

Immediate Effect of Positional Release Technique versus Active Release Technique on Upper Trapezius Myofascial Pain, Tightness and Neck Disability in College-Going Students: A Comparative Study

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ABSTRACT:

Background: Upper trapezius myofascial pain is common among college-going students due to prolonged static postures, increased screen time, and academic burden, resulting in pain, muscle tightness with restricted cervical mobility, and neck-related disability. Positional Release Technique (PRT) and Active Release Technique (ART) are widely used manual therapy interventions. However, a comparative evidence on their immediate effects remains limited.

Objectives: Aim of the study is to compare the effectiveness of Positional Release Technique to Active Release Technique on Upper Trapezius Myofascial Pain among college-going students.

Methodology: Based on a previous study that reported a minimum sample size of 38 participants using the Visual Analogue Scale (VAS), 40 participants were recruited for this present study. 40 college-going students aged 20–25 years with upper trapezius myofascial pain were randomly assigned to Group A (PRT, n=20) or Group B (ART, n=20). Pain intensity, neck-related disability, cervical range of motion, and pain during manual pressure application were assessed using VAS, NDI, cervical ROM measurements, and VAS with manual pressure, respectively. Changes within each group were analyzed using the Wilcoxon Signed-Rank Test, while differences between groups were assessed using the Mann–Whitney U test.

Results: Both Groups showed statistically significant results with improvements in pain intensity, neck disability, and cervical mobility following intervention ($p < 0.001$). Between-group analysis demonstrated significantly greater improvements in VAS, NDI, and cervical range of motion in the PRT group compared to the ART group ($p < 0.001$).

Conclusion: Both techniques are effective for immediate relief from symptoms but however, PRT group demonstrates or showed superior immediate clinical improvement with decrease in symptoms. Due to its gentle, non-invasive approach and higher patient comfort, PRT may be considered a preferred initial intervention for rapid pain relief and functional improvement in young adults with Upper Trapezius Myofascial pain.

Keywords: Positional Release Technique (PRT), Active Release Technique (ART), Cervical Range of Motion (CROM) , Visual Analogue Scale (VAS)

INTRODUCTION:

Myofascial pain syndrome is a very common musculoskeletal condition for shoulder and cervical region and is characterised by myofascial trigger points. Myofascial Trigger Points are hyperirritable nodules which , located in taut bands of skeletal muscle fibres. These trigger points produces tenderness, gives referred pain and restricts range of motion. In this case , upper trapezius muscle is one of the most frequently affected muscles, particularly in individuals with prolonged sitting posture and repetitive forward head activities ¹

College-going students presents a population with a high prevalence of neck and shoulder pain due to academic stress, work , prolonged use of laptop and extensive smartphone usage or long studying hours. The poor ergonomic habits in students like, sustained neck flexion and static forward head postures while working contributes to the trigger points developement in the upper trapezius muscle.² Studies have reported that nearly 50–70% of college students experience neck pain, with the upper trapezius being the most common site for myofascial trigger points.³ These Myofascial trigger points (MTrPs) leads to different functional impairments, reduced cervical range of motion, muscle tightness, headaches and decreased work productivity. So, identifying it early and to treat therefore is important to prevent chronic neck and shoulder pain due to myofascial trapezius pain and to avoid long-term disability.⁴

Various interventions under physiotherapy are used to treat myofascial trigger points via traditional methods such as stretching , massage, dry needling, ultrasound therapy and many more manual therapy techniques. Among these, manual therapy techniques are used widely due to their immediate therapeutic effects and minimal equipment requirements.⁵ **Positional Release Technique (PRT)** is an indirect manual therapy approach which involves to place the affected muscle in a position of maximal comfort, and is proven to act by reducing muscle spindle activity, decrease protective muscle guarding and restore normal muscle tone ⁶ and on the other hand, **Active Release Technique (ART)** is a type of soft tissue mobilization technique which is proven to break down adhesions, restore normal tissue mobility and improve muscle function.⁷ Both of these techniques are used in clinically to treat myofascial pain, but there is limited research directly comparing the immediate effects of these interventions, specially in young adult populations such as college students. Therefore, this present study aimed to compare the immediate effects of Positional Release Technique and Active Release Technique on pain, cervical range of motion and neck disability among college-going students with upper trapezius myofascial pain.

