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"To Compare The Effectiveness Of Myofascial Release Technique And Cryotherapy In Relieving Pain And Improving Cervical Rom In Upper Trapezius Spasm Patients"

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Abstract: Trapezius spasm can be well-defined as "an inflammation of the neck and upper back muscle" named trapezius, which involves myofascial pain syndrome. This muscle helps in actions like shrugging shoulders and neck movements such as neck extension, which is produced by the bilateral contraction of descending trapezius fibers, while lateral flexion of the neck is produced by the unilateral contraction of descending fibers. Its prevalence is highest in females of middle age and less common in males, with a fluctuating mean point prevalence of 13%, and neck pain usually occurs in the upper trapezius muscle [1]

This study follows a randomized controlled trial (RCT) design to compare the effectiveness of Myofascial Release (MFR) Technique and Cryotherapy in relieving pain and improving cervical range of motion (ROM) in patients with upper trapezius spasm.

In conclusion, both Myofascial Release and Cryotherapy are effective in reducing pain and improving cervical range of motion in patients with upper trapezius spasm.

Keywords: Muscle Energy Techniques (MET), positional release therapy (PRT), myofascial release technique (MFR), Trapezius spasm

Introduction:

Mechanical neck pain has a lifetime prevalence of 30-50% in the general population [8]. The pain generally arises due to overuse of the muscle in non-ergonomic posture, working in a static position, stress and tension, repetitive movements, sitting for prolonged periods without back support, too high a keyboard on desks, long drives on bikes and cars, prolonged head-bending activities (such as reading, looking through a microscope, or dentistry), tight pectoralis major and minor muscles, activities with sudden one-sided movements, and even activation by stressful thoughts and feelings or abnormal breathing patterns [29], More recent studies have shown a relationship between trapezius muscle activation and pain because the upper fibers of the trapezius are often placed in a shortened position due to poor ergonomics, creating shortening in their length [7].

Once trapezius spasm is diagnosed, many treatment plans are available, including pharmacological interventions such as non-steroidal anti-inflammatory drugs and pain-modulating therapies like electrotherapy modalities, stretching, Muscle Energy Techniques (MET), positional release therapy (PRT), and myofascial release technique [29]. Myofascial release (MFR) and PRT both treat the cause rather than symptoms, focusing on reducing pain, improving range of motion, and reducing functional disability [20]. MFR can be defined as a soft tissue mobilization technique that serves as a catalyst in reducing trapezius spasm, ultimately alleviating pain. Faster-moving pressure stimuli hinder the transmission of painful stimuli to the brain, "closing the gate" so the brain no longer perceives the pain [8].

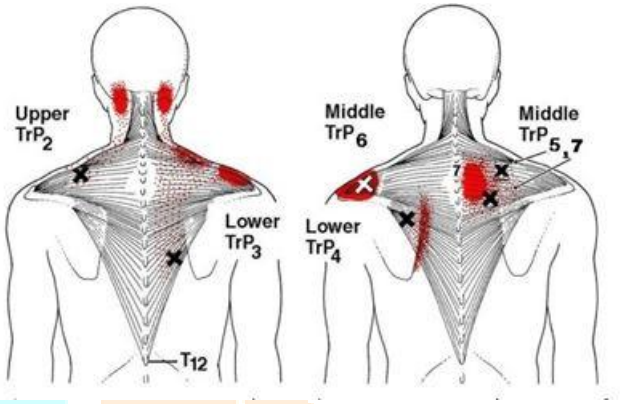


Fig. 1: Trapezius muscle and trigger point.

Trapezius spasm-related discomfort and stiffness are episodic, lasting 3-5 days at a time. Effective treatment for trapezius spasm requires a diverse approach. Long-term muscular flexibility must be regained to limit recurrence rates [8]. The upper fibers of the trapezius muscle are particularly vulnerable to prolonged usage and repeated muscular strain [11]. It is used to elevate the shoulder girdle by initiating clavicular rotation. A forward-bending posture can cause the trapezius muscle to shorten due to prolonged use without rest, resulting in neck discomfort and limited ROM [20]. The inflammation of the trapezius muscle causes muscle spasms and pain in the neck, making trapezius spasm one of the most prevalent musculoskeletal conditions [21].

