



EFFECTIVENESS OF POSITIONAL RELEASE TECHNIQUE ON PAIN AND DISABILITY IN SURGEONS WITH NON- SPECIFIC LOW BACK PAIN

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Abstract

Background: Nonspecific low back pain (NSLBP) is a common musculoskeletal disorder among surgeons due to prolonged standing and awkward postures. It contributes significantly to pain, functional disability, and reduced work efficiency. Positional Release Technique (PRT), a manual therapy approach, may provide an effective, non-invasive method to reduce pain and disability.

Aim: To evaluate the effectiveness of the Positional Release Technique on pain and disability in surgeons with nonspecific low back pain.

Methodology: An experimental study was conducted on 50 surgeons with NSLBP, selected through simple random sampling. Participants were divided into two groups. Group A received PRT along with spine exercises, while Group B received conventional therapy with spine exercises. The intervention was provided for one week, with outcome measures including the Visual Analogue Scale (VAS) for pain and the Oswestry Disability Index (ODI) for disability. Data were analyzed using paired and unpaired t-tests for intra- and inter-group comparisons.

Results: The PRT group demonstrated a greater reduction in pain intensity and an improvement in functional disability ($p < .001$) compared with those receiving conventional therapy.

Conclusion: The study established that PRT was more effective at reducing pain and disability among surgeons with nonspecific low back pain.

Key words: Non -Specific Low Back Pain, Oswestry Disability Index, Positional Release Technique, Visual Analogues Scale, Manual Therapy.

Introduction

Low back pain is characterized by discomfort, muscle spasms, or stiffness in the area between the L1 and L5 vertebrae. This region is located below the lower edge of the twelfth ribs and above the upper gluteal fold. It may or may not be accompanied by pain that radiates to the lower limbs.¹ The lifetime prevalence of low back pain is approximately 23%, with 11-12% of the population experiencing disability due to this condition.²

The studies show that 74% of general surgeons, 69.5% of orthopedists, 53% of neurosurgeons, 30% of ENT surgeons, and 28% of ophthalmologists report experiencing low back pain. The main cause is prolonged standing or abnormal posture.³

Nonspecific low back pain (LBP) is characterized by the absence of structural changes, such as disc space narrowing or joint injuries. It can also be associated with marked scoliosis or lordosis, which may contribute to back pain. Although there are no structural changes in nonspecific LBP, it can still limit daily activities and lead to temporary or permanent work disabilities.⁴ The incidence of nonspecific low back pain is higher among medical professionals who experience heavy physical exertion, such as repetitive movements and maintaining static postures for long periods. The characteristics of nonspecific low back pain include a heavy sensation of pain that worsens with exertion and improves with rest. There are no neurological signs or issues related to muscle contraction or posture, and the pain is often associated with specific activities.⁵ Prolonged periods of standing, the use of lead aprons, and inadequate ergonomic setups in operating theatres contribute to increased mechanical stress on the lumbar spine.⁶ Over time, these factors can lead to muscle imbalances, fatigue, and the development of myofascial trigger points, which are significant contributors to non-specific low back pain (NSLBP).⁷ Non-specific low back pain is often associated with mechanical and functional impairments involving muscles, ligaments, and joints.⁸

Myofascial dysfunction is characterized by hyperirritable spots within tight bands of skeletal muscle, which plays a crucial role in the pathophysiology of non-specific low back pain (NSLBP).⁹ These trigger points can lead to localized pain, referred pain, and a restricted range of motion, contributing to disability.¹⁰ Myofascial pain syndrome affecting the quadratus lumborum muscle is one of the most common musculoskeletal disorders seen in patients with low back and buttock pain, including those with failed back surgery syndrome. The referral pain of the deep fiber trigger points (TrPs) can extend from the lower back to the sacroiliac joint and then to the lower buttock. In contrast, the referral pain from the superficial fiber TrPs may radiate from the iliac crest to the greater trochanter, along the lateral aspect of the femur, and into the groin area. Due to this physiological response, myofascial pain in the quadratus lumborum muscle can lead to conditions such as pseudo-sciatica and failed back surgery syndrome, especially when accompanied by trigger points in the sacroiliac joint or gluteus minimus.¹¹

