International Journal of Healthcare Sciences ISSN 2348-5728 (Online)
Vol. 13, Issue 1, pp: (542-546), Month: April 2025 - September 2025, Available at: www.researchpublish.com

THE EFFECTIVENESS OF ISCHEMIC COMPRESSION AND DYNAMIC STRETCHING ON PAIN IN SUBJECTS WITH UPPER TRAPEZITIS – A COMPARATIVE STUDY

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DOI: https://doi.org/10.5281/zenodo.16779875

Published Date: 08-August-2025

Abstract: **Background: The most prevalent musculoskeletal condition is trapezitis, which primarily affects the upper trapezius muscle due to overuse or strain.**

Aim of The Study: The aim of the study is to compare the effectiveness of ischemic compression and dynamic stretching on pain in subject with upper trapezitis.

Materials And Methods: A total of 40 subjects were chosen from APCOPT and assigned to two groups, namely the ischemic compression group along with Transcutaneous Electrical Nerve Stimulation (TENS) (n=20) and the dynamic stretching exercises group along with Transcutaneous Electrical Nerve Stimulation TENS (n=20), based on inclusion and exclusion criteria. Numeric pain rating scale (NPRS) and cervical range of motion (CROM) were used as outcome measures

Result: The mean value of ischemic compression at the post-test was found to be higher than the mean value of dynamic stretching exercises.

Conclusion: The findings of this study suggest that ischemic compression is more effective than dynamic stretching exercises in reducing pain associated with upper trapezitis.

Keywords: **Transcutaneous Electrical Nerve Stimulation (TENS), upper trapezitis, Numeric pain rating scale (NPRS), Cervical Range of Motion (CROM).**

1. INTRODUCTION

Trapezitis is one of the most common musculoskeletal disorders caused by inflammation of the trapezius muscle, leading to muscle spasms and neck pain[5,6]. The trapezius muscle is the most superficial of the posterior muscles and primarily belongs to the shoulder region. It consists of three fibers—upper, middle, and lower. Neck pain is commonly seen in individuals due to the involvement of the upper trapezius muscle during lateral flexion[7].Neck pain is a frequent complaint among working men and women. Working posture with the neck in extreme flexion increases the load moment three to four times on the neck, causing spasms in the neck muscles[12].

Trapezitis is defined as inflammation of the trapezius muscle. The upper trapezius muscle is designed as a postural muscle and is highly susceptible to overuse. The pain is present even at rest and worsens with activity. Passive range of motion may be painful due to pain and protective spasms in the antagonist muscle group[17].

Myofascial trigger pain is characterized by chronic muscle aching with increased sensitivity to pressure. This type of pain is generally a deep, dull ache in the affected muscle. A tight, palpable band of muscle can often be felt, commonly referred to as a "trigger point." These bands are highly sensitive to pressure, and patients experience sharp pain when pressure is applied to the exact point. A trigger point is a hypersensitive palpable nodule in a taut band. They can be classified into two categories: active and latent trigger points[14].**Active trigger points** are associated with spontaneous complaints of pain, which may be present at rest or during motion[14].**Latent or passive trigger points** does not cause spontaneous pain but may be elicit with manual pressure[14].

OBJECTIVE OF THE STUDY:

To assess the pre-test and post-test level to reduce pain among patient with Upper Trapezius Spasm by ischemic compression technique.

To assess the pre-test and post-test level to reduce pain among patient with Upper Trapezius Spasm by dynamic stretching exercise.

To compare the post-test values of NPRS and CROM in Group A and Group B

2. REVIEW OF LITERATURE

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STUDY DESIGN:

This study was designed as an quasi-experimental study conducted in the Physiotherapy Outpatient Department of Adhiparasakthi College of Physiotherapy located in Melmaruvathur. A convenient sampling method was employed to select participants. The data collection was carried out over a period of four weeks with sessions conducted three days per week.

INCLUSION CRITERIA:

Individuals aged between 18 and 30 years, including both males and females, may present with limited range of motion (ROM), particularly in side bending or rotational movements of the neck. This restriction is often accompanied by noticeable difficulty or discomfort during neck movements. A common clinical finding in such cases is a palpable tender spot in the upper trapezius muscle, which may be associated with muscle spasms or myofascial trigger points. Patients frequently report pain exceeding 3 on the Numerical Pain Rating Scale (NPRS), and may exhibit a “jump sign” — an involuntary vocalization or withdrawal response when the tender area is palpated. These signs are indicative of upper trapezius involvement, often contributing to cervical movement limitations and localized muscular discomfort[17].

