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Effectiveness of Myofascial Release with Icing Versus Ultrasound with Ischemic Compression in Patients with Upper Trapezitis: An Experimental Study

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Abstract:

- ***Background***:

Trapezitis is a painful inflammatory condition of the trapezius muscle, often associated with myofascial pain. It typically presents with muscle tightness and discomfort, leading to reduced neck mobility. The condition is most commonly observed in individuals between 18 and 50 years of age. Physiotherapeutic approaches such as myofascial release with icing and ultrasound combined with ischemic compression are frequently used to manage symptoms, but limited evidence exists comparing their effectiveness in treating upper trapezitis.

- ***Objective***:

To find out the effectiveness of myofascial release with icing vs ultrasound with ischemic compression in patients with upper trapezitis.

- ***Methods***:

An experimental study was conducted on a total of 30 subjects with the upper trapezitis condition present for not more than 3 months. They were taken and allocated into two groups comprising 15 subjects in each group by the lottery method, as group 1 received myofascial release (MFR) followed by icing, while group 2 received ischemic compression followed by ultrasound. Outcome measures were the Visual Analogue Scale (VAS) for pain and the Universal Goniometer for measuring Range of Motion (ROM).

- ***Duration*:**

Total duration of four weeks, three treatment sessions per week

- ***Results***:

The statistical analysis showed a significant difference between the two groups. This shows that subjects in group 1 showed a significant improvement over those in group 2.

- ***Conclusion***:

The study concluded that the MFR, along with icing, is more effective in improving the neck range of motion, especially neck lateral flexion, and reducing pain in individuals with upper trapezitis.

Keywords: *MFR – Myofascial Release, IC – Ischemic Compression, Upper Trapezitis, Ultrasound Therapy, Cryotherapy.*

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I. INTRODUCTION

Trapezitis is defined as an inflammation of the trapezius muscle located in the neck and upper back, often associated with myofascial pain syndrome. The trapezius muscle plays a vital role in shoulder shrugging and neck movements. Specifically, neck extension results from bilateral contraction of the descending trapezius fibers, while lateral flexion is produced by unilateral contraction of these fibers. [1] [2] Due to its shape and placement, the trapezius is often called the "shawl muscle." The upper trapezius is regularly activated at low levels while sitting or standing, which is linked to head posture. This makes it a frequent source of tension and neck discomfort, particularly among those who spend long hours at desks, working on computers, or driving. Activities such as watching television, sitting poorly at a computer, or using an overly thick pillow can also trigger neck spasms. Since the trapezius is a postural muscle, it is particularly susceptible to overuse. [6]

One prevalent source of musculoskeletal discomfort is the myofascial trigger point, which refers to specific areas within tense bands of skeletal muscle that are sensitive to touch and can cause referred pain and autonomic responses. These trigger points may be identified by increased discomfort during both active and passive muscle stretching, pain during resisted contraction, or a localized twitch when the point is pressed. Upper trapezius trigger points can cause neck pain and restrict cervical mobility. They often develop from prolonged neck flexion or poor posture, particularly in the neck and shoulder blade regions, leading to muscle tightness and eventual spasms. Spasms give rise to "muscle knots" or trigger points due to ongoing muscle activation [3] [4] [5]. Since muscles are not suited for continuous contraction, they can become overworked over time, resulting in tightness, limited movement, and intensified pain. This establishes a relentless cycle of pain and spasms that is challenging to break. Effective treatment for trapezitis requires a multi-faceted approach. The primary goals are to eliminate taut bands, trigger points, and tender areas to reduce pain and, in the long term, restore muscle flexibility [6, 7].

Myofascial release (MFR) is a technique for soft tissue mobilization aimed at alleviating spasms in the trapezius and minimizing pain. Rapid application of pressure can hinder the transmission of pain signals to the brain, as suggested by the "gate control theory," while the release of serotonin further diminishes pain perception. MFR works to relax tense muscles, enhance blood circulation, promote lymphatic drainage, stimulate muscle stretch reflexes and fascia, and modify the viscosity of the ground substance, aiding in the restoration of proper tissue alignment and alleviating pressure on sensitive pain structures**.** [3] [13]. Ischemic compression, a technique frequently utilized in trigger point therapy, involves applying firm, sustained pressure directly on the trigger point. This action temporarily limits blood flow (ischemia), and when the pressure is released, increased blood flow (reactive hyperemia) helps eliminate metabolic waste, deliver oxygen, and facilitate tissue healing. This method can be performed using fingers, thumbs, or elbows, with pressure being gradually intensified as pain diminishes. Instead of relying solely on stretching, therapists can implement direct fascial release methods to relieve muscle tension. [8].