RESEARCH METHODOLOGY :

MATERIAL / TOOLS:

1. Participant Information Sheet
2. Consent Form
3. Visual Analog Scale (VAS)
4. Goniometer
5. Neck Disability Index Scale (NDI)

METHODOLOGY:

1. Study Design- A Comparative Study, Two-Armed , Single-Blind , Parallel Study

2. Study duration- (1 day) Immediate Effect
3. Study Setting- Different Colleges in Ahmedabad
4. Study Technique – Random Sampling via Lottery Method
5. Sample Size – 40 participants (20 participants each group)
6. Study Population – College Going students with age 20-25 years.
7. Group Allocation – Group A (PRT) , Group B (ART)
8. Approval – Ethical Committee of Apollo Institute of Physiotherapy , Ahmedabad

RANDOMIZATION AND BLINDING :

Participants were randomly allocated into two groups using a lottery-based dot randomization method. Assessors were blinded to interventions , but due to nature of interventions blinding of participants and therapist was not feasible. Therefore, the study was conducted as an open-label study without therapist and participant blinding. To reduce bias, outcome measures were assessed by the qualified investigator who was assigned to subjects to intervention groups according to group of randomization.

INCLUSION AND EXCLUSION CRITERIA :

Participants were screened according to inclusion and exclusion criteria. Individuals with age 20-25 years , both genders College students with active/latent trigger point on palpation over upper trapezius , pain atleast >1 week of musculoskeletal origin and reduced cervical range of motion on checking via goniometry, and participants who gave written informed consent were included , and individuals with history of cervical spine trauma, fracture, recent surgery, presence of neurological deficits such as radiculopathy or myelopathy, diagnosed cervical disc pathology or inflammatory arthritis and structural deformities, use of any recent analgesic and physiotherapy treatment taken or any other contraindications were excluded. Baseline measurements of pain, disability, and cervical range of motion were recorded.

PROCEDURE :



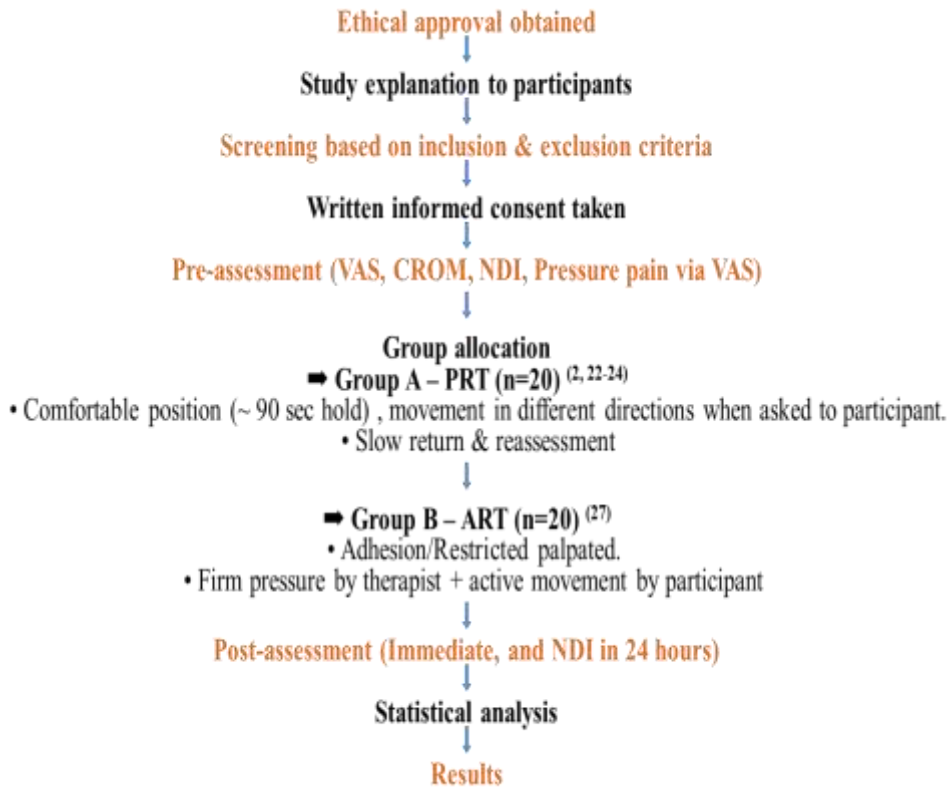


Figure 1. Explained Procedure of Intervention And showed the major areas of Myofascial Trigger points for Upper Trapezius Muscle.

