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Effect of Active Release Technique versus Positional Release Therapy on Pain, Range of Motion and Functional Disability in Patients with Chronic Non-Specific Low Back Pain

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Abstract

Background: Chronic non-specific low back pain (CNLBP) is a common musculoskeletal condition associated with pain, restricted lumbar mobility and functional disability. Active Release Technique (ART) and Positional Release Therapy (PRT) are manual therapy approaches used to address soft-tissue dysfunction and improve mobility.

Objective: To determine and compare the effects of ART and PRT on pain, lumbar range of motion and functional disability in patients with CNLBP.

Methods: A comparative study included 40 participants aged 25–60 years with low back pain of 12 weeks duration. Participants were divided equally into Group A (ART; n=20) and Group B (PRT; n=20) using simple random sampling. Treatment was provided for 40 minutes per session, three sessions per week for four weeks (12 sessions). Pain, lumbar range of motion and functional disability were assessed using the Numerical Pain Rating Scale (NPRS), Modified Modified Schober Test (MMST) and Oswestry Disability Index (ODI), respectively. Data were analyzed using paired and independent t-tests after assessment of normality with the Shapiro–Wilk test; significance was set at $p<0.05$.

Results: Both groups demonstrated statistically significant pre- to post-intervention improvement in all three outcomes ($p\leq0.05$). Between-group pre-test differences were not significant. At post-test, Group A showed lower NPRS (2.50±1.00 vs 4.10±0.967; p=0.001), higher MMST (4.66±0.430 vs 3.95±0.351; p=0.001), and lower ODI (37.90±7.18 vs 46.80±8.69; p=0.001) than Group B.

Conclusion: Both ART and PRT improved pain, lumbar mobility and functional disability in patients with CNLBP. Based on the reported post-test comparisons, ART produced superior outcomes to PRT over the four-week intervention period.

Keywords: chronic non-specific low back pain; active release technique; positional release therapy; pain; lumbar range of motion; functional disability.

INTRODUCTION

Low back pain is a considerable health problem and is commonly managed in primary healthcare (1,2). The project describes low back pain as pain, muscle tension or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain (4,5). Chronic low back pain is described as

symptoms lasting more than 12 weeks (6,7), while non-specific low back pain is pain not attributable to a recognized specific pathology (4,5). The project identifies muscle imbalance, myofascial trigger points, postural malalignment, dysfunctional movement, and psychological factors as possible non-specific contributors (3,5,6). The musculature of the lower back and the lumbopelvic-hip complex contributes to spinal stability and movement control. In particular, the project discusses the role of the multifidus, erector spinae, psoas, quadratus lumborum and hip musculature (8,9). ART is described as a non-invasive soft-tissue treatment involving site-specific manual pressure combined with precise patient movement, intended to address scar tissue and adhesions and allow tissue lengthening (17–19). PRT is described as a manual therapy in which the affected tissue is positioned in a position of comfort, commonly maintained for approximately 90 seconds with sustained pressure, to promote muscle relaxation (16,20–24). The present study was undertaken because the project identified limited comparative evidence regarding ART and PRT for CNLBP and sought to determine which approach produced greater improvement in pain, lumbar range of motion and functional disability (17–24).

AIM AND OBJECTIVES

Aim: To determine the effect of ART and PRT on pain, range of motion and functional disability in patients with chronic non-specific low back pain.

The objectives were to determine the effect of ART; determine the effect of PRT; and compare ART versus PRT on pain, range of motion and functional disability.

METHODS

Study design and setting

The study was approved by the institute ethics committee, IEC- RIPT/DT/21/4504. The study used a comparative design. The total study duration was six months. The study was conducted in the physiotherapy department of Revathi Medical Center, Avinashi, Tirupur, Tamil Nadu.