EXCLUSION CRITERIA:

Before initiating physiotherapy interventions, it is crucial to screen for serious underlying conditions that may contraindicate or modify treatment approaches. Red flag conditions such as cervical radiculopathies, malignancy, recent or past trauma, and active infections must be carefully considered. A history of intervertebral disc prolapse, previous cervical spine fractures, or congenital or acquired torticollis can also significantly influence cervical assessment and management. Additionally, systemic issues such as vertigo, myocardial infarction, or chronic heart diseases may present with overlapping symptoms and should be thoroughly evaluated to ensure patient safety and appropriate referral when needed[15].

3. METHODOLOGY

A total of 40 subjects were chosen from APCOPT and assigned to two groups, namely the ischemic compression group along with Transcutaneous Electrical Nerve Stimulation (TENS) (n=20) and the dynamic stretching exercises group along with Transcutaneous Electrical Nerve Stimulation TENS (n=20), based on inclusion and exclusion criteria. Numeric pain rating scale (NPRS) and cervical range of motion (CROM) were used as outcome measures.

TREATMENT DURATION:

Group A: Ischemic compression technique (5 min) and TENS (10 min).

Group B: Dynamic stretching exercise (10 min) and TENS (10 min).

TREATMENT TECHNIQUE:

- Ischemic compression technique.
- Dynamic stretching exercise.

1. ISCHEMIC COMPRESSION TECHNIQUE:

The patient was seated comfortably on an armless chair with both feet flat on the floor, with the cervical spine side-flexed away from the affected side to allow better access to the upper trapezius muscle. The therapist stood on the side of the identified sensitive point and supported the patient's head in lateral flexion toward the affected side. Manual palpation was used to locate the myofascial trigger point (MTrP) in the upper trapezius, followed by direct digital ischemic compression. Pressure intensity was increased gradually to a tolerable level and maintained for 30 seconds to 2 minutes. Patients reported a satisfactory pressure sensation during the technique. Rest periods were given between compressions to avoid tissue irritation. Additionally, each session included Transcutaneous Electrical Nerve Stimulation (TENS) for 10 minutes (frequency: 80–120 Hz; pulse duration: 100–200 μs; mode: continuous; intensity gradually increased to a strong, non-painful level), followed by active cervical range of motion (ROM) exercises. This combination of ischemic compression and TENS has been supported by studies showing improved pressure pain threshold (PPT), reduced muscle tenderness, and increased cervical ROM in patients with upper trapezius trigger points[11,13].

2. DYNAMIC STRETCHING EXERCISE:

NECK ROLL STRETCHING EXERCISE:

The patient seated comfortably on a chair or standing upright, and the therapist positioned beside the patient for supervision, the exercise begins by gently tilting the neck to the right, initiating a stretch through the lateral neck and upper trapezius region. The patient is then instructed to slowly roll the head in a counterclockwise direction, pausing briefly upon reaching the left shoulder to maintain controlled movement and stretch. The motion continues until the head returns to the starting position, completing the arc. The sequence is then reversed in a clockwise direction, and the entire process is repeated 2–3 times for therapeutic effect[8].

SHOULDER ROLL STRETCHING EXERCISE:

The patient may be positioned comfortably in either sitting or standing, with the arms resting at the sides. The therapist stands beside the patient to observe and assist as needed. The exercise begins with the patient performing five backward circular shoulder rolls, followed by five forward rolls. This sequence is repeated 2–3 times. Shoulder roll exercises are commonly used to enhance scapular mobility, reduce muscle tension in the upper trapezius and levator scapulae, and promote postural awareness. These movements have been shown to increase shoulder girdle flexibility and improve neuromuscular coordination, particularly in individuals with neck or shoulder dysfunction[16].

DUMBBELL SHRUG:

The patient stands upright with feet shoulder-width apart and knees slightly bent, holding a dumbbell in each hand with arms relaxed at the sides and palms facing inward. The therapist stands beside the patient for supervision. The patient performs a shoulder shrug by elevating the shoulders toward the ears contracting the upper trapezius holds for one count, and then slowly lowers. This is repeated 8–12 times per set using starting weights of approximately 17–26 pounds. Each session also includes TENS therapy applied for 10 minutes (frequency 80–120 Hz; pulse duration 100–200 μs; continuous mode; intensity increased until a strong but non-painful sensation is felt) along with active cervical range of motion exercises. Shrug exercises have been shown to effectively activate the upper trapezius and improve strength and postural control, particularly when combined with electrotherapeutic modalities for enhanced neuromuscular re-education[9,10].

