Immediate Effect of Ischemic Compression versus Positional Release Technique on Pain and Range of Motion among College-Going Students with Trapezitis: An Experimental Study

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Abstract: **Background:** Trapezitis is a common myofascial condition among college-going students, largely due to prolonged faulty posture, sustained neck flexion and excessive mobile phone use. Ischemic Compression (IC) and Positional Release Technique (PRT) are two manual therapy techniques used to treat upper trapezius trigger points, but their immediate effects have rarely been compared.

Methods: An experimental comparative study was conducted on **40 college-going students aged 18–26 years** with trapezitis. Subjects were randomly allocated into two groups of 20 each. Both groups received a hot pack for 15 minutes; Group A then received Ischemic Compression and Group B received Positional Release Technique. Pain was assessed with the Visual Analogue Scale (VAS) and cervical lateral flexion with a universal goniometer, before and immediately after a single session.

Results: Both groups showed statistically significant within-group improvement ($p < 0.05$). VAS reduced from 5.55 ± 1.66 to 2.25 ± 1.51 in Group A and from 5.55 ± 1.27 to 2.05 ± 1.27 in Group B. Right and left lateral flexion improved significantly in both groups. **Between-group comparison showed no significant difference** in VAS ($p = 0.65$), right lateral flexion ($p = 0.48$) or left lateral flexion ($p = 0.46$).

Conclusion: Ischemic Compression and Positional Release Technique are equally effective in producing immediate pain relief and improving cervical lateral flexion range of motion in college-going students with trapezitis.

Index Terms **– Trapezitis, Ischemic Compression, Positional Release Technique, Myofascial Trigger Point, Neck Pain, Range of Motion, VAS, College Students**

INTRODUCTION

Trapezitis can be defined as an inflammation of the trapezius muscle of the neck and upper back that involves myofascial pain syndrome [1]. The trapezius helps in shrugging of the shoulders and in neck movements; bilateral contraction of its descending fibres produces neck extension, while unilateral contraction produces lateral flexion of the neck [2]. Neck pain is most common in middle-aged females, with a mean point prevalence of about 13%, and it usually arises in the upper trapezius [3]. Among college-going students the problem is growing: about 79% of people aged 18–26 years use mobile phones with their neck bent, and spend only a few hours of the day without their phones [4].

The pain generally arises from overuse of the muscle in non-ergonomic postures, static work positions, stress, repetitive movements, prolonged sitting without back support, prolonged head-bending activities such as reading, tight pectoral muscles and abnormal breathing patterns [4]. Studies have shown a relationship between trapezius muscle activation and pain [5,6], because poor ergonomics keeps the upper fibres in a shortened position. Stressed soft tissue receives less oxygen and nutrients, accumulates metabolic waste and finally develops **myofascial trigger points** [1]. Upper trapezius tightness has been found to be highly prevalent among university students and strongly associated with chronic neck pain and poor posture [7].

Trigger points are hyperirritable foci within a palpable taut band of the muscle belly. Simons et al. described them as a tender spot on a taut band that produces referred pain or altered sensation at least 2 cm beyond the spot when pressure is held for less than 10 seconds, and that may restrict cervical range of motion (ROM) [1]. The trapezius receives its nerve supply from the spinal accessory nerve (CN XI) and the C3 and C4 cervical nerves.

Treatment options for trapezitis include non-steroidal anti-inflammatory drugs, electrotherapy modalities, stretching, Muscle Energy Technique, positional release and ischemic compression [8,9]. **Positional Release Technique (PRT)**, proposed by Lawrence H. Jones, involves passive positioning of the body in a position of comfort that shortens the hypertonic muscle by approximating its origin and insertion. This inhibits muscle spindle activity, reduces the guarding efferent impulses and allows the muscle to return to its normal resting tone; the proposed mechanisms are spindle resetting, reduced nociceptive sensitivity and improved circulation [8,9,10].

