COMPARISON OF INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION AND PERCUSSIVE MASSAGE THERAPY IN COLLEGIATE STUDENTS WITH UNILATERAL TRAPEZITIS

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ABSTRACT-

Background: Trapezitis is an inflammation of the trapezius muscles, resulting in pain or spasms in the neck. This condition can cause significant discomfort and restrict the range of motion in the neck and upper back. Symptoms may include stiffness, tenderness, and difficulty moving the shoulders or arms. It can be triggered by poor posture, overuse, stress, or injury, and is often managed with rest, physical therapy, and pain relief massage. The most common muscle affected is trapezius. It is estimated that 85% of individuals visiting pain clinics have trigger points in their neck, with these trigger points being more prevalent in women than in men. Myofascial trigger points (MTrPs) are clinically divided into two categories; active and latent. Practitioners increasingly turning to instrument-assisted soft tissue mobilization (IASTM) as an effective technique for treating trigger points and relieving related pain. IASTM utilizes specifically designed tools to manipulate soft tissue, with the goal of reducing pain improving range of motion and enhancing overall function. Percussion therapy (PT) is a modern treatment method that employs mechanical massage tools, such as the Theragun. This therapy involves the manipulation of soft tissues through rapid, repetitive pressure to enhance flexibility and reduce pain. **Method**: The objective of the study was to access the effect of Instrument Assisted Soft tissue mobilization and Theragun on 60 subjects having trapezitis Subjects were randomly selected from D. Y. Patil College of Physiotherapy Kolhapur and assessed using goniometer, algometer and NPRS scale. Inclusion and exclusion criteria were taken into account, and participants who agree to join the study were assigned to one of the three groups after receiving an explanation of the study. **Result:** A paired t test was used to perform Pre and post comparisons within each groups. Within group comparison values were significant, individual group pre and post values were calculated for NPRS, Range of motion and Pressure threshold. P value for group A, B, C was significant i.e ($p=<0.05$), Comparison between three groups was done by ANOVA. Pairwise comparison between groups was done using Tukey-Post hoc Test. **Conclusion:** Group B (IASTM along with Conventional Therapy) was shown to be more effective for improving Range of motion (lateral flexion and rotation) then group C and Group C (Theragun along with Conventional Therapy showed significant reduction in Pain score (NPRS) and pain pressure threshold in participant's with trapezitis.

Keywords: Trapezitis, IASTM, Theragun, Algometer, Range of motion.

INTRODUCTION

The trapezius is a broad, triangular muscle that arises from the medial third of the superior nuchal line of the occipital bone, the ligamentum nuchae, the spinous processes, and the supraspinous ligament of all twelve thoracic vertebrae. [1]

Inflammation of the trapezius muscle is known as trapezitis which results in pain or spasms in the neck. This condition can cause significant discomfort and restrict the range of motion in the neck and upper back. Symptoms may include stiffness, tenderness, and difficulty moving the shoulders or arms. It can be triggered by poor posture, overuse, stress, or injury, and is often managed with rest, physical therapy, and pain relief massage. It is becoming increasingly common among people who work at desks, use computers, or engage in physical labor that involves extensive use of their neck or back muscle.

Myofascial trigger points (MTrPs) are sensitive, palpable nodules found within tight muscle fiber bands. They often arise in the neck and shoulder muscles, with the trapezius being the most commonly impacted muscle. It is estimated that 85% of individuals visiting pain clinics have trigger points in their neck, with these trigger points being more prevalent in women than in men. [2] Clinically, myofascial trigger points (MTrPs) are classified as either active or latent. Active trigger points cause persistent pain even at rest and are associated with distinct patterns of referred pain. In contrast, latent trigger points only produce pain when pressed and can lead to restricted movement.

Myofascial pain syndrome is a long term condition marked by pain that arises from trigger points. Myofascial pain syndrome is linked to various musculoskeletal issues, such as muscle spasms, limited range of motion (ROM), and reduced flexibility of muscle fibers. Additionally, it can cause autonomic symptoms, which can further impair a patient's physical capabilities and overall function. [3]

These methods aim to alleviate symptoms, enhance flexibility, and restore normal muscle activity. Practitioners increasingly rely on instrument-assisted soft tissue mobilization (IASTM) as a method which is effective for dealing with trigger points and alleviating associated pain.

IASTM involves using a specifically designed instrument to manipulate soft tissue, aiming to alleviate pain and enhance range of motion and overall function.

Percussion therapy (PT) is a modern treatment method that employs mechanical massage tools, such as the Theragun. This therapy involves the manipulation of soft tissues through rapid, repetitive pressure to enhance flexibility and alleviate musculoskeletal pain.

