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Effect Of Primal Reflex Release Technique on Work Related Musculoskeletal Shoulder & Neck Pain, Working Posture, Work Performance and Quality of Life Among Sweepers Of IAMR

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ABSTRACT

Introduction: Work-related musculoskeletal disorders (WMSDs) represent a growing concern in occupational health, particularly among individuals engaged in manual labor. Among street sweepers, the prevalence of shoulder and neck pain is especially high. Studies indicate that up to 70% of street sweepers report experiencing musculoskeletal pain, with the shoulder and neck areas being the most frequently affected.

Materials and methods: A cross sectional observational study was conducted at the Institute of Applied Medicines & Research, Duhai, Ghaziabad. The study will involve a total sample size of 30 participants, with 15 participants in the experimental group receiving PRRT along with ergonomic education and conventional exercises and 15 participants in the control group receiving ergonomic education along with conventional exercises.

Results: The data analysis reveals clear and significant differences between Group A (PRRT + Ergonomics) and Group B (Ergonomics + Exercise), with Group A consistently showing superior outcomes across all measured variables, including pain reduction, posture improvement, range of motion (ROM), quality of life, and work performance. Pain score (NPRS):In Group A, the mean pre-intervention pain score, measured using the Numeric Pain Rating Scale (NPRS), was 8, among the sweepers. The combined Primal Reflex Release Technique (PRRT) with ergonomic education and exercise, the mean pain score dropped significantly to a range of 2 to 4. This represents an average reduction of 5.5 points, highlighting a highly significant alleviation of musculoskeletal pain in the shoulder and neck regions ($p < 0.001$).

Furthermore, the effect size (Cohen's $d > 1.2$) indicates that the magnitude of the change in pain levels was not only statistically significant but also clinically meaningful.

In contrast, Group B, which received only ergonomic education and exercise, exhibited a less pronounced reduction in pain scores. The pre-intervention pain scores in this group ranged from 7 to 8, and the post-intervention scores decreased to 5 to 6, showing a modest average reduction of 1.5 points. The change, although positive, was not statistically significant ($p = 0.08$), indicating that while ergonomic interventions provided some relief, they were insufficient in addressing the chronic musculoskeletal pain faced by sweepers.

Discussion: The findings from this study clearly demonstrate that the Primal Reflex Release Technique (PRRT) combined with ergonomic education and exercise (Group A) yielded significantly better outcomes compared to ergonomic education and exercise alone (Group B) in addressing work-related musculoskeletal disorders (WMSDs), particularly in the shoulder and neck regions of sweepers. This discussion will explore the implications of these results, comparing them with previous studies and theoretical frameworks, and will examine the broader context of these findings in occupational healtIn conclusion, the study highlights the superior effectiveness of the Primal Reflex Release Technique (PRRT) combined with ergonomic education and exercise in significantly reducing pain, improving posture, enhancing range of motion, and boosting quality of life and work performance among street sweepers suffering from work-related musculoskeletal disorders.

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) represent a growing concern in occupational health, particularly among individuals engaged in manual labor. Defined by the World Health Organization (WHO), these disorders encompass a variety of conditions affecting muscles, tendons, ligaments, and nerves due to occupational activities. Among street sweepers, the prevalence of shoulder and neck pain is especially high. Studies indicate that up to 70% of street sweepers report experiencing musculoskeletal pain, with the shoulder and neck areas being the most frequently affected.[1]

The implications of WMSDs extend beyond discomfort; they significantly impair workers' ability to perform tasks efficiently and effectively. This leads to decreased productivity and increased healthcare costs for employers and healthcare systems. The economic burden of WMSDs is substantial, with estimates suggesting that they cost the U.S. economy over $54 billion annually due to medical expenses and lost productivity.[2] Moreover, chronic pain and disability from WMSDs can severely impact individuals' quality of life, contributing to stress, anxiety, and depression .[3]

As the workforce ages, the incidence of WMSDs is likely to increase, especially among older workers who may face heightened risks for developing musculoskeletal issues due to the cumulative effects of physical strain over time.[4]

Therefore, addressing shoulder and neck pain among vulnerable populations, such as street sweepers, is essential for fostering a healthier workforce and ensuring sustainable labor practices.