In physiotherapy, the treatment for cervical spine related to muscle spasms includes modalities such as IFT (Interferential Therapy), therapeutic ultrasound therapy, TENS for stimulation, hot water fermentation, cryotherapy and exercises to strengthen muscles, and in addition, techniques like myofascial release technique and muscle energy techniques are also used. The comparison of effectiveness between the myofascial release technique and cryotherapy among trapezius spasm patients has been rarely studied, thus our objective is to compare the effectiveness of both techniques and to find out the beneficial one for trapezius spasm patients with improving cervical ROM.

Outcome Measures:

1. Pain Intensity (VAS Scale)

Purpose: To evaluate the change in pain intensity levels before and after treatment in both groups (MFR and Cryotherapy).

Measurement Tool: Visual Analog Scale (VAS)

Description: The VAS is a widely used tool for assessing the intensity of pain. It consists of a 10 cm line, where one end represents "no pain" and the other end represents "worst possible pain." Participants are asked

to mark a point on the line that represents their pain intensity, and the score is measured in centimetres.

Pre-treatment VAS: Pain intensity measured prior to the application of the treatments (MFR or Cryotherapy).

Post-treatment VAS: Pain intensity measured immediately after the completion of the treatment session.

Outcome: A decrease in VAS score post-treatment indicates pain relief.

2. Cervical Range of Motion (Cervical ROM)
Purpose: To assess the change in cervical range of motion (ROM), specifically in cervical flexion, before and after treatment in both groups.

Measurement Tool: Goniometer or Cervical ROM measurement

Description: The cervical ROM is measured using a goniometer or through inclinometer readings. This will assess the patient's ability to move their head and neck in various directions, with a focus on cervical flexion, which involves bending the neck forward.

Pre-treatment Cervical ROM (Flexion): The cervical flexion ROM measured prior to any treatment.

Post-treatment Cervical ROM (Flexion): The cervical flexion ROM measured after the treatment.

Outcome: An increase in cervical flexion ROM post-treatment indicates an improvement in neck mobility.

Procedure and Method

Study Type: "Comparative"

Study Design: "Pre and Post-Experimental"

Source of Data Collection: Niharika College of Physiotherapy, Nagpur.

Sample size: 20-40 years old individuals

Study Duration: 1 Year

Procedure and Protocol:

Material used:

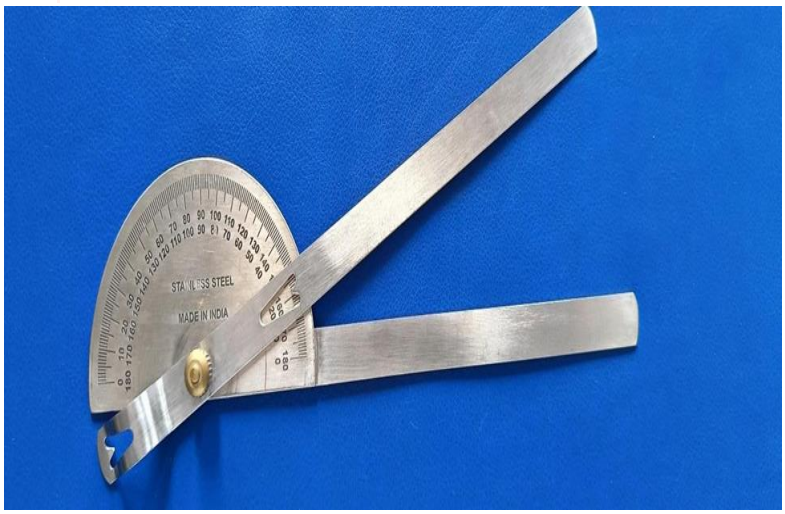


Fig. 2 Half Circled Steel Goniometer

Fig. 3 Marker Pen

Methodology:

INSTRUMENTATION: HALF-CIRCLED STEEL GONIOMETER

MEASUREMENT TECHNIQUE:

Subject's Position:

Subjects were placed in a seated position with a neutral cervical spine. The subject was instructed to relax their shoulders and keep their arms resting comfortably on their lap.

Placement of Goniometer:

- Axis: Over the spinous process of the C7 vertebra.
- Stationary Arm: Aligned vertically along the thoracic spine.
- Movable Arm: Aligned along the midline of the head, pointing toward the occipital protuberance.