Participants and sampling

Forty participants were included and divided equally into Group A (ART, n=20) and Group B (PRT, n=20). Simple random sampling was used. Inclusion criteria were low back pain of 12 weeks duration; male or female participants aged 25–60 years; ability to perform lumbar range-of-motion testing within the limit of pain; and absence of radiating pain to the buttocks or leg. Exclusion criteria included lumbar radiculopathy, inflammatory conditions such as rheumatoid arthritis and ankylosing spondylitis, recent spinal fracture or surgery, use of muscle relaxants or other pain medication, cardiopulmonary disease limiting activity tolerance, lumbar infection and malignancy.

Intervention

The intervention lasted four weeks, with 40-minute sessions three times per week, for a total of 12 sessions. Group A received ART directed to the back extensor, gluteus medius, iliopsoas and piriformis muscles. The protocol involved therapist-applied pressure to identified tight or tender tissue while the participant performed prescribed movement to lengthen/shorten the targeted tissue according to the project protocol.

Group B received PRT directed to the quadratus lumborum, iliopsoas, piriformis and erector spinae. Tender points were identified and the involved region was positioned in a position of comfort while sustained pressure was maintained for approximately 90 seconds, as described in the project protocol.

Outcome measures

Pain was measured using the NPRS, an 11-point scale from 0 (no pain) to 10 (worst pain). Lumbar range of motion was assessed using the MMST. Functional disability was assessed using the ODI, expressed from 0% (no disability) to 100% (maximum disability).

Statistical analysis

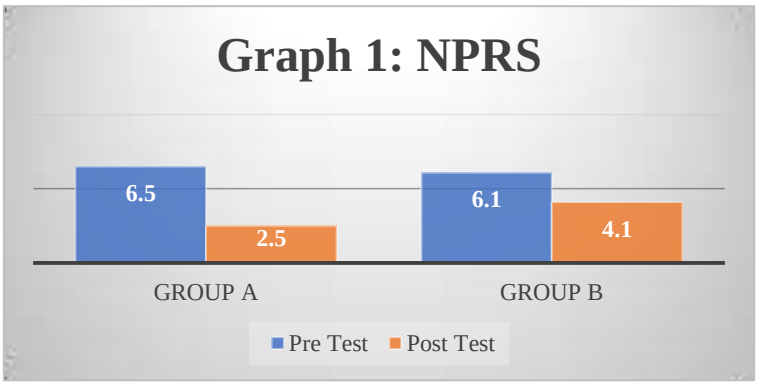
Data were analyzed using SPSS version 24. The Shapiro–Wilk test was used to assess normality. As the data were reported to be normally distributed, parametric testing was used. Paired t-tests were used for within-group pre- versus post-test comparisons, and independent t-tests were used for between-group comparisons. Statistical significance was set at $p<0.05$ with a 95% confidence interval.