OUTCOME MEASURE:

In this study, the primary outcome measures included the Numerical Pain Rating Scale (NPRS) and Cervical Range of Motion (CROM) for lateral flexion. The NPRS is a widely accepted, valid, and reliable self-report scale used to assess current pain intensity on an 11-point scale (0 = no pain to 10 = worst imaginable pain). Recent studies support the NPRS's psychometric strength in neck pain populations, reporting average intra-class correlation coefficients of approximately 0.67

and a minimal clinically important difference (MCID) of approximately 1.5 to 2.6 points for meaningful clinical change[1,3].CROM for lateral flexion was measured using a digital goniometer aligned at the C7 spinous process, with participants seated and instructed to tilt their head laterally without rotation. Normative values reported in healthy young adults (aged 18–29 years) average approximately 42° ± 7.9° on the right and 41° ± 7.7° on the left, with the upper limit around 45°, consistent with AAOS benchmarks[2,4].These measures provided an integrated assessment of subjective pain perception and objective cervical mobility, permitting comprehensive evaluation of therapeutic effects in the study.

4. RESULT

Data analysis was performed using statistical software SPSS v26.0 applying paired sample t-tests to compare pre- and post-intervention outcomes within both groups. In Group A (Ischemic Compression Technique), the Numerical Pain Rating Scale (NPRS) showed a significant reduction in pain levels, with a pre-test mean of 6.65 decreasing to 3.85 post-test ($t = 10.466$, $p = .000$), indicating a statistically significant improvement. Similarly, Cervical Range of Motion (CROM) for lateral flexion improved markedly from a mean of 15.40° pre-test to 33.55° post-test ($t = -14.94$, $p = .000$), showing a substantial increase in cervical mobility. In Group B (Dynamic Stretching Exercise), NPRS scores also demonstrated a statistically significant reduction from 6.70 to 4.80 ($t = 13.262$, $p = .000$), while CROM improved from 15.05° to 23.85° ($t = -13.77$, $p = .000$). Although both interventions produced statistically significant improvements in reducing pain and increasing range of motion, Group A exhibited greater post-test improvements in both NPRS and CROM, suggesting that ischemic compression may be more effective in managing upper trapezius trigger points and enhancing cervical lateral flexion.

5. DISCUSSION

The objective of this study was to compare the efficacy of ischemic compression and dynamic stretching exercises in reducing pain and improving range of motion in individuals with upper trapezitis. The results demonstrated that both interventions led to significant improvements in pain reduction and range of motion, but ischemic compression showed superior outcomes compared to dynamic stretching exercises.

In this study, the mean value of pain reduction (measured by NPRS) in the ischemic compression group was significantly higher than that in the dynamic stretching exercises group. This suggests that ischemic compression may be more effective in reducing pain associated with upper trapezitis. Ischemic compression is known to release trigger points, improve blood circulation, and promote tissue healing and recovery. The release of trigger points can help alleviate muscular tightness and reduce pain. Additionally, the temporary increase in blood flow after releasing the compression brings fresh oxygen and nutrients to the affected area, further aiding in pain relief and healing.

While both interventions showed significant improvements, it is important to consider individual preferences and contraindications when selecting the appropriate treatment for upper trapezitis. Ischemic compression may not be suitable for individuals with specific medical conditions or over areas of acute inflammation, open wounds, infected tissues, or compromised blood circulation. Dynamic stretching exercises, on the other hand, may be more accessible and suitable for a wider range of individuals. Additionally, combining these interventions with other modalities such as Transcutaneous Electrical Nerve Stimulation (TENS) can further enhance their effectiveness in pain management and functional improvement.

6. CONCLUSION

This study suggests that both ischemic compression and dynamic stretching exercises are effective in reducing pain and improving range of motion in individuals with upper trapezitis. However, ischemic compression showed superior outcomes compared to dynamic stretching exercises.

LIMITATIONS AND SUGGESTIONS:

LIMITATIONS:

This study had a small sample size. Inadequate literature supporting the dynamic stretching exercise. Ergonomical advices and posture correction not employed.

SUGGESTIONS:

Use of big sample size for the research purpose. Use of more reliable scale. Increasing the study duration. Increasing the follow up session

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