Innovations

The Impact of Maitland and Mulligan Mobilizations on Individuals Suffering from Chronic Low Back Dysfunction

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Abstract

Background and Objectives: *One of the most prevalent complaints among people in their working years is chronic low back dysfunction (CLBD). A wide range of causes contribute to CLBD, many of which have unclear etiologies. When it comes to treating CLBD, both Maitland and Mulligan procedures are regarded as effective manual therapy methods. However, it's unknown how effective the two approaches vary from one another. The goal of this research was to assess the effects of Maitland and Mulligan treatments on patients with CLBD's range of motion and dysfunction level.* ***Methods:****For this study, thirty patients were randomly assigned to one of two groups (group A and group B). Those who are around the ages of thirty and fifty. There were 15 patients in Group A, having a mean age of 40.0 (±4.81) years (8 men and 7 women). The patients in this group underwent standard physical therapy along with Mulligan method. The 15 patients in Group B had a mean age of 42.93 (±6.68) years, with 5 males and 10 women. They were treated with a normal physical therapy program and the Maitland approach. Outcome assessment:Measures of outcome include the modified Shober test for ROM and the visual analogue scale(VAS) used for assessing pain level.* ***Results:****The result indicated that there was no-significant variance in range of motion, pain or dysfunction between the Maitland and Mulligan methods.* ***Conclusion****:Terms of pain relief and increased range of motion in those with CLBD, between the Mulligan and Maitland approaches, there was no statistically significant difference.*

Key words: *Maitland Mobilization, Mulligan Technique, Chronic Low Back Dysfunction (CLBD), Mobilizations with Movement (MWMs), Physical Rehabilitation, Visual Analogue Scale(VAS), Range of Motion (ROM), Low Back Pain (LBP), Pressure Pain Threshold (PPT), Trunk Bending/Flexion.*

Introduction

Among individuals in their working years, the most common kind of illness is chronic low back dysfunction (CLBD)[1]. Apart from causing agony to individuals, it also results in financial strain because of medical expenses and lost productivity. Chronic low back dysfunction is caused by a various type of conditions. These variables arise from normal spinal structures under normal stresses or from abnormal spinal structures under normal loads. Along with the endurance of the muscle groups in the lower limbs and pelvic girdle, other factors that might affect the stresses transferred to the spine include flexibility, trunk strength, posture, and body mechanics[2]. Herniated discs, facet joints, muscles, ligaments, and sacroiliac joint dysfunction are among the common causes of low back dysfunction[3]. Mobilizations with Movement, or MWMs, are used on the joints in the periphery. The foundation of MWM stems from Kaltenborn's (1989) contention that glide is necessary for pain-free movement, physiological motions are a mix of rotation and glide, and joint surfaces are not entirely congruent. When the articulating surface of a bone is concave, glide happens in one direction; when it is convex, glide occurs in the opposite direction. Treatment is administered parallel to the treatment plane, which is positioned 90 degrees from the concave articulating surface of the bone. It appears that by waking up joint mechanoreceptors, Maitland mobilization treatments may help individuals with lumbar mechanical feeling uncomfortable. The anterior-posterior and posterior-anterior motions are based on the same planes in peripheral joints. It is speculated that these receptors modify the pain-spasm cycle by inhibiting hypertonic muscles and pre-synaptically suppressing nociceptive fibers in linked regions, both of which strengthen motor abilities[4].During treating spinal dysfunction, physiotherapists often use passive joint mobilizations[5]. Various theories have been proposed to explain how mobilizations produce clinical effects, include non-specific placebo effects, direct impacts on the biomechanical environment, articular and periarticular tissue, and the central nervous system's nociceptive input[6,7]. This study was done because Maitland and Mulligan lumbar mobilization were both shown to be useful in managing musculoskeletal issues.

Aims of study: To evaluate the efficacy of Maitland and Mulligan mobilization techniques in lumbar spine aiding individuals with persistent low back dysfunction to improve and increase range of motion across their lumbar regions.

Materials And Procedures

The NIMS hospital's outpatient clinic served as the study's location. It was created to look at how Lumbar ROM and dysfunction level were affected in individuals with chronic LBD while using Mulligan MWM v/s Maitland P-A mobilization methods.

