

ORIGINAL ARTICLE

Comparative Effects of Positional Release Technique Versus Deep Transverse Friction Massage on Pain and Disability in patients with Acute Mechanical Low Back Pain

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ABSTRACT

Background: Mechanical low back pain is the pain caused by natural vulnerability of the spine to static loads owing to muscular and gravity forces, as well as pain that is caused by kinetic deviation from normal physiology. Positional release technique, commonly known as strain counterstrain (SCS), is a passive positional therapy that uses indirect hand manipulation to reduce musculoskeletal discomfort and dysfunction.

Aim: To compare the effects of positional release therapy and deep transverse friction massage on lumbar pain, lumbar range of motion and disability among patients with mechanical low back pain

Methods: After getting ethical approval from the University of Faisalabad, 40 male and female mechanical low back pain patients aging 20-40 years, having at least one trigger point in the iliopsoas muscle on the anterior lumbar aspect were recruited in the study by purposive sampling, and were randomly allocated into 2 groups by means of lottery method. The outcome measures were assessed at three different occasions i.e. baseline, 2nd week and 4th week. The numeric pain rating scale for lumbar pain, goniometry for lumbar range of motion and Oswestry disability scale for lumbar disability were used in the study.

Results: A total of 40 participants were included of which 57.5 % were male and 42.5% were females. The mean age was 30.37±6.01 years, mean BMI was 24.94 ± 3.64. 2 participants from positional release group and 1 from deep transverse friction massage were dropped out. NPRS showed 3.27 and 3.05 decrease, lumbar flexion showed 11.28 and 11.42 degrees increase, lumbar extension showed 4.9 and 4.94 degrees increase and ODI showed 14.53 and 14.78 points decrease in positional release technique and deep transverse friction massage, respectively.

Conclusion: Both the techniques produced significant results in reducing lumbar pain, the lumbar disability and improving lumbar range of motion in their respective group, but none of them proved to be superior to other in between group comparison.

Keywords: Deep Transverse Friction Massage; Mechanical Low Back Pain; NPRS; Positional Release Technique.

INTRODUCTION

Low back pain (LBP) is discomfort or pain that extends from last rib to the buttocks and sometimes going down the lower extremities, it is usually felt on either side of the mid line¹. Mechanical low back pain is characterized as pain that initiates in the spine, the intervertebral discs, or the soft tissues that surround the vertebrae. Spondylosis, disc herniation, and sacroiliac joint dysfunction are among the conditions that can lead to mechanical LBP². Chronic mechanical low back pain is frequently caused by repetitive stress and overuse, which is commonly a result of an occupational trauma³.

Low back pain patients can be divided into three groups: those with spinal stenosis or lumbar radiculopathy, those with non-specific low back pain, and those with low back pain linked with particular spine disease⁵.

Mechanical low back pain is classified as acute, subacute, or chronic. The Pain that lasts less than six weeks is categorized as acute, that lasts six to twelve weeks as subacute, while that last more than 12 weeks as chronic⁴.

Low back pain is the major reason of disability globally, and it is influenced by societal norms, local medical tactics, and legislation. Extending high-cost health-care models to middle- and lower-income nations will worsen the problem rather than alleviate it. As a result, LBP has become a serious global public health issue⁵. This is particularly worrisome in middle and lower-income countries, where informal employment is prevalent and job mobility

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is limited. As a result, disability caused by low back pain might exacerbate the poverty cycle in underdeveloped nations⁶.

LBP is the 5th most prevalent reason for hospital visits, affecting 60-80% of the population at some time in their life⁷. In the 2017 Global Burden of Disease study, the global age-standardized point prevalence of LBP was estimated to be 7.5 percent⁸. Western Europe had the highest incidence, followed by North Africa/Middle East, while the Caribbean and central Latin America had the lowest⁹.

Mechanical Low back pain can be the result of structural changes in the quadratus lumborum, piriformis and the multifidus muscle due to dysfunction in the lumbar motor control, lumbar integrity and an abnormal compression in the spinal nerve roots leading to nociceptive pain in the low back region¹⁰. Muscle spasms, pain, and a reduction in range of motion are all symptoms of improper ergonomics & biomechanical variables, which can eventually lead to degenerative changes or impairment in lumbar joint¹¹.

Positional release technique, commonly known as strain counter strain (SCS), is a passive positional therapy that uses indirect hand manipulation to reduce musculoskeletal discomfort and dysfunction¹². PRT is fourth most often used osteopathic manipulative method commonly used to treat pain, local edema, fascial tension, joint hypomobility, muscle inefficiency, muscular spasm, and weakness in orthopedic patients¹³.

