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To compare the effect of post-isometric relaxation and myofascial release therapy on subacute non-specific neck pain among work from home professionals

Dr. Vanshika Singh, Dr. Mukesh Sharma
Assistant Professor, TDTR DAV IP & R, Yamuna Nagar, Haryana, India
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Abstract
Background: Neck pain is a leading cause of disability among young adults, significantly impacting work productivity and quality of life. This study aimed to compare the efficacy of Post-Isometric Relaxation (PIR) and Myofascial Release Therapy (MFR) for managing subacute non-specific neck pain in individuals working from home.
Methodology: Sixty participants were randomly allocated into two groups: Group A (PIR) and Group B (MFR). Over a four-week intervention period, outcomes were assessed on days 1, 14, and 28. Primary outcome measures included the Numerical Pain Rating Scale (NPRS), Cervical Range of Motion (CROM) via goniometry, and functional disability via the Neck Disability Index (NDI).
Results: While both interventions demonstrated statistically significant improvements ($p<0.05$) across all parameters, inter-group analysis revealed that the PIR group achieved superior reductions in pain and disability, alongside greater gains in CROM compared to the MFR group.
Conclusion: PIR therapy is more effective than MFR in improving functional outcomes and alleviating subacute non-specific neck pain.

Keywords: Subacute neck pain, crom, NDI, post-isometric relaxation, myofascial release

Introduction

Neck pain is recognized as one of the most pervasive musculoskeletal disorders globally, with a reported 12-month prevalence ranging from 42% to 67% in young adults [1]. According to the Global Burden of Disease Study, low back and neck pain represent the second leading causes of years lived with disability (YLD) for individuals aged 25–40 years [2]. This condition is significantly associated with functional disability and a diminished quality of life; in the younger demographic, it serves as a primary risk factor for reduced general work productivity [2]. Importantly, over the past two decades, cervical sagittal alignment has gained prominence as a critical clinical outcome in healthcare. Extensive research demonstrates that biomechanical dysfunction, represented by abnormal cervical sagittal alignment, profoundly influences human health, as it is correlated with chronic pain, disability, and compromised functional performance [3,4,5].

Non-specific neck pain (NSNP) is formally defined as pain localized in the posterior region of the neck, extending from the superior nuchal line to the spine of the scapula, and laterally to the superior border of the clavicle and the suprasternal notch [6]. The etiology of NSNP is linked to various occupational and musculoskeletal factors, including prolonged working hours, a sedentary lifestyle, high cognitive workloads, and ergonomically deficient computer workstation designs [7]. These stressors frequently culminate in muscle spasms, decreased cervical mobility, and progressive functional limitations [8]. To standardize clinical assessment, the Neck Pain Task Force recommends a four-grade classification system based on severity, ranging from Grade I to Grade IV [9,10].

In the modern era, neck pain has become an escalating concern due to the extensive use of computers and laptops in both professional and home environments. Prolonged static loading leads to postural alterations, specifically rounded shoulders and forward head posture (FHP). This faulty positioning causes a loss of the normal lordotic curvature of the upper cervical spine, which increases muscle tension and shortening, eventually resulting in chronic pain [11, 12]. Therefore, the ergonomic design of the workstation is vital to reduce the risk of injury [13]. Conservative management of NSNP includes pharmacological approaches; however, physical therapy remains a cornerstone of treatment, utilizing manual therapy, exercise therapy, and electrotherapeutic modalities [14, 15].

Muscle Energy Technique (MET) relies on reciprocal inhibition and Post-Isometric Relaxation (PIR). PIR is a form of MET where the patient's muscles contract isometrically against a therapist's counterforce. This process is mediated by the Golgi Tendon Organ (GTO), which triggers a reflex inhibition of the agonist muscle [16]. Conversely, Myofascial Release (MFR) is a manual therapy aimed at facilitating the mechanical and neural adaptive potential of the myofascial system [17]. Fascia can become restricted due to trauma or poor posture; MFR involves low-load, long-duration stretching to restricted fascia to decrease pain and increase local blood flow [18,19]. Despite widespread clinical application, research comparing their relative efficacy in treating subacute NSNP is scarce. Therefore, the aim of this study was to evaluate and compare the effectiveness of PIR versus MFR on pain, cervical range of motion (CROM), and functional disability (NDI) among professionals working from home.

Materials & Methods

This experimental study, comparative in nature, was conducted at the TDTR DAV Institute of Physiotherapy, Yamuna Nagar. A total of 60 participants were recruited

using a convenient sampling method. Prior to the commencement of the study, ethical approval was obtained from the institutional review board, and written informed consent was secured from all subjects. The study population comprised work-from-home professionals suffering from subacute non-specific neck pain (NSNP).