Cryotherapy, a form of cold therapy used since Hippocrates' era, is another prevalent treatment for musculoskeletal pain. Applying ice lowers tissue temperature, causes vasoconstriction, and reduces inflammation, tissue metabolism, oxygen consumption, and muscle spasms. Cold packs can lessen nociceptor activation and slow the conduction velocity of nerves, leading to reduced pain sensation at tissue depths of 2 to 4 cm. [3]. Therapeutic ultrasound, a diathermy method, is commonly utilized for soft tissue injuries. It supports tissue repair and healing, boosts fibroblast-driven collagen synthesis, and helps alleviate muscle knots resulting from chronic overuse. [9, 13]

Prior studies have emphasized the role of myofascial trigger points as a major source of musculoskeletal pain, particularly in the upper trapezius. Travell and Simons described these hyperirritable nodules as contributors to pain, restricted motion, and functional limitations. Myofascial release (MFR) has been shown to improve pain and range of motion by reducing fascial restrictions, and its effects are enhanced when combined with icing due to its analgesic and anti-inflammatory benefits. Similarly, ischemic compression (IC) and ultrasound (US) have demonstrated positive outcomes in deactivating trigger points and improving soft-tissue mobility. Consequently, this study is structured as an experimental investigation to evaluate the effectiveness of myofascial release combined with icing compared to ultrasound therapy alongside ischemic compression in treating upper trapezitis..

II. METHODOLOGY

An experimental study was conducted at KKC College of Physiotherapy, Puttur, and Andhra Pradesh. A complete assessment was done for the 30 subjects who were found eligible for the participation in this study. Following the Institutional Scientific review Board approval was initiated and Informed concern forms were obtained from all the participants, and the study was explained to them.

Study period— The protocol was implemented for four weeks, three times a week.

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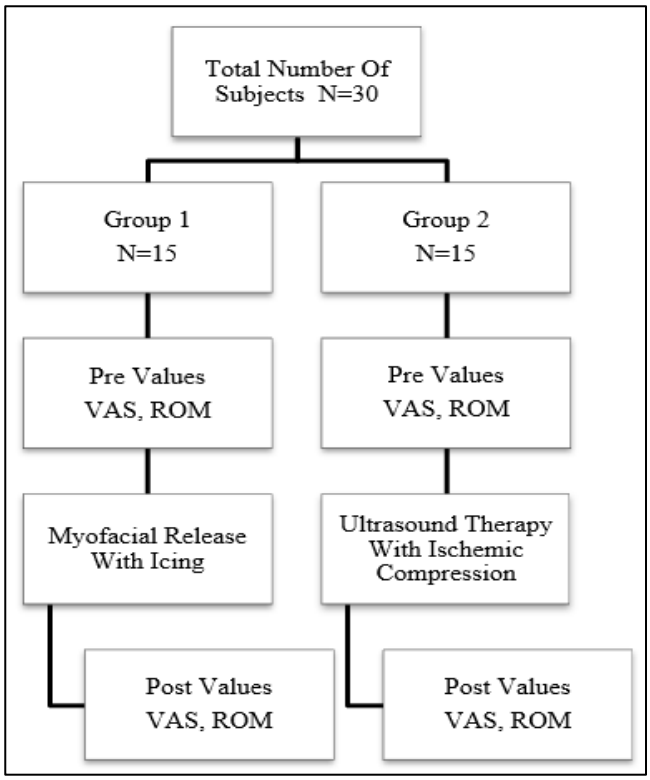


Fig 1 Methodology

➢ *Inclusion Criteria*

- Individuals aged between 18 and 40 years diagnosed with acute upper trapezitis
- Duration of symptoms not exceeding 3 months
- Both male and female participants
- Pain intensity of ≥3 on the Visual Analogue Scale (VAS)
- Presence of restricted cervical lateral flexion

➢ *Exclusion Criteria*

- Chronic trapezitis with a duration of more than 3 months
- Presence of degenerative conditions affecting the cervical spine
- Any known cervical spine pathology
- Open wounds in the treatment area
- Spinal deformities (e.g., scoliosis, kyphosis)
- Fractures, including fractures of the cervical vertebrae
- Traumatic neck injuries
- Diagnosed with cervical radiculopathy
- History of upper limb surgeries
- Psychological disorders or altered mental status affecting participation
- Significant skin changes (e.g., infections, rashes) over the neck or shoulder

➢ *Outcomes*

- Pain intensity measured by the Visual Analogue Scale (VAS)
- Cervical Range of Motion (ROM) measured with a universal goniometer

III. STUDY PROCEDURE

The complete process of assessment was done for 30 subjects who were eligible for participation in the study, and informed consent was taken from all the participants, who were explained about this study. Baseline assessment included pain evaluation using the Visual Analogue Scale (VAS) and measurement of cervical range of motion using a universal goniometer. Participants were randomly assigned to two groups of 15 each using the lottery method. Outcome measures were recorded both before the intervention and after four weeks of treatment.

➢ *Intervention for Group 1*

The intervention for Group 1 consisted of myofascial release (MFR) followed by icing. Myofascial Release

- *Protocol:*

✓ *Position of the Therapist:*

Standing behind the patient, oriented towards the affected side.