Study Design:Additionally, there was a pre-treatment–post-treatment methodology. Two groups of fifteen individuals each were randomly chosen from within thirty LBD patients of both sexes.

Subjects:A total of thirty individuals were diagnosed with CLBD. They were chosen at random and vary in age from 30 to 50. Only stretching and back and abdominal muscle

strengthening exercises were part of the traditional physical therapy regimen for the fifteen patients in Group A. The other patients underwent Mulligan mobilization with movement (MWM). The 15 patients in Group B had the same traditional program for physical rehabilitation, lasting four weeks that includes twelve sessions (three per week), along with Maitland postero-anterior mobilization.

The 15 patients in Group A (Mulligan) received both MWM technique and a traditional physiotherapy program. The exercises included stretching of the hamstring muscles and the lower back "by knee to chest" exercises. Additionally, the exercises strengthened the muscles of the lumber region by bridging and active back extension[8], strengthen the abdominal muscles by posterior pelvic tilt and squats[9].

The group B, consisting of fifteen patients from Maitland, was treated with the same conventional physical therapy techniques as group A, including postero-anterior mobilization.

Inclusion criteria:

- Be in the age range of thirty to fifty.
- Having a referral from an orthopaedic surgeon and experiencing chronic LBD
- More than three months of sickness[10].

Exclusion Criteria:

- Patients who have undergone back surgery in the past.
- Deficit in Neurology.
- Individuals having musculoskeletal deformities at birth.
- Cardiopulmonary illness accompanied by a reduction in tolerance to physical exercise.

Materials:

- The Visual Analogue Scale (VAS), which measures LBP level[11]
- Measurement of tapes
- A belt for mobilization

Methods of patient evaluation:

Pain assessment: The VAS is utilized to determine the LBP level, which divides a 10-cm scale into 0 and 10 points, with 0 denoting no pain and 10 denoting the greatest possible pain[11,12].

ROM assessment: The modified Schober test is utilized to measure side bending to the left and right as well as lumbar flexion and extension[13].

Treatment Procedure:

Therapeutic exercise program: 12 sessions, three times a week for a month, consisting of sit-ups and posterior pelvic tilts to develop stomach muscles and active back extension and bridging to strengthen back muscles. Throughout a session, every exercise was done 10 times, with a 6-seconds hold at the last range[8].

Mulligan MWM method: It was used every other day for four weeks, three times a week, ten times a day, at a level slightly below (at the level of L4-L5 spinous process) or ASIS. It was only used for A group.
Maitland (P-A) mobilization: The same lumber spinous level (L4-L5) was used, but without the patient's aid, should completely extend the wrist 10 times per session while positioning the hand's pisiform or ulnar surface over the selected lumbar spinous process (SP). The patient received treatment in twelve sessions, three per week, on alternate days for a duration of four weeks. That was exclusively applied to B group.

Statistical Analysis:Every statistical analysis was executed using the Statistical Package in Social Studies (Version 18 of SPSS for Windows). The data were checked for extreme score presence and the normalcy assumption before final analysis. In order to do parametric calculations for the research was necessary for the analysis of variance and relationship measures. During several examinations, subject age, body weight and height were compared to see how comparable the groups were at baseline. There were two independent variables in the present test. Initial element was the ±tested group; this was a between-subject factor with Group B get P-A mobilization, while Group A undergoes mobilization with movement on two levels. The two levels of the inside-subject component were training periods (before and after training periods). In addition, this test looked at the fifth dependent variable, the visual analogue scale, and the range of motion for the trunk's flexion, extension, left and right bending. Mixed patterns in 2x2 dimensions the assessed variables of interest at various training intervals and testing groups were compared using MANOVA. For the MANOVAs, the starting alpha standard was chosen at 0.05.