The Positional Release Technique (PRT), also known as strain-counterstrain, is a manual therapy method aimed at alleviating musculoskeletal pain. This technique involves positioning the body in a way that maximizes comfort, which helps reduce muscle spindle activity and promotes relaxation of the affected

tissues.¹² Developed by Lawrence H Jones¹³, PRT aims to alleviate tender points by shortening the affected muscles, which reduces nociceptive input and aids in neuromuscular re-education. This technique is gentle and non-invasive, making it suitable for individuals with both acute and chronic pain conditions. Several studies have shown that PRT effectively reduces pain and improves functional outcomes in patients with musculoskeletal disorders, including low back pain.¹⁴ Despite its potential benefits, there is limited evidence specifically examining the effectiveness of PRT in surgeons suffering from NSLBP, a population exposed to unique occupational risk factors.

Considering the high prevalence of low back pain among surgeons and the need for effective, non-invasive treatment options, this study aims to assess the effectiveness of the positional release technique in reducing pain and disability in surgeons with non-specific low back pain.

Methodology

An experimental study was conducted in the physiotherapy department of Maharashtra Institute of Physiotherapy, Latur. Following approval granted by the institutional ethics committee. One hundred participants from the outpatient department, diagnosed with non-specific low back pain, were selected based on the inclusion and exclusion criteria detailed below and were randomly divided into groups A and B of 50 participants each by an independent collaborator using opaque, sealed envelopes. Prior written Informed consent was obtained from each participant. The participants were included if they met the following criteria: Age group 25 years -50 years, clinically diagnosed with non-specific low back pain symptoms lasting less than 6 weeks, both male and female surgeons, disability score between 21% and 60% according to the ODI. Participants having spinal pathology (infection, tumour, osteoporosis, or nerve root compression), systemic disease, pregnancy, recent spinal injury or surgery, or red flags such as cancer, infections, etc., were excluded.

The baseline data on back pain were obtained using a visual analogue scale (VAS), and disability data were obtained using the Oswestry disability index (ODI) to assess functional outcome. The outcomes were assessed at baseline and at 1 week.

Group A received the Positional Release Technique (PRT)¹⁵. The participant was placed in a prone position. The therapist palpated the posterior lumbar tender points using the pincer technique, which was applied at the following sites: paraspinal area, tip of the transverse processes of (L3, L4, L5) and the gluteal region. If more than one tender point was located, the most sensitive one was treated first. Treatment was accomplished with the patient prone and the therapist standing on the side of the dysfunction, applying moderate ischemic compression on the palpated trigger points. The ipsilateral lower extremity on the side being treated was moved into hip joint extension (15-20 degrees). The therapist's knee was carefully placed under the patient's raised thigh to maintain the position. From this position, abduction and external rotation of the ipsilateral hip were performed, with or without rotation or side bending of the trunk away from the side with the tender points. The participant was asked to provide immediate feedback on the degree of pain or discomfort at the palpated tender point being deactivated. This position was maintained for about 90 seconds, with firm pressure applied to the tender point. After

holding the position for 90 sec the hip was slowly returned to neutral. The tender point was re-evaluated and, if necessary, treated again up to 3 times before proceeding to the next point. No more than 5 tender points were treated in a single session.

Participants were also given conventional back exercises, including pelvic bridging, single-knee-to-chest stretches, and lower-trunk rotation stretches, along with core stabilisation exercises such as planks, slow curl-ups, and bird dog.

The protocol for conventional and core stabilization exercises was:

For pelvic bridging, participants were positioned in a crook lying position and were instructed to slowly raise the buttocks from the floor, keeping the back straight, and then let it down slowly. This movement was repeated 10 times.

Single Knee-to-chest stretches: In the crook lying position, participants were asked to pull one knee toward the chest until a comfortable stretch was felt in the lower back and buttocks. This position was held for 20 seconds and then released, after which participants were asked to repeat with the opposite knee. A total of 10 repetitions were performed.

Lower-trunk rotation stretches: In the crook-lying position with feet resting on the floor, participants were asked to lift the feet and knees together, then rotate them to one side of the body and then to the other. These exercises were performed for 10 repetitions.