Primal Reflex Release Technique (PRRT):

The Primal Reflex Release Technique (PRRT) is an innovative manual therapy approach that targets the body's reflexive systems to alleviate pain and restore functional movement. PRRT is grounded in the principles of neurology and physiology, positing that many musculoskeletal issues arise from dysfunctional reflexes that develop in response to physical stress, trauma, or emotional strain.[5] By employing gentle manipulative techniques to stimulate specific reflex pathways, PRRT aims to recalibrate these reflexes, leading to pain relief and improved mobility.

Methodology Sampling

This study employs a pre-test post-test experimental research approach to assess the effects of the Primal Reflex Release Technique (PRRT) on work- related musculoskeletal shoulder and neck pain, working posture, work performance, and quality of life among sweepers at IAMR. This approach allows for the examination of changes over time within the same participants, providing insights into the effectiveness of the intervention.

Research Design

The research design is a pre-test post-test experimental design. Participants will undergo assessments before and after the intervention period, enabling the comparison of outcomes related to pain, posture, performance, and quality of life. This design effectively measures the impact of interventions in a controlled manner while accounting for potential confounding variables.

Variables under Study INDEPENDENT VARIABLES

- Primal Reflex Release Technique (PRRT)
- Ergonomic education

DEPENDENT VARIABLES

- Working Posture
- Pain
- Range of motion
- Quality of life
- Work performance

Study Setting

The study will be conducted at the Institute of Advanced Medical Research (IAMR), providing a unique environment where sweepers engage in physically demanding tasks, making it an ideal setting for investigating work-related musculoskeletal issues.

Target Population, Inclusion and Exclusion

1. Target Population

- Sweepers employed at IAMR.

Inclusion Criteria

- Adults aged 25-50 years.
- Individuals reporting shoulder and neck pain.
- Ability to provide informed consent.

Exclusion Criteria

- History of major musculoskeletal injuries in the last year.
- Recent surgeries involving the shoulder or neck.
- Neurological disorders affecting movement.

Sample Size

The study will involve a total sample size of 30 participants, with 15 participants in the experimental group receiving PRRT along with ergonomic education and conventional exercises and 15 participants in the control group receiving ergonomic education along with conventional exercises.

Sample Techniques

The sample technique was convenient sampling.

Protocol
The sample of 30 subjects were selected from the population on the basis of inclusion and exclusion criteria. They were divided into two groups i.e., group A (PRRT + ergonomic education + exercise) and group B (ergonomic education + exercise). The subjects of both groups were explained about the nature of the study and the written consent will be signed. Pre readings of the VAS scale, Rapid Upper Limb Assessment, Inclinometer, Quality of life questionnaire, Work performance scale were taken as baseline i.e., before starting the intervention for both the groups i.e., Group A (PRRT + ergonomic education + exercise) and Group B (ergonomic education + exercise).

Group A (PRRT + ergonomic education + exercise)
All the participants went a total of 12 training session for 4 weeks and 3 sessions per week. The protocol consisted of a combination of PRRT with exercise and ergonomic education. Reflex release technique for neck and shoulder pain consisted of SCM release technique, splenius capitis reflex release, C3-C4/ levator scapulae release technique, rotator cuff reflex release, first and second rib release, AC joint release technique, costosternal release technique , coracobrachialis release technique. And the exercise program included stretching of upper trapezius, levator scapulae, scalene, sternocleidomastoid and pectoralis for 15 min, 3 times a week to improve blood circulation and posture.
Ergonomic education –
1. Reduce the repetitive motions by interspacing activities
2. Avoid static posture by sequencing job activities
3. Use proper size brooms with long handles to avoid bending
4. Reduce forceful exertions
5. Maintain upright posture as far as possible with minimum twisting and bending.

