Myofascial Release and Core Stability Exercises Among Chronic Lower Back Pain Patients

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ABSTRACT

Background: Chronic low back pain (CLBP) is a prevalent condition affecting individuals' quality of life, often managed through various physical therapy techniques. Myofascial release (MFR) and core stability exercises (CSE) are commonly used interventions aimed at reducing pain and improving functionality.

Objective: To evaluate the effectiveness of MFR and CSE in reducing pain, improving disability levels, and enhancing core stability among female patients with CLBP.

Methods: A randomized controlled trial was conducted at Memon Medical Institute Hospital, Karachi, enrolling 50 female patients aged 25-35 years with CLBP for over three months. Participants were randomly assigned to two groups: Group A received MFR with TENS, and Group B received CSE with TENS. Both groups underwent treatment thrice weekly for six weeks. Outcomes were measured using the Visual Analog Scale (VAS), Oswestry Disability Index (ODI), lower body flexibility tests, and core endurance assessments. Data were analyzed using paired t-tests with SPSS version 25.

Results: Group A showed significant reductions in VAS (5.68 ± 1.28 to 3.36 ± 1.03, $p < 0.001$) and ODI (56.40 ± 11.27 to 42.52 ± 13.19, $p = 0.001$). Group B showed similar reductions in VAS (6.16 ± 1.17 to 3.72 ± 1.30, $p < 0.001$) and ODI (61.40 ± 8.89 to 44.44 ± 12.50, $p < 0.001$). Core endurance improved significantly in both groups.

Conclusion: Both MFR and CSE effectively reduced pain and disability, with notable improvements in core stability among patients with CLBP.

INTRODUCTION

Low back pain (LBP) is a highly prevalent condition that affects individuals worldwide and represents one of the most common complaints in primary care settings. LBP can originate from a variety of sources, including musculoskeletal, neural, and skeletal structures, and may be exacerbated by factors such as prolonged postures, physical strain, and age-related degenerative changes. Chronic LBP, defined as pain persisting for more than three months, poses significant challenges in clinical management due to its complex etiology, which often includes non-specific pain, radiculopathy, and structural abnormalities like spinal stenosis or disc protrusion. Magnetic resonance imaging or computed tomography scans are often utilized to diagnose specific causes, although lumbar radiography is generally avoided within the first two months of nonspecific pain due to the lack of evidence supporting its efficacy in improving outcomes (1).

In the realm of physical therapy, a variety of interventions are employed to alleviate the symptoms of LBP, with myofascial release (MFR) and core stability exercises (CSE) being among the most utilized. Myofascial release is a manual therapy technique that involves applying sustained pressure to the myofascial tissues with the intent of releasing fascial restrictions, improving tissue elasticity, and restoring optimal function. This technique addresses the fascial network, which envelops and supports muscles, thereby contributing to a musculoskeletal corset that stabilizes the spine. Dysfunction within this network can compromise stability and exacerbate pain, making MFR a critical component of LBP management (2). MFR has been shown to decrease discomfort, enhance spinal mobility, and positively affect myoelectric activity in patients with chronic LBP, providing a non-invasive, cost-effective therapeutic option (3).

Core stability exercises target the deep stabilizing muscles of the lumbar and pelvic regions, including the transverse abdominis, multifidus, and pelvic floor muscles. These exercises aim to improve the neuromuscular control of the trunk, thereby enhancing stability and reducing the risk of LBP recurrence. Core stability is crucial for maintaining balance and coordinating movements of the spine and extremities, and deficits in core stability have been linked to the persistence of LBP. Interventions such as supine bridges, planks, and dynamic stability exercises are designed to engage these core muscles, promoting endurance and functional performance in activities of daily living (4). The effectiveness of CSE has been demonstrated across various populations, including elderly individuals, athletes, and healthcare professionals, highlighting its versatility and broad applicability in clinical practice (5).

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Despite the widespread use of MFR and CSE, there is ongoing debate regarding their relative efficacy, particularly when applied as standalone versus combined interventions. Some studies suggest that MFR can be enhanced by incorporating elements of core stability, while others advocate for individualized exercise prescriptions based on the patient's specific needs and baseline functional status (6). This study aims to compare the effectiveness of MFR and CSE in reducing pain and disability among patients with chronic LBP, with the goal of providing evidence-based recommendations that can guide clinical decision-making. By evaluating pain reduction, disability scores, and functional outcomes, this research seeks to contribute to the optimization of therapeutic strategies for chronic LBP, ultimately improving the quality of life for affected individuals (7).