For Planks, the participant was positioned prone while the therapist stood at the side of the plinth. The patient placed the palms on the plinth with hands facing forward. Legs were extended, thighs squeezed, and the core muscles engaged to lift the upper body off the floor. The back was kept straight, hips aligned, and knees straight. The position was held for 10-20 seconds.

For curl-ups, the participant was positioned supine, while the therapist stood at the side of the plinth. The participant maintains supine lying with knees flexed and feet flat on the plinth. The abdominal muscles were slowly contracted to raise the shoulder blades off from the plinth. The position was held for 10-20 seconds, then slowly returned to the starting position.

For Bird Dog, the participant was positioned in quadruped while the therapist stood beside the plinth. While inhaling, the patient simultaneously extended the shoulder on one side and the opposite hip. The position was held for 5-10 seconds. While exhaling, the patient returned to the starting position.

Participants in group B were given conventional back exercises, including pelvic bridging, single-knee-to-chest stretches, and lower-trunk rotation stretches, along with core stabilisation exercises such as planks, slow curl-ups, and bird-dog as described above.

Statistical analysis:

The data obtained were entered in a Microsoft Excel sheet, and statistical analyses were performed using a statistical package for the social sciences (SPSS) (Version 20). Results were

presented as Mean, SD, counts and percentages, and diagrams. The Mann-Whitney U test was used to compare continuous variables between two groups, whereas the Wilcoxon signed-rank test was used to compare continuous variables within groups. For categorical data, the Chi-square test was performed to compare the two groups. If the p-value was less than 0.05, it was considered statistically significant. All statistics are two-tailed.

Results:

Table 1. Pre Post comparison of dependent variables within group A (PRT)

Variables	N	Mean	Diff	%	SD	Wilcoxon signed-rank test value	p-value	Remarks
Pre Oswestry Disability Index (%)	50	39.08	-	-	18.322			
Post Oswestry disability index (%)	50	11.92	27.16	69.49846469	12.427	1265	< .001	Significant
Pre-visual analogue scale	50	6.14	-	-	1.591			
Post visual analogue scale	50	1.26	4.88	79.47882736	1.322	1275	< .001	Significant

The administration of Positional Release was found to be effective in reducing the Oswestry disability index. From Table 1 (above) and Figure 1 (below), we observed that the mean ODI score prior to treatment was 39.08, which decreased to 11.92 after treatment, with a mean difference of 27.16 and a 69.5% reduction. The analysis using the Wilcoxon signed-rank test demonstrated statistical significance of the improvement ($P < 0.001$), and the administration of Positional Release was found to be effective in reducing the VAS Score. The mean VAS score prior to treatment was 6.14, which decreased to 1.26 after treatment, with a mean difference of 4.88 and a 79.5% reduction. The analysis using the Wilcoxon signed-rank test demonstrated the statistical significance of the improvement, with $P < 0.001$. Details are shown at full length in Table 1 and Figure 1.

Figure 1. Pre Post comparison of dependent variables within group A (PRT)