Ischemic Compression (IC) applies sustained vertical pressure over the trigger point with enough force and duration to temporarily reduce blood flow. When the pressure is released, reactive hyperaemia flushes the area. Simons proposed that local pressure lengthens the shortened sarcomeres of the trigger point, reduces muscle tension and improves ROM [1,11]. IC may also normalise the biomechanical properties of the muscle fibres [12]. Pressure is usually maintained for about 60 seconds, though recent studies suggest 60–90 seconds [13].

Both IC and PRT treat the cause of trapezitis rather than only the symptoms. Most previous studies have compared these techniques with other manual and non-manual methods over long treatment periods, and their **immediate effects have not been directly compared** in college-going students. Hence, the present study was undertaken.

NEED OF THE STUDY

In college-going students, trapezitis is caused by prolonged faulty posture, overuse and stressful neck movements, which affect activities of daily living. Various studies have compared different manual and non-manual techniques, but they are based on long-term treatment plans, and no study has compared these two techniques for their immediate effect. Hence, this study assessed the immediate effect of Ischemic Compression versus Positional Release Technique on pain and range of motion among college-going students with trapezitis.

AIM AND OBJECTIVES

Aim: To compare the immediate effect of Ischemic Compression versus Positional Release Technique on pain and range of motion among college-going students with trapezitis.

Objectives: (1) To assess the immediate effect of Ischemic Compression on pain and range of motion using VAS and universal goniometer. (2) To assess the immediate effect of Positional Release Technique on pain and range of motion using VAS and universal goniometer. (3) To compare the effect of both techniques on pain and range of motion.

HYPOTHESIS

Alternative hypothesis (H1): There will be a significant difference between the effects of Ischemic Compression and Positional Release Technique on pain and range of motion among college-going students with trapezitis.

Null hypothesis (H0): There will be no significant difference between the effects of Ischemic Compression and Positional Release Technique on pain and range of motion among college-going students with trapezitis.

RESEARCH METHODOLOGY

3.1 Study Design and Population

This experimental comparative study was conducted in the Physiotherapy OPD of Dr. Ulhas Patil College of Physiotherapy, Jalgaon, over a period of 6 months. The study population consisted of college-going students with trapezitis. Ethical clearance was obtained from the Institutional Ethical Committee and written informed consent was taken from all participants.

3.2 Sample Size and Sampling

The minimum sample size was calculated using the formula for estimating the difference between two means (n = 2ZZSZ/dZ), using means of 6.87 and 12.27, standard deviations of 3.96 and 3.53 (pooled SD 3.75) and a 95% level of confidence (Z = 1.64). The required sample was **40 subjects**, who were allocated by simple random sampling into **Group A (n = 20): Ischemic Compression** and **Group B (n = 20): Positional Release Technique**.

3.3 Selection Criteria

Inclusion criteria: age 18–26 years; both males and females; neck pain for at least the last 15 days; palpable trigger points in the trapezius; pain score of 3–7 on VAS [14]; limitation of neck movement due to pain; and willingness to participate.

Exclusion criteria: cervical injury; history of referred pain due to cervical pathology; degenerative cervical spine; wound over the neck region; and shoulder pathology.

3.4 Materials

Pen, evaluation sheet, consent form, universal goniometer, hot pack and treatment couch.

3.5 Outcome Measures

Visual Analogue Scale (VAS): a 10 cm horizontal line from 0 (no pain) to 10 (most severe pain), on which the subject marks the present pain intensity. The VAS has high test-retest reliability (ICC = 0.97) and is a valid measure of pain intensity [14].

Cervical lateral flexion ROM (universal goniometer): with the subject seated upright, the fulcrum was placed over the C7 spinous process, the stationary arm aligned with the thoracic spinous processes perpendicular to the floor, and the moving arm aligned with the dorsal midline of the head using the occipital protuberance. The subject bent the neck sideways as far as possible without rotation or flexion, and right and left lateral flexion were recorded in degrees. Intra- and inter-examiner reliability of this method ranges from ICC 0.80 to 0.93 [15].

