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Combination of Core Stability Exercises and Maitland Manual Therapy is Better Alternative in the Management of Chronic Low Back Pain

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ABSTRACT

Background: Low-back pain (LBP) remained a problem for human beings throughout history and is globally linked with huge costs. There are a huge number of trials about the management of low back pain but no consensus about the best treatment approach among all these studies. Core stability and Maitland mobilization are considered frequently for the management of the LBP. However, the combination of the two is not studied.

Objective: To evaluate the effectiveness of Core stability exercises coupled with Maitland Manual Therapy versus conventional physical therapy about disability in patients with chronic low back pain (CLBP).

Materials and Methods: This double-blinded Randomized control trial was conducted at the Helping Hand Institute of rehabilitation sciences Mansehra from July 2019 to December 2019. The inclusion criteria were both male and female participants with chronic LBP and Age between 18 - 60 years. After screening the participants a simple lottery method randomization technique was used and a total of 70 participants were recruited and allocated into two equally matched groups, Maitland manual therapy combined with core stability exercise (MC) group and Conventional Physical therapy group (CT). The disability score was collected through Roland Moris Disability Index (RMDI) before the first treatment session and after 5 weeks.

Results: The mean age of the MC group's participants was 41.34 ± 10.77 years while the mean age of the CT group's patient was 38.63 ± 12.52 years. There were n=17 females and n=18 males in MC group, while n=24 were males and n=11 were female in the CT group. The normality of the data was analyzed by using the Shapiro-wilk test which suggests data was parametric. RMDI score for MC group improved from 14 ± 1.97 to the 6.34 ± 2.19 with P = 0.001 similarly for the CT group the RMDI score improved from 13.51 ± 3.24 to the post score 9.91 ± 2.4 with the P= 0.001.

Conclusion: Maitland manual therapy combine with core stability exercises is a better alternative to conventional physical therapy in terms of improvement in CLBP related disability.

Introduction

As a part of the "Global Burden of Disease Study 2010", Low Back Pain consider amongst the ten high weight sickness and wounds according to the professional group, with an average amount of "Disability Adjusted Life Years" advanced than Tuberculosis, HIV, Lung tumor, Road traffic accident (RTA), preterm birth complications and Chronic obstructive pneumonic Sickness (COPD).[1] It is commonly recognized that the cause of chronic low back pain (CLBP) is largely unknown. Presumably many factors involved in the etiology and pathogenesis of the nonspecific LBP and all innervated spinal tissues can be possibly a wellspring of pain.[2] LBP has a severe impact

on social life and is related globally with a huge cost. The huge cost is in terms of both direct and indirect health care expenses absentees from work and a disability-related financial burden.[3, 4]

Active physical therapy, management emphasized exercise as a key component in the treatment of CLBP recommended by international guidelines.[5] According to the National Health Survey, around 1.3 million people seek physical therapy management per year, and the estimated cost is about £150 million in the United Kingdom (UK).[6] To manage low back pain different treatment strategies are available such as oral medications, Injection therapy at lumbar region, surgery, Physical Therapy, Chiropractic and psychotherapy and so on.[7]

In Physical Therapy protocols currently used, numerous methods of manual therapy (MT) techniques to treat LBP.[8-10] On the bases of the bio-psycho-social model which represents the core of MT, various treatment approaches along with clinical reasoning are used by the manual therapist including manipulation and mobilization as well as a variety of different procedures of physical exercises. [11]

Core stabilization exercises have developed a major fitness trend that has begun to be practical in sports medicine and musculoskeletal rehabilitation programs.[12] Numerous trials suggested that core stabilization exercises are a significant element of the LBP rehabilitation program.[13, 14] The selection of specific core stability exercises is necessary which integrates the sensory and motor system to obtain the desired outcome.[15] Moreover, the stabilization program comprises the exercises related to the earlier triggering of the local muscles of the trunk and should be advance to involve further dynamic, static and functional exercises, that encompasses the synchronized contraction of the local and apparent spinal muscles.[16, 17]

Similarly, Maitland's mobilization is used globally and its effectiveness in isolation established.[18, 19] The trial has been done in relation to the effect of Maitland mobilization compared to segmental exercises and the effectiveness of both shown[20], but there is no study available regarding the combined effects of Maitland manual mobilization and core stability exercises in disability related to CLBP. These patients are frequently seen in primary care and pursue management over and over again from different caregivers for their back problems. Therefore, the objective of the study was to evaluate the effectiveness of Core stability exercises coupled with Maitland Manual Therapy versus conventional physical therapy to decrease disability in patients with CLBP.