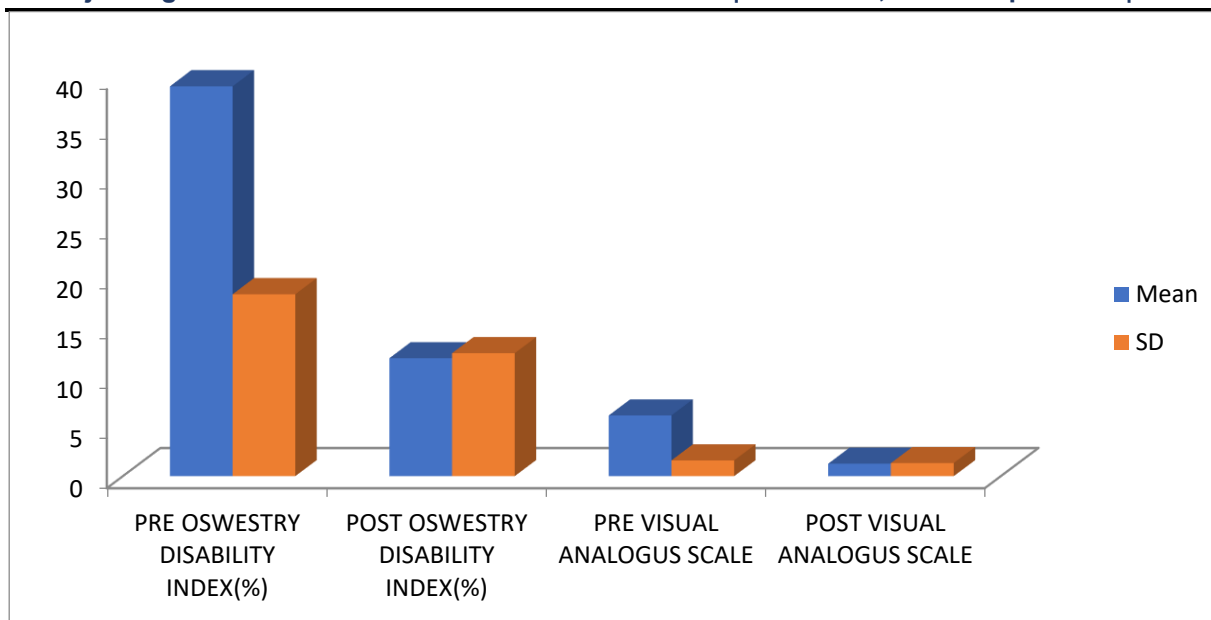


Table 2. Pre Post comparison of dependent variables within group B (Conventional Exercise)

Variables	N	Mean	Diff	%	SD	Wilcoxon signed-rank test value	p-value	Remarks
Pre Oswestry-disability index (%)	50	43.42	-	-	13.557			
Post Oswestry disability index (%)	50	23.4	20.02	46.10778443	10.18	1225	< .001	Significant
Pre-visual analogue scale	50	6.1	-	-	1.249			
Post visual analogue scale	50	3.12	2.98	48.85245902	0.895	1275	< .001	Significant

The administration of the Convention was found to be effective in reducing the Oswestry Disability Index. From Table 2 (above) and Figure 2 (below), we observed that the mean ODI score prior to treatment was 43.42, which decreased to 23.4 after treatment, with a mean difference of 20.2 and a 46.1% reduction. The analysis using the Wilcoxon signed-rank test demonstrated statistical significance of the improvement ($P < 0.001$), and the administration of the Convention was found to be effective in reducing the VAS. The mean VAS score prior to treatment was 6.1, which decreased to 3.12 after treatment, with a mean

difference of 2.98 and a 48.85% reduction. The analysis using the Wilcoxon signed-rank test demonstrated statistical significance of the improvement, with $P < 0.001$.

Figure 2. Pre Post comparison of dependent variables within group B (Conventional Exercise)