3.6 Procedure

Subjects were screened according to the selection criteria, and trapezitis was confirmed by palpating the upper trapezius between the acromion and the cervical spine for taut bands, local tenderness and referred pain. Demographic details and baseline (pre-test) VAS and ROM were recorded. **Both groups received a hot pack for 15 minutes** prior to the intervention to relax the soft tissues. Outcome measures were recorded again **immediately after the single session** (post-test).

Group A – Ischemic Compression: With the subject in sitting or supine lying with the cervical spine in neutral, the therapist identified the trigger point in the upper trapezius by pincer palpation and applied sustained, gradually increasing, non-painful thumb pressure until a tissue resistance barrier was felt. The pressure was held until the barrier released, then increased to the next barrier. This was repeated until the trigger point tension or tenderness disappeared or 90 seconds had elapsed, whichever occurred first.

Group B – Positional Release Technique: With the subject in supine lying and the cervical spine in neutral, the therapist sat behind the subject on the affected side and identified the trigger points along the upper fibres of the trapezius by pincer palpation. The head was laterally flexed towards the side of the trigger point, and the shoulder was abducted to about 90° with slight flexion or extension to fine-tune the position of comfort. This position was **held for 90 seconds**, followed by a slow passive return to the anatomical neutral position, which was maintained for 5 minutes.

3.7 Statistical Analysis

Data were entered in Microsoft Excel and analysed using Minitab 17. The **paired t-test** was used for within-group comparison of pre- and post-intervention values, and the **unpaired t-test** for between-group comparison of post-intervention values. The level of significance was set at $p \leq 0.05$.

RESULTS AND DISCUSSION

4.1 Results

A total of 40 college-going students with trapezitis completed the study, with 20 subjects in each group.

Table 1: Age distribution of subjects

Age (years)	Group A n (%)	Group B n (%)	Total n (%)
18–20	1 (5.00)	2 (10.00)	3 (7.50)
21–23	14 (70.00)	10 (50.00)	24 (60.00)
24–26	5 (25.00)	8 (40.00)	13 (32.50)
Total	20 (100)	20 (100)	40 (100)

Most subjects in both groups were aged 21–23 years (70% in Group A and 50% in Group B).

Table 2: Gender distribution of subjects

Gender	Group A n (%)	Group B n (%)	Total n (%)
Male	4 (20.00)	4 (20.00)	8 (20.00)
Female	16 (80.00)	16 (80.00)	32 (80.00)
Total	20 (100)	20 (100)	40 (100)

Females formed 80% and males 20% of the subjects in both groups, so the groups were similar in gender distribution.

Table 3: Within-group comparison of VAS (paired t-test)

Group	Test	Mean	SD	t value	p value
A (IC)	Pre	5.55	1.66	10.69	0.00*
	Post	2.25	1.51		
B (PRT)	Pre	5.55	1.27	20.57	0.00*
	Post	2.05	1.27		

*p < 0.05, significant

In Group A, the mean VAS score **reduced from 5.55 ± 1.66 to 2.25 ± 1.51** ($t = 10.69$, $p = 0.00$). In Group B, it **reduced from 5.55 ± 1.27 to 2.05 ± 1.27** ($t = 20.57$, $p = 0.00$). Both techniques therefore produced a statistically significant immediate reduction in pain.

