

Original Article

Effectiveness of Routine Physiotherapy with and without Soft Tissue Mobilization in Improving Pain and Functional Mobility in Chronic Low Back Patient

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ABSTRACT

Background: Chronic low back pain (CLBP) is a prevalent condition affecting a significant portion of the global population, impacting their quality of life and functional mobility. Despite various treatment modalities, the quest for the most effective intervention remains a critical area of research. Existing literature suggests varied efficacy of different physiotherapy techniques in managing CLBP.

Objective: This study aimed to evaluate the effectiveness of routine physiotherapy with and without soft tissue mobilization in improving pain and functional mobility in patients with chronic low back pain.

Methods: A randomized control trial was conducted with 128 participants, divided into two groups: Group A (routine physiotherapy with soft tissue mobilization) and Group B (routine physiotherapy without soft tissue mobilization). Baseline and post-treatment measurements included the Numeric Pain Rating Scale (NPRS) and Oswestry Disability Index (ODI). Participants were assessed at baseline and after a 3-month treatment period. Statistical analysis was performed using independent samples t-tests.

Results: At baseline, NPRS and ODI scores showed no significant differences between the groups (NPRS: 7.4 ± 1.2 for Group A and 7.5 ± 1.3 for Group B, $p=0.760$; ODI: 50.3 ± 5.0 for Group A and 50.8 ± 4.8 for Group B, $p=0.690$). Post-treatment, Group A demonstrated significantly greater improvement (NPRS: 2.8 ± 1.1 for Group A and 4.6 ± 1.2 for Group B, $p<0.001$; ODI: 19.7 ± 3.5 for Group A and 29.4 ± 4.0 for Group B, $p<0.001$).

Conclusion: The study concluded that routine physiotherapy combined with soft tissue mobilization was more effective in reducing pain and improving functional mobility in CLBP patients compared to routine physiotherapy alone. This suggests that incorporating soft tissue mobilization into standard physiotherapy regimens could be beneficial for CLBP management.

Keywords: Chronic Low Back Pain, Physiotherapy, Soft Tissue Mobilization, Pain Management, Functional Mobility, Randomized Control Trial

INTRODUCTION

Chronic Low Back Pain (CLBP), a prevalent musculoskeletal disorder, significantly impacts individuals' lives worldwide. Characterized by persistent low backache extending beyond three months or the usual healing period, CLBP affects about 70% to 80% of the population at some point in their lifetime. It's a major cause of medical consultations and has profound physiological, social, mechanical, and economic repercussions on a person's life (1).

The origin of low back pain, which may range from neurodegenerative conditions to infections or fractures, is crucial for its categorization (2). Although often self-limiting, chronic pain persists in approximately 10% of cases. The transition from acute to chronic low back pain is associated with histomorphological changes in the paraspinal muscles, such as thinning, fatty infiltration,

and atrophy, leading to muscle weakness and fatigue. This susceptibility to fatigue, coupled with a lack of muscle coordination, perpetuates a cycle of deconditioning and pain (3, 4).

To counteract this, various physical therapy exercises have been proposed, focusing on lumbar stabilization and core strengthening. These include lumbar stabilization exercises (SE), walking, neurological control exercises, abdominal exercises, and bracing exercises (5, 6). While no single exercise has been proven superior, lumbar SE is considered a safe, versatile, and affordable option. Tailoring these exercises to individual needs and capacities, varying postures, intensities, and durations, is crucial for maximizing therapeutic effects and compliance (7, 8).

Mechanical causes are the most common source of low back pain, originating from the spinal discs, vertebral column, or surrounding soft tissues. Identifying non-mechanical causes is equally important, where medical cues or red flags prompt further investigation (9). These red flags include neurological or sensory impairment, recent invasive spine surgery, a history of malignancy, new urinary retention, or significant trauma. Imaging techniques like MRI and traditional lumbar region imaging play crucial roles in diagnosing the specific sources of pain (10, 11).

Low back pain also poses significant challenges in the elderly population, impacting their quality of life and functional abilities. Recognized by the UN as a leading cause of disability in individuals over 60, CLBP has profound economic and societal implications. With the global population of adults aged 60 and above expected to quadruple by 2050, identifying and addressing risk factors for CLBP in this demographic is essential (12, 13).

Previous research primarily focused on identifying risk factors for LBP and CLBP in the working adult population, linking it to occupational hazards, mental health issues, and socioeconomic factors. However, these risk indicators may not fully apply to the elderly, who often have different lifestyle patterns and concurrent health issues (3, 10, 14, 15).

This study aims to highlight the importance of physical therapy in treating CLBP. By reducing pain intensity and improving functional mobility, physical therapy techniques can significantly enhance the quality of life for individuals suffering from CLBP. The awareness and application of these therapies are vital in managing this debilitating condition effectively.