✓ *Position of the Patient:*

Sitting on a supportive chair without armrests, with both feet flat on the floor**.**

- *Procedure:*

Deep transverse friction was applied to the affected region for around 10 minutes. Myofascial stretching of the upper trapezius muscle was conducted three times, with each session lasting 90 seconds. Gradual friction was applied to the main trigger point using the right thumb, supported by the left thumb placed on top. Myofascial release was then carried out using the ulnar edges of both palms, while the patient kept cervical side flexion toward the opposite side.

- *Icing Protocol:*

A cold pack was utilized for 20 minutes as the patient remained seated in a relaxed and supportive posture.

➢ *Intervention for Group 2*

Group 2's intervention involved ischemic compression followed by the application of ultrasound therapy.

- *Ischemic Compression Protocol*

✓ *Patient Position:*

The patient was seated in a forward-leaning posture, supported by a pillow to facilitate relaxation of the targeted muscle.

✓ *Therapist Position:*

The therapist stood next to the patient, facing the side that was affected.

✓ *Application:*

Compression was applied using concentric, clockwise circular motions. A firm yet tolerable pressure was exerted on the identified trigger points with the thumb, held for 60 seconds each. As the patient's pain level diminished, the

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pressure was gradually increased to sustain the therapeutic intensity.

- *Ultrasound Therapy Protocol*

The painful region was initially identified through palpation and marked for treatment. Subsequently, continuous-mode ultrasound therapy was delivered while the patient was in a relaxed seated position.

✓ *Intensity:*

1.5 W/cm², Frequency: 1 MHz, Duration: 5 minutes

IV. STATISTICAL ANALYSIS

The data were analyzed and interpreted statistically using the Statistical Package for Social Science software [SPSS] and Microsoft Excel 2007. A paired T-test was used in each group to compare the pre-post, and an unpaired T-test was used to compare the changes after the intervention. P < 0.005 was found to be statistically significant.

V. RESULTS

Table 1 Mean of Visual Analog Scale [VAS] in Group 1 and Group 2

Descriptive Statistics

	Paired t-Test			
Group 1 VAS	**Mean**	**SD**	**t Value**	**P Value**
Pre Test	8.07	0.88	33.698	<0.001
Post Test	1.60	0.74		
	Paired t-Test			
Group 2 VAS	**Mean**	**SD**	**t-Value**	**P Value**
Pre Test	8.07	0.79	19.724	<0.001
Post Test	2.40	0.98		

Table 1 represents the comparison of Visual Analogue Scale (VAS) scores between pre- and post-intervention within each group. In Group 1, the pre-test mean VAS score was 8.07 ± 0.88, which significantly reduced to a post-test mean of 1.60 ± 0.74 following the intervention. The calculated t-value was 33.698, indicating a statistically significant improvement (p = 0.001, $p < 0.05$). Similarly, in Group 2, the pre-test mean VAS score was 8.07 ± 0.79, which decreased to a post-test mean of 2.40 ± 0.98. The t-value for this change was 19.724, also demonstrating a statistically significant reduction in pain (p = 0.001, $p < 0.05$).

