



O-10 PHYSIOTHERAPY MANAGEMENT FOR LUMBAL STRETCHING EXERCISE AND LUMBAL CORE STABILIZATION EXERCISE IN CHRONIC LOW BACK PAIN : A CASE STUDY

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Abstract

Introduction: Chronic low back pain refers to the low back, lumbosacral and sacroiliac pain over 3 months which is sometimes accompanied by radiating pain in the lower extremities. LBP is one of the most common musculoskeletal disorders with a prevalence rate of 80%. LBP treatment can be done with medication and physiotherapy programs. The purpose of this study was to determine the effectiveness of a physiotherapy program using MWD, Tens, stretching exercise and lumbal core stabilization exercise to reduce pain, improving range of motion and optimizing functional ability in patient with CLBP.

Case Presentation: Mr. Y feels pain in the lower back, left buttocks and left hamstring since 1 year ago, sometimes he feels tingling and cramping in his left leg. The patient also complained of pain in the left hip area and was known to have a history of falling from his motorcycle and cracking his left hip. The patient is unable to walk long distances, feels pain in the waist if he sits too long, feels pain when bending his back and unable to lift heavy weights from the floor. The complaints will be reduced when used to rest.

Management and Outcome: The patient attended therapy three times once a week with a physiotherapy programs MWD, Tens, Stretching Exercise and Lumbal Core Stabilization Exercise. Patient were evaluated using Numerical Rating Scale (NRS), Meterline, Goniometer, Manual Muscle Testing (MMT), and Oswestry Disability Index (ODI).

Conclusion: Physiotherapy program for 1 months with the intensity of patient visits once a week with the intervention of MWD, Tens, Stretching Exercise and Lumbar Core Stabilization Exercise can reduce pain intensity, increasing left hip range of motion and increase the patient's functional ability.

Keyword: chronic low back pain, core stabilization exercise, stretching exercise, physiotherapy



Introduction

In a global context, chronic LBP results in one of the highest cost in healthcare and is a substantial source of morbidity and social impact (Wajswelner, 2012). Chronic low back pain refers to lower back, lumbosacral and sacroiliac pain for more than 3 months, sometimes accompanied by pain radiating to the lower extremities. Chronic LBP often causes pain and functional disability, which has a negative effect on a person's quality of life (Feilong, 2020). Low Back Pain (LBP) is one of the most common musculoskeletal disease disorders with a prevalence rate of 80% (Hyun Suhn 2019). 7.3% of the world's population including about 10% of adults in the United States suffer from pain and functional limitations caused by low back pain (Feilong, 2020).

Exercise plays a role in the management of chronic LBP with a recent systematic review showing that exercise is effective in reducing pain and improving function and is more beneficial than passive exercise. However, the most effective type of exercise remains to be clarified. Indeed, one of the main controversies in chronic LBP and the exercise literature is whether specific exercise is required or whether general exercise is equally effective. Specific exercises refer to exercises individually determined by the healthcare practitioner based on the patient's clinical details such as: direction of movement that worsens or relieves symptoms, history of injury, findings on examination, and response to clinical testing. General exercise was defined as any exercise that was not individually prescribed to a patient based on a clinical examination, possibly including sports such as walking, swimming, cycling, strength training and stretching. (Wajswelner, 2012).

Exercise can improve back extension strength, mobility, endurance and functional disability. Various exercises such as lumbar stabilization exercises, motor control exercises, core exercises, lumbar flexion exercises, walking exercises and bracing exercises have been proposed to reduce chronic LBP. These exercises focus on lumbar stabilization and core strengthening. This leads to an increase in isometric endurance by increasing muscle endurance and potentially preventing LBP. (Hyun Suh, 2019). Stretching Exercise is encouraged by the American College of Sports Medicine (ACSM) to increase flexibility, relax muscles and further contribute to balancing performance while preventing musculoskeletal pain (Adriana, 2020).

Based on the background of the problem above, it can be concluded that the purpose of this study is to determine the effect of physiotherapy management with stretching exercise and lumbar core stability exercises in reducing pain, improving range of motion and muscle strength through increasing physical endurance and functional ability in chronic low back pain.

Case Presentation

Subjective Examination

Mr. Y feels pain in the lower back, left buttocks and left hamstring since 1 year ago, sometimes he feels tingling and cramping in his left leg. The patient also complained of pain in the left hip area and was known to have a history of falling from his motorcycle and cracking his left hip. The patient is unable to walk long distances, feels pain in the waist if he sits too long, feels pain when bending his back and unable to lift heavy weights from the floor. The complaints will be reduced when used to rest.

The patient's personal history, he went for therapy riding his motorcycle, it's a bit far from home, sometimes the patient wore a lumbar corset but the corset was not too attached anymore so sometimes the pain was felt when the road was bumpy.

