Effectiveness of Maitland Manual Therapy Approach Mobilization with Aerobic Exercise in Patients with Chronic Low Back Pain

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Abstract

Background: Low back pain is the most common type of musculoskeletal pain and various treatments are given to treat it. Mobilization and aerobic exercise has very good effect in relieving pain and disability. This study focuses to evaluate the combined effect of mobilization and aerobic exercise program in patient with chronic LBP.

Methods: The study designed used was a pretest and post test experimental study. Samples are taken with convenient sample method. N=10 with a duration of 12 weeks. Posterioanterior mobilization and high intensity exercises where given and data’s were calculated and the results were obtained by two outcome tools –VAS and OSW questionnaire. the data colected from (12/01/2023 to 10/03/2023) with gardern city university physiotherapy out patient department.

Results: The pre test mean value of VAS is 7.1 and the post test mean value is 5.8. The mean difference of pre test and post test value of VAS measurement is 1.9. The pre test mean value of OSW questionnaire is 41% and the post test mean value is 21%. The mean difference of pre test and post test value of OSW questionnaire is 20%.

Conclusion: Maitland mobilization with high intensity aerobic exercise was effective in reducing pain and disability and also in the improvement of range of motion for low back pain. This study can be used as treatment protocol in the field of physiotherapy to treat the patient with chronic low back pain

Keywords: Maitland mobilization, high intensity exercises, low back pain, pain management Prolonged immobilization after a surgical procedure for patients with shoulder dysfunction.

Introduction

Low back pain is a most frequent type of musculoskeletal pain. Low back pain is defined as pain and discomfort localized below the costal margin and above the inferior gluteal folds with or without leg pain. Chronic low back pain refers to pain persisting for 12 weeks or more.

As part of WHO study, LBP was detected in 15.4% of the population under survey in urban area, and 23.4% of the population in rural areas. Low back pain is a common musculoskeletal symptom that may be either acute or chronic; it may be caused by a variety of diseases and disorder that affect the lumbar spine.¹
The LBP occurs due to certain risk factors like occupational, Age, Alcohol and drug abuse, family history, gender, level of activity, obesity, poor posture alignment, previous back injury, psychosocial and spiritual factors, smoking. The individual with LBP suffers with stiffness in spine and pain that radiates from the low back to buttock down the back of the thigh and into the calf and toes. The patient have difficulty in standing which affects their activities of daily living and results in disturbance of functional independence.2

Mobilization is a method of restoring or maintaining joint movement. An indication for mobilization is pain, muscle spasm and Restriction of joint range of motion. Mobilization helps in relieving the pain, increasing circulation of synovial fluid and also maintains extensibility and tensile strength of the articular and peri-articular tissue, improving tissue nutrition.

Aerobic exercise is a sub maximal rhythmic repetitive exercise of large muscle group during which the needed energy is supplied by inspired oxygen. High intensity form of exercise acts on most of the body system therefore it might be effective in changing clinical symptoms and aerobic exercise is more effective in pain reduction.2,3,4

The active physiotherapy program focused on improving functional capacity though strengthening and coordination exercises and understanding proper ergonomics. Instrumental training was completed using training machines and devices. The goal was to focus on muscle reconditioning by progressing a constant load to the trunk. The aerobic exercise program consisted of 1 hour classes, including a 10 to 20 minute warm-up, followed by twenty to 30 minutes of specific trunk and leg exercise and a 15 minute cool-down. This study was able to reveal that the effect of exercise improves general function and perception of pain and disability by acting on the central core. All 3 treatments proved to be equally successful in reducing pain intensity, frequency, and disability during daily tasks; however, after the first 6 months those partaking in the physiotherapy program showed a relapse towards pre-study levels. Physiotherapy, along with instrumental training, cost about 4 times more than an aerobic exercise program, leaving aerobic exercise as being both effective and economical.

Methodology

The study designed with a pretest and posts test experimental study with a convenient sample size of 10 male patients between age group of 18-45. The community based setup of study was conducted for 12 weeks, which includes male’s patients with more than 3 months of low back pain. This study excluded patients with Inflammatory or tumor problem, osteoporosis of spine, cardio vascular disease, spinal infection, severe respiratory diseases, pregnancy, prior low back surgery, spinal deformity and rheumatic joint disease. Treadmill apparatus is used for testing, and patient is evaluated with Visual Analogue Scale, Oswestry Disability Questionnaire.

The patient position for the mobilization intervention was prone on a treatment table with a small pillow under the abdomen. First apply PA pressure to the spinous process of each lumbar vertebra using 1 or 2 small amplitude movement (grade l). The PA mobilization intervention consisted of graded oscillation applied to the most painful lumbar segment. Three bouts of 40-sec oscillation were applied to this segment at rate of approximately 1 to 2 Hz and at the highest amplitude tolerated without the reproduction of symptoms. Following mobilization of the most painful segment, 2 bouts of 40-seconds oscillations (up to grade 1,2) administered to each of the remaining lumbar vertebral levels. The total time for the PA mobilization intervention was approximately ten minutes.

