

COMPARING THE EFFICACY OF CORE STABILITY EXERCISES AND CONVENTIONAL PHYSICAL THERAPY IN THE MANAGEMENT OF LOWER BACK PAIN: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: A significant section of the population around the world suffers from lower back pain (LBP), a prevalent musculoskeletal ailment. It is characterized by pain, stiffness, or muscle tightness in the lumbar region, which can radiate to one or both legs. LBP can have a significant impact on an individual's quality of life, affecting their ability to perform daily activities, work, and participate in physical activities. Various treatment approaches have been used to manage LBP, including conventional physical therapy and core stability exercises. While both treatment modalities have been shown to be effective in managing LBP, it is not clear which approach is more effective. This has led to a need for further research to compare the efficacy of these two treatment approaches

Objective: To evaluate the efficacy of core stability exercises and conventional physical therapy in managing lower back pain (LBP) among patients.

Methodology: A randomized control trial was conducted at Rehman Medical Institute from July 2017 to December 2017. Patients were randomly assigned to Group A and Group B using the lottery method. Data were collected from 60 patients meeting the inclusion criteria. Patients in the Group Received Core stability exercises for 30 minutes three times a week for four weeks. Patients in Group B received Conventional physiotherapy for 30 minutes three times a week for four weeks. Pre-treatment and post-treatment evaluation of pain and function were done using the Visual Analogue Scale (VAS) and modified disability (MODI) questionnaires, respectively. The data was analyzed using SPSS version 23.

Results: The mean ages of both groups were 29.70 and 30.86 years. Out of 60 patients, 2 (3.33%) were female and 58 (96.66%) were male. There was no significant difference at the baseline in Group A and Group B in terms of age, Pre-VAS, and Pre-MODI ($P > 0.05$). There was a significant improvement in pain and functional status in Group A and B as post-VAS (0.038) and post-MODI (0.02) which showed significant differences.

Conclusion; This study found that both core stability exercises and conventional physical therapy are beneficial in easing pain and enhancing patients' functional status with LBP. However, core stability exercises were shown to be more effective in managing LBP compared to conventional physical therapy. Therefore, it is recommended that core stability exercises be incorporated into the management of patients with LBP.

Keywords; Lower back pain, Visual Analogue Scale, modified disability questionnaire, core stability exercises.

INTRODUCTION

Low back pain is a widespread and debilitating condition that affects individuals of all ages and lifestyles worldwide, and it is one of the most common reasons for seeking medical care. In fact, studies estimate that up to 80% of people experience low back pain at some point in their lives¹. Low back pain has a significant impact on quality of life, physical function, and productivity, leading to missed workdays and increased healthcare costs. Thus, it is a substantial public health problem that requires effective management strategies².

Physical therapy is one of the most commonly used conservative treatments for low back pain, and it includes a wide range of interventions, such as exercise, manual therapy, education, and modalities³. One of the frequently prescribed physical therapy

interventions is core stability exercises, which aim to enhance the strength and neuromuscular control of the muscles that stabilize the lumbar spine⁴. These exercises are designed to target the deep muscles of the abdomen, lower back, and pelvis, such as the transversus abdominis, multifidus, and pelvic floor muscles, which play a crucial role in maintaining spinal stability and protecting the spine against injury⁵.

Despite the widespread use of core stability exercises in the management of low back pain, their effectiveness compared to conventional physical therapy approaches is still under debate⁶. Some studies have suggested that core stability exercises may be more effective than conventional physical therapy for treating low back pain⁷. In contrast, other studies have found no significant difference between the two approaches⁸. Therefore, there is a need for further research to clarify the relative effectiveness of

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core stability exercises and conventional physical therapy in managing low back pain⁹.

This article aims to provide a comprehensive review of the current evidence on the effectiveness of core stability exercises and conventional physical therapy in the management of low back pain. We will critically evaluate the existing literature and discuss the potential benefits and limitations of each approach. The findings of this article will have significant implications for clinical practice, as they will help inform the selection of appropriate treatment approaches for patients with low back pain, ultimately improving their clinical outcomes and quality of life.