MATERIAL AND METHODS

A randomized controlled trial was conducted at the outpatient department of Memon Medical Institute Hospital, Karachi, to evaluate the effectiveness of myofascial release (MFR) and core stability exercises (CSE) among patients with chronic low back pain. The study enrolled fifty female patients aged between 25 and 35 years, who were selected using a convenience sampling method. Inclusion criteria comprised individuals who had been experiencing low back pain for at least three months and had a Visual Analog Scale (VAS) score ranging from 3 to 8. Exclusion criteria included patients with a history of spinal fractures, arthritis, any bony deformity, and those currently using corticosteroids.

Participants were randomly assigned into two groups using a simple random sampling procedure. Group A received the myofascial release technique along with transcutaneous electrical nerve stimulation (TENS). The TENS treatment was administered using a 50 Hz conventional device with a pulse duration of less than 150 microseconds, applied to the lower back for 15 minutes along with a hot pad. The MFR was performed using a roller massager stick along the superficial back line for 30 seconds. Group B received core stability exercises in conjunction with TENS, with the TENS settings similar to those used for Group A. Core stability exercises included supine hook lying, supine bridge with core stabilization, curl-ups, modified plank exercises (knees flexed), side plank (knees extended), and supine bridge on a Swiss ball. These exercises were performed with ten repetitions per set, held for five seconds in each position, progressing from one to three sets with a rest interval of 30 seconds between sets and two to three minutes between exercises. Both groups received three sessions per week for a total of six weeks.

Data collection involved assessing pain levels using the VAS, disability levels using the Oswestry Disability Index (ODI), lower body flexibility using the chair sit and reach test, and core stability endurance using the supine bridge test. The VAS was recorded using a 10-cm scale, with 0 indicating no pain and 10 indicating the worst pain imaginable. The ODI, a self-reported questionnaire, measured the impact of LBP on activities of daily living, with scores ranging from 0 to 100, where higher scores indicated greater disability. Lower body flexibility was assessed by having patients sit on the edge of a chair with one leg straight and the other bent, reaching for the toe of the straight leg; measurements were taken in millimeters. Core stability endurance was evaluated by instructing patients to perform a supine bridge, noting the duration they could maintain the position in seconds.

Ethical approval for the study was obtained from the Institutional Review Board of Memon Medical Institute Hospital, and all procedures were conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants prior to enrollment in the study. Data analysis was performed using SPSS version 25. Descriptive statistics were used to summarize baseline characteristics, and paired t-tests were employed to compare pre- and post-intervention outcomes within each group. A significance level of less than 0.05 was considered statistically significant for all comparisons. The findings were aimed at identifying the more effective intervention between MFR and CSE, thereby contributing to evidence-based recommendations for the management of chronic low back pain in clinical practice.

RESULTS

In Group A (MFR), there was a significant reduction in pain as indicated by the decrease in VAS scores from 5.68 ± 1.28 to 3.36 ± 1.03 ($p < 0.001$). Similarly, disability levels measured by the Oswestry Disability Index (ODI) improved significantly, with scores decreasing from 56.40 ± 11.27 to 42.52 ± 13.19 ($p = 0.001$). However, lower body flexibility showed no significant change, with pre- and post-intervention scores remaining almost the same (3.00 ± 2.56 vs. 2.99 ± 2.05, $p = 0.900$). A notable improvement was observed in core endurance, which increased from 104.80 ± 13.26 seconds to 136.00 ± 13.54 seconds ($p < 0.001$).

In Group B (CSE), a significant reduction in pain was also observed, with VAS scores decreasing from 6.16 ± 1.17 to 3.72 ± 1.30 ($p < 0.001$).