Group A received Positional Release Technique. Therapist identified the trigger point in the upper trapezius muscle and positioned the patient’s neck into a position of maximum comfort. This position was maintained for approximately 90 seconds before slowly returning to neutral. This was done in different positions of neck.

Group B received Active Release Technique. The therapist applied firm manual pressure over the restricted tissue while the participant actively moved the neck through specific movements to release adhesions and improve tissue mobility.



Figure2: Positional Release Technique to the individual with Upper Trapezius Myofascial Pain

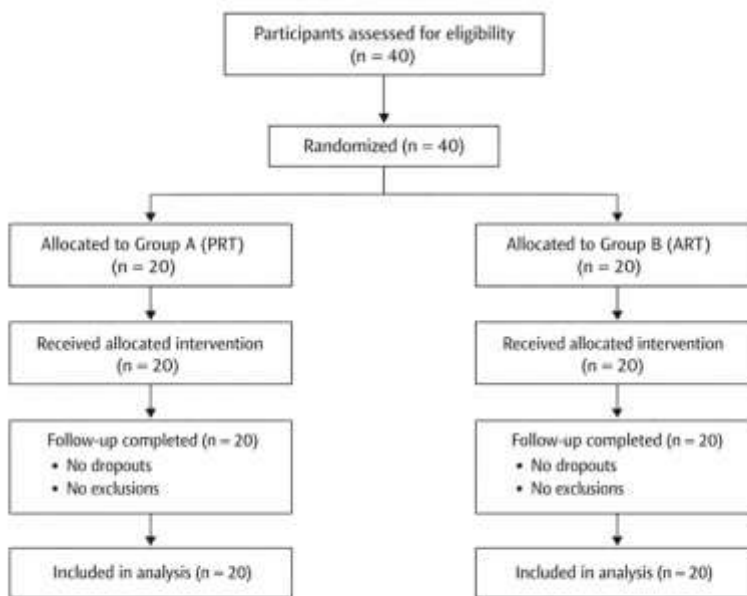
OUTCOMES:

Upper Trapezius Trigger Point Identification : Myofascial trigger points in the upper trapezius muscle were identified through palpation of taut bands and localized tender points, reproducing the participant’s familiar pain. Visual Analog Scale (VAS): Pain intensity was assessed by Visual Analog Scale (VAS), which is a 10-cm horizontal line range from 0 (no pain) to 10 (worst imaginable pain). Participants were asked to mark the point representing their current level of pain. Pressure Pain Sensitivity (VAS-P / Tenderness Rating) : Pressure pain over the upper trapezius trigger point was assessed by manual palpation by thumb with similar pressure applied on trigger points post treatment session, and participants rated the tenderness using the Visual Analog Scale. Functional disability due to neck pain was checked by using the Neck Disability Index Score (NDI) , Cervical Range of Motion was measured for cervical flexion , lateral flexion and rotation by using Standard Goniometer.

STATISTICAL ANALYSIS:

Statistical significance was set at $p < 0.05$. Statistical Analysis : Done from IBM SPSS SOFTWARE VERSION 27. Descriptive statistics were used to calculate mean and standard deviation. As the data was not non-normally distributed, thus non-parametric tests were applied. Wilcoxon Signed Rank Test was used for within-group comparisons, and Mann–Whitney U Test was used for between-group comparisons. The level of statistical significance was set at $p < 0.05$.

Flowchart 1 : CONSORT flow diagram showing participant recruitment, randomization, allocation, follow-up and analysis in the study comparing Positional Release Technique and Active Release Technique.