METHODOLOGY:

This pilot randomized controlled trial enrolled 60 patients with generalized low back pain and was divided equally into two groups at random. The study was conducted at Rahman Medical Institute over a period of approximately six months from July 2017 to December 2017. A consecutive random sampling technique was used to recruit both male and female participants aged between 22 and 42 years with a history of unspecific lower back aches. The study was single-blinded, and subjects with radiculopathy, spinal stenosis, infection/tuberculosis of the spine, spinal surgery, spinal fracture, history of cancer, and pregnancy were excluded based on the predefined criteria.

This study involved interventions for patients with low back pain, which included core stability exercises and conventional physical therapy. Traditional physical therapy includes techniques such as heat therapy, manual and/or mechanical traction, short wave diathermy (SWD), therapeutic ultrasound (T-US), and transcutaneous electrical nerve stimulation (TENS) for the same amount of time and frequency. Group A was administered core stability exercises for 30 minutes, three times per week on alternative days, for a total of four weeks (one month). Meanwhile, Group B received traditional physical therapy for the same duration and frequency.

RESULTS

The statistical analysis of data was carried out using SPSS version 23. To evaluate the variances between the experimental and control groups, an independent t-test was used. In addition, a paired t-test was conducted to identify any potential effects before and after the treatment within each group. The study participants were divided into two groups: Group A received CSE treatment, while Group B was treated with CPT. Both groups had similar baseline characteristics in terms of age, with a mean age of 29.70 and 30.86 years for Groups A and B, respectively. A total of 60 patients with LBP were included in this study, of which 2 (3.33%) were female and 58 (96.66%) were male, as shown in (TABLE 1).

Table 1; General characteristics of the groups concerning age and gender.

Variable	Group A (n=30)	Group B (n=30)	P-value
Age (Mean ± S.D)	29.70 ± 4.97	30.86 ± 6.06	0.10
Gender			
Male	28 (93.3%)	30 (100%)	0.003
Female	2 (3.33%)	0 (0%)	

In order to compare the baseline measures of both groups, an independent t-test was utilized in terms of pre-MODI. The experimental group (Group A) had a mean of 74.73 and a standard deviation of 5.00, while the control group (Group B) had a mean of 75.73 and a standard deviation of 6.64. The p-value obtained was .06, indicating that there was no significant difference between the two groups. This information is presented in (Table 2).

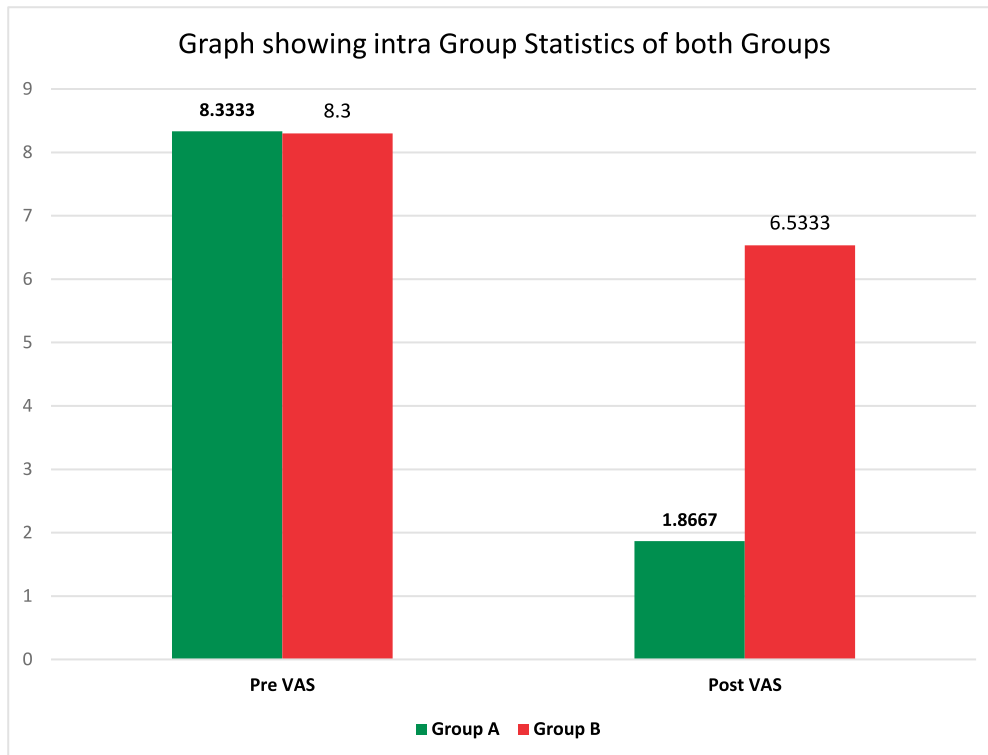
Table 2; Independent t-test comparing the baseline measurement (pre-MODI) of both groups.