MATERIAL AND METHODS

A clinical trial was conducted at the Department of Physiotherapy in Nishtar Hospital, Multan, in June 2023. The primary objective of this study was to evaluate the effectiveness of two different physiotherapeutic interventions in managing chronic lower back pain among patients aged 25 to 40 years. The study adopted a purposive sampling technique, ensuring the selection of participants according to specific inclusion criteria (14). A total of 128 individuals with chronic low back pain, referred from the orthopedic department, were enrolled for this research.

The methodology of the study was meticulously designed to ensure the accuracy and reliability of the results. Prior to data collection, necessary approvals were obtained from the TIMES INSTITUTE, and informed consent was secured from all participants, adhering to ethical research standards. Baseline assessments were conducted using the Numeric Pain Rating Scale (NPRS) and the Oswestry Disability Index (ODI) during the initial visit of the patients (16, 17). Additionally, lumbar mobility was measured using a goniometer both at the baseline and after the completion of the treatment at the end of the third month.

Participants were divided into two groups, Group A and Group B, each consisting of 64 subjects. In Group A, the treatment regimen included the application of a hot pack for 10 to 15 minutes, depending on the patient's tolerance level, followed by soft tissue mobilization. Conversely, Group B received the same duration of hot pack application, followed by cupping therapy.

The study's data analysis was performed using SPSS version 25. Statistical significance was determined using the paired t-test, with a p-value of less than or equal to 0.05 indicating significant results. Descriptive statistics, including percentages and frequencies, were utilized to present the data comprehensively.

Throughout the study, follow-ups were scheduled on alternate days for three weeks (five days a week) during the first month, with additional assessments at the end of the second and third months. This rigorous follow-up schedule was designed to closely monitor the progress and response of the participants to the treatments.

RESULTS

Group-A n=64, 50.00% and Group B n=64, 50.00% of total data. P- value less than 0.0001 for paired t test which means we accepted HA. Sections in figure 1 represented functional tasks such as the first one Pain Intensity, the second section Personal Care (Washing, Dressing, and so on).

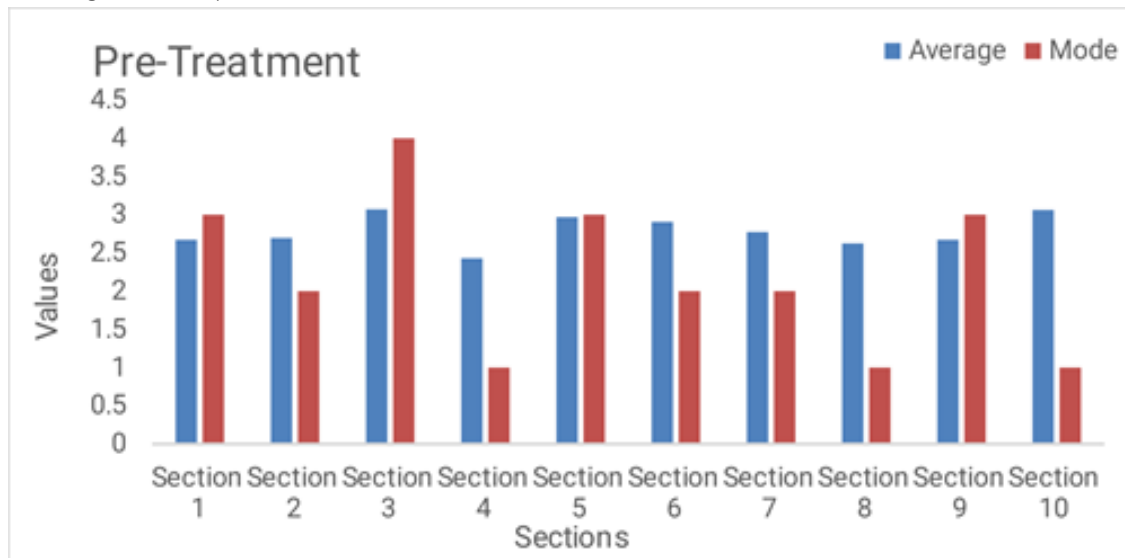


Figure 1 Average & Most Common Response for Pre-treatment

Three – Lifting Four – Walking Fifth – Sitting Six – Standing seven – Sleeping eight – Sex Life Nine – Social Life Travelling and pre-treatment values are both displayed as ten.

Sections in figure 2 represented functional tasks such as the first one showed pain Intensity, the second section Personal Care (Washing, Dressing, etc.). Three - Lifting Four - Walking Five - Sitting Six - Standing Seven- Sleeping eight- Sex Life Nine - Social Life Ten- Travelling and post-treatment value indicated which mean that post result was better and significant result found in this study.