RESULTS:

Baseline Comparison

At baseline, both groups demonstrated comparable values in all outcome measures assessed including pain intensity, pressure pain sensitivity, cervical range of motion (CROM), and neck disability index

(NDI), indicating homogeneity between groups before any intervention. Both interventions resulted in reduced pain intensity, reduced disability, and increased cervical range of motion following treatment. Within-group comparisons were performed using the Wilcoxon Signed Rank Test due to non-normal distribution of data. The results indicate **statistically significant improvements within both groups** for all outcome variables ($p < 0.001$).

DESCRIPTIVE STATISTICS :

Table 1: Descriptive Statistics (Mean ± SD) : Values for all outcome measures before and after intervention in both groups.

Outcome Measure	PRT Pre	PRT Post	ART Pre	ART Post
VAS (Pain)	5.65 ± 1.18	1.40 ± 1.23	4.25 ± 1.02	2.05 ± 1.39
VAS-P (Pressure Pain)	6.85 ± 1.23	2.15 ± 1.42	5.40 ± 1.43	2.75 ± 1.65
Neck Disability Index (%)	25.15 ± 5.21	10.20 ± 2.57	22.70 ± 7.25	14.90 ± 7.86
CROM – Lateral Flexion (°)	29.05 ± 2.91	44.30 ± 2.08	33.40 ± 4.13	42.45 ± 3.36
CROM – Flexion (°)	29.30 ± 1.84	44.25 ± 2.79	33.65 ± 3.67	43.05 ± 3.36
CROM – Rotation (°)	50.60 ± 2.98	68.65 ± 2.72	60.25 ± 7.41	69.85 ± 7.30

Table 2: Within-Group Comparison (Wilcoxon Signed Rank Test)

Outcome	PRT Z	PRT p	ART Z	ART p
VAS (Pain)	-3.973	<0.001	-3.750	<0.001
Neck Disability Index	-3.927	<0.001	-3.837	<0.001
CROM Lateral Flexion	-3.964	<0.001	-3.934	<0.001
CROM Flexion	-3.941	<0.001	-3.848	<0.001
CROM Rotation	-4.130	<0.001	-3.926	<0.001

Visual Analogue Scale (VAS) : Participants in the PRT group demonstrated a reduction in mean pain score from 5.65 ± 1.18 to 1.40 ± 1.23 , indicating substantial pain relief. Similarly, the ART group showed improvement with mean VAS scores decreasing from 4.25 ± 1.02 to 2.05 ± 1.39 . However, the magnitude of pain reduction was greater in the PRT group. **Pressure Pain Sensitivity :** The PRT group decreased from 6.85 ± 1.23 to 2.15 ± 1.42 , while the ART group improved from 5.40 ± 1.43 to 2.75 ± 1.65 , demonstrating reduced trigger point sensitivity. This was taken as Tertiary Outcome.

Neck Disability Index : The PRT group improved from 25.15 ± 5.21 to 10.20 ± 2.57 , whereas the ART group improved from 22.70 ± 7.25 to 14.90 ± 7.86 . The reduction in disability was greater in the PRT group compared to ART. **Cervical Range of Motion :** Cervical mobility improved in both groups across all measured movements. Lateral Flexion : PRT group increased from $29.05^\circ \pm 2.91$ to $44.30^\circ \pm 2.08$, while ART improved from $33.40^\circ \pm 4.13$ to $42.45^\circ \pm 3.36$. Cervical Flexion : PRT improved from $29.30^\circ \pm 1.84$ to $44.25^\circ \pm 2.79$, whereas ART improved from $33.65^\circ \pm 3.67$ to $43.05^\circ \pm 3.36$. C. Rotation : PRT increased from $50.60^\circ \pm 2.98$ to $68.65^\circ \pm 2.72$, while ART improved from $60.25^\circ \pm 7.41$ to $69.85^\circ \pm 7.30$.

Short Statistical Conclusion

All outcome measures demonstrated statistically significant improvements within both groups ($p < 0.001$). The PRT group exhibited greater reductions in pain and disability along with greater improvements in cervical range of motion compared to the ART group. Overall, both groups demonstrated significant increase in cervical mobility, with greater improvements observed in the PRT group for most movements.