Deep transverse friction massage is applied to soft tissue structures like tendons, muscles or ligaments to improve mobility and prevent scar formation¹⁴. Deep transverse friction massage

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entailed the direct application of physical pressure to the musculotendinous junction, which, when adequate, stimulates Golgi tendon organs and inhibits muscular tension^{15,16}.

The effectiveness of Positional release therapy and deep transverse friction massage on quadratus lumborum for patients of mechanical low back pain was not evaluated. So, this research study was carried out to find out the better manual therapy treatment option for mechanical low back pain. The most effective manual therapy treatment will be applied in future for treatment purpose.

MATERIALS AND METHODS

This single blinded RCT was conducted after ethical Approval from University of Faisalabad with in a duration of 6 months. 40 Participants were recruited by purposive sampling techniques for the study and data was collected from Madina Teaching Hospital Faisalabad, Allied Hospital Faisalabad, District Head Quarter, Hospital Faisalabad and Physio Rehab Clinic Faisalabad. The participants were grouped into 2 equal treatment groups, PRT group and DTFM group using lottery method where the selection of participants into groups depends upon the card drawn and the specific number assigned to participants.

The male and female patients of mechanical low back pain aging 20-40 years¹⁷, having at least one trigger point in the iliopsoas muscle on the anterior lumbar aspect and one in the quadratus lumborum muscle lateral to transverse processes of L1-L5 diagnosed by applying anterior and medial pressure by using thumb and index figure and presence of palpable taut bands, hypersensitive tender spot in the taut band that produced local twitch response and typical referred pattern of trigger points, and participants having pain history of less than 6 weeks¹⁸, visiting the study settings were considered as the study population. While the patients having LBP secondary to any other disease as Congenital or acquired spinal deformities, Spinal stenosis, Diagnosed disc prolapse, Rheumatoid arthritis, any malignancies or recent history (<3 months) of surgery, soft tissue injury, Acute infections, were excluded from the study.

Pain was assessed using NPRS scale, lumbar ROM was measures using Goniometers and Oswestry disability index was used to assess disability secondary to LBP

The frequency of treatment was 3 sessions per week for 4 weeks and the measurement were recorded at baseline, 2nd week and then 4th week. The overall treatment time for both the groups was 30 minutes.

Group A (Positional Release Technique): The patient was prone, with his trunk extended laterally toward the trigger point side. The therapist stood on the pain side, putt his or her knee on the table, and then supported the patient's affected leg on his or her thigh. The patient hip was then extended, abducted at 45 degrees, & gently rotated to fine-tune the position, which was held for 90 seconds. This was repeated for 3 times with a 90 seconds rest between each repetition¹⁹. The individual is then passively positioned in a relaxed position after it.



The patient was lying down in supine position, and the examiner was standing on the painful side. The examiner flexed the patient's hips to about 90 degrees, rotating the hips away from the trigger point side to approximately 60 degrees, and allowed the feet to descend toward the floor to generate lateral flexion away from the tender point side and continuing it for 90 seconds. The table head may be lifted, or a pillow can be placed beneath the pelvis of patient. This must be repeated for 3 times and with a 90 seconds rest between each repetition¹⁹.



Group B (Deep Friction Massage): The participants were advised to lie down in a prone position. Before beginning the operation, the treatment area was cleansed and dried. After palpating the affected painful site on the quadratus lumborum when the muscle is relaxed and shortened, the therapist treated the patient. The patient's tolerance was taken into consideration when a transverse friction massage was given across the muscle fiber. Transverse friction massage was performed to the affected muscle as the thumb of the therapist and the skin of the patient were pulled together as one²⁰. The same procedure was repeated for painful spot at iliopsoas muscle²¹. There were total of 3 repetitions with each repetition lasting 2 minutes with one minute rest between consecutive repetitions for both.

Statistical Analysis: SPSS version 26 was used for the analysis of data. Descriptive statistics as mean \pm S.D was used to summarize the continuous variables. The normality of data was assessed by Shapiro-Wilks test, for within group analysis Friedman test and for between group analysis Mann-Whitney U test were applied for Numeric pain rating scale and Lumbar ROM by Goniometer as the data was not normally distributed. As ODI was Normally distributed so for within group analysis Repeated measures ANOVA and for between group analysis Independent Samples t-test were applied.

RESULTS

Table 1 given below shows the age distribution, gender and BMI of the participants. The data shows that age was categorized into 3 categories, out of 40 participants 30 percent participants were lying in the 20-26 years category, 27.5% participants were lying in the 27-33 years category and the rest 42.5% participants were lying in the 34-40 years category. The mean age of the participants was 30.48 ± 6.02 years and as per gender distribution in the study there were 57.5 % male and 42.5% female of which 2.5% underweight participants, 50% were normal weight, 42.5 percent were overweight and the rest 5 percent were obese. The mean of BMI was 24.95 ± 3.64 .

