

Maitland Mobilization versus Core Stability Exercises in Management Chronic Nonspecific LBP

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Low back pain (LBP) is one of the main causes that affect mechanical function in human bodies worldwide; 90% of the cases have non-specific LBP. There are various options for managing non-specific LBP. Clinical practice typically uses Maitland mobilization and core stability exercises to manage chronic nonspecific low back pain, but there is currently a lack of research examining their comparative effectiveness. The objective of this study was to assess and compare the efficiency of Maitland mobilization and core stability exercise as treatment modalities for adults suffering from chronic non-specific low back pain. A cohort of 36 patients, aged 18 to 45 years, diagnosed with non-specific low back pain (NSLBP), were recruited and provided with their informed permission. Participants were assigned to two groups using a basic random sampling method. Group A, consisting of 18 participants, underwent central posterior-anterior spinal mobilization, while Group B, also consisting of 18 participants, performed core stability exercises. The Visual Analogue scale (VAS) was used to evaluate pain, while functional disability was assessed using the Oswestry Disability Index (ODI). The study aimed to achieve its objective by documenting and comparing pre- and post-treatment ratings. Based on the results of the study, both Maitland mobilization technique and core stability exercises showed significant improvements in reducing pain intensity (VAS) and improving functional disability (ODI) in patients with non-specific low back pain (NSLBP) with p values of 0.001. However, there was no statistically significant difference between the two treatment methods in terms of pain reduction ($p = 0.312$) and improvement in ODI ($p = 0.055$). Additionally, there was no significant relationship between body mass index and functional disability or pain intensity for both treatment methods with p values ranging from 0.034 to 0.987. Gender did not play a statistically significant role in the effectiveness of either Maitland mobilization or core stability exercises in treating chronic NSLBP. Both core stability exercises and the Maitland approach have been shown to effectively reduce pain and improve functional impairment in people suffering from chronic nonspecific low back pain.

Keywords: Chronic nonspecific LBP, core stability exercises, Maitland mobilization, Oswestry disability index.

low back pain (LBP) is defined as pain below the costal margin and above the inferior gluteal folds with or without radiating to the leg. Chronic Nonspecific Low Back Pain is a highly widespread condition across the globe and is a

leading cause of work-related impairment^{1,2}. It affects a significant portion of the population, with a prevalence rate of up to 70% among individuals aged 35-55 years old¹.

Low back pain (LBP) is normally categorized based on the duration of pain, which includes acute (lasting less than 6 weeks), sub-acute (lasting 6 to 12 weeks), or chronic (lasting more than 12 weeks). LBP can also be classified as specific pain, caused by identifiable pathophysiological mechanisms originating from either non-spinal or spinal sources, or nonspecific back pain without a clearly identifiable reason. Nonspecific back pain may arise from the complex interplay of biological, psychological, and social factors. It is important to note that nonspecific back pain accounts for approximately 80 to 90% of all reported cases of low back pain².

Different treatment strategies are used to manage LBP including oral medications, Injection therapy at the lumbar region, surgery, Physical Therapy, Chiropractic and psychotherapy, and so on, in the case of physical therapy, active physical therapy management with an emphasis on exercise as a key component in the treatment of chronic LBP³.

Physical activity has a positive effect in reducing NSLBP. Using therapeutic exercises to energize and strengthen the core is named core stability exercises (CSE). CSE is an effective treatment for all CLBP patients (specific and non-specific) in improving pain, and disability.⁴

They are effective methods for treating pain for Chronic NSLBP patients⁵, and CSE is more effective than routine physiotherapy in terms of achieving a greater reduction in pain intensity with chronic NSLBP⁶, it provides a significant difference in improving endurance, function and reduction of pain compared to conventional exercise⁷. Also, CSE has a significant effect on the reduction of functional disability in patients with chronic LBP⁸. Furthermore, when it is compared to conventional physical therapy, it is significantly better in decreasing functional disability in chronic NSLBP⁹.