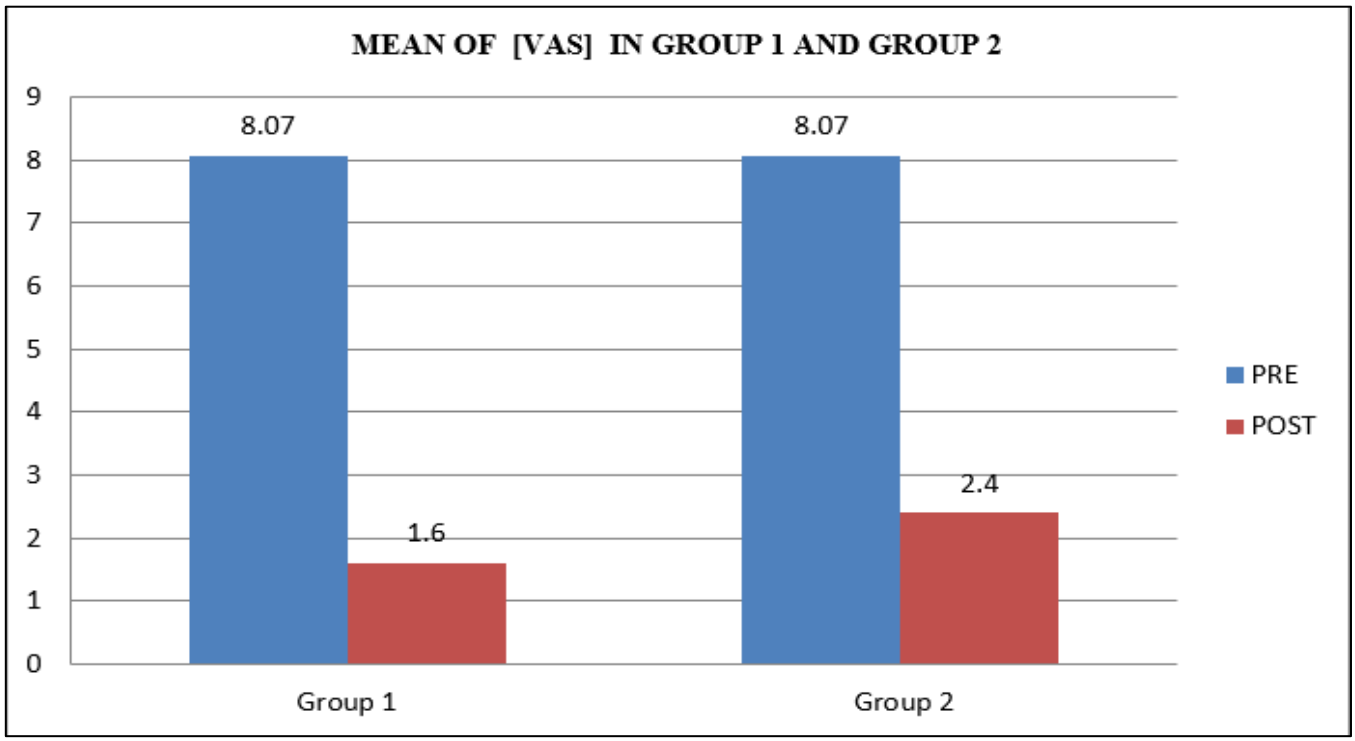


Fig 2 Mean of Visual Analog Scale [VAS] in Group 1 and Group 2

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Table 2 Mean of Neck Flexion Pre and Post for Group 1 and Group 2
Descriptive Statistics

	Paired t-Test			
Group 1 Neck Flexion	**Mean**	**SD**	**t-Value**	**P-Value**
Pre-Test	36.27	3.03	-13.539	<0.001
Post Test	43.93	2.55		
	Paired t-Test			
Group 2 Neck Flexion	**Mean**	**SD**	**t-Value**	**P Value**
Pre-Test	35.07	3.03	-13.439	<0.001
Post Test	41.00	3.16		

Table 2 presents the within-group comparison of neck flexion range of motion (ROM) before and after the intervention. In Group 1, the mean pre-test neck flexion was 36.27 ± 3.03 degrees, which significantly improved to 43.93 ± 2.55 degrees after the intervention. The calculated t-value was -13.539, indicating a statistically significant improvement (p = 0.001, $p< 0.05$). Similarly, in Group 2, the pre-test mean was 35.07 ± 3.03 degrees, which increased to 41.00 ± 3.16 degrees post-intervention. The corresponding t-value was -13.439, also reflecting a statistically significant enhancement in neck flexion ROM (p = 0.001, $p< 0.05$). Although both groups showed significant improvements, Group 1 demonstrated a greater increase in neck flexion ROM compared to Group 2.

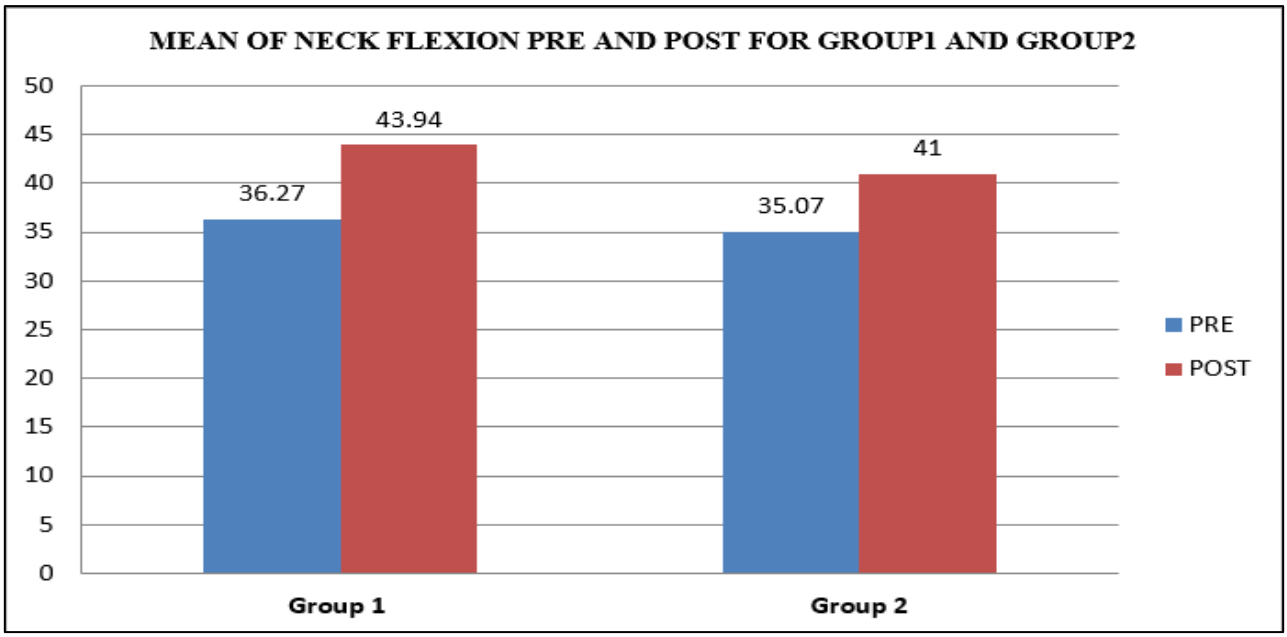


Fig 3 Mean of Neck Flexion Pre and Post for Group 1 and Group 2

Table 3 Mean of Neck Extension Pre and Post Test for Group 1 and Group 2
Descriptive Statistics