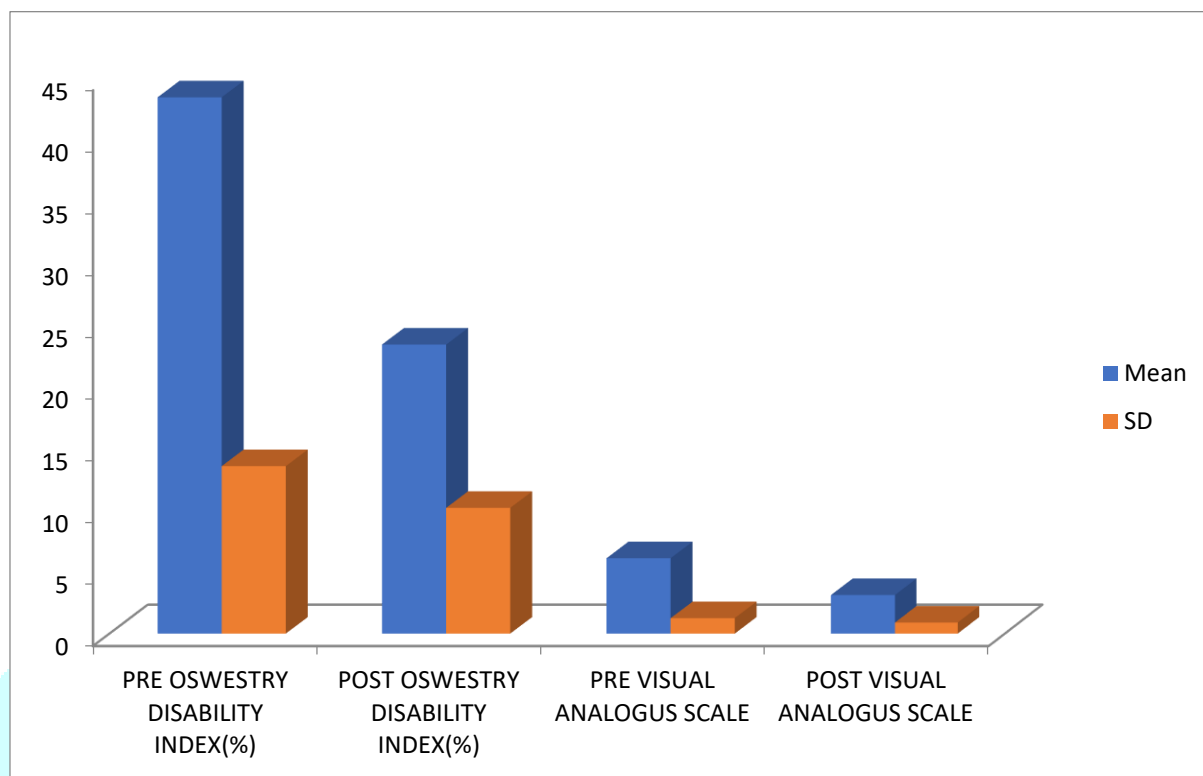


Table 3. Pre-Pre and Post-Post comparison of dependent variables between groups for ODI.

Variables	Group	N	Mean	SD	Mann-Whitney U test value	p-value	Remarks
Pre Oswestry Disability Index (%)	Positional Release	50	39.08	18.322	1.35	0.17	Not Significant
	Conventional Physiotherapy	50	43.42	13.557			
Post Oswestry disability index (%)	Positional Release	50	11.92	12.427	5.06	<.0001	Significant
	Conventional Physiotherapy	23.	20.02	10.18			

The pretest means were (%) 39.08 in the Positional Release group and (%) 43.42 in the Conventional Physiotherapy group. The Mann-Whitney U test was performed to compare the groups. From Table 3 (above) and Figure 3 (below), we observe that the P-values for almost all pre-comparison parameters were greater than 0.05. Hence, we can conclude that there was no statistically significant difference between the groups on the

Oswestry Disability Index. Further, we can observe that the mean (%) for Convention is greater than the positional Release.

The post-test means were (%) 11.92 in the Positional Release group and (%) 23.4 in the Convention Group. The Mann-Whitney U test was performed to compare the groups. From Table 3 and Figure 3, we observed that the P-value for almost all parameters was less than 0.05. Hence, we can conclude that there was a statistically significant difference between the groups on the post-treatment Oswestry Disability Index. Furthermore, we observe that the mean (%) for Convention is higher than that for Positional Release Technique. Positional Release group is better than the Convention Group for ODI.

Figure 3. Pre-pre and post-post comparison of dependent variables between groups for ODI.