On the other hand, Maitland mobilization is a manual technique that involves gentle and deliberate mobilization of the spinal joints, performed within the patient's comfortable range of motion. The foundation of this approach lies in the understanding of the biomechanical and neurophysiological mechanisms, with a specific focus on enhancing joint motion. By improving the range of motion, reducing muscle spasms, and

alleviating pain, this approach aims to address these aspects³.

Maitland mobilization has a strong effect on reducing pain and disability in patients with LBP¹. It considers an alternative treatment for pain among patients with chronic NSLBP¹⁰.

PA mobilization was effective in reducing pain and improving function compared to thermotherapy in patients with NSLBP¹¹. Also, PA mobilization resulted in a significant reduction of pain and functional disability compared with McKenzie press-up exercise in patients with NSLBP¹².

According to the literature, CSE showed no significant difference for chronic NSLBP versus manual therapy in general¹³, and even though Maitland mobilization combined with core stability exercise had a significant effect in improving functional disability in chronic LBP than conventional physical therapy protocol³, no study has been conducted yet to compare between PA mobilization and CSE in patients with chronic NSLBP.

Thus, the current study aims to compare Maitland mobilization and core stability exercise in the management of pain and disability among adult patients with chronic NSLBP.

METHODS AND MATERIALS

There are several methods of treating NSLBP. However, all the used methods vary among themselves in their effectiveness of treatment for this case. There is also a contradiction in some studies about the method of treating NSLBP as the final way, and this is what was previously clarified in the literature.

Study design

A random experimental study was carried out at the physiotherapy center at Palestine Ahliya University in West Bank from December 2022 to January 2022.

Population, Sample, and Subjects

Target population

All patients referred to the out-patient physiotherapy department at the Physiotherapy center at PAU, who are diagnosed with NSLBP by an orthopedic physician until NOV.2022.

Source population

Medical records of the orthopedic

department at Health Care Center in West Bank

Sample population

A random sample of patients who are diagnosed with NSLBP and referred to physiotherapy.

Inclusion criteria

(A) Females and males with age 18-45 years. (B) LBP due to Nonspecific pathology. (C) The onset of LBP is more than 3 months. (D) Localized Pain with functional activities of daily living.

Exclusion criteria

(A) Individuals experiencing neurological deficits in their lower limbs, characterized by reduced muscle strength in specific muscle groups (myotomes) or diminished sensation in specific areas of the skin (dermatomes). (B) Individuals with systemic diseases or neurological disorders. (C) Any clinical condition that presents contraindications to mobilization. (D) Individuals with a history of spinal surgery or those who have received epidural injections. (F) Participants who have undergone physical therapy treatment for low back pain within the past six months.

Sampling method

Probability Simple randomized sampling was used in which patients were randomly distributed into two groups. An offsite randomization schedule to ensure allocation protection was used through by computer software program that generates the random sequence, it was generated a random allocation sequence to each group. Group A (Maitland mobilization): 18 patients were given 3 sessions per week for 2 weeks, and one mobilization technique was applied for 10 minutes. Group B (Core stability exercises): 18 patients were given 3 sessions per week for 2 weeks, and 4 core stability exercises were applied for almost 20 to 25 minutes, each exercise should be finished within 3 to 5 minutes, and 20 repetitions for each one with different holding periods for each exercise. A 2–3-minute break between each exercise is recommended.

Study Setting

The assessment of eligibility criteria, obtaining written informed consent, collecting data, and conducting statistical analysis were performed by researcher #1, who would be unaware of the group allocation. Participants were received both oral and written instructions regarding the potential

risks and benefits of the research and provided written approval.