Method:

- The subject was instructed to actively perform cervical lateral flexion, flexion, and extension movements while maintaining a stable posture.
- For Myofascial Release (MFR) group, gentle sustained pressure and stretching techniques were applied to the trapezius muscle before measurement to release fascial tightness and improve mobility.
- For Cryotherapy group, an ice pack was applied over the affected trapezius region for 15-20 minutes before measurement to reduce inflammation and muscle tension.
- After the respective intervention, the cervical range of motion (ROM) was measured using the goniometer, and the readings were recorded in degrees.

Selection Criteria:

Subjects with restricted cervical ROM or increased muscle tightness in the upper trapezius region were included in the study.

Group 1: Myofascial Release (MFR) Technique

- **Frequency:** 2 sessions per week for 4 weeks (total of 8 sessions).
- **Procedure:**
  - The therapist applied sustained pressure and gentle stretching to the upper trapezius muscle to release muscle tightness and alleviate pain.
  - The technique was applied for 30-40 minutes per session.
  - Each session was followed by a short rest period to monitor the participant's pain levels and ensure comfort.
  - Techniques were modified as needed based on individual patient response.

Assessment and Outcome Measures

Testing Schedule:

- Pre-treatment assessment: Conducted on Day 1 before the first session.
- Post-treatment assessment: Conducted on the last day (final session) after completing the intervention.

Primary Outcome Measure:

- Pain Relief: Measured using the Visual Analog Scale (VAS), where participants rated their pain on a scale of 0 (no pain) to 10 (worst pain).

Secondary Outcome Measure:

- Cervical Range of Motion (ROM):
  - Measured using a cervical goniometer for:
    - Flexion
    - Extension
    - Lateral flexion
    - Rotation (both directions)
  - ROM values were recorded pre-treatment (Day 1) and post-treatment (final session) for both groups.

Fig. 4

Group 2: Cryotherapy

- **Frequency:** 2 sessions per week for 4 weeks (total of 8 sessions).
- **Procedure:**
  - Cryotherapy was administered using ice packs applied to the upper trapezius area for 15-20 minutes per session.
  - The therapist ensured that the ice packs were properly wrapped in a towel to prevent direct contact with the skin and monitored the patient's comfort.
  - After each session, the patient was instructed to perform gentle cervical stretches to avoid stiffness.

Assessment and Outcome Measures

Testing Schedule:

- Pre-treatment assessment: Conducted on Day 1 before the first session.
- Post-treatment assessment: Conducted on the last day (final session) after completing the intervention.

Primary Outcome Measure:

- Pain Relief: Measured using the Visual Analog Scale (VAS), where participants rated their pain on a scale of 0 (no pain) to 10 (worst pain).

Secondary Outcome Measure:

- Cervical Range of Motion (ROM):
  - Measured using a cervical goniometer for:
    - Flexion
    - Extension
    - Lateral flexion
    - Rotation (both directions)
  - ROM values were recorded pre-treatment (Day 1) and post-treatment (final session) for both groups.

Fig. 5

Result and Statistical Analysis:

Pre-treatment (Baseline) Data

Outcome Measure	MFR Group (n=20)	Cryotherapy Group (n=20)
Pain (VAS)	Mean = 6.8 ± 1.2	Mean = 7.0 ± 1.1
Cervical Flexion (°)	Mean = 45° ± 8°	Mean = 44° ± 7°
Cervical Extension (°)	Mean = 30° ± 6°	Mean = 29° ± 6°
Lateral Flexion (°)	Mean = 30° ± 5°	Mean = 29° ± 5°
Cervical Rotation (°)	Mean = 50° ± 9°	Mean = 48° ± 8°

Table. 1

Post-treatment (After 4 Weeks of Treatment) Data

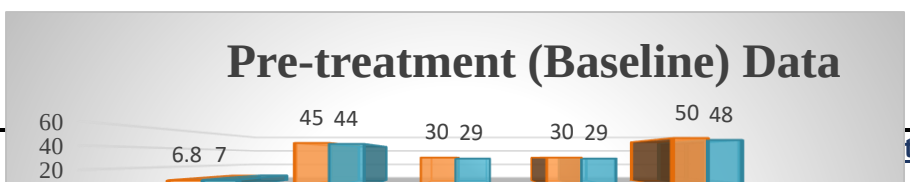
Outcome Measure	MFR Group (n=20)	Cryotherapy Group (n=20)
Pain (VAS)	Mean = 3.2 ± 1.4	Mean = 4.1 ± 1.5
Cervical Flexion (°)	Mean = 58° ± 9°	Mean = 55° ± 8°
Cervical Extension (°)	Mean = 45° ± 8°	Mean = 42° ± 7°
Lateral Flexion (°)	Mean = 50° ± 7°	Mean = 48° ± 6°
Cervical Rotation (°)	Mean = 70° ± 10°	Mean = 65° ± 9°