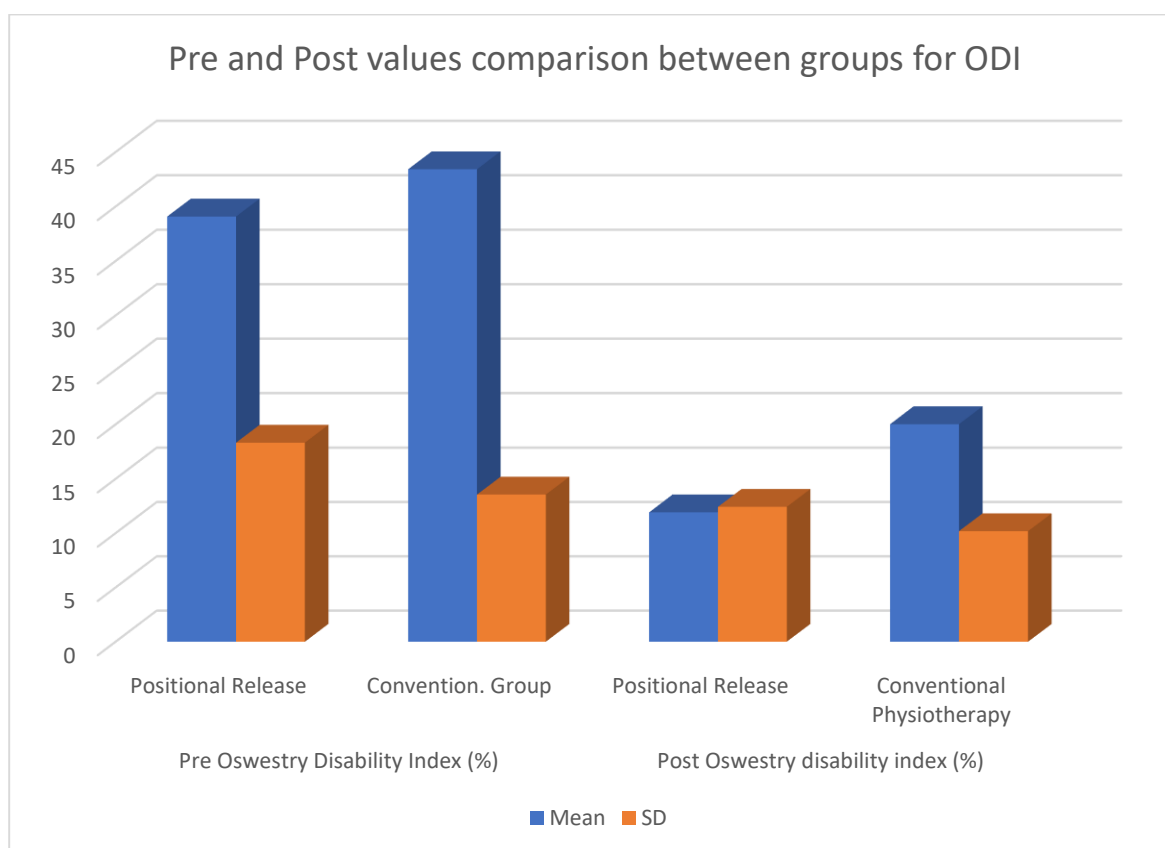


Table 4. Pre-Pre and Post-Post comparison of dependent variables between groups for VAS.

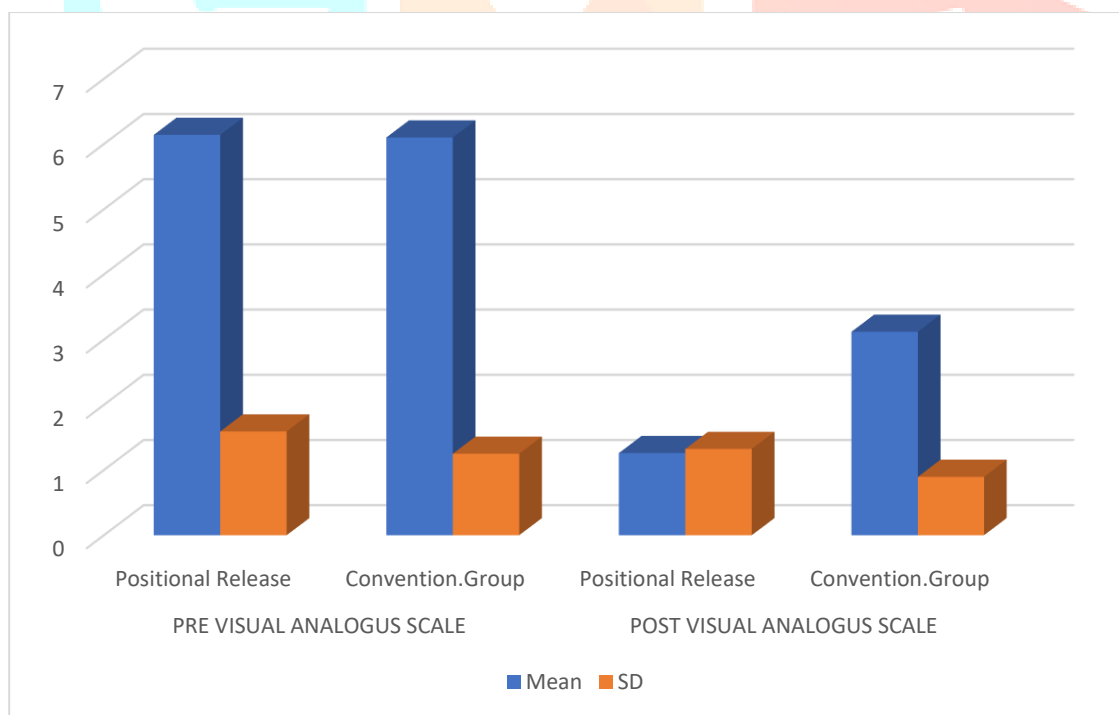
Variables	Group	N	Mean	SD	Mann-Whitney U test value	p-value	Remarks
Pre-visual analogue scale	Positional Release	50	6.14	1.591	1267	0.907	Not Significant
	Convention. Group	50	6.1	1.249			
	Positional Release	50	1.26	1.322	369	< .001	Significant