The eligible participants who provided written approval were randomly assigned to either the Maitland group or the core stability exercises group. The randomization schedule was prepared by an independent researcher who had no contact with the participants and was not involved in the recruitment, screening, assessment, enrollment, or treatment process. An independent physiotherapist #3, who was also unaware of the group allocation, conducted all Visual Analog Scale (VAS) and Oswestry Disability Index (ODI) assessments before treatment and after a 2-week period. To ensure the neutrality of the researchers, patients were instructed not to disclose their group affiliation before each evaluation. Additionally, all personal data was kept confidential by coding participants' names before, during, and after the study. Another independent physiotherapy #4 was carried out for two groups.

Data collection

All patients with chronic NS-LBP were referred by the orthopedic specialist to screen the study eligibility according to the inclusion and exclusion criteria. The physiotherapists who treat patients with chronic NS-LBP were used a standardized evaluation form that consists of a patient interview history, physical evaluation, and clinical notes history. The whole study was explained to the participating patients. The study included 36 different patients complaining of Chronic NS-LBP to investigate the effectiveness of Maitland mobilization and core stability exercises in treating pain and improving disability among adult patients with Chronic NS-LBP. Patients were divided into two groups randomly, each group consisted 18 patients. The first group was treated with Maitland mobilization, while the second group was given core stability exercises. Both the Visual analogue scale (VAS) to assess pain and Oswestry Disability Index (ODI) to measure low back functional disability. It was used in both groups before and after 8 sessions, and then the results regarding pain and functional disability before and after between both groups were compared.

Instrumentation

Demographic data was collected for each patient, and individual evaluations were conducted. The Visual Analogue Scale (VAS) was utilized as

a reliable and valid measurement of pain intensity experienced by individuals. This scale is sensitive to clinical changes in pain and ranges from 0 (indicating no pain) to 10 (representing the worst imaginable pain). Patients were asked to select the point on the scale that best correlated with their pain intensity⁽¹⁴⁾. Additionally, the Oswestry Low Back Pain Disability Index (ODI) was employed. This questionnaire consists of 60 items and assesses pain-related limitations across 10 domains: Pain Intensity, Personal Care, Lifting, Walking, Sitting, Standing, Sleeping, Sex Life, Social Life, and Traveling. Within each domain, patients were asked to indicate which of the six statements applied to them, with scores ranging from 0 (no impairment) to 5 (maximum impairment). The scores for each domain were summed and multiplied by 2 to yield a Disability Index Score percent¹⁵. In cases where participants did not complete all items, the score was pro-rated by averaging the completed items and multiplying by 10. The ODI was used to assess functional performance.

Interventions

Central P/A mobilization

Posterior-to-anterior (PA) mobilization technique is a cornerstone of Maitland vertebral mobilization. It can be defined as a passive oscillatory movement⁹. It can be used to treat pain distributed to both sides of the lumbar spine with careful and comprehensive examination before the application of the technique¹².

When applying this technique, the patient should be relaxed and comfortable in a prone position with a pillow under the abdomen, the therapist should stand close to the patient, and the therapist's sternum should be perpendicular to the selected mobilization segment when performing the technique. The Therapist should apply central PA pressure to the spinous process of each lumbar vertebra using small amplitude movements (grade I)¹².

During the mobilization process, it is important to apply pressure that re-produces the discomfort felt while bending backward in a standing position. If grade 1 mobilization does not elicit any pain, higher grades (II-IV) were utilized. After assessing each lumbar vertebra, the most painful segment treated with graded central PA oscillations. This involves applying three sets

of 40-second oscillations to the segment, using an amplitude that the patient can tolerate. The therapist was reassessed the patient's pain before moving on to treat another lumbar vertebra. Grade IV mobilization was applied at the end range of stiffness segment, ensuring that the pain remains tolerable. The entire PA mobilization intervention typically takes approximately 10 minutes¹².

Core stability exercise

Abdominal tightening exercise

The patient is asked to bring both hips together to feel the contraction of lower abdominal muscles, Patients were asked to hold the position for 20 seconds, then return to the starting position .20 repetitions are needed¹⁶.