Methodology

A double-blinded randomized control trial was conducted on n=70 patients with CLBP (>3 months) in Helping Hand Institute of rehabilitation sciences Mansehra. The inclusion criteria were both male and female participants with chronic LBP and Age between 18 - 60 years. Exclusion criteria were history of spinal surgery, Participants with ankylosing spondylitis, and Participants diagnosed with neurological, systemic inflammatory diseases, mental disorders, Malignancies, Osteoporosis, and Rheumatoid arthritis, and Pott's disease will be excluded from the study and any other red flag conditions. The total 110 participants were screened against the inclusion and exclusion criteria from the Physiotherapy department of Helping Hand Institute of rehabilitation sciences Mansehra, as a convenient sample, seventy participants come across the inclusion criteria. After screening the participants a simple lottery method randomization technique was used and was assigned randomly into two groups, each group contains 35 patients. As shown in consort diagram.

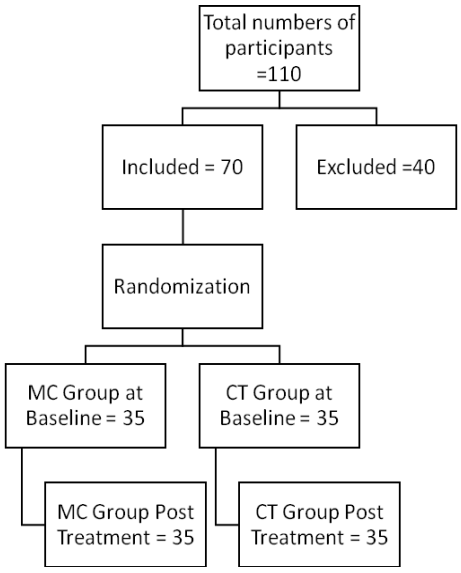

Figure 1. Consort Diagram

This study was completed within a period of 6 months (July 2019 to December 2019. The experimental group (MC) received Maitland manual therapy and core stability exercise and Control (CT) group received Conventional physical therapy.

Helping Hand Institute ethical review board authorization was obtained before the commencement of the study. Before the intervention, written consent was obtained from all the Participants. The design of this study was suitable to test the hypotheses and answer the research question within the available period and cost.

Treatment was given under the supervision of expert Physical Therapist, all subject selected for the study received session approximately 30 min. The therapist and the patient were blinded about their alternative group. The detail of the treatment protocols of both groups shown in table I.

Analyses: Descriptive statistics for demographics the age were presented through means and standard deviation and frequency was used for gender. Shapiro-wilk test was used to check the normality (P>0.05) at baseline statistics for RMDI. A paired t-test was used to compute change from the baseline score of RMDI for both groups. An Independent t-test was used to compute differences between the means of two groups.

Table I: Treatment Protocols.

Maitland manual therapy and core stability exercise (MC Group)	
Treatment Protocol	**Dose**
Maitland Manual Therapy grade-II & III	30 sec and 3 set/session, 2 session/week for 5 week
Quadrupt Opposite arm & leg	10 repetition/Session, 2 Session/Week for 5 week
The Plank	
Superman's	
Prayer Cat Camel	
Conventional physical therapy (CT Group)	
Treatment Protocol	**Dose**
Knee to Chest	10 repetition/Session, 2 Session/Week for 5 week
Straight Leg Raise	
Rotational Stretch	
Bridging	
Press up	
Soft tissue mobilization	

Results

The mean age of MC group's participants was 41.34 ± 10.77 years while the mean age of the CT group's patient was 38.63 ± 12.52 years. There were 17 females and 18 males in MC group, while 24 were males and 11 were female in CT group.

The result of this study shows that there were no significant differences between the two groups at the baseline (P=0.45), implying that randomization was successful. Both groups improved significantly from their baseline scores of RMDI with respective intervention. RMDI score for MC group improved from 14 ± 1.97 to the 6.34 ± 2.19 with P = 0.001 similarly for the CT group the RMDI score improved from 13.51 ± 3.24 to the post score 9.91 ± 2.4 with the P= 0.001. The differences between the means of the two group for a change were 7.65(±0.30) in MC group and 3.60(±2.51) in CT group. This statistics shows that the MC group show more improvement in decreasing disability related to CLBP with p>0.001. As shown in table II.