Post visual analogue scale	Convention. Group	50	3.12	0.895			
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The pre-test means were 6.14 in the Positional Release group and 6.1 in the Convention Group; the Mann-Whitney U test was conducted to compare the groups. From Table 4 (above) and Figure 4 (below), we observe that the P-values for almost all parameters were greater than 0.05. Hence, we concluded that there was no statistically significant difference between VAS and Groups. Further, we observed that the mean for Convention was lower than that for positional Release.

The post-test means were 1.26 in the Positional Release group and 3.12 in the Convention Group; the Mann-Whitney U test was conducted to compare the groups. From Table 8 and Figure 8, we observed that the P-value for almost all parameters was less than 0.05. Hence, we concluded that there was a statistically significant difference in VAS scores between the groups. Further, we observed that the mean for Convention was greater than the positional Release. The Positional Release group outperformed the Convention Group.

Figure 4. Pre-Pre and Post-Post comparison of dependent variables between groups for VAS.



Discussion:

The present study examined the effectiveness of the Positional Release Technique (PRT) in conjunction with conventional physiotherapy for reducing pain and disability in surgeons with non-specific low back pain (NSLBP). The findings indicate that while both treatment groups demonstrated statistically significant improvements, the group receiving PRT experienced greater reductions in both pain and disability. These results provide clinically meaningful evidence supporting the use of PRT as an additional

treatment option in occupational settings for individuals with NSLBP. At baseline, there were no statistically significant differences between the two groups in terms of the Oswestry Disability Index (ODI) and Visual Analogue Scale (VAS) scores, indicating that the groups were comparable and that randomization was successful. This finding aligns with methodological recommendations for controlled trials in musculoskeletal research, where establishing baseline equivalence is crucial for attributing any post-intervention changes to treatment effects rather than confounding variables. Within-group analysis revealed a substantial improvement in the Pain Rehabilitation Therapy (PRT) group, which achieved a 69.5% reduction in disability and a 79.5% reduction in pain intensity. In contrast, the conventional physiotherapy group exhibited more moderate improvements, with a 46.1% reduction in ODI scores and a 48.85% reduction in VAS scores. These findings indicate that exercise-based interventions, including core stabilization and flexibility exercises, are effective for managing nonspecific low back pain (NSLBP). Furthermore, incorporating manual therapy enhances the therapeutic outcomes. This aligns with current rehabilitation practices that promote multifaceted approaches to treating low back pain. The superior results observed in the Progressive Resistance Training (PRT) group are supported by emerging evidence. A recent systematic review and meta-analysis showed that combining PRT with conventional physiotherapy leads to greater improvements in pain intensity and activity limitations compared with conventional therapy alone.¹⁴ Although the overall certainty of the evidence was low due to methodological limitations in the included studies, the consistent direction of the results favored combined interventions. This finding supports the results of the present study, reinforcing that Position Release Technique (PRT) serves as an effective adjunct rather than a standalone therapy. The underlying mechanism of PRT offers a plausible explanation for these results. PRT, also known as strain-counterstrain, is an indirect manual therapy technique that places the affected muscle in a position of ease. This approach reduces abnormal muscle spindle activity and nociceptive input, leading to a neuromodulatory effect that decreases muscle hypertonicity, improves local circulation, and reduces trigger point sensitivity. The PRT group demonstrated a statistically significant improvement on the Numeric Pain Rating Scale (NPRS), indicating decreased pain severity. These findings are consistent with those reported by Meseguer et al.¹⁶ Researchers have reported a reduction in pain among individuals undergoing positional release therapy (PRT). The analgesic effect of PRT may be due to the relaxation of damaged tissues, which is achieved by positioning the patient to target inflammatory mediators. It has been concluded that PRT can be effective in producing hypoanalgesia and reducing activity in tender points. PRT is known to alleviate pain by decreasing muscle contractions through a signalling mechanism to the brain, effectively addressing acute and sensitive somatic dysfunctions.¹⁷ Our results are in agreement with prior studies reporting improvements in ROM, functional status, and pain reduction following PRT intervention.¹⁸ Myofascial trigger points and neuromuscular dysfunction are significant contributors to non-specific low back pain (NSLBP), especially in individuals who experience prolonged postural stress, such as surgeons. The Positional Release Technique (PRT) may be more effective in addressing the underlying issues than exercise alone. The occupational context of this study further enhances its clinical relevance because surgeons often face prolonged static postures, repetitive movements, and ergonomic constraints, all of which contribute to cumulative lumbar stress and the