Table 2 represents descriptive statistics and Friedman test statistics for NPRS, Lumbar Flexion and Extension while repeated measure ANOVA for ODI. The results showed that the mean of NPRS for Group A and B at baseline was 4.94 ± 1.21 , 4.26 ± 1.2 and after 4th week was 1.66 ± 0.77 , 1.21 ± 0.63 respectively. The mean of Lumbar Flexion for Group A and B at baseline was 53.94 ± 6.11 degrees, 53.63 ± 6.02 degrees and after 4th week was 65.22 ± 5.83 degrees, 65.05 ± 6.2 degrees respectively. The results also showed that the mean of Lumbar Extension for Group A and B at baseline was 13.77 ± 1.93 degrees, 14.00 ± 1.97 degrees and After 4th week

was 18.67±2.65 degrees, 18.95±2.12 degrees respectively. While the mean of Lumbar Extension for Group A and B at baseline was 45.83±6.00 degrees, 46.79±5.48 degrees and after 4th week was 31.33 ± 5.04 degrees, 32.00 ± 5.72 degrees respectively.

The above results showed that the significant value of NPRS, Lumbar Flexion and Extension and ODI is less than 0.005 which means that both techniques, the PRT and DTFM has reduced the pain, improved lumbar Rom and significantly reduced lumbar disability in patients with mechanical LBP in their respective groups (Table 2).

Table 3 given below shows the test statistics of the Mann-whitney U test conducted on NPRS, and Limber ROM while Independent Sample t-test for ODI between group A and B. Looking at the table we see that the pre-test and post test Values of both group were not statistically significant for NPRS. Lumbar ROM and ODI which indicated that both PRT & DTFM were equally effective in reducing pain, increasing lumbar ROM and reducing Lumbar

disability in patients with mechanical Low back pain in their respective groups (Table 3).

Table 1: Demographic data

Age	%age (n)
20-26 Years	30(12)
27-33 Years	27.5(11)
34-40 Years	42.5(17)
Gender	
Male	57.5(23)
Female	42.5(17)
Body Mass Index (BMI)	
Underweight	2.5(1)
Normal weight	50(20)
Overweight	42.5(17)
Obese	5(2)

Table 2: Within Group Analysis of NPRS, NDI and Cervical Lateral Flexion

	Group A (n=18)		Group A (n=18)	
Numeric Pain Rating Scale (Friedman test)				
	Mean ± SD	P-value	Mean ± SD	P-value
NPRS at Baseline	4.9444±1.21133	0.002	4.2632 ±1.19453	0.001
NPRS after 2nd Week	3.5000±.98518		3.0526 ±.77986	
NPRS after 4th Week	1.6667±.76696		1.2105 ±.63060	
Lumber Flexion ROM (Friedman test)				
Lumber Flexion at Baseline	53.9444 ± 6.11144	0.003	53.6316 ±6.02965	0.001
Lumber Flexion after 2nd Week	58.8333 ± 5.97298		59.1053 ± 6.38483	
Lumber Flexion after 4th Week	65.2222 ± 5.83655		65.0526 ± 6.20460	
Lumber Extension ROM (Friedman test)				
Lumber Extension at Baseline	13.7778 ±1.92676	0.002	14.0000 ±1.97203	0.004
Lumber Extension after 2nd Week	16.0000 ±2.00000		16.4211 ± 2.00875	
Lumber Extension after 4th Week	18.6667 ± 2.65684		18.9474 ± 2.12063	
Oswestry Disability Index (Repeated measures ANOVA)				
Lateral Flexion to Right at Baseline	45.8333 ±6.00245	0.001	46.7895 ±5.48309	0.005
Lateral Flexion to Right after 2nd Week	38.5000 ± 5.38243		39.1053 ±5.4046	
Lateral Flexion to Right after 4th Week	31.3333 ±5.04101		32.0000 ±5.72519	

Table 3: Between Group Analysis

	Mann-Whitney U		Asymp. Sig. (2-tailed)
Numeric Pain Rating Scale (Mann Whitney test)			
NPRS at Baseline		160.000	.264
NPRS after 2nd Week		127.500	.164
NPRS after 4th Week		121.500	.094
Lumber Flexion (Mann Whitney test)			
Lumber Flexion at Baseline		195.500	.903
Lumber Flexion after 2nd Week		167.000	.903
Lumber Flexion after 4th Week		170.000	.976
Lumber Extension (Mann Whitney test)			
Lumber Extension at Baseline		189.500	.773
Lumber Extension after 2nd Week		150.000	.518
Lumber Extension after 4th Week		161.500	.770
Oswestry Disability Index (Independent Sample T test)			
	Groups	Mean ± SD	P-value
Oswestry Disability Index at Baseline	Group A	45.4000 ±6.09918	.514
	Group B	46.6000 ±5.40370	
Oswestry Disability Index after 2nd Week	Group A	38.5000 ± 5.38243	.735
	Group B	39.1053 ± 5.40468	
Oswestry Disability Index after 4th Week	Group A	31.3333 ±5.04101	.709
	Group B	32.0000 ±5.72519	