Pelvic tilt exercises

This exercise was done by keeping both hands behind the buttocks and pressing on them by flattening the spine and bending the pelvis up slightly, then holding for up to 10 seconds with 20 times of repetitions¹⁶.

Partial curl

The patient was in a supine position with knee bent and arms behind the head, the feet slightly away from the buttocks, then patient raise the upper body from the ground approximately 30 to 40 degrees, the abdominal muscles begin to contract, then the upper body was in lower to the ground again, the whole movement approximately takes 3 to 4 seconds. It should be repeated 20 times¹⁶.

Back extension exercise

The patient needs to lie in a prone position on a mat with legs straightening with a pronated forearm, then lift the upper back. Hips should be pressed into the mat with the head and neck in a neutral position. The patient should hold this position for 30 seconds, then lower again to starting position and repeat the exercise for 20 sets¹⁶.

Statistical analysis

Following the collection of study data, the researchers conducted a thorough review in preparation for computer entry. The data was accurately entered into the computer system, utilizing specific numerical values. Statistical processing of the data involved extracting numbers and percentages. The hypotheses were examined at a significance level of $\alpha = 0.05$, employing statistical tests such as the T-test and Pearson

correlation. The computer software used for these analyses was the Statistical Package for the Social Sciences (SPSS).

RESULTS

In the present study, a total of 36 subjects (16 males and 20 females) were selected to investigate the effectiveness of Maitland mobilization and core stability exercises in

reducing pain intensity and improving functional disability in individuals with chronic nonspecific low back pain. These subjects were randomly assigned to two groups; Group A (consisting of 18 participants) and Group B (also consisting of 18 participants).

The findings were shown significant differences in the effect of mobilization technique in the treatment of nonspecific LBP at $\alpha=0.05$ for the level of Amount of functional disability (ODI) and decrease pain intensity (VAS) respectively. The differences in favor of the post-group with a mean (23.67), inverses of the pre-group with a mean (50.02), and the results indicated that there were significant differences at $\alpha=0.05$ for the level of severity of pain (VAS). The differences in favor of the post-group with a mean (2.38), inverses of the pre-group with a mean (6.88). It means the Maitland mobilization technique has an effect on improving function and reducing pain for CNSLBP. These results are presented in Table 1.

The results showed significant differences in the effect of core stability exercises in the



Fig. 1. Central P/A mobilization

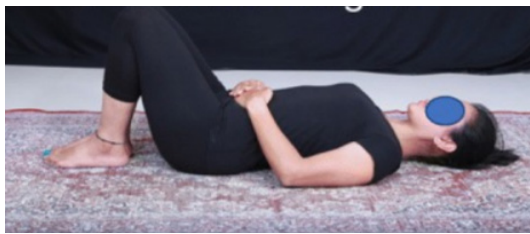


Fig. 2. Abdominal tightening exercise

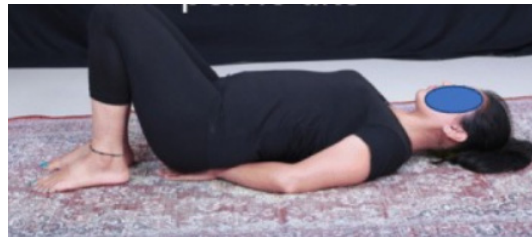


Fig. 3. Pelvic tilt exercise

Table 1. Effect of Maitland mobilization on VAS and ODI

		Mean	Std. Deviation	DF	T	Sig
Amount of functional disability (ODI)	Pre treatment	50.02	6.33	14	9.609	0.001
	PostTreatment	23.67	4.47			
Severity of pain (VAS)	Pre treatment	6.88	0.99	14	8.768	0.001