Group B (ergonomic + exercise)
The exercise program included stretching of upper trapezius , levator scapulae , scalene , sternocleidomastoid and pectoralis for 15 min , 3 times a week to improve blood circulation and posture.
Ergonomic education –
1. Reduce the repetitive motions by interspacing activities
2. Avoid static posture by sequencing job activities
3. Use proper size brooms with long handles to avoid bending
4. Reduce forceful exertions
5. Maintain upright posture as far as possible with minimum twisting and bending

DETAILED PROCEDURE
Application of PRRT
1. 1st and 2nd rib release — The patient was instructed to laterally rotate the head to the involved side as far as comfortable and extend the arms straight. The patient performed an active side-bend to the side where tenderness was noted, and ask the patient to reach down as far as possible towards the knee while forcefully coughing with side bend. This was repeated for 3-4 times.
2. Costo-sternal release — The therapist position in the same side of dysfunction. The patient was instructed to bring the shoulder in PNF D2 flexion pattern and again bring the hand contralateral to the ASIS and to do the movement as fast and hard as possible, while the movement was being done, the therapist applied tricky resistance while the movement. This was repeated for 6-8 times.
3. AC Joint springing /release technique — The patient was lying in supine position with eyes closed and turn at the unaffected side with unaffected hand held on head. The therapist hand was on the lateral border of scapula and the patient was instructed to do horizontal adduction of the affected side with shoulder down (depression) as far as possible and bring the shoulder up (elevation) as much as possible). This was repeated for 6-8 times.
4. Rotator cuff positional release — The patient was lying in side-lying position on the unaffected side with hip and knee flexed and hand resting on head. Then the patient was instructed to turn back in the same position without moving pelvis. This was repeated for 2-3 times a day for 2min.
5. Coracobrachialis release technique – The patient position sitting with the shoulder and elbow at approximately 90degree. The therapist taps on the radio-styloid process and near elbow joint.
6. C7 to T1 release — The patient was in supine position and was instructed to close the eyes and to flex the shoulder to 45 degrees and squeeze the fingers and hold it. And the therapist was applying sudden thrust. This was repeated for 6-8 times.
7. SCM release – The patient was in supine position and therapist position the behind the patient. The therapist then tap over the SCM on both the sides for 30 sec.

Testing Procedure:
The study follows a pre and post-test format with a three-week period between the tests. All the subjects will be trained in testing procedures prior to testing and will be able to ask questions about how to perform any of the tests at any time during the assessment.

Fig 1.- Release of trigger point of sterno-cleidomastoid muscle.

Fig 2.- Release of trigger point of flexor carpi radiali

RESULTS

Outcome Measures	Group A		Group B		p - value	Effect Size (Cohen's d)
	Pre	Post	Pre	Post		
Pain (NPRS)	8	2 — 4	7 — 8	5 — 6	<0.001	1.2
Posture (RULA)	6 — 8	2 — 3	6 — 7	5 — 6	,0.001	1.4
ROM	40 — 50	80 — 90	45 — 50	55 — 61	,0.001	1.3
Quality of Life	60 — 66	85 — 90	60 — 65	65 — 70	<0.001	1.5

The data analysis reveals clear and significant differences between Group A (PRRT + Ergonomics) and Group B (Ergonomics + Exercise), with Group A consistently showing superior outcomes across all measured variables, including pain reduction, posture improvement, range of motion (ROM), quality of life, and work performance.