DISCUSSION

This comparative study was based on finding the effects of positional release technique and Deep transverse friction massage on pain and disability in patients with mechanical Low back pain. The results of the study indicated that both techniques were significant in reducing lumbar pain, increasing lumbar flexion and extension range of motion as well as decreasing lumbar disability but none of the two has significant effects on the study variables as assessed by numeric pain rating scale, goniometry and oswestry disability scale among the patients of mechanical LBP.

The outcome of the current study is in contrast with the results given by Ibraheem, et al., 2017¹⁹, that concluded that positional release technique for the low back pain was not significant in decreasing pain, and rather conventional therapy was better and effective as compared to positional release technique among low back pain patients, but the present study gave contrasting view where the positional release technique was found decreasing the lumbar pain, disability and increasing the lumbar range of motion among the mechanical low back pain patients.

The outcome of the study are supported by the results given by Doley, et al., 2014¹⁷, that stated Positional release technique is useful for managing low back pain in physiotherapy

because it effectively reduces pain from Quadratus Lumborum trigger points while increasing functional capacity, similar results are given by the current study that positional release technique is an effective treatment for the patients of mechanical low back pain due to quadratus lumborum trigger point as it reduced the pain, disability and increased lumbar range of motion as assessed by numeric pain rating scale, Oswestry disability scale and goniometry, respectively.

The results of the current study are also supported by the study conducted by Gala and Kulkarni et al, in 2021¹⁴ compared the effects of deep transverse friction massage and positional release therapy on Planter Fasciitis that both the techniques were equally effective in reducing pain caused due to planter Fasciitis, similar results were given by the present study where the deep transverse friction massage was significant and equally effective as compared to positional release technique in reducing pain, functional disability and increasing lumbar range of motion among patients of mechanical low back pain.

The findings of the present study are in line with the views by Divya, et al. 2022²², that stated that positional release technique is as effective as conventional treatment as well as other therapeutic options available in reducing pain and disability among the patient, similar results are given by current study where PRT and DTFM both are equally effective in reducing pain, functional disability and increasing lumbar range of motion among patient of mechanical low back pain.

According to Simons, applying local pressure may equalize the length of the sarcomeres in the affected trigger point, hence reducing discomfort. To treat tender spots, positional release technique is typically utilized with the targeted muscle in a shortened position. The activation of A δ fibers may be the reason positional release technique reduces pain. These explanations lend weight to the findings of our study, which showed that the positional release technique group pain intensity decreased in patients with mechanical low back pain²³.

The results of the current study are also supported by Vohra, et al., 2014²⁴, that stated that the positional release technique on the quadratus lumborum was significant in reducing pain and functional disability among patients of low back pain patients with quadratus lumborum trigger points, similar results are obtained in current study where the positional release technique decreased lumbar pain, disability among patients of mechanical low back pain.

It has been demonstrated that the PRT is beneficial in reducing the functional disability score as well as the amount of pain experienced by patients who have mechanical low back pain. The soothing effect of the strain-counter strain technique may be attributable to the nociceptive theory, which states that the positional release mechanism employed by positional release technique has the potential to reduce the amount of tissue damage that occurs in malfunctioning muscles²⁵. It has been seen that both the pain and tension in the quadratus lumborum and iliopsoas muscles have lessened, which lends credence to the hypothesis that the application of positional release technique led to the relief of muscle spasm and an improvement in the relevant painless movement as well as tissue flexibility. The outcomes of the current investigation have given support for previous studies about the reduction of pain.

The view of the present study are in line with the results produced by the Azzam, et al., 2020²⁶, Mohammed, et al. 2015²⁷, kannabiran, et al. 2015²⁸, stated that positional release technique is an effective treatment in treating the patients of low back pain, which are in line with the current study where the positional release technique along with the baseline treatment was effective in increasing lumbar range of motion, decreasing lumbar pain and functional disability in patient with mechanical low back pain. In order to control the length and tone of the afflicted tissues, positional release technique is supposed to work by automatically resetting muscle spindles.

CONCLUSION

A 4-week intervention of the deep transverse friction massage and positional release technique produced significant results in reducing lumbar pain, the lumbar disability and improving lumbar range of motion, but the intergroup comparison revealed that both the positional release technique and deep transverse friction massage were equally effective and none of them produced significant results as compared to the other among mechanical low back pain patients.

Conflict of interest: Nil

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