	Paired t-Test			
Group 1 Neck Extension	**Mean**	**SD**	**t-Value**	**P Value**
Pre-Test	54.13	4.21	-4.176	<0.001
Post-Test	55.53	4.12		
	Paired t-Test			
Group 2 Neck Extension	**Mean**	**SD**	**t-Value**	**P Value**
Pre-Test	50.67	2.92	-6.424	<0.001
Post-Test	52.53	2.58		

Table 3 presents the within-group comparison of neck extension range of motion (ROM) before and after the intervention. In Group 1, the mean pre-test neck extension was 54.13 ± 4.21 degrees, which significantly improved to 55.53 ± 4.12 degrees after the intervention. The calculated t-value was -4.176, indicating a statistically significant improvement (p = 0.001, $p< 0.05$). Similarly, in Group 2, the pre-test mean was 50.67 ± 2.92 degrees, which increased to 52.53 ± 2.58 degrees post-intervention. The corresponding t-value was -6.424, also reflecting a statistically significant enhancement in neck extension ROM (p = 0.001, $p< 0.05$). Although both groups showed significant improvements, Group 1 demonstrated a greater increase in neck extension ROM compared to Group 2.

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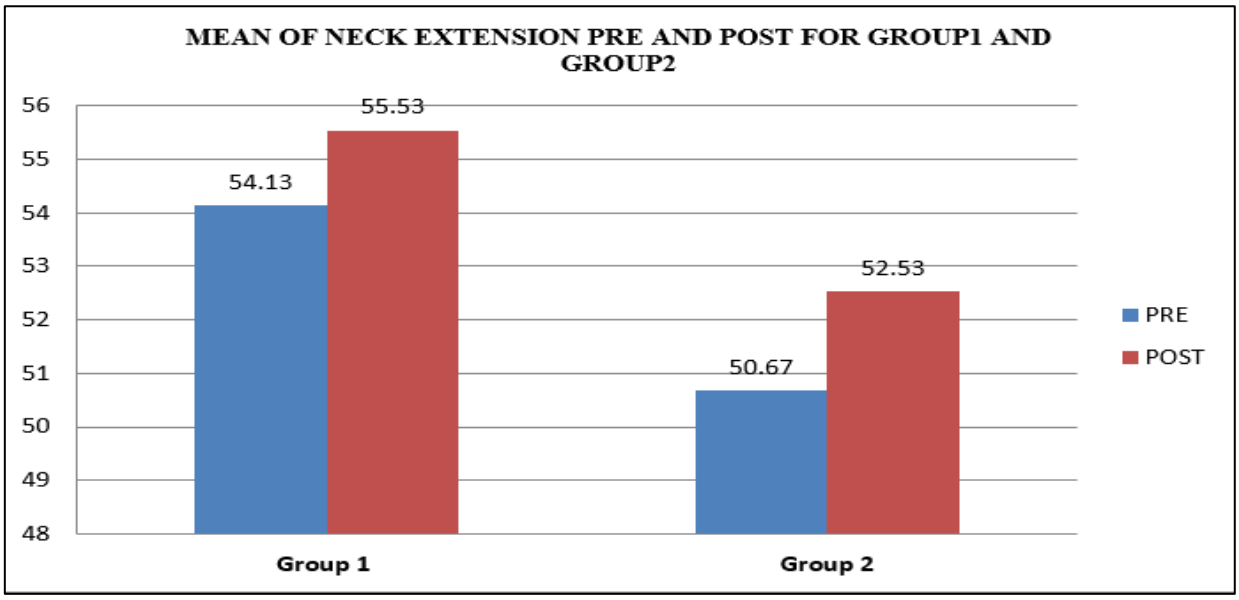


Fig 4 Mean of Neck Extension Pre and Post for Group 1 and Group 2

Table 4 Mean of Neck Right Lateral Flexion Pre and Post Test for Group 1 and Group 2

Descriptive Statistics

	Paired t-Test			
Group 1 Neck Right Lateral Flexion	**Mean**	**SD**	**t-Value**	**P-Value**
Pre-Test	37.67	4.54	-16.305	<0.001
Post-Test	46.73	3.55		
	Paired t-Test			
Group 2 Neck Right Lateral Flexion	**Mean**	**SD**	**t-Value**	**P-Value**
Pre-Test	39.80	4.46	-4.838	<0.001
Post-Test	42.67	3.22		

Table 4 presents the within-group comparison of the neck right lateral flexion range of motion (ROM) before and after the intervention. In Group 1, the mean pre-test neck lateral flexion was 37.67 ± 4.54 4.54degrees, which significantly improved to 46.73 ± 3.55 degrees after the intervention. The calculated t-value was -16.305, indicating a statistically significant improvement ($p = 0.001$, $p < 0.05$). Similarly, in Group 2, the pre-test mean was 39.80 ± 4.46 degrees, which increased to 42.67 ± 3.22 degrees post-intervention. The corresponding t-value was -4.838, also reflecting a statistically significant enhancement in neck lateral flexion ROM ($p = 0.001$, $p < 0.05$). Although both groups showed significant improvements, Group 1 demonstrated a greater increase in neck right lateral flexion ROM compared to Group 2.