Pain Scores (NPRS)

In Group A, the mean pre-intervention pain score, measured using the Numeric Pain Rating Scale (NPRS), was 8, indicating severe pain among the sweepers at baseline. Following the intervention, which combined Primal Reflex Release Technique (PRRT) with ergonomic education and exercise, the mean pain score dropped significantly to a range of 2 to 4. This represents an average reduction of 5.5 points, highlighting a highly significant alleviation of musculoskeletal pain in the shoulder and neck regions ($p < 0.001$). The large reduction in pain can be attributed to PRRT's targeted approach in addressing reflexive dysfunctions associated with musculoskeletal pain, making it particularly effective for this physically demanding population. Furthermore, the effect size (Cohen's $d > 1.2$) indicates that the magnitude of the change in pain levels was not only statistically significant but also clinically meaningful.

In contrast, Group B, which received only ergonomic education and exercise, exhibited a less pronounced reduction in pain scores. The pre-intervention pain scores in this group ranged from 7 to 8, and the post-intervention scores decreased to 5 to 6, showing a modest average reduction of 1.5 points. The change, although positive, was not statistically significant ($p = 0.08$), indicating that while ergonomic interventions provided some relief, they were insufficient in addressing the chronic musculoskeletal pain faced by sweepers. The small effect size in Group B underscores the limited impact of ergonomics and exercise alone on pain reduction.

Posture Scores (RULA)

Posture was assessed using the Rapid Upper Limb Assessment (RULA), with pre-intervention scores in Group A ranging from 6 to 8, indicating poor working posture and a high risk of musculoskeletal injury. After the intervention, Group A's posture scores significantly improved, with post-intervention scores dropping to a range of 2 to 3. This corresponds to an average improvement of 4 to 5 points, which was statistically significant ($p < 0.001$). The remarkable improvement in posture in Group A can be linked to PRRT's ability to restore proper reflexive patterns, combined with ergonomic education aimed at improving workplace posture. The large effect size (Cohen's $d = 1.4$) reflects the substantial improvement in reducing biomechanical stress on the upper body, which is critical for manual laborers like sweepers.

In Group B, the pre-intervention RULA scores were between 6 and 7, similar to Group A. However, the post-intervention improvement was minimal, with scores ranging from 5 to 6. This represents an average improvement of just 1 point, which was not statistically significant ($p = 0.10$). Despite receiving ergonomic education, Group B's improvement in posture was modest, further underscoring the added value of PRRT in Group A.

Range of Motion (ROM)

Group A exhibited a significant increase in shoulder range of motion (ROM) following the PRRT intervention. Pre-intervention ROM, measured using an inclinometer, was between 40° and 50°, indicating restricted shoulder movement, likely due to chronic musculoskeletal tension and pain. Post- intervention, the ROM increased dramatically to 80° to 90°, reflecting an average improvement of 40° ($p < 0.001$). This large improvement highlights PRRT's efficacy in releasing muscular and joint restrictions, thereby enhancing flexibility and mobility. The substantial effect size (Cohen's $d > 1.3$) further confirms the meaningful clinical impact of this intervention on improving ROM in sweepers, who require a full range of motion to perform their tasks effectively. Group B, on the other hand, showed only a small increase in ROM, with pre- intervention values ranging from 45° to 50°, and post-intervention values improving modestly to 55° to 61°. The average improvement of 10–12° was not statistically significant ($p = 0.09$), suggesting that while ergonomic education and exercise had some impact, they were not sufficient to produce meaningful improvements in shoulder flexibility.

Quality of Life (WHOQOL-BREF)

Quality of life, as measured by the physical health dimension of the WHOQOL- BREF, improved significantly in Group A. Pre-intervention scores ranged from 60 to 66, reflecting a compromised quality of life due to chronic pain and physical limitations. After the intervention, scores increased substantially to 85 to 90, indicating an average improvement of 25 points ($p < 0.001$). This marked enhancement in quality of life can be attributed to the combined effects of pain reduction, improved posture, and increased flexibility, all of which likely contributed to improved physical well-being and reduced daily discomfort. The large effect size (Cohen's $d > 1.5$) suggests that PRRT had a profound positive impact on the sweepers' overall quality of life, making it a valuable intervention for improving their physical and emotional health.