Participants, both male and female aged 25–40 years, were included if they reported a Numeric Pain Rating Scale (NPRS) score >3, a Neck Disability Index (NDI) score >15/50, and had been experiencing symptoms for 6–12 weeks. Eligible subjects were required to have at least six months of computer-based work experience, averaging a minimum of two hours daily. Exclusion criteria included diagnosed disc prolapsed, spinal malignancies, infections, congenital spinal malformations (e.g., torticollis), or any neurological/cardiovascular impairments. Subjects with a history of spinal surgery, recent fractures, or those who received physiotherapy for neck pain within the last three months were also excluded.

Participants were randomly allocated into two equal groups (n=30 each) using a computer-generated random sequence. Group A (Experimental) received Post-Isometric Relaxation (PIR) therapy, while Group B (Conventional/Comparison) received Myofascial Release Therapy (MRT). Outcome measures, including NPRS for pain intensity, Universal Goniometry for Cervical Range of Motion (CROM), and the NDI for functional disability, were recorded at baseline (Day 1), mid-intervention (Day 14), and post-intervention (Day 28).

Prior to the specific manual interventions, both groups received a 10-minute hot pack application to the cervical region. Both groups were treated three times a week (i.e., on alternate days) for 4 consecutive weeks.

Group A: Post-Isometric Relaxation (PIR) Subjects received PIR targeting the Upper Trapezius and Levator Scapulae in a supine position. For the Upper Trapezius, the therapist stabilized the shoulder and cupped the mastoid process, moving the neck into contralateral side-bending. The patient performed a 10-second isometric contraction against resistance, followed by a 10-second gentle stretch into the new range. For the Levator Scapulae, the neck was placed in flexion and rotation away from the affected side before applying the isometric-relaxation cycle. Each technique was repeated five times.

Group B: Myofascial Release Therapy (MRT) Subjects received MRT in a seated position. For the Upper Trapezius, the therapist applied a soft-fist technique, taking up a line of tension from the mid-belly toward the acromion while the patient performed active head rotations. For the Levator Scapulae, the line of tension was directed toward the inferior border of the scapula as the patient flexed the head forward. Each myofascial stretch was maintained for 10 seconds and repeated five times.

The data gathered from these interventions were subsequently analyzed to determine the comparative efficacy of PIR versus MRT in restoring biomechanics and reducing disability in the specified professional demographic.

Statistical Analysis

Data analysis was performed using SPSS version 20.0 and Microsoft Excel 2010. Descriptive statistics, including Mean and Standard Deviation (SD), were calculated for all demographic variables and outcome measures. To assess the normality of the distribution, baseline characteristics of age and gender were analyzed. An Unpaired t-test was employed for inter-group comparisons of age and baseline scores to ensure homogeneity between Group A and Group B.

For intra-group analysis (within-group comparison), Repeated Measures ANOVA was utilized to evaluate the significance of improvements across three time intervals: Day 1 (Baseline), Day 14 (Mid-intervention), and Day 28 (Post-intervention). Post-hoc analysis using Tukey's Method for pairwise comparison was subsequently applied to identify specific intervals of significant change. For inter-group analysis (between-group comparison) at various intervals, the Unpaired t-test was utilized to compare the mean difference between the Post-Isometric Relaxation (PIR) and Myofascial Release (MFR) groups. Statistical significance for all tests was set at $p < 0.05$ with a 95% confidence interval.

Results

Baseline Characteristics

A total of 60 subjects participated in the study, divided equally into Group A and Group B. Demographic analysis revealed that Group A consisted of 43% males and 57% females, while Group B comprised 53% males and 47% females. The mean age for Group A was 29.27 ± 4.08 years and for Group B was 30.33 ± 4.87 years. Unpaired t-test results ($p = 0.362$) confirmed that there was no statistically significant difference in age between the two groups at baseline, ensuring a comparable starting point.

Intra-Group Comparison (Within-Group Analysis)

Both treatment protocols demonstrated highly significant clinical improvements over the 28-day intervention period.

- **Group A (PIR):** Repeated ANOVA showed significant reductions in pain intensity, with NPRS scores dropping from 6.57 ± 1.50 on Day 1 to 1.97 ± 1.37 on Day 28 ($p < 0.001$). Functional disability (NDI) improved drastically from a mean of 27.00 ± 6.87 to 3.10 ± 1.60 ($p < 0.001$). Furthermore, all Cervical Range of Motion (CROM) parameters, including flexion, extension, lateral flexion and rotation, showed significant gains.

- **Group B (MFR):** Similarly, the MFR group showed significant progress. NPRS scores improved from 6.50 ± 1.48 to 2.97 ± 1.49 ($p < 0.001$), and NDI scores decreased from 28.33 ± 6.19 to 4.20 ± 1.90. Cervical mobility also increased significantly from baseline to Day 28 across all planes.