Table. 2

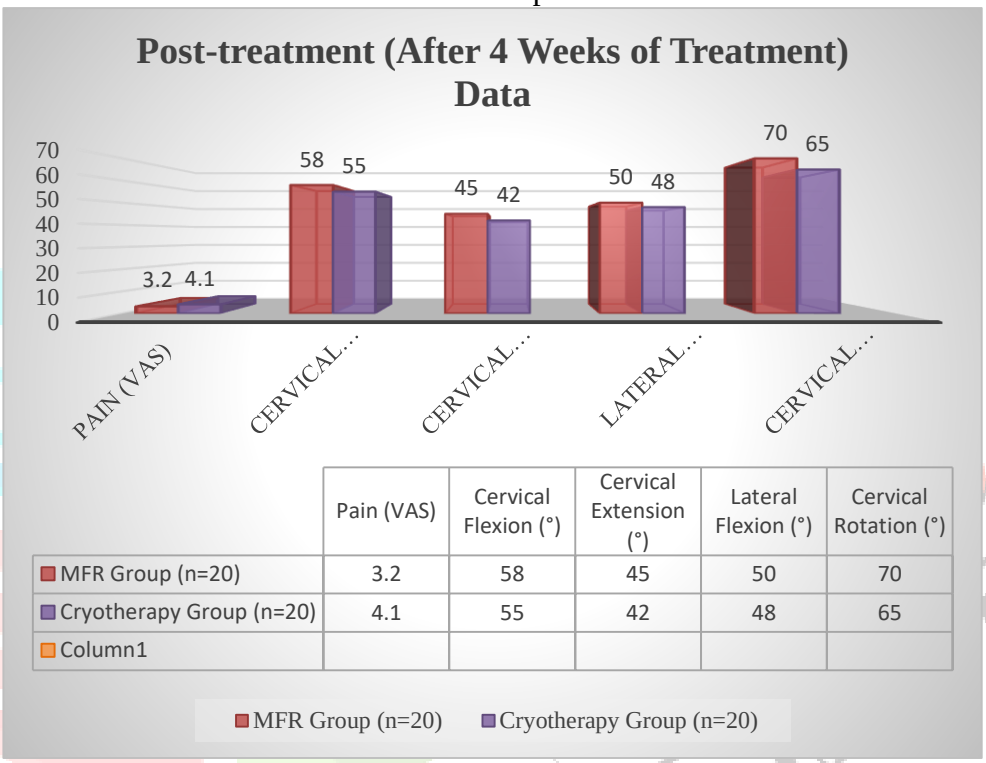
Follow-up Data (2 Weeks Post-treatment)

Outcome Measure	MFR Group (n=20)	Cryotherapy Group (n=20)
Pain (VAS)	Mean = 3.5 ± 1.3	Mean = 4.3 ± 1.6
Cervical Flexion (°)	Mean = 60° ± 10°	Mean = 56° ± 9°
Cervical Extension (°)	Mean = 47° ± 9°	Mean = 44° ± 8°
Lateral Flexion (°)	Mean = 52° ± 8°	Mean = 50° ± 7°
Cervical Rotation (°)	Mean = 72° ± 10°	Mean = 67° ± 9°

