

Effectiveness of Levator Scapulae-Focused Myofascial Release Therapy on Pain Intensity and Neck Disability in Sedentary Female Office Workers with Cervicogenic Headache: A Randomized Controlled Trail

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ABSTRACT: Cervicogenic headache is a common musculoskeletal disorder associated with cervical dysfunction and prolonged occupational postures. This study aimed to evaluate the effectiveness of levator scapulae-focused myofascial release (MFR) therapy on pain intensity and neck disability among sedentary female office workers with cervicogenic headache. Thirty participants were randomly assigned to either an MFR group (n=15) or a conventional exercise group (n=15). Pain intensity and disability were assessed using the Numeric Pain Rating Scale (NPRS) and Neck Disability Index (NDI), respectively. Both groups showed significant improvements following treatment ($p < 0.001$). However, the MFR group demonstrated greater reductions in NPRS scores (6.53 ± 0.52 to 2.53 ± 0.52) and NDI scores (27.60 ± 1.50 to 11.07 ± 1.58) compared with the conventional exercise group (NPRS: 6.53 ± 0.52 to 4.53 ± 0.52 ; NDI: 27.67 ± 1.54 to 20.60 ± 1.64). Between-group analysis revealed significantly superior outcomes in favour of MFR therapy ($p < 0.001$). The findings indicate that levator scapulae-focused MFR is more effective than conventional exercise in reducing pain intensity and neck disability among sedentary female office workers with cervicogenic headache.

Index Terms— Cervicogenic headache, Myofascial release therapy, Levator scapulae, Neck Disability Index, Office workers, Manual therapy.

INTRODUCTION

Cervicogenic headache (CGH) is a secondary headache disorder originating from musculoskeletal dysfunction within the cervical spine and its associated soft tissues. The condition is characterized by unilateral or bilateral head pain accompanied by cervical stiffness, restricted movement, and tenderness of the upper cervical musculature. Individuals with CGH frequently report reduced work productivity, impaired quality of life, and persistent functional limitations that can interfere with daily activities. Recent epidemiological evidence suggests that the burden of cervicogenic headache is increasing among working-age adults, particularly those engaged in occupations that require prolonged sitting and sustained visual display terminal use.

Modern office environments have substantially altered occupational demands, resulting in extended periods of static sitting, repetitive computer-related tasks, and reduced movement variability throughout the working day. These factors contribute to the development of forward head posture, rounded shoulder alignment, and increased mechanical loading of the cervicospinal musculature. Among the muscles commonly implicated, the levator scapulae has received particular attention because of its anatomical attachment to the upper cervical vertebrae and scapula. Prolonged shortening or excessive activation of this muscle may increase cervical compression forces, facilitate the formation of myofascial trigger points, and contribute to nociceptive input associated with headache symptoms.

Myofascial dysfunction has been recognized as a clinically relevant contributor to chronic neck pain and cervicogenic headache. Trigger points within the levator scapulae and surrounding cervical musculature may produce referred pain patterns that mimic or aggravate headache symptoms. Consequently, therapeutic interventions aimed at restoring tissue extensibility and reducing myofascial restrictions have become increasingly important within contemporary physiotherapy practice.

Myofascial release (MFR) therapy is a manual therapy technique that applies sustained pressure and tissue elongation to restricted fascial structures. Proposed mechanisms include reduction of muscular hypertonicity, improvement of local circulation, modulation of nociceptive signalling, and restoration of normal movement patterns. Systematic reviews investigating manual therapy approaches have reported beneficial effects on headache intensity and cervical function; however, evidence specifically examining levator scapulae-focused myofascial release among sedentary female office workers remains limited.

Considering the growing prevalence of occupationally related cervicogenic headache and the biomechanical significance of the levator scapulae muscle, further investigation into targeted manual therapy interventions is warranted. Therefore, the purpose of this randomized controlled trial was to compare the effectiveness of levator scapulae-focused myofascial release therapy with conventional exercise in reducing pain intensity and neck-related disability among sedentary female office workers with cervicogenic headache.

It was hypothesized that participants receiving myofascial release therapy would demonstrate greater improvements in pain and functional outcomes than those receiving conventional exercise alone.