Tukey's post-hoc analysis confirmed that for both groups, significant improvements occurred not only between Day 1 and Day 28 but also at the mid-way point (Day 14), indicating a progressive recovery curve.

Inter-Group Comparison (Between-Group Analysis)

The comparative analysis between the two techniques revealed a superior outcome for the PIR group across most variables by the end of the study.

Table 1: Shows the Between-group Comparison of NPRS

Unpaired T Test	NPRS					
	1st day		14th day		28th day	
	Group A	Group B	Group A	Group B	Group A	Group B
Mean	6.57	6.50	4.40	4.73	1.97	2.97
S.D.	1.501	1.480	1.404	1.437	1.377	1.497
Number	30	30	30	30	30	30
Maximum	9	9	7	8	4	6
Minimum	4	4	2	2	0	0
Range	5	5	5	6	4	6
Mean Difference	0.07		0.33		1.00	
Unpaired T Test	0.173		0.909		2.693	
P value	0.8631		0.3673		0.0092	
Table Value at 0.05	2.00		2.00		2.00	
	Not-Significant		Not-Significant		Significant	

- **Pain (NPRS):** While there was no significant difference at baseline (p = 0.863) or Day 14 (p = 0.367), by Day 28, Group A showed a significantly lower mean pain score (1.97 ± 1.37) compared to Group B (2.97 ± 1.49), with p = 0.009.

Table 2: Shows the Between-group Comparison of Neck Disability Index score

Unpaired T Test	Neck Disability Index (NDI)					
	1st day		14th day		28th day	
	Group A	Group B	Group A	Group B	Group A	Group B
Mean	27.00	28.33	14.57	17.57	3.10	4.20
S.D.	6.873	6.194	4.812	4.847	1.605	1.901
Number	30	30	30	30	30	30
Maximum	39	38	23	28	7	8
Minimum	15	15	6	8	0	1
Range	24	23	17	20	7	7
Mean Difference	1.33		3.00		1.10	
Unpaired T Test	0.789		2.406		2.422	
P value	0.4332		0.0193		0.0186	
Table Value at 0.05	2.00		2.00		2.00	
Result	Not-Significant		Significant		Significant	

- **Disability (NDI):** Significant differences between groups emerged as early as Day 14 (p = 0.019) and were maintained at Day 28 (p = 0.018), with the PIR group achieving lower disability scores.

- **Range of Motion:** By Day 28, the PIR group (Group A) achieved significantly higher mean values in Cervical Flexion (39.37° vs 35.83°, p < 0.001), Extension (38.43° vs 35.20°, p = 0.002), Right Rotation (63.03° vs 55.83°, p < 0.001), Left Rotation (61.60° vs 55.93°, p < 0.001), Right Flexion (34.83° vs 29.63°, p < 0.001) and Left Flexion (34.10° vs 29.27°, p < 0.001)compared to the MFR group (Group B).

These results indicate that while both Post-Isometric Relaxation and Myofascial Release are effective, PIR therapy yields statistically superior results in reducing pain and disability while enhancing cervical mobility in professionals working from home.

Discussion

The findings of this study provide clinical evidence that both Post-Isometric Relaxation (PIR) and Myofascial Release (MFR) are effective in mitigating the symptoms of sub-acute non-specific neck pain (NSNP) among work-from-home professionals. However, the comparative analysis reveals that Post-Isometric Relaxation (PIR) yielded statistically superior improvements in pain intensity (NPRS), Cervical Range of Motion (CROM), and functional disability (NDI).

Neurophysiological Mechanisms of PIR

The pronounced efficacy of PIR in Group A can be explained through the principle of autogenic inhibition. During the isometric contraction phase of PIR, the tension within the muscle-tendon unit stimulates the Golgi Tendon Organs (GTOs). These receptors send afferent impulses to the spinal cord, which in turn inhibit the alpha motor neurons of the agonist muscle, resulting in immediate reflex relaxation [16]. This "neuromuscular reset" is particularly effective for the upper trapezius and levator scapulae—postural muscles that frequently become hypertonic and shortened during prolonged sedentary work [11,16].

The subsequent reduction in muscle spindle sensitivity allows for a gain in CROM through a combination of mechanical "creep" and plastic changes in the connective tissue [17]. Furthermore, the pain-relieving effects of PIR are likely mediated by the activation of joint mechanoreceptors and the descending pain modulatory system. Research suggests that isometric exercise triggers the release of endogenous opioids and beta-endorphins, effectively raising the pain threshold and breaking the chronic "pain-spasm-pain" cycle [18]. These results corroborate findings by researchers who identified PIR as a superior intervention compared to routine physical therapy for mechanical neck pain [19,20].