The goals to be achieved are to reduce the pain felt by the patient, increasing range of motion, facilitate increasing muscle strength and optimizing the patient's functional activities.

Physical Examination

The basic physical examination includes aspects of vital signs, inspection, palpation. Findings in

vital sign examination showed normal condition in all aspects including blood pressure, respiratory rate, pulse / heart rate and temperature. Based on the inspection, it was found that the patient was wearing a lumbal corset, the patient's posture was slightly kyphosis and the gait tended to lean on the healthy side. Based on palpation findings, it was found that there was tenderness and spasm in the gluteal area.

Futhermore, the physiotherapis performs a specific examination for the diagnosis of low back pain using the SLR / laseque test and bragard test. Based on the results of the specific examination, the SLR / laseque test was found to be positive, namely the patient felt radiating pain when passively flexing the hip around 80°, the bragard test was found to be negative. The ensure the validity of the examination, it is necessary to know the value of the validity and reability of the examination. The study found that the sensitivity of the SLR / laseque test is 91% and the specificity is 26% (Deville et al, 2000). While the sensitivitu of the bragard test is 69.3% and the specificity is 67.42% (Homayouni et al, 2018).

Examination of the basic hip movements was carried out by examining passive, active and isometric movements. On examination of passive and active motion, it was found that there was limited range of motion (ROM) in hip flexion, hip adduction and hip abduction movements. For the examination of isometric motion against resistance, the patient has not been able to perform because of the weakness of the hip abductor muscles.

Pain assessment was carried out using the Numeral Rating Scale (NRS) with a score of 0 (no pain), 1-3 (mild pain), 4-6 (moderate pain) to 7-10 (severe pain).

Examination of the range of motion of the trunk joint was measured with a meterline and examination of the range of motion of the hip joint was measured using a goneometer to determine the patient's flexibility and limitations of movement.

On examination of the performance of muscle strength, the results showed that the strength of the right hip muscle was normal with a value of 5. Meanwhile, the strength of the left hip muscle was a value of 3 for flexors, adductors and abductors and a value of 4 for extensors.

Examination of functional activity ability in LBP cases was carried out using ODI with 10 question points for the patient's functional activity items, namely pain implementation, self-care, lifting, walking, sitting, standing, sleeping, social life, traveling and recreation.

Management and Outcome

The process of physiotherapy is carried out to the patient as long as the patient follows all treatment sessions at the hospital. The patient came to the physiotherapy once a week for a month, the goals of the intervention were to reduce pain, increase hip ROM, increase muscle strength and optimize the ability of functional activities. The table below describes the interventions provided :

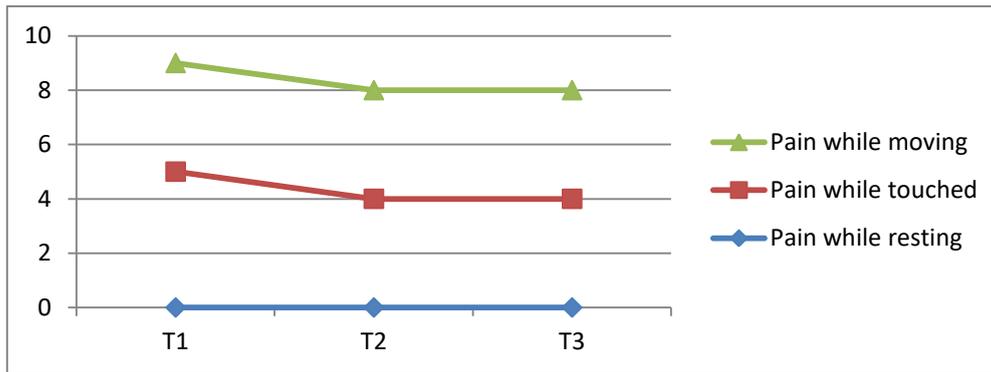
Intervention	Dosage	Description
MWD	F = 4 or 8 MHz I = between 40 – 60 W T = 12 minute T = continous	
Tens	F = 7 Hz (low frequency) I = 250 µs T = 12 menit T = continous	
Lumbal Core Stabilization Exercise	F = twice a day I = hold 8x count, 5x repetition T = 30 minute T = core stabilization	Bridging Exercise, Half Plank
Stretching Exercise	F = twice a day I = hold 8x count, 5x repetition T = 30 minute T = stretching exercise	Single Knee to Chest, Double Knee to Chest, Piriformis Muscle Stretching, Hamstring Muscle Stretching

Table 1 : Physiotherapy program plan

Results

Pain Measurement Results with NRS

After physiotherapy was given, pain assessment using NRS obtained the following results:



Picture 1 : NRS measurement result from first to third therapy

The graph above shows a decrease in the frequency of pain from T1-T2 from pain while touched and pain while moving.