Discussion

This study has concentrated on determining the benefit of Maitland manual therapy combined with core stability exercises versus conventional physical therapy and to explain which one strategy is most successful for diminishing the level of disability in patient with chronic low back pain (CLBP). Pre &post analysis in both group showed significant difference. While comparing. Combination group showed more reduction in disability as compare to conventional therapy group. The patients with CLBP was enrolled in this study they appear to be demonstrative of a more general inhabitants based on our

Table II: Statistical Analysis

Treatment groups	**RMDI SCORE Mean (±SD)**			**Cohen's-d**	**P value**
	Before	After	Change		
MC	14(±1.97)	6.34(±2.20)	7.65(±0.30)	2.88	0.001
CT	13.51(±3.25)	9.91(±2.48)	3.60(±2.51)	3.99	0.001
P-Value	0.45	0.001	0.001		
Paired t-test statistics shown in the column and Independent sample t-Test statistics in the row					
MC: Maitland Manual Therapy and core Stability Exercise group. CT: Conventional Physical Therapy Group SD: Standard Deviation					

everyday practice.

A study conducted by Samir SM et al to find out the efficacy of "Mulligan vs Maitland" methods on level of pain and range of motion in patients with chronic low back pain. Study measurements was taken on visual analogue scale for pain and a modified Shober test for ROM. Post interventional analysis reveals that there was no significant difference found between the aforementioned protocols. [21]

Amita Mehta conducted a randomized control trial to find out the efficacy of "Maitland mobilization versus Shacklocks neurodynamic" mobilization in patients with low back pain. 50 participants were randomly allocated into two groups. The results show that both groups were improved significantly nevertheless the Shacklocks neurodynamic mobilization group presenting considerably quick improvement. [22]

A randomized control trial was conducted by Shabana Khan et al to compare the Sustained Natural

Apophysial Glides (SNAG) with Maitland mobilization in patients with chronic low back pain. A total 60 patients were selected and allocated into two groups, each group comprising of 30 patients. The treatment protocols was 3 sessions per week for 4 weeks. The results of the study shows that both groups were improved significantly but the SNAG protocol group were improved slightly more than the Maitland protocols group. [23].

A study were designed to find the effects of core stabilization exercises to increase neuromuscular control and correct Multifidus dysfunction in patients with chronic low back pain. The researcher selected 11 healthy women and 17 women with chronic LBP. The cross sectional areas of the Multifidus muscle were measured through ultrasonography. Post treatment analysis shows that the core stability exercises increased significantly the cross sectional area of multufidus muscle both in healthy women and women with chronic LBP. [24].

A study was conducted to find out the differential effects of core stability exercises and conventional physical therapy in patients with chronic low back pain, to analyze the alteration in postural control parameters. A total 30 patients were randomly allocated into two groups. Post interventional analyses shows that the core stability exercise group improved significantly in term of enhanced postural control parameters as compare with baseline measures. [25]

To find the efficacy of core stability exercises in patients with chronic low back pain a meta-analysis conducted in 2012. Author found the published articles from 1970 to October 2011 by using electronic searches. The results of this analysis show that the core stability exercises is more effective in decreasing pain and physical function in chronic low back pain patients in short term as compared to general exercises, but no significant long term difference was observe in the aforementioned protocols. [26]

In favor with other recent studies, it's decided that Maitland manual therapy coupled with core stability exercise was more reliable and suitable treatment approach to decreasing the disability in patients with CLBP as linked with other approaches, conventional therapy or none.

Conclusion

Maitland manual therapy combine with core stability exercise are more significant and shows more improvement in reduces the disability related to CLBP than conventional physical therapy protocol. It demonstrated that patients were more gratified with the intervention when they perceived lower disability and reported in RMDI questionnaire. Lower disability is related to better functional outcomes such as longer working tolerance without symptoms being produced.

Limitations and Recommendation: Except age and height, the groups were similar at the baseline. Of course the comparison of groups having same age and height would be more desirable. On the contrary, improbably these group variances had a major influence on the key outcomes of the study. The recurrence rate, life style and occupational aspect were not analyzed due to limited time and insufficient data. In future these aspect are recommended to be evaluated for the improvement in the quality of life.

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