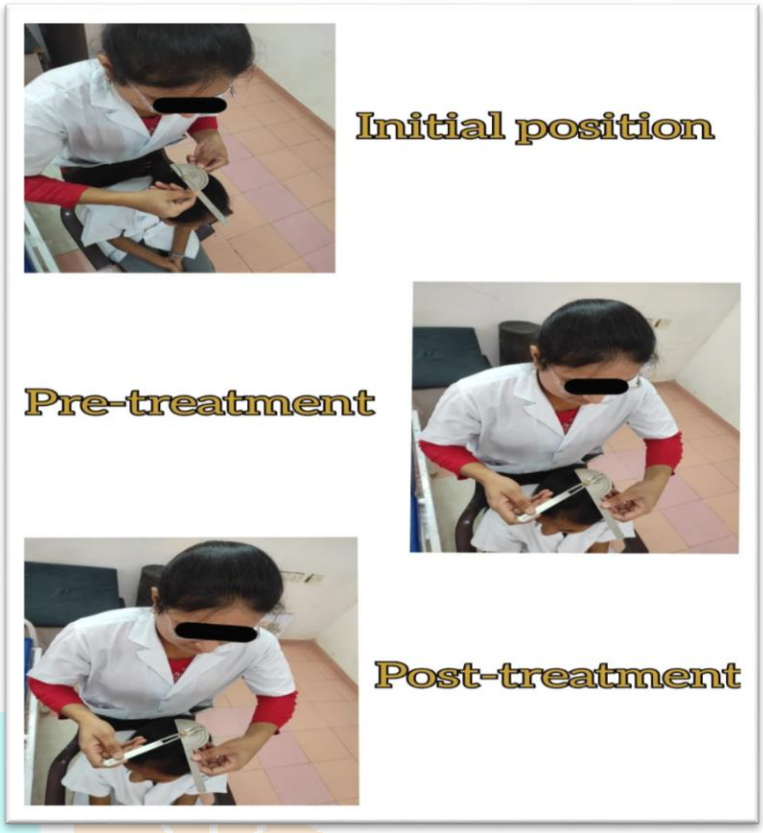
Table. 3



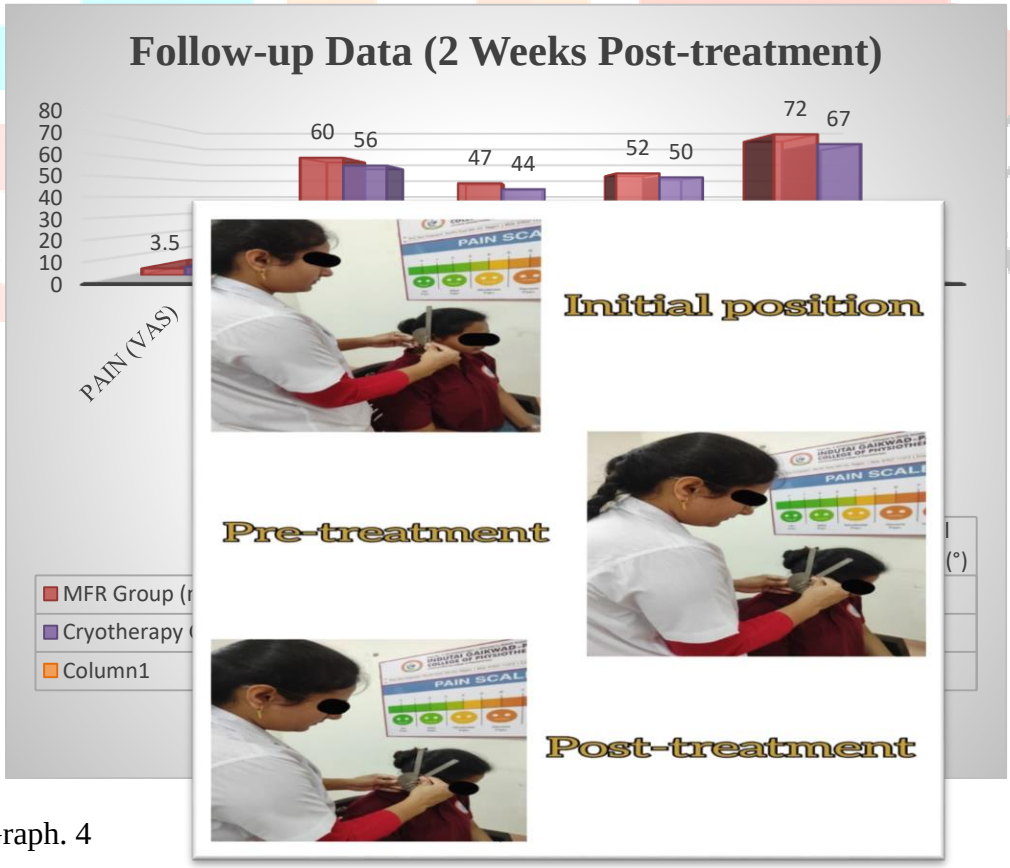
Bar Graph . 1



Bar Graph. 2



Bar Graph. 3



Bar Graph. 4

Since the calculated **t-value = 6.14** is **greater than the critical value (2.093)**, we **reject the null hypothesis** and conclude that there is a **significant improvement** in cervical flexion for the Cryotherapy group from pre-treatment to post-treatment