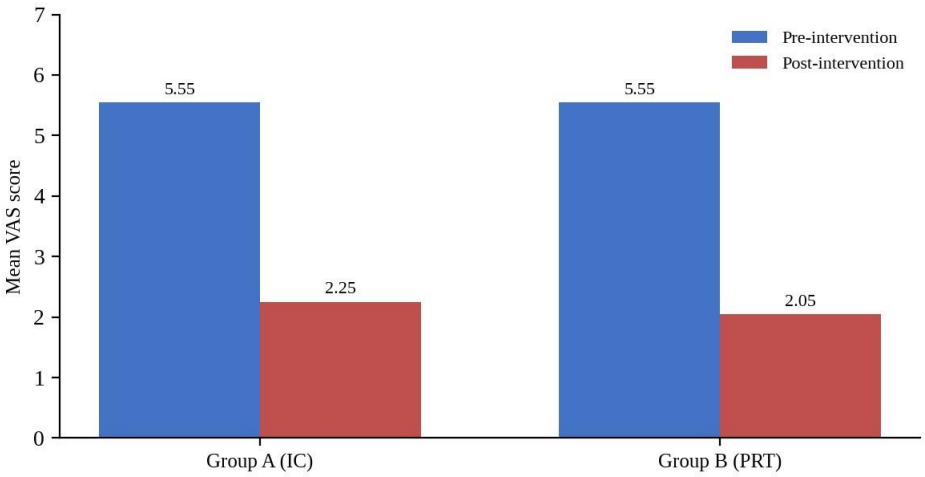

Figure 1: Pre- and post-intervention mean VAS scores in Group A and Group B

Table 4: Within-group comparison of cervical lateral flexion ROM in degrees (paired t-test)

Group / Side	Test	Mean	SD	t value	p value
A – Right	Pre	33.05	7.90	6.08	0.00*
	Post	37.40	6.84		
A – Left	Pre	30.75	5.34	6.71	0.00*
	Post	36.35	6.56		
B – Right	Pre	30.75	8.45	7.41	0.00*
	Post	35.85	7.04		
B – Left	Pre	29.75	7.81	6.58	0.00*
	Post	34.60	8.04		

*p < 0.05, significant

In Group A, right lateral flexion increased from 33.05° to 37.40° and left lateral flexion from 30.75° to 36.35°. In Group B, right lateral flexion increased from 30.75° to 35.85° and left lateral flexion from 29.75° to 34.60°. **All improvements were statistically significant (p = 0.00).**

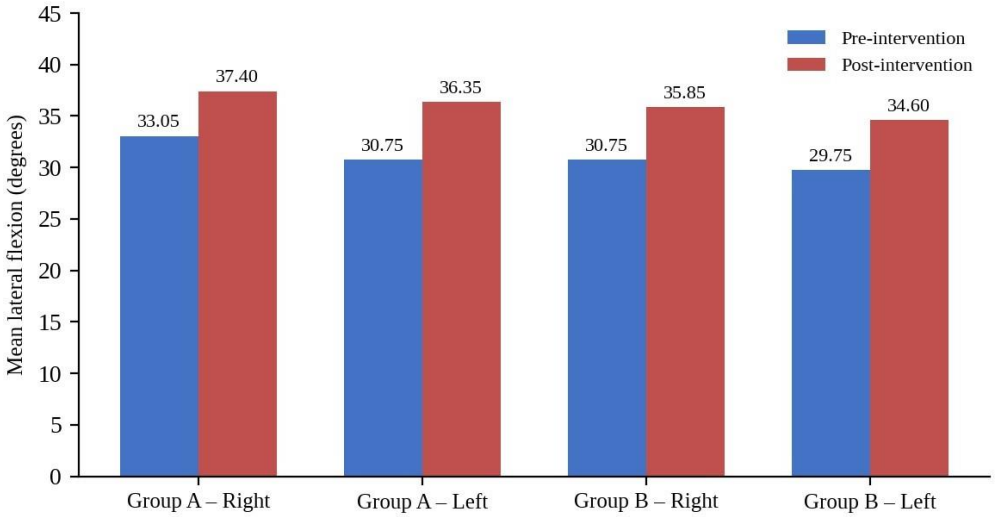

Figure 2: Pre- and post-intervention mean cervical lateral flexion ROM in Group A and Group B

Table 5: Between-group comparison of post-intervention values (unpaired t-test)