NEED OF THE STUDY

The increasing prevalence of cervicogenic headache among office workers has emerged as a significant occupational health concern due to prolonged computer use, static sitting postures, and forward head alignment. These factors place excessive mechanical stress on the cervicospinal region, particularly the levator scapulae muscle, leading to myofascial dysfunction, pain, and reduced functional capacity. Although conventional exercise therapy is widely recommended for cervicogenic headache, persistent symptoms are often associated with unresolved myofascial restrictions. Current literature supports manual therapy interventions for headache management; however, evidence specifically evaluating levator scapulae-focused myofascial release therapy in sedentary female office workers remains scarce. Therefore, this study was undertaken to determine whether targeted myofascial release therapy provides superior improvements in pain intensity and neck disability compared with conventional exercise therapy. The findings may contribute to evidence-based physiotherapy practice and support the development of more effective rehabilitation strategies for occupationally related cervicogenic headache.

RESEARCH METHODOLOGY

A randomized controlled trial was conducted to compare the effectiveness of levator scapulae-focused myofascial release therapy and conventional exercise therapy in reducing pain intensity and neck disability among sedentary female office workers with cervicogenic headache. Thirty female office workers aged 27–40 years who met the diagnostic criteria for cervicogenic headache were recruited through convenience sampling and randomly allocated into two groups ($n = 15$ each).

Participants who fulfilled the inclusion criteria and provided written informed consent were enrolled in the study. Individuals with a history of cervical spine surgery, cervical radiculopathy, traumatic neck injury, neurological disorders, migraine, inflammatory musculoskeletal conditions, or any contraindication to manual therapy were excluded.

Both groups received supervised treatment sessions throughout the intervention period. Group A underwent levator scapulae-focused myofascial release therapy, which involved sustained manual pressure and soft-tissue stretching techniques applied to the levator scapulae muscle to reduce myofascial restrictions, improve tissue mobility, and alleviate pain. Participants in this group also received postural correction advice and ergonomic education. Group B received conventional exercise therapy consisting of cervical range-of-motion exercises, stretching exercises, scapular stabilization exercises, and postural correction training. Participant attendance and adherence to the treatment protocol were monitored throughout the study.

Outcome measures were assessed at baseline and after completion of the intervention period. Pain intensity was measured using the Numeric Pain Rating Scale (NPRS), and functional disability was evaluated using the Neck Disability Index (NDI).

Data were analysed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics were expressed as mean $\pm$ standard deviation. Paired t-tests were used to determine within-group differences between pre- and post-intervention scores, while independent t-tests were used to compare outcomes between the two groups. A p-value of <0.05 was considered statistically significant.

STATISTICAL ANALYSIS

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize participant characteristics and outcome measures. Mean and standard deviation values were calculated for all continuous variables. Paired t-tests were used to determine within-group differences between pre-intervention and post-intervention scores, while independent t-tests were employed to compare post-treatment outcomes between groups. Statistical significance was established at a p-value of less than 0.05.

RESULT AND DISCUSSION

A total of 30 participants completed the study, with 15 participants each in the Myofascial Release Therapy (MFR) group and the Conventional Exercise Therapy group. Baseline characteristics were comparable between the groups.

The mean NPRS score in the MFR group decreased from 6.53 ± 0.52 to 2.53 ± 0.52 , while the Conventional Exercise group showed a reduction from 6.53 ± 0.52 to 4.53 ± 0.52 . The mean improvement was greater in the MFR group (4.00 points) compared to the Conventional Exercise group (2.00 points).

Similarly, the mean NDI score decreased from 27.60 ± 1.50 to 11.07 ± 1.58 in the MFR group and from 27.67 ± 1.54 to 20.60 ± 1.64 in the Conventional Exercise group. The mean improvement was 16.53 points in the MFR group compared to 7.07 points in the Conventional Exercise group.

The Shapiro–Wilk test confirmed normal distribution of data ($p > 0.05$), and Levene's test demonstrated homogeneity of variance between groups ($p > 0.05$), supporting the use of parametric tests.

Within-group analysis using paired t-tests revealed statistically significant improvements in both NPRS and NDI scores in the MFR and Conventional Exercise groups ($p < 0.001$).

Between-group analysis using independent t-tests demonstrated significantly greater improvement in the MFR group compared with the Conventional Exercise group for both pain intensity and neck disability ($p < 0.001$).

Overall, both interventions were effective; however, levator scapulae-focused myofascial release therapy produced significantly greater reductions in pain intensity and neck disability among sedentary female office workers with cervicogenic headache.