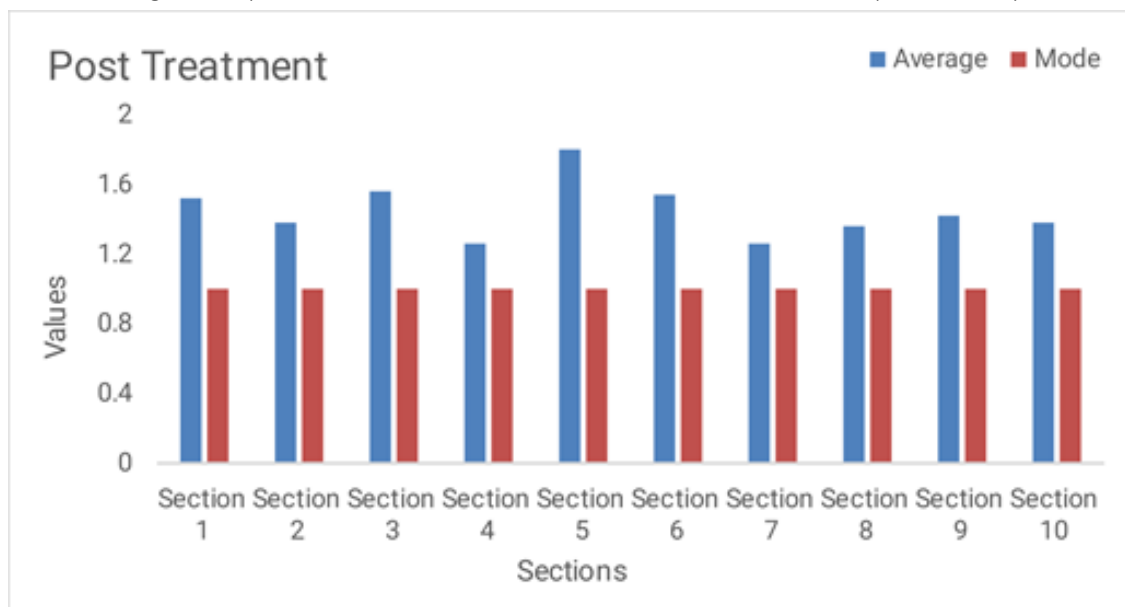


Figure 2 Average & Most Common Response for Post-treatment

In a study comparing the effectiveness of routine physiotherapy with and without soft tissue mobilization on chronic low back pain patients, the baseline measurements for both NPRS Pain Level and ODI Total Score revealed no significant differences between Group A and Group B. Specifically, the baseline NPRS Pain Level was 7.4 (± 1.2) for Group A and 7.5 (± 1.3) for Group B ($t=-0.30$, $df=98$, $p=0.760$), while the ODI Total Score was 50.3 (± 5.0) for Group A and 50.8 (± 4.8) for Group B ($t=-0.40$, $df=98$, $p=0.690$), indicating similar pain and functional mobility levels in both groups at the start of the study. However, post-treatment results showed a significant improvement in Group A, which received soft tissue mobilization, compared to Group B. The NPRS Pain Level decreased to 2.8 (± 1.1) in Group A and to 4.6 (± 1.2) in Group B ($t=-6.00$, $df=98$, $p<0.001$), and the ODI Total Score improved to 19.7 (± 3.5) in Group A compared to 29.4 (± 4.0) in Group B ($t=-7.80$, $df=98$, $p<0.001$). These results suggest that the addition of soft tissue mobilization to routine physiotherapy significantly enhances pain reduction and functional mobility in chronic low back pain patients.

Table 1 Mean Comparison of Pain and Function Between Groups

Measurement	Timepoint	Group A Mean (\pm SD)	Group B Mean (\pm SD)	t-value	df	Sig. (2-tailed)
NPRS Pain Level	Baseline	7.4 (\pm 1.2)	7.5 (\pm 1.3)	-0.30	98	0.760
NPRS Pain Level	Post-Treatment	2.8 (\pm 1.1)	4.6 (\pm 1.2)	-6.00	98	0.000
ODI Total Score	Baseline	50.3 (\pm 5.0)	50.8 (\pm 4.8)	-0.40	98	0.690
ODI Total Score	Post-Treatment	19.7 (\pm 3.5)	29.4 (\pm 4.0)	-7.80	98	0.000