In Group B, quality of life improved only slightly, with pre-intervention scores between 60 and 65, and post-intervention scores ranging from 65 to 70. The average improvement of 5–6 points was not statistically significant ($p = 0.12$), indicating that ergonomics and exercise alone were not sufficient to produce meaningful changes in participants' quality of life.

Work Performance

Work performance, a critical outcome for sweepers, improved significantly in Group A. Pre-intervention work performance scores ranged from 50 to 60, reflecting the negative impact of musculoskeletal pain and poor posture on their ability to perform job tasks efficiently. After the PRRT intervention, scores increased dramatically to 80 to 89, showing an average improvement of 25 points ($p < 0.001$). This improvement was statistically significant and

supported by a large effect size (Cohen's d = 1.4), indicating that PRRT not only reduced pain but also enhanced the sweepers' functional capacity, allowing them to work more effectively and with less discomfort.
Group B showed only moderate improvements in work performance, with pre- intervention scores between 50 and 60, and post-intervention scores increasing to 60 to 70. The average improvement of 8 points was not statistically significant (p = 0.07), further demonstrating the limited effect of ergonomics and exercise on improving functional work performance without the addition of PRRT.

Discussion

The findings from this study clearly demonstrate that the Primal Reflex Release Technique (PRRT) combined with ergonomic education and exercise (Group A) yielded significantly better outcomes compared to ergonomic education and exercise alone (Group B) in addressing work-related musculoskeletal disorders (WMSDs), particularly in the shoulder and neck regions of sweepers. This discussion will explore the implications of these results, comparing them with previous studies and theoretical frameworks, and will examine the broader context of these findings in occupational health.

Effectiveness of PRRT in Reducing Musculoskeletal Pain
The most striking result of this study is the significant reduction in pain experienced by participants in Group A. With an average reduction of 5.5 points on the NPRS, this aligns with previous studies that have highlighted PRRT's effectiveness in alleviating musculoskeletal pain by addressing underlying reflexive dysfunctions.[5] demonstrated that PRRT effectively recalibrates dysfunctional neuromuscular reflexes, which are often the source of chronic pain in physically demanding occupations. This mechanism could explain the substantial pain relief observed in the present study.
Similar findings were observed by [6], who reported significant reductions in pain scores among patients receiving PRRT compared to those undergoing traditional physical therapy. The current study reinforces these results, particularly within the context of manual laborers like street sweepers, where repetitive strain injuries and poor posture are common. The large effect size observed in pain reduction further supports the use of PRRT as a highly effective intervention for WMSDs.
In contrast, Group B showed only a modest reduction in pain, consistent with findings by[9], who noted that while ergonomic education and exercises are beneficial, they often provide limited relief when not combined with more targeted interventions like PRRT. This suggests that while ergonomic training addresses some postural and mechanical issues, it does not effectively address the neurological and reflexive components of musculoskeletal pain.

Posture Improvements and Functional Benefits
The significant improvements in posture observed in Group A can be attributed to the combined effects of PRRT and ergonomic training. As highlighted by [8] poor working posture is a primary contributor to musculoskeletal disorders in manual labor occupations, and interventions that address both physical posture and underlying neuromuscular dysfunctions tend to be more effective. PRRT's ability to restore normal reflex patterns likely played a key role in the posture improvements observed in this study, as indicated by the large effect size in RULA scores.
The modest improvements in posture seen in Group B, while not statistically significant, are consistent with the findings of [11], who emphasized that ergonomic interventions alone can improve posture but often fail to address deep-seated neuromuscular issues, limiting their overall effectiveness.

CONCLUSION

In conclusion, the study highlights the superior effectiveness of the Primal Reflex Release Technique (PRRT) combined with ergonomic education and exercise in significantly reducing pain, improving posture, enhancing range of motion, and boosting quality of life and work performance among street sweepers suffering from work-related musculoskeletal disorders.

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