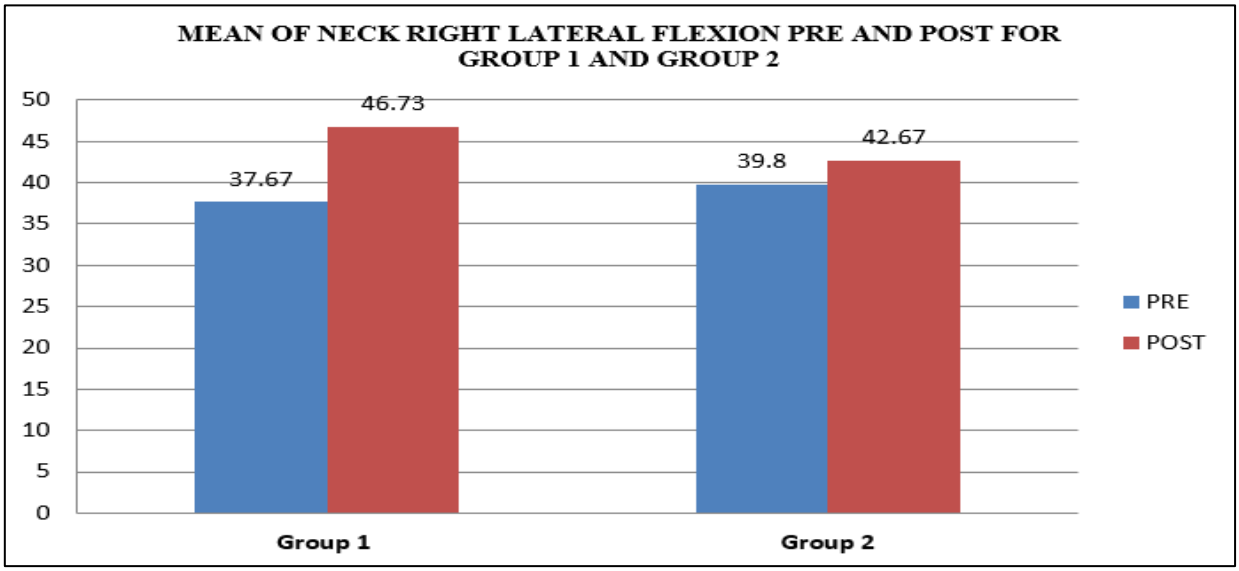


Fig 5 Mean of Neck Right Lateral Flexion Pre and Post for Group 1 and Group 2

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Table 5 Mean of Neck Left Lateral Flexion Pre and Post Test for Group 1 and Group 2
Descriptive Statistics

	Paired t-Test			
Group 1 Neck Left lateral Flexion	**Mean**	**SD**	**t-Value**	**P Value**
Pre-Test	39.47	4.56	-11.915	<0.001
Post-Test	46.27	3.03		
	Paired t-Test			
Group 2 Neck Left lateral Flexion	**Mean**	**SD**	**t-Value**	**P Value**
Pre-Test	38.47	3.39	-6.036	<0.001
Post-Test	42.73	2.82		

Table 5 presents the within-group comparison of the neck left lateral flexion range of motion (ROM) before and after the intervention. In Group 1, the mean pre-test neck lateral flexion was 39.47± 4.56 degrees, which significantly improved to 46.27± 3.03 degrees after the intervention. The calculated t-value was -11.915, indicating a statistically significant improvement ($p = 0.001$, $p < 0.05$). Similarly, in Group 2, the pre-test mean was 38.47 ± 3.39 degrees, which increased to 42.73± 2.82degrees post-intervention. The corresponding t-value was -6.036, also reflecting a statistically significant enhancement in neck lateral flexion ROM ($p = 0.001$, $p < 0.05$). Although both groups showed significant improvements, Group 1 demonstrated a greater increase in neck left lateral flexion ROM compared to Group 2.