Result

Among the individuals in either group-age, weight, and height did not show any statistically significant differences (P>0.05)(Table1). Furthermore, at baseline (pre-intervention), the trunk's range of motion (ROM), including its flexion, extension, and left and right bending, as well as the visual analogue scale (VAS), did not show any statistically significant variations from group to group. Thirty patients were divided into two equal groups for statistical analysis using mixed design MANOVA. The effects within the subject were significant (F= 91.428, p= 0.000), yet based on the knowledge, there were no significant differences between the treatment duration impact (F =1.274, p =0.308) and the subjective effect (F = 00.779, p = 00.595). The characteristics statistics (mean ± SD) of all the components included in the experiment are shown in Table (2). The results of multiple pairwise comparison tests conducted in a similar context showed that there were significantly decreases($p<0.050$) in the visual analogue scale and trunk's ROM like extension in the post-treatment condition compared with the pre-treatment condition one in both A and B groups, and significantly increases ($p<0.050$) in the trunk's flexion movement in the post-treatmentcompared with the pre-treatment condition one in the B group. Table(3) presents a pair-wise comparison of all detective variable values in both groups prior to and following treatment. There were no discernible variations between the two groups' VAS and Range of motion of trunk

extension, flexion, left bending, and right bending, according to multiple pairwise comparisons on between-subject effects (p>0.05). Table (4) compares each of the detective variables in both groups, group A and group B, multiple pairwise.

Table 1: shows the descriptive data and un paired t-test for the mean age, height, and weight of the CLBD patients in A and Bgroups.

	Age in yrs.	**Weight in kg.**	**Height in cm.**
A-Group	40 ± 4.80	83.5 ± 7.80	166.7 ± 4.30
B-Group	42.9 ± 6.60	80.8 ± 5.960	167.7 ± 6.850
t- values	-1.380	1.050	-0.4760
p- values	0.1790	0.3030	00.6390

Table2: In patients with CLBD, descriptive data of the trunk flexion, extension, left and right bending ROM and VAS:

Dependent-Variables	**Grou p A**		**Grou p B**	
	Pretreatment	**Post treatment**	**Pre treatment**	**Post treatment**
Visual Analogue Scale	6.60± 0.80	2.40 ± 1.050	7.10 ± 1.060	3.33 ± 1.440
ROM – trunk's flexion	20.50±1.10	21.30 ±1.140	19.76 ±1.420	21.40±3.380
ROM–trunk's extension	12.10±0.760	10.43 ±1.80	12.20±0.990	11.30±1.090
ROM–Trunk's Bending (Rt)	41.10±1.310	41.16 ±1.210	41.80±1.690	42.10±1.510
ROM– Trunk's Bending(Lt)	41.16±1.210	41.43 ±1.130	42.13± 2.310	42.25±1.860

Table 3: Pre and after treatment data for each group compared multiple pairs wise:

Multiple pair wise comparison tests ± posthoc-tests for Visual Analogue Scale and trunk's ROM such as extension, flexion, left bending and right bending *at pre- and post-treatments in both groups(A and B).*										
	Group A					Group B				
Dependent -variables	Visual Analogue Scale	ROM-trunk flexion	ROM-trunk extension	Trunk's Rightbending	Trunk's Left bending	Visual Analogue Scale	ROM-trunk's flexion	ROM-trunk's extension	Trunk's Rt. bending	Trunk's Lt. bending

Pre versus Post-treatment	0.000*	0.156	00.000*	00.809	00.383	0.000*	0.006*	00.013*	00.281	00.742

Table4: Several pairwise comparisons between the two groups pre-treatment and post treatment values:

Multiple pair wise comparison tests ± posthoctests for Visual Analogue Scale and trunk's ROM such as extension, flexion, Rt. side Bending, and Lt. side bending *at pre-treatment and pos- treatments for both groups(A and B).*										
	Pre-treatment					Post-treatment				
Dependent-variables	Visual Analogue Scale	ROM-trunk's flexion	ROM-trunk's extension	Trunk's Rt.bending	Trunk's Lt bending	Visual Analogue Scale	ROMtrunk Flexion	ROM-trunk's extension	Trunk's Rt. bending	Trunk's Lt. bending
Group A Versus Group B	00.204	00.126	00.76	00.217	00.164	00.053	00.914	00.123	00.074	00.167

Discussion

By using a mixed design MANOVA to analyze the data, the current study's results revealed no significant differences in terms ranges of pain intensity, active lumbar movements like as extension, flexion, and right and left sides bending range of motion were compared between group B (Maitland P-A mobilization) and group A (Mulligan MWM).