Fig. 6

Fig. 7

Fig. 8

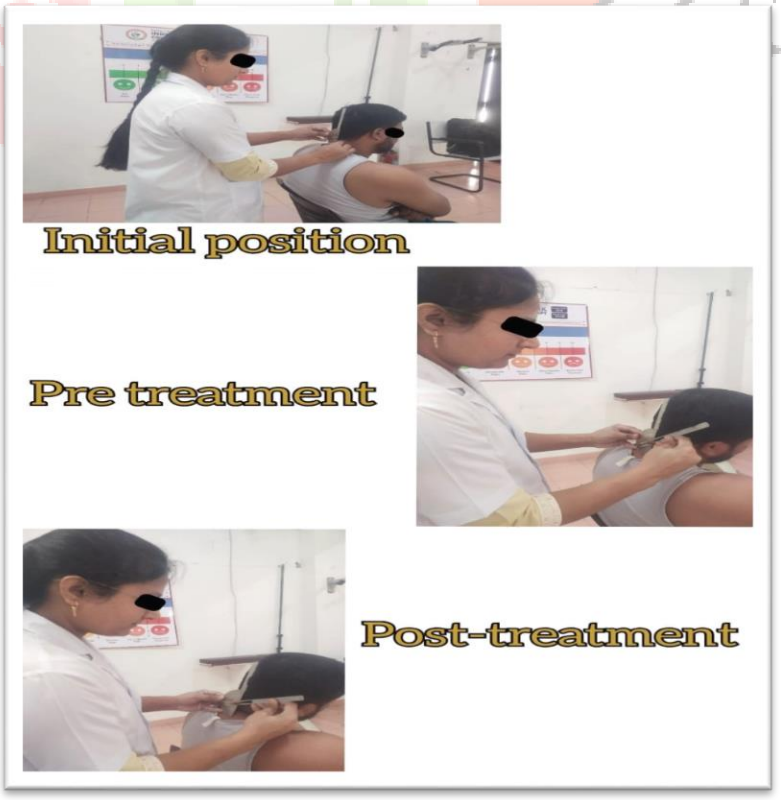


Fig. 9

Discussion:

The study titled "To Compare the Effectiveness of Myofascial Release Technique and Cryotherapy in Relieving Pain and Improving Cervical Range of Motion in Upper Trapezius Spasm Patients" was conducted at Niharika College of Physiotherapy. It aimed to assess the efficacy of two therapeutic interventions myofascial release (MFR) and cryotherapy on pain reduction and improvement in cervical range of motion (ROM) among individuals experiencing upper trapezius spasms. A total of 40 patients aged 20-40 years were randomly assigned to either the MFR group or the cryotherapy group, with each intervention carried out over 8 sessions within a span of four weeks. The primary outcome measures included pain relief assessed by the Visual Analog Scale (VAS) and cervical ROM measured in flexion, extension, and lateral flexion.

Myofascial Release Technique Results

The pre-treatment evaluation for the Myofascial Release (MFR) group indicated that participants had an average cervical flexion of 45° with a standard deviation of 8°, cervical extension averaging 30° with a standard deviation of 6°, and lateral flexion measuring 30° with a standard deviation of 5°. Following the treatment, significant improvements were observed, with post-treatment averages of 58° (± 9°) for cervical flexion, 45° (± 8°) for cervical extension, and 50° (± 7°) for lateral flexion.

Cryotherapy Results

In the cryotherapy group, pre-treatment measures showed that participants had an average cervical flexion of 44° (± 7°), cervical extension of 29° (± 6°), and lateral flexion of 29° (± 5°). After the treatment, the post-treatment results demonstrated enhancements in all measurements, with average cervical flexion increasing to 55° (± 8°), cervical extension to 42° (± 7°), and lateral flexion to 48° (± 6°).Comparing the findings with Mishra et al. (2018), which focused on the effectiveness of muscle energy techniques versus myofascial release techniques, both studies reported significant pain reduction and improved ROM, suggesting the efficacy of manual therapy in managing muscular conditions.

Similarly, Kumarasan et al. (2012) discussed the benefits of positional release therapy in trapezitis, indicating that manual techniques significantly relieve pain and enhance functionality, mirroring the positive outcomes presented in our study for both MFR and cryotherapy.