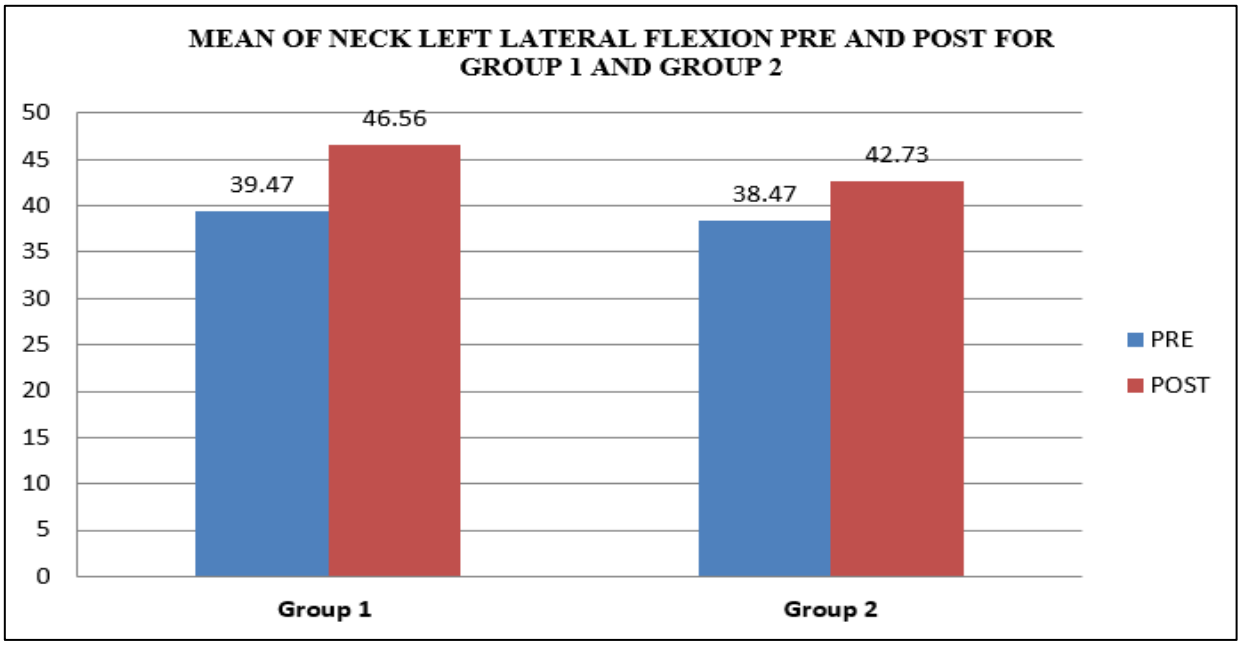


Fig 6 Mean of Neck left Lateral Flexion Pre and Post for Group 1 and Group 2

Table 6 Post Values Comparison of Outcome Measures for Group 1 and Group 2
Descriptive Statistics

PARAMETER	**GROUP 1 POSTVALUE**	**GROUP 2 POSTVALUE**	**P value**
	Mean ± SD	**Mean ± SD**	
VAS	1.60±0.74	2.40±0.98	<0.02
NECK FLEXION	43.93±2.55	41.00±3.16	<0.01
NECK EXTENSION	55.53±4.12	52.53±2.58	<0.03
NECK RIGHT LATERAL FLEXION	46.73±3.55	42.47±3.22	<0.01
NECK LEFT LATERAL FLEXION	46.27±3.03	42.73±2.82	<0.01

Table 6 summarizes the post-intervention comparison of outcome measures between Group 1 and Group 2. Statistically significant differences were observed in all parameters assessed, with Group 1 demonstrating superior improvements in pain levels and cervical range of motion across flexion, extension, and lateral flexion movements. These findings suggest a more favorable therapeutic effect in Group 1 following the intervention.

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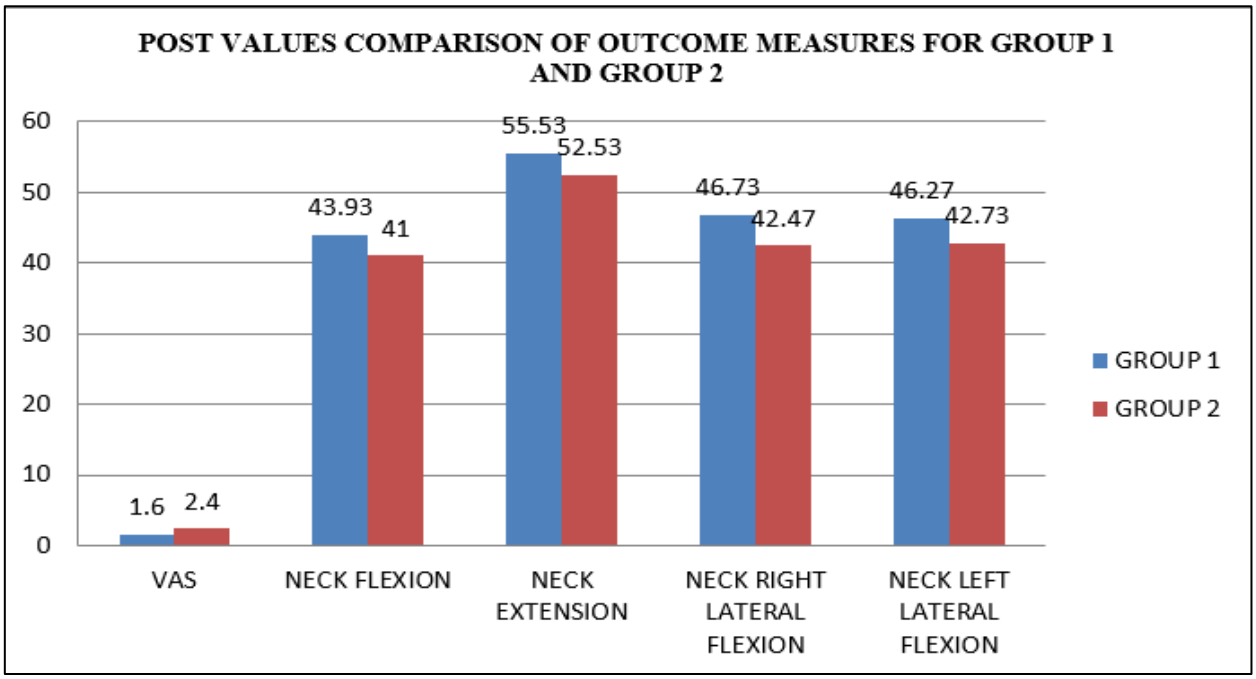