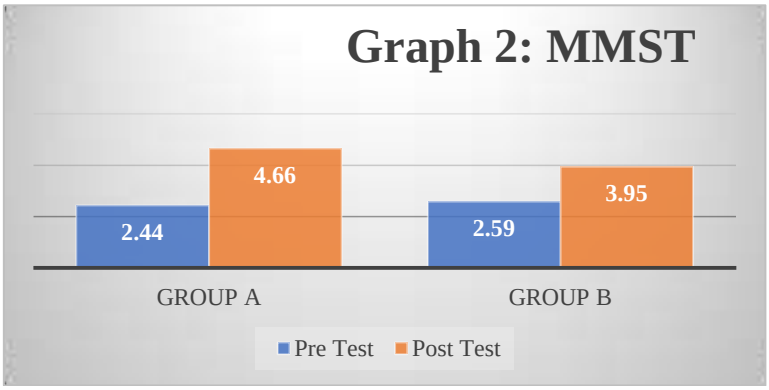
RESULTS

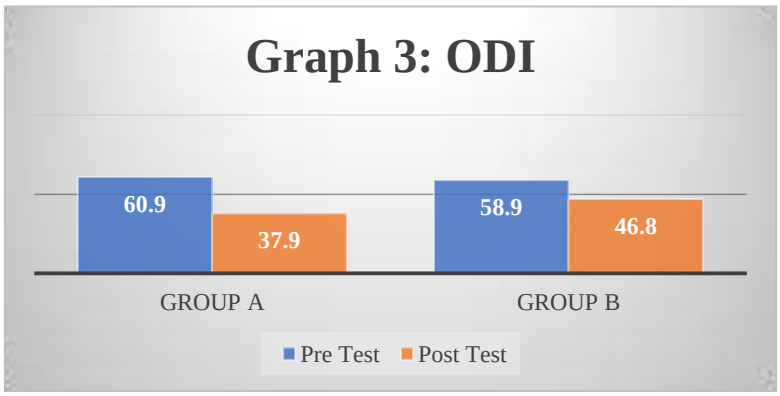
The two groups were comparable at baseline for the three reported outcome measures, with no statistically significant between-group differences at pre-test. Following four weeks of treatment, both groups demonstrated significant improvement in pain, lumbar range of motion and functional disability. The between-group post-test comparisons favored Group A.

Table 1. Pre-test, post-test and between-group post-test outcome values.

	Group A		Group B	
Outcome	ART Pre	ART Post	PRT Pre	PRT Post
NPRS	6.50±1.00	2.50±1.00	6.10±0.967	4.10±0.967
MMST	2.44±0.509	4.66±0.430	2.59±0.451	3.95±0.351
ODI	60.90±7.26	37.90±7.18	58.90±8.78	46.80±8.69







DISCUSSION

The present comparative study found significant improvement in all three outcome measures after four weeks in both treatment groups. The baseline means did not differ significantly between groups, whereas post-test comparisons showed statistically significant differences favoring ART.

The project proposes that ART may influence pain through mechanical stimulation of cutaneous and muscular mechanoreceptors and associated neurophysiological responses. It also describes ART as addressing soft-tissue adhesions and scar tissue while the patient actively moves through the relevant range, potentially facilitating tissue lengthening and movement.

For PRT, the project describes pain reduction in relation to positioning the involved tissue in a position of comfort, reduction of tender-point activity and relaxation of hyperactive muscle. It proposes that reduced localized spasm may improve range of motion, circulation and biomechanical function.

The superior post-test outcomes observed with ART may therefore be related, within the framework proposed by the project, to the combination of therapist-applied pressure with active patient movement and direct treatment of the targeted soft tissues. However, these proposed mechanisms should be interpreted as theoretical explanations from the project rather than as causal mechanisms definitively established by the present study.

The findings are consistent with studies cited in the project. Previous work described beneficial effects of ART on pain, disability and movement in low back pain, while studies of PRT also reported improvements in pain and disability. The present study adds a direct comparison between the two techniques within the stated four-week protocol.

CONCLUSION

Both ART and PRT were effective in reducing pain, increasing lumbar range of motion and improving functional disability in patients with chronic non-specific low back pain. Group A, which received ART, demonstrated significantly better post-test outcomes than Group B, which received PRT, for NPRS, MMST and ODI. Based on the reported statistical results, the study rejected the null hypothesis and accepted the alternative hypothesis.

LIMITATIONS

The sample size was small. There was no follow-up assessment of symptoms. The study duration was short.

RECOMMENDATIONS

Future studies should include longer follow-up periods to assess long-term benefits. Studies should be conducted with larger sample sizes. Comprehensive treatment approaches combining appropriate interventions may be investigated to determine whether better outcomes can be achieved.

INFORMED CONSENT

The project states that informed consent was obtained from all participants and that participation was voluntary, with the right to withdraw at any time. The project consent form also states that participant information would be kept confidential.

CONFLICT OF INTEREST

Not reported in the project.

AUTHOR CONTRIBUTIONS

Ajisha jebin.c: Conceptualization, methodology, participant recruitment, data collection, statistical analysis, manuscript preparation, and manuscript revision.

Dr. Stanley E & Dr. S Ramkumar: Study conception and design, supervision, methodology validation, interpretation of results, critical revision of the manuscript, and final approval of the manuscript.

Dr. P Bright Alwin Victor: Administrative support, overall academic guidance, and final approval of the manuscript

DATA AVAILABILITY STATEMENT

The project contains a master chart with individual pre- and post-test values for the 40 participants; no separate public dataset is reported.

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