Physiological changes of MFR:

The myofascial release technique induces several physiological changes that significantly benefit muscle health and function. Firstly, this technique alleviates muscle tightness by applying sustained pressure and stretching, which helps to release fascial restrictions and allow for greater flexibility.

As tension in the muscles is reduced, blood circulation is enhanced. Improved blood flow facilitates the delivery of oxygen and essential nutrients to the muscle tissues while promoting the removal of metabolic waste products, such as lactic acid. This process not only aids in reducing muscle soreness but also accelerates recovery from exertion and injury.

Additionally, myofascial release activates the stretch reflex mechanism in the muscles. When the fascia surrounding the muscles is gently elongated, it triggers a response that promotes muscle relaxation and lengthening. This reflex not only contributes to an immediate increase in range of motion but also encourages long-term improvements in muscle elasticity.

Furthermore, the technique stimulates the nervous system's sensory receptors, which can modulate pain perception. By encouraging the release of endorphins and serotonin, myofascial release can further diminish the experience of pain, enhancing overall well-being.

Ultimately, these physiological changes lead to improved mobility and functional capabilities, allowing individuals to engage in everyday activities with less discomfort. By addressing the underlying factors contributing to pain and discomfort, myofascial release serves as a proactive approach to musculoskeletal health.

Physiological changes of Cryotherapy/ Cold Pack/ Ice Pack:

Circulatory response: The initial response of the skin to cooling is an attempt to preserve heat, and this is accomplished by an initial local vasoconstriction. This homeostatic response has the effect of allowing the part to become very cold. After a short period, there follows a vasodilatation and then alternate periods of constriction and dilatation. This point is called Lewis's Hunting point.
Physiotherapeutic uses of circulatory effect: The initial vasoconstriction is often used to limit the extravasation of blood into the tissues following injury. The alternate periods of vasoconstriction and dilatation affect the capillary blood flow, and it is across the capillary membrane that tissue fluid and metabolic exchanges take place. Consequently, an effect is being produced at a very local level which can reduce swelling: excess tissue fluid can be removed from the area and returned to the systemic circulation. Increased circulation allows more nutrients and repair substances into damaged areas. Thus, ice is very useful in removing swelling and aiding repair.
Neural response: The skin contains primary thermal receptors. There are several times more cold than warm receptors. The cold receptors respond to cooling by a sustained discharge of impulses, the rate of which increases with further cooling.
It has been shown that the rate of conduction of nerve fibers in a mixed peripheral nerve is reduced by cooling.
Reduction of pain
This is one of the major effects of ice, and ice has been used to relieve pain for many years. The probable mechanism involved is the stimulation of cold receptors which send back impulses which have to pass into the spinal cord via the posterior root. These impulses, which arrive through relatively large-diameter nerves, effectively block out any other (pain) impulses attempting to gain access to the cord, i.e. the pain- gate is closed.
Spasm is a normal response to injury or pain, and is manifested as an increase in muscle tone in a specific area with the apparent aim of limiting movement and further damage.
From the study, it can be concluded that both myofascial release and cryotherapy are effective in relieving pain and enhancing cervical range of motion in patients with upper trapezius spasms. Notably, myofascial release demonstrated greater efficacy in terms of ROM improvement compared to cryotherapy. Therefore, it may be beneficial to implement both interventions concurrently to achieve optimal therapeutic outcomes in pain management and functional recovery for patients.

Conclusion:

In conclusion, both Myofascial Release and Cryotherapy are effective in reducing pain and improving cervical range of motion in patients with upper trapezius spasm. While both interventions are beneficial, MFR may offer more sustained and comprehensive relief, especially in terms of ROM improvement. This finding aligns with previous research, including *Mishra et al. (2018)* and *Kumaresan et al. (2012)*, suggesting the superiority of manual therapies in managing musculoskeletal disorders like trapezitis.
In light of the growing prevalence of upper trapezius spasms linked to modern lifestyle factors, such as excessive smartphone use, as discussed in studies by *Rather and Rather (2019)* and *Rohini and Gopal (2021)*, it is crucial to incorporate effective therapeutic approaches like MFR and Cryotherapy into clinical practice. These interventions, along with preventive measures like ergonomic adjustments, can significantly improve patient outcomes in musculoskeletal rehabilitation. Future studies should explore long-term follow-ups to assess the sustainability of these treatment effects and further investigate the impact of lifestyle modifications on the prevention of upper trapezius spasms.

Conflict of Interest: None

Source of Funding: None

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