Table 2. Impact of core stability exercises on VAS and ODI

		Mean	Std. Deviation	DF	T	Sig
Amount of functional disability (ODI)	Pre treatment	51.5	17.0	14	5.220	0.001
	PostTreatment	16.2	8.64			
Severity of pain (VAS)	Pre treatment	6.13	1.35	14	7.549	0.001
	PostTreatment	1.88	0.83			

treatment of nonspecific LBP at $\alpha=0.05$ for the level of Amount of functional disability (ODI) and decrease pain intensity (VAS) respectively. These differences are in favor of the post-group with a mean (16.2), inverses of the pre-group with a mean (51.5) and also the results indicated that there were significant differences at $\alpha=0.05$ for the level of Severity of pain (VAS). The differences are in favor of the post-group with a mean (1.88), inverses of the pre-group with a mean (6.13). It means that the core stability exercises have a good effect on improving function and decreasing pain intensity for chronic nonspecific LBP. These findings are shown in Table 2.

The results indicated that there were no significant differences at $\alpha=0.05$ for the level of the Maitland mobilization and core stability exercises in decreasing pain and improving functional disability among patients with chronic nonspecific low back pain. This finding is shown in Table 3.



Fig. 4. Partial curl

The Pearson correlation was used for the relationship between BMI (KG/ M2) Amount of functional disability (ODI), and Severity of pain (VAS) with Maitland mobilization. There was no relationship at $\alpha=0.05$ between BMI (KG/ M2), Amount of functional disability (ODI), and Severity of pain (VAS) with Maitland mobilization. These results are shown in Table 4.

It used Pearson correlation for the relationship between BMI (KG/ M2) and the amount of functional disability (ODI), The severity of pain (VAS) with core stability exercises. There was no relationship at $\alpha=0.05$ between BMI (KG/



Fig. 5. Back extension exercise

Table 3. Maitland mobilization versus core stability exercises on VAS and ODI

	Group	Mean	Std. Deviation	DF	T	Sig
Amount of functional disability (ODI)	Therapeutic exercise (A)	16.25	8.64	14	-2.157	0.055
	Maitland mobilization(B)	23.67	4.47			
Severity of pain (VAS)	Therapeutic exercise (A)	1.88	.83	14	-1.048	0.312
	Maitland mobilization(B)	2.38	1.06			

Table 4. Pearson correlation between BMI (KG/ M2) and Amount of functional disability (ODI), Severity of pain (VAS) with Maitland mobilization.

Sig	Pearson Correlation	Maitland mobilization
0.034	0.744*	BMI (KG/ M ²) * functional disability (ODI)
0.808	0.103	BMI (KG/ M ²) * Severity of pain (VAS)

Table 5. Pearson correlation between BMI (KG/ M2) and Amount of functional disability (ODI), Severity of pain (VAS) with core stability exercises

Sig	Pearson Correlation	Core stability exercises
0.959	0.022	BMI (KG/ M ²) * functional disability (ODI)
0.987	0.007	BMI (KG/ M ²) * Severity of pain (VAS)

M2) and Amount of functional disability (ODI), Severity of pain (VAS) with core stability exercises. These results are presented in Table 5.

DISCUSSION

LBP is one of the most common public health problems. NSLBP is low back pain without underlying specific causes and symptoms lasting over 12 weeks⁴.

A pilot RCT was conducted to evaluate the effectiveness of Maitland manual mobilization versus core stability exercise in decreasing VAS and improving ODI with chronic NSLBP. Current study consisted 36 patients with chronic NSLBP.

The age of the group of participants was in the range of 18 to 45 years old with no serious pathology or any contraindication for the interventions, participants above 45 years old had not been included in the study as they might experience low back pain due to degenerative changes in the lumbar spine¹².

In this study, Pre & post analysis for VAS and ODI scores in the first group treated by Maitland mobilization and the second group treated by core stability exercises showed significant differences at the end of the sixth treatment sessions during two weeks, but there was no significant difference when comparing the effect of each intervention to each other.