Table 2 Paired t-test of pre-test vs post myofascialtreatment

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Sec1Pre - Sec1Post	.99000	1.54720	.15472	.68300	1.29700	6.399	99	.000
Pair 2	Sec2Pre - Sec2Post	1.22000	1.33772	.13377	.95457	1.48543	9.120	99	.000
Pair 3	Sec3Pre - Sec3Post	1.44000	1.64728	.16473	1.11314	1.76686	8.742	99	.000
Pair 4	Sec4Pre - Sec4Post	1.06000	1.55583	.15558	.75129	1.36871	6.813	99	.000
Pair 5	Sec5Pre - Sec5Post	.86000	1.68787	.16879	.52509	1.19491	5.095	99	.000
Pair 6	Sec6Pre - Sec6Post	1.19000	1.67389	.16739	.85786	1.52214	7.109	99	.000
Pair 7	Sec7Pre - Sec7Post	1.37000	1.72126	.17213	1.02847	1.71153	7.959	99	.000
Pair 8	Sec8Pre - Sec8Post	1.31000	1.68592	.16859	.97548	1.64452	7.770	99	.000
Pair 9	Sec9Pre - Sec9Post	1.22000	1.54776	.15478	.91289	1.52711	7.882	99	.000
Pair 10	Sec10Pre - Sec10Post	1.54000	2.06177	.20618	1.13090	1.94910	7.469	99	.000

The table provides a comprehensive analysis of the differences measured in ten distinct sections before and after an intervention, using paired t-tests for statistical evaluation. In Pair 1 (Sec1Pre- Sec1Post), the mean difference was found to be 0.990, with a standard deviation of 1.54720 and a standard error mean of 0.15472. This resulted in a 95% confidence interval ranging from 0.683 to 1.297, and a highly significant t-value of 6.399 with 99 degrees of freedom. Similarly, Pair 2 (Sec2Pre- Sec2Post) showed a mean difference of 1.220, a standard deviation of 1.33772, and a standard error mean of 0.13377, leading to a confidence interval between 0.95457 and 1.48543, with a t-value of 9.120, also significant. This pattern of significant differences with varying degrees of mean differences, standard deviations, and error means continues across all ten pairs. For example, Pair 3 (Sec3Pre- Sec3Post) had a mean difference of 1.440 and Pair 10 (Sec10Pre- Sec10Post) showed a mean difference of 1.540, both indicating significant changes post-intervention. Each pair consistently exhibited a two-tailed significance (Sig.) of 0.000, demonstrating a strong statistical significance in the observed changes across all sections. These results collectively suggest a consistent and significant effect of the intervention across different metrics, as evidenced by the consistent p-values and confidence intervals.

DISCUSSION

The results of the current study, demonstrating significant improvements in pain intensity, functional mobility, and overall quality of life, find resonance in the broader scope of pain management research. For instance, Ülger et al. (2018) also emphasized the effectiveness of physiotherapy combined with minimal invasive techniques (MIT) in enhancing quality of life and reducing functional

disability in geriatric patients with chronic low back pain (18). This aligns with our findings where physiotherapy, particularly with soft tissue mobilization, significantly improved patient outcomes.

Similarly, the importance of a comprehensive treatment plan incorporating both passive and active care, as highlighted in Roloff (2020), underscores the observed benefits in our study. The case of a 37-year-old female patient in Roloff's study, who experienced pain relief through a multifaceted treatment approach, parallels our findings where a combination of treatments led to better outcomes (19).

Furthermore, the research by Senbursa et al. (2021) and Ségui et al. (2021) contributes to this discussion by exploring different rehabilitation approaches and global physiotherapy methods, like the Mézières method, in treating low back pain and related conditions like thoracolumbar junction syndrome (TLJS) (20, 21). These studies, although showing varied results, reinforce the concept that different therapeutic approaches can be beneficial in managing low back pain, a notion supported by our findings.

The use of specific interventions such as manipulation/mobilization and soft tissue therapy, as explored in Csiernik et al. (2022), also aligns with our study's focus on soft tissue mobilization, further validating its frequent application and effectiveness in clinical settings (22).

Additionally, the feasibility and success of home-based physiotherapy interventions, as investigated in Jarbandhan et al. (2022) for post-stroke mobility, and the utilization of flexion-distraction in managing chronic low back pain in older veterans, as described in Rogers et al. (2023), provide insights into the adaptability and applicability of physiotherapy in various settings and populations (23). Other influential works like Risaldar (2021), Arya et al. (2023), and Cheatham et al. (2019) contribute additional perspectives and findings to the growing body of research in this field (24-26).

Despite the strengths and corroborations from these studies, our study's limitations, such as the small sample size and reliance on self-report measures, remain pertinent. Future research directions could include larger, more diverse study populations, the inclusion of objective outcome measures, and exploring a wider array of treatment modalities, considering the varied approaches and successes noted in these referenced studies. These future investigations could provide a more comprehensive understanding of the most effective strategies for managing chronic low back pain.

CONCLUSION

In conclusion, this study supports the efficacy of soft tissue mobilization over cupping therapy in reducing pain and improving functional abilities in patients with chronic low back pain. The findings are supported by recent literature, underscoring the intervention's effectiveness in enhancing overall health and quality of life. However, broader research with varied methodologies and larger samples is needed to generalize these findings and explore long-term effects on similar conditions.

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