Physiological Impact of Myofascial Release (MFR)

Group B also demonstrated significant clinical gains, validating MFR as a potent manual intervention. MFR targets the viscoelastic properties of the myofascia.

Prolonged static loading in professionals leads to the formation of cross-links in the fascia and increased viscosity of the ground substance, resulting in restricted mobility [12,17]. By applying low-load, long-duration mechanical stress, MFR facilitates the release of these fascial barriers and stimulates mechanoreceptors within the soft tissue [18]. This reduces interstitial friction and enhances paraspinal muscle activation, contributing to the observed improvements in NDI and CROM [19].

Comparative Synthesis

While both techniques are beneficial, the superiority of PIR suggests that the active neuromuscular engagement of the patient provides a more profound reset of motor tone than the passive structural stretching utilized in MFR. In the sub-acute phase of neck pain, where muscle guarding and hypertonicity are primary drivers of disability, the inhibitory reflex of PIR offers a more rapid restoration of biomechanical harmony.

Fig 1: A. PIR for Upper Trapezius B. PIR for Levator Scapulae

Fig 2: A. Myofascial Release for Trapezius B. Myofascial Release for Levator Scapulae

Conclusion

This study concludes that while both PIR and MFR are effective conservative treatments for sub-acute non-specific neck pain in work-from-home professionals, Post-Isometric Relaxation (PIR) is significantly more effective in reducing pain, restoring cervical mobility, and enhancing functional capacity.

Clinical Relevance

Given the escalating prevalence of NSNP in the digital workforce, PIR represents a safe, cost-effective, and evidence-based manual therapy. Integrating PIR with thermotherapy (hot fomentation) provides a comprehensive approach to managing musculoskeletal dysfunction, offering a high-value intervention for clinical practice.

Limitations and Future Research

The study is limited by a relatively small sample size and a lack of long-term follow-up to evaluate the sustainability of the treatment effects. Future research should prioritize:

- Larger, multi-center trials to increase generalizability.
- Longitudinal studies with 6-month and 1-year follow-up sessions.
- Incorporation of objective strength testing (dynamometry) to supplement ROM data.
- Comparative studies focusing on chronic versus sub-acute presentations.

Declaration by Authors

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References

1. Hoy DG, *et al*. The epidemiology of neck pain. Best Pract Res Clin Rheumatol,2010:24(6):783-92.
2. GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries. Lancet,2020:396(10258):1204-22.
3. Ames CP, *et al*. Cervical sagittal parameters. Spine,2012:37(22S):S137-42.
4. Tang S, *et al*. Postoperative cervical sagittal alignment. Spine,2012:37(23):1916-23.
5. Hansraj KK. Assessment of stresses in the cervical spine caused by posture. Surg Technol Int,2014:25:277-9.
6. Misailidou V, *et al*. Relationship of clinical factors with non-specific neck pain. BMC Musculoskelet Disord,2010:11:215.
7. Cagnie B, *et al*. Individual and work-related risk factors for neck pain. Eur Spine J,2007:16(5):679-86.
8. Lau KT, *et al*. Relationships between sagittal postures of thoracic and cervical spine. Manual Therapy,2010:15(5):457-63.
9. Haldeman S, *et al*. The Bone and Joint Decade Task Force on Neck Pain. Spine,2008:33(4 Suppl):S5-7.
10. Carroll LJ, *et al*. Course and prognostic factors for neck pain. Spine,2008:33(4):S75-82.
11. Chaitow L. Muscle Energy Techniques. 4th ed. Edinburgh: Elsevier, 2013.
12. Barnes MF. The basic science of myofascial release. J Bodyw Mov Ther,1997:1(4):231-8.
13. Sharan D, *et al*. Effect of ergonomics on musculoskeletal disorders in IT professionals. Work,2012:41(1):748-53.
14. Miller J, *et al*. Manual therapy and exercise for neck pain. Cochrane Database Syst Rev,2010:(1):CD004249.
15. Gross A, *et al*. Manual therapy for mechanical neck disorders. Cochrane Database Syst Rev,2015:(2):CD004249.
16. Mitchell FL, Mitchell PK. The Muscle Energy Manual. East Lansing: MET Press, 1995.
17. Schleip R. Fascial plasticity - a new neurobiological explanation. J Bodyw Mov Ther,2003:7(1):11-9.
18. Ajimsha MS, *et al*. Effectiveness of myofascial release in the management of pain. J Bodyw Mov Ther,2014:18(2):273-81.
19. Junaid M, *et al*. Effects of PIR vs MTrP in mechanical neck pain. J Pak Med Assoc,2020:70(8):1321-5.
20. Kumar GY, *et al*. Comparative study of PIR and RPT in myofascial trigger points. Int J Physiother,2016:3(3):331-6.