	Pre-treatment (MODI score)	P-Value
Group A (Mean ± S.D) (n= 30)	74.73±5.00	.06
Group B (Mean ± S.D) (n= 30)	75.73±6.64	

The paired t-test was used to assess the effect of treatment on the VAS score in both groups. For Group A, the mean pre-VAS score of 8.33 + .80 was significantly reduced to 1.86 + .86 (post-VAS score) with a p-value of .000 (P < 0.05). In contrast, Group B showed a decrease from the mean pre-VAS score of 8.30 + .91 to a post-VAS score of 6.53 + 1.16 with a p-value of .00 (P < 0.05) (Table 5). Therefore, the results indicate that core stability exercises are effective in treating patients with LBP both statistically and clinically (Table 3) (Figure 1).

Table 3; Paired t-test for pre & post-VAS of both groups

	Pre-treatment (VAS score)	Post-treatment (VAS score)	P-Value
Group A (Mean ± S.D) (n= 30)	8.33±.80	1.86±.86	.00
Group B (Mean ± S.D) (n= 30)	8.30 ± .91	6.53±1.16	.00



A paired t-test was utilized to compare the pre-and post-treatment MODI scores of both groups. Group A showed a significant decrease in their mean and standard deviation of pre-MODI score from 74.73±5.00 to 20.26±3.52 (post-MODI) with a p-value of .00 (P<0.05). On the other hand, group B also exhibited a significant reduction in their mean and standard deviation of pre-MODI score from 75.73±6.64 to 56.30±5.57 (post-MODI) with a p-value of .00 (P<0.05) (Table 4). Therefore, the results indicated that Core stability exercises were effective both statistically and clinically in treating patients with LBP (Table 5).

Table 4; paired t-test to evaluate the pre- and post-MODI measurements of both groups.

	Pre-treatment (MODI score)	Post-treatment (MODI score)	P-Value
Group A (Mean ± S.D) (n= 30)	74.73±5.00	20.26±3.52	.00
Group B (Mean ± S.D) (n= 30)	75.73± 6.64	56.30±5.57	.00

Table 5; Post VAS group Statistics

	Pre-treatment (VAS score)	P-Value
Group A (Mean ± S.D) (n= 30)	1.86±.86	.03
Group B (Mean ± S.D) (n= 30)	6.53± 1.16	

DISCUSSION

The results indicate that to reduce pain and improve functions in a patient with LBP the CSE were more effective than CPT. Akhtar MW et al reported that CSE is more effective as compared to Routine Physical therapy (RPT) in reducing pain in subjects with nonspecific LBP, which is similar to the present study in terms of age and treatment outcome such as pain¹⁰. Coulombe BJ et al reported that CSE was better than General Exercise (GE) for reducing pain and improving the functional status of subjects with LBP, which is similar to the results of our study¹¹. Another study conducted by Shamsi M et al reported that no difference was found b/w the CSE group and GE group in improving pain and disability¹².

Tang S et al conducted a study to investigate whether the combination of Chinese-Tuina (CT) and CSE had a greater impact than CT alone in treating LBP patients. The study found that both groups showed a significant increase in Japanese Orthopaedic Association scores (JOA) and a decrease in VAS score, but no significant difference was observed between the two groups. This result supported our study that found CSE to be effective in treating LBP¹³. In another recent study by Javadian Y et al, the

impact of core stability exercise on the accessory movements of the lumbar spine in patients with non-specific chronic low back pain was examined. The study showed that both groups had a significant decrease in accessory movements of the lumbar spine, except for L3 in the control group, with a P value less than 0.05¹⁴.