There is no study yet comparing Maitland mobilization and core stability exercises as the best choice of intervention in treating chronic NSLBP among adult patients, but, Elbayomy, & Koura¹³ conducted a systematic review study regarding the effectiveness of Core strengthening for chronic NSLBP indicating that there was no clinically significant difference between core strengthening exercises and manual therapy in general¹³. On the

other hand, de Mèlo and his friends¹⁷ demonstrated an RCT study about using Maitland mobilization in improving pain and functionality in chronic lumbar pain of young adults, suggesting that patients who were treated with therapeutic exercises had a significant improvement over 6 weeks ($p=0.026$) and 12 weeks ($p=0.018$) post-treatment in Roland Morris Questionnaire (RMQ), that used to assess pain-related disability resulting from Lapthe same thing was observed in VAS score in relation to 6 weeks of follow-up ($p=0.018$), and 12 weeks post-treatment ($p=0.017$), while patients treated with Maitland mobilization has a constant result regarding VAS and RMQ throughout the treatment.

The compression in the previous study was between Maitland mobilization and general exercises, and not with specific core stability exercises. However, it investigated that the exercises had a superior effect on Maitland mobilization regarding the decreasing of pain and improving function in patients with CNSLBP, which doesn't support our study result of having no significant effect between the Maitland mobilization and core stability exercises in relation of pain and functional disability.

Some factors may have influenced the previous findings including the higher BMI in the Maitland group, another thing that patients in this group reported mild pain according to VAS before the treatment ($VAS < 4$), and they finished treatment without pain. However, the means to be considered to improve pain in VAS, the individual's final score compared to the initial score should have a difference greater than 3.5, and therefore, the lower value was not clinically significant for VAS.

In the case of BMI, another contributing factor that might also affect the current study finding regarding no significant effect in ODI score between the Maitland technique and core stability

exercises. There was a positive relationship between BMI (KG/ M2) and functional disability (ODI) (P value < 0.034) in the Maitland group, while there was no positive relationship in the core stability exercises 'group, and whenever the score of the BMI increased in patients with chronic LBP, and the score of functional disability increased¹⁸. Therefore, it's important to maintain the body weight within the recommended range to reduce the risk of functional disability and mortality¹⁹. However, there was no major contributing factor affecting the result of an average of pain as the VAS score in the Maitland group had shown no significant difference compared to the pain score in the core stability exercises. We should accept the issue that both treatments have great benefits, this is mentioned in the following paragraphs when comparing the impact of each treatment on the pain severity and function with the results of previous studies. Otherwise, preferring one technique over another one a matter should be addressed when following up the study with a larger sample and for a longer treatment period.

Correspondingly, The study's findings of reduction in pain intensity and improvement in functional disability with the application of Maitland mobilization, are consistent with the findings of an RCT study reported by Shah, & Kage¹² indicated that Posterior anterior mobilization (PA) provides a significant reduction in the average of pain severity, It was also measured with VAS scale and disability functional scores as measured by ODI scale compared with Mackenzie press up exercise in patients with NSLBP (P < 0.05)

The current study results including the effectiveness of Maitland mobilization in minimizing pain and improving functional disability are also consistent with the findings of another RCT study demonstrated by Baig and his friends¹¹ determined that PA mobilization had a significant effect in alleviating pain and improving function compared to thermotherapy in participants complaining of NSLBP.

Moreover, a systematic review study demonstrated by Outeda and his colleagues¹ about the impact of the Maitland techniques on LBP, suggested that there is an evidence that the manipulations and mobilizations described in the Maitland Concept reduce pain and disability in people with LBP when applied alone or in

combination with other interventions. Those results were agreeing with our study's findings, suggesting that Maitland mobilization provides a post-treatment significant reduction in VAS and ODI scores compared to treatment.

Maitland mobilization was shown to be significantly effective in reducing pain in patients with CLBD²⁰, Phelan and his friends¹⁰ supported the use of Maitland Spinal Mobilization as an effective method providing a significant difference in reducing pain in 90 patients complaining of NSLBP after four weeks of follow-up, three times per week. This finding indicated that manual therapy could be considered a preferable alternative intervention to conventional physiotherapy treatment in the management of NSLBP, which reinforced the current study's result regarding the effectiveness of Maitland mobilization in minimizing the patients' pain.