Fig 7 Post Values Comparison of Outcome measures for Group 1 and Group 2

VI. DISCUSSION

Trapezitis refers to inflammation of the trapezius muscle, often accompanied by the early onset of muscle spasm. This spasm presents as muscular tightness and is frequently associated with pain. If left untreated, persistent spasm can lead to the development of myofascial trigger points, further contributing to muscle tightness and restriction in cervical range of motion (ROM), particularly in lateral flexion.

The involvement of the trapezius muscle in such cases significantly limits neck mobility and functional activities. Several studies have demonstrated that myofascial release (MFR) therapy plays a vital role in reducing pain, decreasing disability, and improving ROM in individuals with upper trapezitis. The therapeutic benefits of MFR can be attributed to the application of sustained pressure on the myofascial tissues, which helps relieve muscle spasm, release trigger points, and restore the muscle to its normal resting length. This mechanism contributes to the reduction of pain and enhancement of neck mobility.

The average VAS score was 1.60 for Group 1 and 2.40 for Group 2, indicating that both interventions were effective in alleviating pain in individuals with trapezitis. However, the group treated with myofascial release (MFR) combined with icing demonstrated greater pain reduction compared to the group receiving ischemic compression and ultrasound therapy. This suggests a superior analgesic effect of the MFR and icing combination. Both groups showed improvements in cervical range of motion, including flexion, extension, and lateral flexion. Group 1 demonstrated higher post-intervention values across all measured movements compared to Group 2. These findings indicate that while both treatment modalities contributed to increased neck mobility, the MFR and icing protocol yielded more significant improvements, particularly in lateral flexion.

The enhanced outcomes observed in the MFR and icing group may be attributed to the synergistic effects of direct myofascial manipulation and cryotherapy. The application of cold packs has been shown to reduce muscle spasm by decreasing tissue temperature, which in turn lowers nociceptor activity and slows nerve conduction velocity. This physiological response contributes to pain relief and facilitates improved muscle function, thereby enhancing the effectiveness of MFR in restoring range of motion.

Chaudhary et al. (2013**)** found that participants who received MFR combined with cold pack therapy reported significantly lower post-treatment pain intensity compared to those in the control group. [3]

Snehal Desai et al. (2018**)** reported that subjects treated with MFR showed a greater reduction in pain intensity, measured using the Visual Analog Scale (VAS), and exhibited improved cervical lateral flexion compared to those treated with ischemic compression. [6]

Ravish V N, Shridhar S (2014) concluded that MFR was superior in the management of trapezitis. The technique improved range of motion (ROM) by relaxing contracted muscles, enhancing circulation and lymphatic drainage, stimulating the muscle stretch reflex, and increasing soft tissue extensibility. [14]

Research indicates that the upper trapezius is the muscle most commonly affected by myofascial triggerpoints. These findings support the results of the present study, showing that MFR with icing is more effective than ultrasound with ischemic compression in managing trapezitis.

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VII. CONCLUSION AND FUTURE SCOPE

The present study provides evidence supporting the effectiveness of myofascial release (MFR) combined with icing in reducing pain and improving neck range of motion (ROM) in individuals with upper trapezitis. The results indicate that MFR with icing is more effective than ischemic compression and ultrasound therapy in decreasing pain intensity and enhancing ROM. Although there was an overall enhancement in ROM for the MFR group, the most significant progress was observed in neck lateral flexion, whereas gains in neck extension were minimal. Hence, the study concludes that MFR combined with icing is a more effective intervention for reducing pain and improving ROM—particularly neck lateral flexion—in individuals with upper trapezitis.

➢ *Future Scope of the Study:*

- Larger sample size studies.
- Long-term follow-up to check sustained effects.
- Include functional and quality-of-life measures.
- Compare across different age groups.
- Explore combination with exercise protocol

➢ *Conflict of Interest:*

The authors declare that there are no conflicts of interest related to this study.

➢ *Source of Funding:*

The study was self-funded. No external funding was received.

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