Theragun treatment stimulates the Golgi tendon organ, prompting the higher middle to relax. This relaxation decreases muscle tension, improves blood flow and nutrient delivery to the tissues, reduces tightness, and enhances flexibility.[4] Percussion therapy, also known as percussive massage therapy, can alleviate muscle soreness and stiffness by delivering rapid, concentrated pulses of pressure to the muscle tissue. This helps enhance blood flow, accelerate the healing process, and reduce pain.

A study revealed that upper trapezius tightness is common among university students. The findings indicated that 53.9% of students struggled to lift heavy objects, 68.1% had difficulty reading, 74.2% experienced headaches, 60% had trouble concentrating, 60.3% faced sleep issues, and 51.4% were unable to engage in recreational activities due to chronic neck pain and poor posture. However, 52% of students could drive with manageable pain intensity despite the tightness in their upper trapezius.[5]

Pulling or straining a muscle: This happens when a muscle is worked too hard or too soon, injuring it. As a result of the muscles' disrupted connection, discomfort and a reduced range of motion are probably going to happen. Pressure: Pain can result from applying excessive or tight pressure to the trapezius, which puts pressure on the muscle.

METHODOLOGY

Type of study: Experimental study design: Randomized Clinical Trial. Sampling method: Consecutive sampling Place of study: physiotherapy OPD of D. Y. Patil college of physiotherapy Study duration: 1year Sample size: 60

Patients who met inclusion and exclusion criteria were considered for the study

Inclusion Criteria All genders, Age group 18- 25 years, participants who were willing to take part in the study, Subjects diagnosed with unilateral upper trapezitis by certified physiotherapist. Participants with decreased cervical joint range of motion. (Lateral flexion and rotation) and tender spots that can be felt in the upper trapezius.

Exclusion criteria: A history of refereed pain related to cervical issues, Fracture or healing fracture in neck and upper back area, wound over neck, degenerative cervical spine, subjects with torticollis.

PROCEDURE

Ethical approval was obtained from the institutional ethical committee. The study was conducted at Dr. D. Y. Patil Medical College Hospital and Research Institute in Kolhapur. Physiotherapy OPD. Participant were included considering the inclusion and exclusion criteria, from D. Y. Patil College of Physiotherapy. A detailed explanation of the Procedure was provided to the participants, who were then asked to sign the consent form if they were willing. The assessment of all the included participants was conducted based on assessment form. Participants then were randomly allocated by Simple Randomization into three Groups Group A‟ receiving Conventional therapy that is Interferential therapy (IFT) and stretching. Group B‟ receiving Interferential therapy (IFT) and stretching along with IASTM and Group C‟ with Conventional group IFT, stretching along with Theragun Assessment on pain score, cervical range of motion and pain threshold was performed at beginning (before 1st session) and after 2 weeks (at the end of last session, i.e: 6th session) of study.

GROUP A: Conventional therapy, IFT: Base frequency of 20 and Sweep frequency 40 were used in 2 pole mode for 15 min per session. IFT is employed as an electro-analgesic technique for pain relief as one of treatment methods. Stretching: Each participant underwent passive stretching exercises targeting the right upper trapezius by laterally flexing the head toward the left side. This position was held for 30s, and repeating 3 times. Conversely, if the left upper

trapezius was affected, the same stretching procedure was applied, involving lateral flexion of the head towards the right side. This method aim to enhance flexibility and elevate tension in the affected muscles.

GROUP B: Instrument Assisted Soft Tissue Mobilisation (IASTM), Interferential therapy and stretching exercises. IASTM Protocol:

Subject position: The participant was seated comfortably with their forehead resting on their forearm on a table in front of them.

Therapist position: The therapist stood near the affected side. Before treatment, a lubricant was applied to the skin. The therapist first used a tool to identify areas of restriction.

Sweeping technique- The nord blade was utilized at a 45 degrees angle to deliver slow strokes along the upper trapezius muscle, moving from its origin to its insertion. The treatment lasted for 3 mins and was performed without causing any discomfort or pain to the participants.