Post-treatment analysis showed that accessory movements of L4 [P=0.04] & L5 [P=0.001], in the EG were substantially reduced than the CG. The study resulted that CSE in combination with GE was more effective than GE alone in improving lumbar spine accessory movements in patients with LBP¹⁴. Another study conducted determined the efficacy of Chinese massage in combination with Core stability exercises on non-specific LBP. The result of the study exhibited that after 2 weeks of intervention, both VAS & ODI values dropped respectively in both the groups [p<0.05] when compared with pre-treatment values, yet no substantial difference was found b/w the groups [p>0.05]. After 8 weeks, the VAS & ODI values reduced respectively in both groups [p<0.05]; at a similar period, both VAS & ODI values remained respectively lesser [p<0.05] in the EG than in CG. The study resulted that CSE can increase the therapeutic outcome of massage (Chinese) in the management of non-specific LBP¹⁵.

CONCLUSION

According to the results of our study, both therapy modalities were effective at reducing pain and improving functional status in patients with LBP. However, CSE was found to be more effective than CPT in treating patients with LBP, implying the potential benefits of core stability exercises in managing this condition. Despite the study's contribution, it had some limitations such as the absence of long-term follow-up and a small sample size of only 60 participants. Additionally, some participants could not receive treatment regularly due to personal commitments such as attending weddings or funerals.

REFERENCES

1. Hoy D, March L, Brooks P, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis*. 2014 Jun;73(6):968-74.
2. Hodges PW, Richardson CA. Inefficient muscular stabilization of the lumbar spine associated with low back pain. A motor control evaluation of transversus abdominis. *Spine (Phila Pa 1976)*. 1996;21(22):2640-2650.
3. Shamsi MB, Sarrafzadeh J, Jamshidi A, et al. The effects of two types of core stability exercises on dynamic balance in young males. *Physio Therapy Sport*. 2010;11(4):56-60.
4. Macedo LG, Maher CG, Latimer J, McAuley JH. Motor control exercise for persistent, nonspecific low back pain: a systematic review. *Physio Therapy*. 2009;89(1):9-25.
5. Saragiotto BT, Maher CG, Yamato TP, Costa LOP, Menezes Costa LC, Ostelo RWJG, Macedo LG. Motor control exercise for chronic non-specific low-back pain. *Cochrane Database Syst Rev*. 2016 Jan 8;(1): CD012004.
6. VanRainville J, Hartigan C, Jouve C, Martinez E. The influence of intense exercise-based physical therapy program on back pain anticipated before and induced by physical activities. *The Spine Journal*. 2004;4(2):176-83.
7. Koes B, Van Tulder M, Thomas S. Diagnosis and treatment of low back pain. *BMJ: British Medical Journal*. 2006;332(7555):1430.
8. Cherkin DC, Sherman KJ, Avins AL, Erro JH, Ichikawa L, Barlow WE, et al. A randomized trial comparing acupuncture, simulated acupuncture, and usual care for chronic low back pain. *Archives of internal medicine*. 2009;169(9):858-66.
9. Burton KA, Clarke RD, McClune TD, Tillotson MK. The natural history of low back pain in adolescent Spine. 1996;21(20):2323-8.
10. Akhtar MW, Karimi H, Gilani SA. Effectiveness of core stabilization exercises and routine exercise therapy in the management of pain in chronic non-specific low back pain: A randomized controlled clinical trial. *Pakistan Journal of medical sciences*. 2017;33(4):1002.
11. Coulombe BJ, Games KE, Neil ER, Eberman LE. Core Stability Exercise Versus General Exercise for Chronic Low Back Pain. *Journal of athletic training*. 2017;52(1):71-2.
12. Shamsi M, Sarrafzadeh J, Jamshidi A, Zarabi V, Pourahmadi MR. The effect of core stability and general exercise on abdominal muscle thickness in non-specific chronic low back pain using ultrasound imaging. *Physiotherapy theory and practice*. 2016;32(4):277-8.
13. Tang S, Qian X, Zhang Y, Liu Y. Treating low back pain resulted from lumbar degenerative instability using Chinese Tuina combined with core stability exercises: A randomized controlled trial. *Complementary therapies in medicine*. 2016;25:45-50.
14. Javadian Y, Behtash H, Akbari M. The effect of core stability exercise on accessory movements of the lumbar spine in patients with non-specific chronic low back pain. *J Back Musculoskelet Rehabil*. 2017;30(5):981-986.
15. Zhang Y, Gong Y, Hu L, et al. Efficacy of massage on muscle pain and motor function in patients with non-specific low back pain: a systematic review and meta-analysis. *J Pain Res*. 2020;13:2979-2994.