Figure 3—Post-Treatment Pain (VAS) Comparison

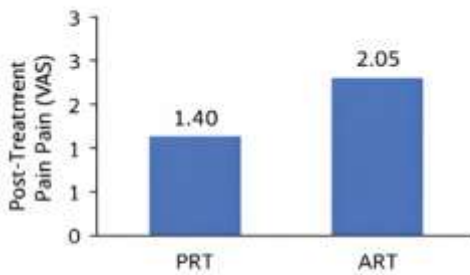


Figure 4—Post-Treatment Neck Disability Index (NDI)

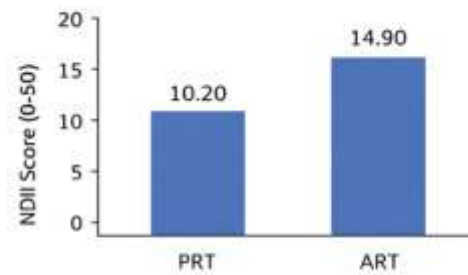


Figure 5— Post-Treatment Cervical Range of Motion (CROM)

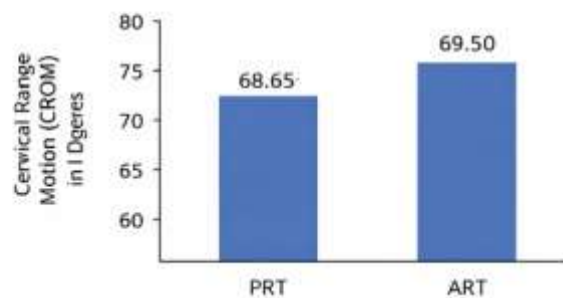


Table No. 4 : Difference Between-Group Comparison After Intervention

Outcome Measure	PRT Post (Mean ± SD)	ART Post (Mean ± SD)	Interpretation
VAS Pain	1.40 ± 1.23	2.05 ± 1.39	More reduced in PRT
VAS Pressure	2.15 ± 1.42	2.75 ± 1.65	Lowered tenderness in PRT
Neck Disability Index	10.20 ± 2.57	14.90 ± 7.86	Disability score decreased more in PRT
CROM Lateral Flexion	44.30 ± 2.08	42.45 ± 3.36	Slightly better in PRT
CROM Flexion	44.25 ± 2.79	43.05 ± 3.36	Slightly better in PRT
CROM Rotation	68.65 ± 2.72	69.85 ± 7.30	Comparable

DISCUSSION:

The findings of the study demonstrated that both interventions resulted in significant improvements within groups; however, PRT produced significantly greater improvements compared to ART in reducing pain and improving cervical ROM.

Myofascial trigger points are a common source or a reason of musculoskeletal pain, in the upper trapezius muscle. These trigger points are characterized by hypersensitive nodules within taut bands of skeletal

muscle which produces localized and referred pain, also limits or restricted movement, and causes functional limitations. The upper trapezius muscle is frequently involved in individuals with neck pain, particularly in students, computer users, with individuals who are usually exposed to prolonged static posture^[8]. Causing sustained mechanical loading and poor postural habits leading to muscle fatigue, ischemia, and biochemical changes that contribute to form trigger point formation^[9].

The present study demonstrated a significant reduction in pain post-intervention following both PRT and ART interventions. These findings are supported by previous studies indicates that manual therapy techniques targets trigger points can effectively, helps to decrease pain and improve function. **Rodríguez-Jiménez et al.** reported that trigger point interventions significantly reduces pain intensity and improves functional outcomes in patients with myofascial pain syndrome^[10]. Pain reduction following manual therapy may occur due to improved local circulation, reduction in muscle hypertonicity, and modulation of nociceptive input.

Despite improvements observed in both groups, PRT produced greater improvements compared to ART in the present study. Positional Release Therapy is an indirect manual therapy technique which involves placing the muscle in a position of maximal comfort or shortened length. Mechanism to work for it is that this ease of position first decreases abnormal muscle spindle activity and reduces gamma motor neuron excitability, leads to relaxation of muscle fibres and decreased trigger point sensitivity^[11]. The reduction in muscle spindle activity allows the neuromuscular system to reset abnormal proprioceptive feedback, results in decreasing pain and improve the muscle function.