development of musculoskeletal disorders. The rapid and significant improvement observed within a short intervention period (one week) underscores the potential of PRT as a time-efficient and practical solution for high-demand professionals. This is particularly important in healthcare settings where time constraints can hinder adherence to longer rehabilitation protocols. Another crucial aspect to consider is the role of multimodal therapy. Current evidence indicates that no single intervention is universally effective for NSLBP, and combined approaches tend to yield better results. The findings of this study support this perspective, showing that integrating manual therapy (PRT) with therapeutic exercise leads to greater improvements than exercise alone. Clinical evidence also suggests that manual therapies can enhance the effectiveness of exercise by reducing pain, improving mobility, and facilitating neuromuscular control. However, the findings should be interpreted with caution due to certain limitations. The short duration of the intervention restricts conclusions about the long-term effectiveness and sustainability of the benefits. Additionally, while subjective outcome measures such as the Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI) are widely validated, they can be influenced by patient perception and reporting bias. Moreover, recent systematic reviews indicate that the quality of evidence for PRT remains low to very low, highlighting the need for high-quality randomised controlled trials with standardised protocols and longer follow-up periods. Future research should focus on long-term outcomes, dose-response relationships, and comparisons with other manual therapy techniques, such as muscle energy techniques and myofascial release. Incorporating objective measures like electromyographic activity, functional performance tests, and biomechanical assessments may further strengthen the evidence base. In conclusion, this study demonstrates that the Positional Release Technique, when combined with conventional physiotherapy, is effective in reducing pain and disability in surgeons with non-specific low back pain.

Conclusion

The study concluded that both groups were individually effective, but, when compared, PRT was more effective than conventional therapy alone at reducing pain and disability among surgeons with nonspecific low back pain.

Limitations

- 1) Duration of the intervention was limited to one week, which restricts the ability to determine the long-term sustainability of the observed improvements in pain and disability.
- 2) The study sample was confined to surgeons within a specific age group and occupational setting.
- 3) The study relied primarily on subjective outcome measures, namely the Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI). The absence of objective outcome measures such as range of motion, muscle strength, or electromyographic activity, limits the comprehensiveness of the assessment.

Future Scope

- 1) Future research should focus on conducting long-term randomized controlled trials to evaluate the sustained effects of the Positional Release Technique in NSLBP.

- 2) Expanding the study population to include diverse groups such as different healthcare professionals, office workers, and individuals with varying severity and chronicity of low back pain would enhance the external validity of the findings.
- 3) Future studies should incorporate objective outcome measures, including lumbar range of motion, muscle activation patterns (using electromyography), postural analysis, and functional performance tests.

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