An excellent method to increase blood flow to the muscles in your back is through aerobic exercise. This helps the damaged muscle tissues repair themselves and reduces stiffness. Additionally, it promotes the synthesis of neurotransmitters, which can assist in the body’s defence against pain and lessen your reliance on painkillers. By reducing stiffness and improving blood flow to the spinal structures, aerobic exercise can reduce back pain by increasing the quantity of nutrients that reach the spine. Exercise walking is different from regular walking in that it moves more quickly while still softly working the muscles. Exercise walking has the benefits of being easier on the spine than jogging, needing little to no equipment (other than a decent pair of shoes), and being accessible almost anywhere. Ankle or wrist weights can be worn to increase the exercise’s level of force. Walking
can be done indoors (in a market or on a treadmill, for example) or outdoors (in a park or around the neighbourhood). Exercise can both provide grateful relief from lower back pain and cause additional discomfort. Exercises that put too much strain on the muscles in and around your lumbar (lower) vertebrae should be avoided. Exercise with low impact can increase heart rate without jarring the vertebrae or exacerbating back pain, making it a better choice for people with back pain.

The patients participated in a program of aerobic exercises that was individualized according to the patient’s initial fitness assessments. High-intensity aerobic exercise was supervised individually. The subjects exercise intensity has been prescribed on karvonen formula. We used heart rate reserve to calculate training zones based on both maximum and resting heart rate using a range of 50-85%. Each exercise session begins with 10-15 min warm-up period. Then treadmill walking and stair climbing at 70-85% of age predicted maximal heart rate, three days per week duration 30min per session. Then session ended with 5 min of stretching. During the 12 week exercise program, exercise intensity was increased from 70 to 85% and exercise duration was increased from 30-45 min per session.

### Results and Discussion

The data’s was calculated and the results were obtained by two outcome tools - VAS and OSW questionnaire. The VAS was used to measure the intensity of pain in low back pain. The pre test and post test values of VAS were analyzed and the mean value was obtained. The pre test mean value of VAS

![Table 1: VAS Score Pre and Post Test Values](image-1)

![Table 2: OSW Questionnaire Pre Test and Post Test Mean Values](image-2)
is 7.1 and the post test mean value is 5.8. The mean difference of pre test and post test value of VAS measurement is 1.9.

The OSW questionnaire was used to measure disability in low back pain. The pre test and post test values of OSW questionnaire were analyzed and the mean value was obtained. The pre test mean value of OSW questionnaire is 41% and the post test mean value is 21%. The mean difference of pre test and post test value of OSW questionnaire is 20%. Thus, the greater difference in mean in both the outcome tools proved the effectiveness of mobilization with high intensity aerobic exercise in low back pain.

The aim of this study was to find out the effect of mobilization with high intensity aerobic exercise in chronic low back pain to reduce pain and disability. High intensity aerobic exercise results in increasing the release of endogenous opiates and breaks down the adhesions which causes disability. Demitris chatzitheodorae stated that high intensity aerobic exercise is effective in relieving pain as it acts on the whole body system.

In low back pain, guidelines (as stated above) promote the avoidance of bed rest, and the continuation with activities as usual. The aim of physical treatments is to improve function, and to prevent disability from getting worse. In chronic low back pain, exercise therapy has become a first-line treatment and should be routinely used. Should recovery be slow in patients with risk factors for developing persistent disabling pain, early supervised exercise therapy can be considered. If low back pain persists for more than 12 weeks, physical treatments that encompass a graded activity or exercise programs that focus on improvements in function, are recommended. In fact, in low back pain greater than 12 weeks, exercise is a first-line treatment that should be considered for routine use. All recent clinical practice guidelines endorse exercise therapy in persistent low back pain. Yet access to structured exercise programs remains erratic.

Most of the researchers from these studies had different hypotheses as to why aerobic exercise was found to be a valuable treatment option. Sculco et al9 believed in the potential of both positive physical and psychological benefits associated with aerobic exercise. There are multiple other studies that also demonstrated a reduction in depression, anger, anxiety, and total mood disturbance. Similarly, Dogan at al5 believed that the differing attitudes a specific person has regarding disability can affect their perception of pain and efforts to seek different treatment options. Researchers also mentioned the increased importance of positive effects in cardiopulmonary fitness level as it affects pain severity, disability status, spinal mobility, and psychological status. Kell et al17 felt that too many programs focus on core strengthening and neglect a whole-body workout. The researchers in this study aimed to mimic programs used by athletes during a preparatory phase of training.(4) Their goal was to provide significant stress to all large muscle groups to enhance overall health of the musculoskeletal system and increase physical function. Wu et al11 believed in 3 main purposes of exercise treatment for LBP: enhancing tolerance of waist movements, relieving pain, and changing the attitude or belief of pain. They found that the major strategies of exercise for clinical effects are back specific and general exercises. Murtezani et al18 acknowledged that those with LBP should refrain from specific back exercises and focus on overall physical activities. It is important to focus on functional reconstruction of the back and surrounding structures to relieve pain, spasms, stiffness, and disability.

Low back pain results in limited spinal range of motion especially spinal extension. When posterior-anterior mobilization force is applied to the lumbar spine; greater translation occurs at spinal level resulting in reducing pain and increase the range of motion. According to Goodsell et al, spinal PA mobilization technique found to be effective in improving the lumbar extension and ultimately reduce low back pain. In this study after 12 weeks, exercise group shows greater improvement on pain intensity in comparison with basic values (7.5-7.2 vs 5.0-5.5) and disability (34-56 vs 20-25).

**Conclusion**

From the above study the Maitland mobilization with high intensity aerobic exercise was effective in reducing pain and disability and also in the improvement of range of motion for low back pain.
This study can be used as treatment protocol in the field of physiotherapy to treat the patient with chronic low back pain.

Limitations:

This study is done with small sample size, and the duration of the study is less.

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