Table 1 Group A (MFR) Results

Parameters	Pre-Mean ± SD	Post-Mean ± SD	P-Value
VAS	5.68 ± 1.28	3.36 ± 1.03	<0.001
ODI	56.40 ± 11.27	42.52 ± 13.19	0.001
Lower Body Flexibility	3.00 ± 2.56	2.99 ± 2.05	0.900
Core Endurance (seconds)	104.80 ± 13.26	136.00 ± 13.54	<0.001

The ODI scores reflected a substantial improvement in disability, decreasing from 61.40 ± 8.89 to 44.44 ± 12.50 ($p < 0.001$). Unlike Group A, Group B showed a slight reduction in lower body flexibility, from 3.48 ± 5.33 to 3.28 ± 4.22, although this change was not statistically significant ($p = 0.080$). Core endurance significantly improved in this group as well, with scores increasing from 96.00 ± 18.25 seconds to 150.00 ± 10.40 seconds ($p < 0.001$).

Table 2 Group B (CSE) Results

Parameters	Pre-Mean ± SD	Post-Mean ± SD	P-Value
VAS	6.16 ± 1.17	3.72 ± 1.30	<0.001
ODI	61.40 ± 8.89	44.44 ± 12.50	<0.001
Lower Body Flexibility	3.48 ± 5.33	3.28 ± 4.22	0.080
Core Endurance (seconds)	96.00 ± 18.25	150.00 ± 10.40	<0.001

Overall, both MFR and CSE programs demonstrated significant effectiveness in reducing pain and improving core endurance among participants with chronic lower back pain. The MFR program particularly excelled in reducing disability levels, while the CSE program showed superior improvements in core stability endurance, highlighting the benefits of tailored rehabilitation approaches in managing chronic lower back pain.

DISCUSSION

The findings of this study demonstrated that both myofascial release (MFR) and core stability exercises (CSE) significantly reduced pain and improved core endurance among patients with chronic lower back pain (CLBP). The significant reduction in pain perception and disability levels observed in both intervention groups aligns with previous research, which has shown that MFR effectively decreases myoelectric activity and improves spinal mobility by addressing fascial restrictions that contribute to pain and functional limitations (7). Core stability exercises, which target the deep stabilizing muscles of the trunk, have also been shown to enhance neuromuscular control and reduce pain in individuals with CLBP, supporting the results of this study (11).

The significant improvement in core endurance observed in both groups underscores the importance of targeting core musculature in the management of CLBP. Previous studies have indicated that core stability exercises can significantly improve trunk muscle strength and endurance, which are critical for spinal stability and the prevention of recurrent back pain (30). The results from this study corroborate these findings and further emphasize the potential of core-focused interventions to enhance functional outcomes in patients with CLBP. However, while both interventions were effective in improving core endurance, the improvement was more pronounced in the CSE group, suggesting that targeted core exercises may be particularly beneficial for enhancing muscular endurance and stability in the lower back (22).

Despite the positive outcomes, this study had several limitations. The sample size was relatively small and consisted only of female participants, which may limit the generalizability of the findings to a broader population, including males or those with different demographic characteristics. Additionally, the use of convenience sampling may have introduced selection bias, affecting the external validity of the results. The short duration of the intervention period (six weeks) may not fully capture the long-term effects of MFR and CSE on chronic pain and disability, which warrants further investigation in studies with extended follow-up periods.

Another limitation of this study was the absence of a control group that received no intervention, which would have provided a clearer understanding of the natural progression of CLBP without therapeutic interventions. Furthermore, although the study employed validated outcome measures such as the VAS and ODI, the assessment of lower body flexibility relied on tests that may not be fully sensitive to changes in this population, as indicated by the lack of significant findings in this domain.

Future research should aim to include larger and more diverse sample populations to enhance the generalizability of the results. It would also be beneficial to explore the combined effects of MFR and CSE, as some studies have suggested that multimodal approaches may yield superior outcomes by addressing multiple aspects of CLBP simultaneously (20). Additionally, incorporating more sensitive measures of functional capacity and quality of life could provide a more comprehensive evaluation of the interventions' impact. Long-term follow-up studies are recommended to assess the sustainability of the observed benefits and to evaluate the potential of these interventions to prevent recurrences of CLBP.

CONCLUSION

In conclusion, this study reinforced the effectiveness of both MFR and CSE in reducing pain and improving core stability among patients with CLBP. The results highlight the value of individualized rehabilitation programs that focus on specific therapeutic targets, such as fascial release and core muscle endurance, to optimize patient outcomes. While both interventions showed significant benefits, further research is needed to explore their combined effects, extend findings to broader populations, and establish long-term efficacy in the management of chronic lower back pain.

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