Group A (Mulligan technique)

Pain Severity:

Comparing the pre-assessment and post-assessment pain levels on a VAS for the chronic Low Back Dysfunction or pain patients in A group allowed researchers to examine the analgesic benefits of the MWM approach. The findings demonstrated a substantial reduction in LBP at the conclusion of the treatment plan.

Numerous research assessed the MWM technique's early pain-relieving effectiveness. A randomized, controlled, repeated measures research design was used in one of these investigations, which included individuals with lateral epicondylalgia[14,15]. In comparison to the placebo and control groups, there was a significant and quick enhance in the 46–48% range for pain free grip force (PFG) after treatment, according

to the data. Under the treatment condition, pressure pain threshold (PPT) improved by around 10%, which was considerably higher than the placebo and control groups.

Range of motion (ROM):

A statistically significant improvement in lumbar flexion, extension, and bilateral right and left side bending range of motion was seen when comparing the post treatment group to the pre-treatment group.In 2001, the effect of the MWM approach on shoulder range of motion was examined by applying it to the elbow of 32 individuals suffering from lateral epicondylealgia. In patients with unilateral lateral epicondylalgia, the findings demonstrated that MWM markedly changed the range of motion (ROM) of the shoulder on both the afflicted and unaffected sides. This shows that numerous joints may benefit from improved range of motion with the use of MWM method. Patients with unilateral lateral epicondylalgia had considerably reduced shoulder joint external rotation range of motion (ROM). It is hypothesized that the shoulder musculature's facilitated muscle activity was the cause of the ROM restriction, and that the MWM lowers this amount of facilitation to enable more ROM in the shoulder.

Group B (Maitland Postero-Anterior Mobilization):

PainSeverity:

The analysis of the MWM approach's analgesic advantages was made possible by comparing the pre-results and post-results of the VAS scale for pain evaluation in the Chronic low back dysfunction or pain in B group patients. In comparison to pretreatment measurements, the findings demonstrated a considerable reduction in LBP after the conclusion of the treatment period. Study has shown that Maitland P-A mobilization may result in notable mechanical and neurophysiological effects[16,17,18]. More study is needed to determine the exact process, particularly with respect to the spine, since it is currently unclear (20). Nonetheless, a number of ideas have been developed in light of the observed benefits, such as the reduction of pain, the improve ROM, and the impact on the autonomic nerve system. Patients (B group) with lowback pain(LBP) have shown a good reduction in pain using P-A mobilization[19].

Range of Motion (ROM):

When comparing the post-treatment group to the pretreatment group, there was a statistically significant improvement in lumbar flexion, extension, and bilateral right and left side bending range of motion. There is evidence to support a greater lumbar extension range of motion (ROM)[20-32]. According to reports, the lumbar spine's segmental movement and the spine's generalized extension are caused by the P-A mobilization force at L4, or farasT7[22]. The research on the overall effects of dysfunction, pain and ROM is still inconsistent, nevertheless.The study's results, in summary, revealed that there was no-statistically significant differences in A group(who got the Mulligan-MWM method) and B group (that got Maitland Postero-Anterior mobilization method) in terms of the minimal pain intensity threshold level, in lumbar spine flexion, extension, and both right and left side bending. The null hypothesis—which maintained that there was no appreciable distinction in the reduction of pain intensity between the Mulligan Mobilization with Movement method and the Maitland Postero-Anterior

mobilization method was accepted in light of these findings. as well as approval of the nullhypothesis, which maintained that here was no appreciable differences between the Maitland P-A mobilization strategy and the Mulligan MWM method in terms of the ROM for lumber spine flexion, extension, and right and left side bending.

Conclusion

In this study there was improvement in the pre and post values in the both groups but there was significant improvement in the trunk flexion movement in Group B which is treated with Maitland Mobilization.

Limitations: Low sample size and single geographical area was the main limitation of the study.

Recommendations: Further studies can be conducted with larger sample size, different geographical area and different age groups.

Ethical-Considerations:

Compliance with Ethical Guidelines: Thisscientific study was approved by the Ethical Committee of NIMS University (Code: NIMS/PTOT/May/2024 dated 3.5.2024).

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