Outcome	Group	Mean	SD	t value	p value
VAS	A (IC)	2.25	1.52	0.45	0.65
	B (PRT)	2.05	1.28		
Right ROM	A (IC)	37.40	6.84	0.71	0.48
	B (PRT)	35.85	7.04		
Left ROM	A (IC)	36.35	6.56	0.75	0.46
	B (PRT)	34.60	8.04		

p > 0.05, not significant

Between-group comparison of post-intervention values showed **no statistically significant difference** between the two groups for VAS (t = 0.45, p = 0.65), right lateral flexion (t = 0.71, p = 0.48) or left lateral flexion (t = 0.75, p = 0.46). Hence, **the null hypothesis was accepted.**

4.2 Discussion

The present study compared the immediate effects of Ischemic Compression and Positional Release Technique on pain and cervical lateral flexion in college-going students with trapezitis. **Both techniques produced significant within-group improvement, but neither was superior to the other.**

Trapezitis is common in young adults because of prolonged faulty posture, sustained neck flexion, excessive mobile phone use, academic stress and repetitive activities. The upper trapezius is especially prone to trigger points due to continuous low-level activation [1]. Hanvold et al. and Fejer et al. reported a high prevalence of neck and shoulder pain among young adults exposed to sustained postural stress [6,3], which matches the profile of the present subjects.

Effect of Ischemic Compression: The significant reduction in pain in Group A can be explained by the temporary ischemia produced by sustained pressure, followed by reactive hyperaemia on release. This improves local circulation and oxygenation and helps remove pain-producing metabolites such as bradykinin, substance P and prostaglandins [12]. Sustained pressure also normalises sarcomere length within the taut band and reduces nociceptive input [1]. Similar pain reduction after IC was reported by Khan and Khan [16], Fernández-de-las-Peñas et al. [17] and Cagnie et al. [13]. The improvement in lateral flexion can be attributed

to reduced muscle stiffness and trigger point sensitivity, which improves muscle extensibility; Nambi et al. [11] and Kisilewicz et al. [12] reported similar findings.

Effect of Positional Release Technique: PRT places the muscle in a shortened, comfortable position, which reduces abnormal proprioceptive input from the muscle spindles, decreases gamma motor neuron activity and breaks the pain–spasm–pain cycle [8]. This normalises muscle tone and reduces protective guarding, which explains the improvement in both pain and ROM in Group B. These results agree with Carvalho et al. [9], Rathod et al. [18], Vispute et al. [19] and Kojidi et al. [10], who reported significant reductions in pain and improvement in ROM after PRT in subjects with upper trapezius trigger points. Saadat et al. also found that inhibition techniques that include positional release improve pain threshold and pain intensity [20].

Between-group comparison: Although Group B showed a slightly lower post-intervention VAS score and Group A showed slightly greater ROM gain, these differences were not statistically significant. This is consistent with Choksi et al. [21], Fernández-de-las-Peñas et al. [17] and Vispute et al. [19], who also found no significant difference between different manual therapy techniques in the immediate management of trapezitis and trigger points. Since degenerative changes are minimal in the 18–26 year age group, the improvements seen can be attributed mainly to soft-tissue and neuromuscular changes, making this population well suited to manual therapy.

CONCLUSION

The present study concluded that **Ischemic Compression is as effective as Positional Release Technique** in reducing pain and improving cervical lateral flexion range of motion in college-going students with trapezitis.

LIMITATIONS

1. The study measured only the immediate effect of a single session, so long-term efficacy is not known.
2. The sample was restricted to college students aged 18–26 years, which limits generalizability.
3. Only lateral flexion was measured; other cervical movements and functional disability were not assessed.

FUTURE SCOPE

1. The study can be extended to a longer treatment protocol (e.g., 2–3 weeks) with follow-up to assess long-term effects.
2. Future research can compare these techniques against a sham or control group to confirm their independent efficacy.

CLINICAL IMPLICATIONS

Both techniques are effective: clinicians can confidently use either Ischemic Compression or Positional Release Technique for immediate pain relief and improvement in ROM in trapezitis. This gives flexibility to choose the technique based on patient preference or trigger point sensitivity; for example, PRT may be preferred in patients who cannot tolerate direct pressure.

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