin with fine sandpaper and cleaning the area with 70% isopropyl alcohol. Excess hair will shave off whenever necessary [30].

In the lumbar multifidus muscle, the electrodes will be placed 2cm laterally at the lumbosacral junction. Multifidus muscles at L5, 2cm laterally from the midline running through the L5 spinal process [17], [20], [11], [21], [50]. A reference electrode will be placed at the tip of the spinous process or on the posterior superior iliac spine process [30].Exercise program The exercises are usually performed 3 times with a hold for 5 seconds. Rest periods of 30 seconds is allowed between repetitions of the exercises and a 1-minute rest period will be given between exercises, the exercises will be persisted for 6 weeks occur twice a week [21],[46],[22].

Fig A multifidus muscle

This review focuses on summarizing all the exercises for multifidus muscle profound in utilizing for the importance of function and decreasing the serenity of low back pain.

Name of exercise	***Perform***	***Reference***
Superman exercise (Fig 1)	Lie down on your stomach with the arms extended so that they are parallel to the floor, palms down, slowly lift your arms, upper body and legs from the floor and hold for 5 seconds.	[38],[30],[21],[15],[35]
Flying squirrel exercise (Fig 2)	Lying prone with knees flexed, hips internally rotated, and legs will be lifted off the floor. Participants' arms will be flexed at the elbows, shoulders externally will be rotated, and lifted off the floor. This position will hold for 5 seconds.	[38]
Prone trunk extension exercise (Fig 3)	Lie on your stomach and put your arms behind your head, take your body up to a fully extended position and you should hold 5 seconds. Your legs should be fully extended	[37], [21],[34],[11]
Bridge exercise(Fig 4)	Lie on your back with both legs bent, tighten and squeeze your gluteus, lift your butt off the floor hold on for 5 seconds.	[21],[8] ,[15],[34]
Bird dog exercise(Fig 5)	On hands and knees with a neutral spine, tense your abdominals and keep your low back quiet, then reach way out	[21],[27],[34],[36],[31]

	with one hand, thumb up, and reach way back with the opposite foot, pushing through the heel, not the toes.	
Back bridge exercise with leg lift (Fig 6)	Lie on your back with your knees bent and your feet flat on the floor, cross your arms over your chest and raise the lower half of your right leg until it's in line with your left thigh, press your left foot into the floor.	[21],[36],[30],[15],[35] [36],[44],[34],[31]

Superman exercise (Fig 1)

Flying squirrel exercise (Fig 2)

Prone trunk extension exercise (Fig 3)

Bridge exercise (Fig 4)

Bird dog exercise (Fig 5)

Back bridge exercise with leg lift (Fig 6)

II. Conclusion

The rehabilitation exercises which Found from the studies which had done before more appropriate than others to control as well as increase the multifidus muscle durability and this a 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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