The application of electro physical agent modalities MWD, Tens, Stretching Exercise and Lumbar Core Stabilization Exercise can reduce the frequency of pain in T1 pain while resting : 0, pain while touched : 5, pain while moving : 5 to T2 pain while resting : 0, pain while touched : 4, pain while moving : 4. At T3 there was no change and there was no increase in the frequency of pain.

Range of Motion of Trunk Measurement Results using a Meterline

The patient's trunk range of motion limited when side flexed to the left and feel pain. The range of motion patient's trunk was measured using a meterline. Trunk range of motion at flexion is 11 cm, extension is 4 cm, right side flexion is 11 cm and left side flexion is 7 cm. And when evaluated in the third therapy, it was found the range of motion of left side flexion is increased from T1 7 cm to T3 8 cm.

Range of Motion of Left Hip Measurement Results using a Goniometer

The hip joint range of motion was measured using a goniometer. After being measured using goniometer on the right hip there's no limitation of range of motion and pain. Meanwhile the left hip has limited range of motion towards flexion and feels pain, while the movement towards abduction there's no limitations but feels pain because there is weakness in the abductor hip muscles, while for extension and adduction movements there are no limitations of range of motion and pain.

According on the results after doing physiotherapy for 3 times, it was found that there was an increase in the range of motion of the left hip joint in the flexion movement, from T1 60° to T3 80°. For the left hip range of motion, abduction and adduction, there has not been an increase of range of motion.

Results of Measurement of Left Hip Muscle Strength with MMT

The muscle strength of left hip muscle was measured using Manual Muscle Testing (MMT). The results obtained are as follows:

Regio Muscle	T1	T2	T3
Fleksor	3	3	3
Ekstensor	3	4	4
Adductor	3	3	3
Abductor	3	3	3

Table 2 : Muscle strength measurement result from first to third therapy

Based on the results above, there was no increase in muscle strength from the first to third therapy.

Functional Activity Measurement Results with Oswestry Disability Index (ODI)

Measurement of functional ability was carried out after doing therapy for T1 – T3 with the following result :

ODI	T1	T3
Total score	35% Disability	31% Disability
	(Moderate Disability)	(Moderate Disability)

Tabel 3 : Functional ability measurement result from first to third therapy

The results of measuring functional ability using the Oswestry Disability Index during T1 and T3 found an increase in functional ability.

Specifically, based on the questionnaire, there was an increase in the functional ability of self-care and lifting. Although according to the calculation of the degree of Low Back Pain has not changed, which is still in the implementation of Moderate Disability, there is still an increase in functional ability.



Discussion

1. Stretching Exercise

Stretching is a physical therapy that is increasingly being used in rehabilitation programs for CLBP. Muscle stretching is effective in reducing pain and improving function but does not increase muscle strength, endurance, tone, and core muscle groups. What is the relationship between flexibility and low back pain? Tension and shortening of certain muscles are commonly found in association with LBP. Muscles commonly shortened include the erector spinae, psoas, iliotibial band, hip external rotators, hamstrings, rectus femoris and gastrocnemius. Tension of these muscles affects the biomechanics of the lumbar spine. In those who experience low back pain there will be a reduction in lumbar flexion. Tension of the hip extensor muscles reduces the naturally occurring lordotic curve in the lumbar region which can increase the posterior pelvic tilt. This condition will reduce the capacity of shock absorbers (shock absorption) and increase compression of the lumbar. Chronic muscle tension can be reduced through effective stretching. Stretches for LBP patients are designed to progressively stretch muscle groups that are too short, the lumbar spine muscles, hip flexors and hip extensors (Waqqash, 2014).

2. Lumbal Core Stabilization Exercise

Core stabilization exercises have been an integral component in the management of patients with low back pain over the past decade. Core stabilization exercises are effective in improving pain, function and tonic core muscle activation of patients with CLBP. Core stabilization exercises are defined as exercises that activate deep core muscles such as the transverse abdominis (TA) and multifidi. Hypothetical reasons for improvement in CLBP after CS exercise include: A core stabilization exercise program is designed to help individuals gain functional strength, neuromuscular control, and muscle endurance of the lumbo-pelvic-hip complex. This approach will offer a more biomechanical efficient for the entire kinetic chain of the lumbo-pelvic-hip thus allowing the body to declarate gravity, ground reaction forces and momentum at the right joint, in the right plane and at the right time. Further mention that the increased stability of the trunk will enable the individual to mantain the spine and pelvis in the most comfortable and acceptable mechanical position that control the forces of repetitive micro trauma and protect the structures of the back from further damage (Waqqash, 2014).

Conclusion

Physiotherapy program for 1 months with the intensity of patient visits once a week with the intervention of MWD, Tens, Stretching Exercise and Lumbar Core Stabilization Exercise can reduce pain intensity, increasing left hip range of motion and increase the patient's functional ability.

Acknowledgments

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