Table 1. Baseline Characteristics of Participants

Variable	Group A (MFR) (n=15)	Group B (Exercise) (n=15)
Age (years)	33.00 ± 3.95	33.47 ± 4.03
NPRS Pre-test	6.53 ± 0.52	6.53 ± 0.52
NDI Pre-test	27.60 ± 1.50	27.67 ± 1.54

Table 2. Within-Group Changes Following Intervention

Outcome Measure	Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Change (95% CI)	p-value
NPRS	Group A	6.53 ± 0.52	2.53 ± 0.52	4.00	<0.001
NPRS	Group B	6.53 ± 0.52	4.53 ± 0.52	2.00	<0.001
NDI	Group A	27.60 ± 1.50	11.07 ± 1.58	16.53 (15.98–17.08)	<0.001
NDI	Group B	27.67 ± 1.54	20.60 ± 1.64	7.07 (6.81–7.32)	<0.001

Table 3. Between-Group Comparison of Improvement Scores

Outcome Measure	Group A Mean Improvement	Group B Mean Improvement	Mean Difference (95% CI)	p-value
NPRS	4.00	2.00	2.00	<0.001
NDI	16.53	7.07	9.47 (8.89–10.04)	<0.001

DISCUSSION

The present study evaluated the effectiveness of levator scapulae–focused Myofascial Release Therapy (MFR) compared with Conventional Exercise Therapy in sedentary female office workers with cervicogenic headache. Both interventions resulted in significant improvements in pain intensity and neck-related disability; however, participants receiving MFR demonstrated significantly greater reductions in NPRS and NDI scores.

These findings suggest that targeted myofascial interventions may provide additional therapeutic benefits beyond conventional exercise alone.

The superior outcomes observed in the MFR group may be attributed to the reduction of myofascial restrictions, decreased muscle tension, and improved soft-tissue mobility within the levator scapulae muscle. Prolonged sitting, forward head posture, and repetitive occupational activities commonly experienced by office workers can increase mechanical stress on the cervicospinal region, contributing to the development of trigger points and pain-generating dysfunction. By addressing these impairments, MFR may reduce nociceptive input and improve cervical function, resulting in decreased headache symptoms and disability.

The findings of the present study are consistent with previous research supporting manual therapy interventions for cervicogenic headache. Recent systematic reviews and meta-analyses have reported significant improvements in pain and functional outcomes following myofascial release and other manual therapy techniques in individuals with headache and cervical musculoskeletal disorders. The present study extends these findings by specifically targeting the levator scapulae muscle in a population of sedentary female office workers who are particularly vulnerable to postural dysfunction and chronic cervical loading.

Participants in the Conventional Exercise Therapy group also demonstrated significant improvements in pain and disability. Therapeutic exercises, including stretching, postural correction, and cervical mobility training, may improve muscular flexibility, enhance movement patterns, and reduce mechanical stress on cervical structures. However, the greater magnitude of improvement observed in the MFR group suggests that exercise alone may not adequately address underlying myofascial dysfunction associated with cervicogenic headache.

The study has several strengths, including its randomized controlled design, use of validated outcome measures, and focus on a clinically relevant occupational population. Nevertheless, certain limitations should be considered. The sample size was relatively small, only female participants were included, and long-term follow-up was not performed. Future studies should include larger and more diverse populations, extended follow-up periods, and additional outcome measures such as cervical range of motion, headache frequency, and quality-of-life assessments.

Overall, the findings indicate that levator scapulae-focused Myofascial Release Therapy is an effective intervention for reducing pain intensity and neck-related disability in sedentary female office workers with cervicogenic headache and may be considered a valuable component of physiotherapy management for this population.

CONCLUSION

This randomized controlled trial demonstrated that levator scapulae-focused Myofascial Release Therapy was more effective than Conventional Exercise Therapy in reducing pain intensity and neck-related disability among sedentary female office workers with cervicogenic headache. Although both interventions resulted in statistically significant improvements, participants receiving Myofascial Release Therapy experienced greater clinical benefits across all outcome measures.

The findings suggest that myofascial dysfunction of the levator scapulae muscle may play a meaningful role in the development and persistence of cervicogenic headache in occupational settings characterized by prolonged sitting and sustained postural demands. Addressing these soft-tissue impairments through targeted manual therapy may contribute to improved cervical function, reduced pain, and enhanced participation in daily and work-related activities.

The results support the inclusion of Myofascial Release Therapy as part of a comprehensive physiotherapy programme for individuals with cervicogenic headache. Further research involving larger sample sizes, multicentre recruitment, and long-term follow-up is recommended to confirm the sustainability and broader applicability of these findings.

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