Meanwhile, The current study's findings of reduction in pain intensity and improvement in functional disability with the application of core stability exercise, are also correlated with the results of a systematic review study accomplished by Frizziero and his colleagues⁴ suggested that core stability is an effective rehabilitation strategy for all CLBP patients (specific and non-specific) in improving pain, and disability regardless the duration of symptoms.

In terms of pain as a dependent outcome that is considered in the present study result, it is constant with the previous studies' results that supported the application of core stability exercises in the management of pain in patients with NSLBP. Smrcina and his friends⁴ demonstrated a systematic review study clarifying that core stabilization exercises can be considered a favorable method for treating pain in patients with chronic NSLBP and Salik Sengul and his friends⁷ accomplished an RCT study, signifying that Core stability exercises had been considered superior to conventional physiotherapy treatment, it offered a significant difference in improving pain during activity, endurance, and function (p < 0.05) compared to conventional exercise in patients with chronic NSLBP. Likewise, the therapeutic effects of core stabilization exercise program over six weeks are more effective in reducing pain, compared to routine physical therapy exercise in patients with chronic NSLBP⁶.

In terms of functional disability, it is another dependent outcome sure being investigated in the present study result, it has a consistency with the previous studies that supported the use of core stability exercises in improving functional disability with chronic NSLBP. Kapetanovic and his colleagues⁸ completed an RCT study, clarifying that patients with chronic LBP (without serious spinal pathology or specific diseases, with no signs of damage to the nerve roots) who performed the core stabilization exercises of three or five times a week had a significant difference in ODI score before and after two months of rehabilitation ($p = 0.0001$) corresponded to patients did not perform the exercises. Waseem and his friends⁹ investigated an RCT study, indicating that the first group of patients with chronic NSLBP who were treated with core stability exercises and the second group of patients treated by routine physical therapy had a significant reduction in disability as measured by ODI at the end of the second, fourth, and sixth week of treatment ($p < 0.05$)., but there was a large reduction in disability being observed for patients⁹. Maitland mobilization combined with core stability exercise was well understood in an RCT study conducted by Ahmed and his friends, which investigated that Maitland manual therapy combined with core stability exercise had a significant effect in reducing the disability related to Chronic LBP than conventional physical therapy protocol ($p < 0.05$).

LBP is a serious healthcare problem and was ranked as the greatest contributor to global disability⁴. Even though there is no significant difference in using Maitland mobilization as the best choice of treatment for pain and functional disability in patients with NSLBP compared to core stability exercises, there is a positive significant effect for each treatment technique in reducing pain and improving functional disability among patients with NSLBP. Thus, using both physiotherapy interventions or one of them provide optimal benefits and greater treatment outcomes at low cost for physiotherapists and patients in the community.

Limitations

Several limitations of this study need to be addressed. The participants have followed up for only two weeks, and it should be a longer period to investigate the constant improvement

due to both interventions. The study findings could only be generalized for only non-specific low back pain and not all patients with low back pain. These limitations need to be handled in future investigation.

CONCLUSION

This the first RCT study compared between PA mobilization and CSE in adult patients with chronic NSLBP, it concluded that the comparison between Maitland mobilization group and CSE group revealed no statistically significant differences regarding VAS and ODI. However, both treatments are effective for the alleviating pain and for the evolution of function among patients with chronic NSLBP.

Continuing this study is crucial as it enables the inclusion of additional individuals and long-term follow-up, hence yielding more substantial results to determine the efficacy of different treatment techniques. Furthermore, it is imperative to conduct additional randomized controlled trials (RCTs) with expanded outcome measures in order to extrapolate findings and obtain more precise, dependable, and verified results that may be effectively applied in clinical settings.

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Conflict of interest

No any conflict of the interest

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