Previous studies support the effectiveness of PRT in managing myofascial trigger points. **Ullah et al.** demonstrated that positional release technique significantly reduced pain intensity and improved cervical range of motion in individuals with upper trapezius trigger points^[12]. Similarly, **Pathak and Pathak** reported that PRT effectively reduced tenderness and improved flexibility of the upper trapezius muscle in patients with myofascial pain syndrome^[13]. The authors suggested that the neuromuscular relaxation achieved through positional release helps normalize muscle tone and reduce trigger point irritability.

In the present study, ART also demonstrated significant improvements in pain and cervical ROM, but the magnitude of improvement was smaller compared to PRT. Active Release Technique is a manual therapy technique that combines soft tissue tension with active patient movement. During ART, the therapist applied pressure to the affected tissue or tender trigger point while the patient actively does movement which lengthens the muscle, this helps break down adhesions and restore normal soft tissue mobility^[14].

Previous research had shown beneficial effects of ART in treating musculoskeletal conditions associated with soft tissue adhesions and restricted mobility. **Mohseni-Bandpei et al.** reported that ART significantly improved cervical mobility and reduced pain in individuals with upper trapezius trigger points^[14]. Concluding that many authors proposed that the improvement occurs due to enhanced tissue extensibility, breakdown of fibrotic adhesion, and improved local circulation.

However, the greater improvement was observed by current author in this present study was with PRT, which showed this technique was gentle and non-provocative nature without applying direct pressure or stretching, PRT allows the muscle to relax in a pain-free position, minimizes protective muscle guarding and facilitates neuromuscular relaxation. This mechanism explains why the greater reduction was in pain intensity observed in the PRT group.

Another possible explanation relates to neurophysiological mechanism of pain modulation. Positional release therapy decreases nociceptive input from muscle spindles and Golgi tendon organ, which may

help in reducing central sensitization and improving muscle relaxation ^[11]. This reduction in nociceptive activity contributes to the rapid relief and improvement in pain and cervical mobility observed in the present study.

The improvements in cervical ROM observed in both groups are also supported by previous literature. Releasing trigger points in the upper trapezius muscle can help restoring normal muscle length, reduce stiffness, and improve cervical spine mobility ^[10,12]. Improved cervical mobility is clinically important, as restricted ROM is commonly associated with neck pain and functional impairment.

Another important consideration in the present study is the **age group of participants (20–25 years)**. Young adults are particularly vulnerable or prone to develop upper trapezius trigger points due to prolonged use of smartphones, laptops, and other electronic devices. Studies have shown that sustained forward head posture increases mechanical stress on cervical muscles, leads to early muscle fatigue and trigger point formation ^[9]. Therefore, early intervention in this population is important to prevent the progression of musculoskeletal disorders.

The findings of the present study have important clinical implications for physiotherapy practice. Both PRT and ART are effective interventions for managing upper trapezius trigger points; however, the greater improvements observed with PRT suggest that it may be a preferable technique for immediate pain relief and restoration of cervical mobility.

CONCLUSION:

Both Positional Release Technique and Active Release Technique are effective in reducing pain and improving cervical mobility and reduce functional inability in individuals with upper trapezius myofascial Pain. However, **Positional Release Technique showed significantly greater improvement compared with Active Release Technique**, suggesting that it may be the preferred intervention for immediate pain relief.

LIMITATIONS:

Only immediate effects evaluated as per feasibility and time limit. Short duration of intervention due to short time availability. Limited age group taken. (20–25 years).

FUTURE RECOMMENDATIONS :

1. Larger Sample Size : Future studies should include a larger number of participants to improve the reliability and generalizability of results with Long-term Follow-up period.
2. Wider Age Groups : This study had shorter age group number just 20-25 years candidates were taken for participation , future studies should include participants from different age groups and populations to assess whether the results are consistent across various demographics.
3. Different occupational groups : Research should also be made in more wider populations such as office workers, healthcare professionals, and athletes, who commonly develop upper trapezius trigger points due to prolonged posture and repetitive activities.
4. Additional Outcome Measures : Future research can include functional disability scales, muscle strength assessment, electromyography (EMG), and quality-of-life questionnaires to provide more comprehensive clinical outcomes.
5. Combination Therapy Studies : Future studies should investigate the combined effect of manual therapy techniques with therapeutic exercises, stretching, postural correction, and ergonomic training

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