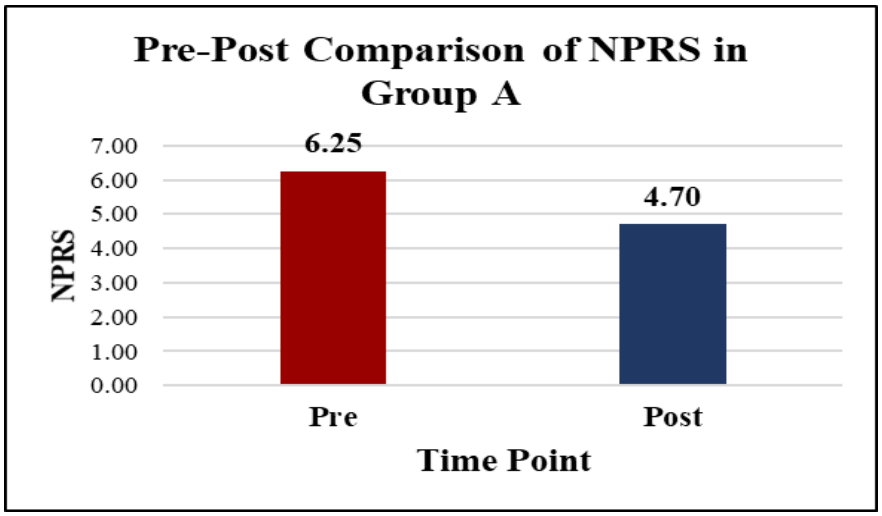
The muscle was then passively stretched by laterally flexing the neck to opposite side, with each stretch held for 30 seconds and repeated three times. The entire treatment protocol consisted of 3 sessions per week over a duration of 2 weeks. All the pre and post data was assessed at Beginning of the treatment and at the end of 6th session respectively and statistical analysis is mentioned. Pain was measured by numerical pain rating score and range of motion by goniometer, pressure threshold by algometer.

GROUP C: Theragun, Interferential therapy and stretching exercises. THERAGUN PROTOCOL Sessions: 1 to 6 of theragun, increase in level of intensity of theragun as tolerated by the subject. Duration: 3 sessions/week for 2 weeks. All the pre and post data was taken as baseline (at the beginning of treatment) and at the end of 6th session and statistical analysis is also mentioned. Pain will be measured by numerical pain rating score and range of motion by goniometer, pressure threshold by algometer.

RESULTS

Paired t test was used for analyzing within group Pre and post comparisons. Within group comparison values were significant, individual group pre and post values were calculated for NPRS, Range of motion and Pressure threshold. P value for group A, B, C was significant i.e (p=<0.05) Comparison between three groups was done by ANOVA for group there was significant difference seen in NPRS score, range of motion and Algometer. For NPRS while comparing between three groups mean value of group C was comparatively low.

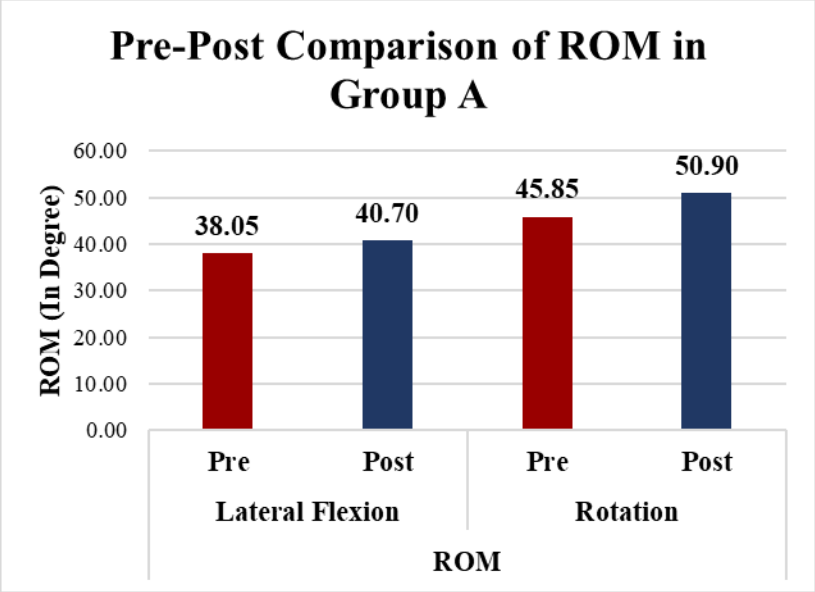
GRAPH 1



In range of motion group B showed high mean value and SD Considering Algometer scores mean value and SD for this outcome measure was found to be lowest in C group as compare to A and B. Pairwise comparison between groups was done using Tukey-Post hoc Test. When comparing pairwise results were significant between each pair of group but for NPRS and Algometer between C and B and for group B and C in lateral flexion and rotation was significantly less as compare to other pairs of groups. Pain after 6th session (4.70 ±1.72) is significantly less than pain before starting the session (6.25 ± 1.62) of group A and P value (2.8*10 -10 which is less than 0.001 (**graph 1)**

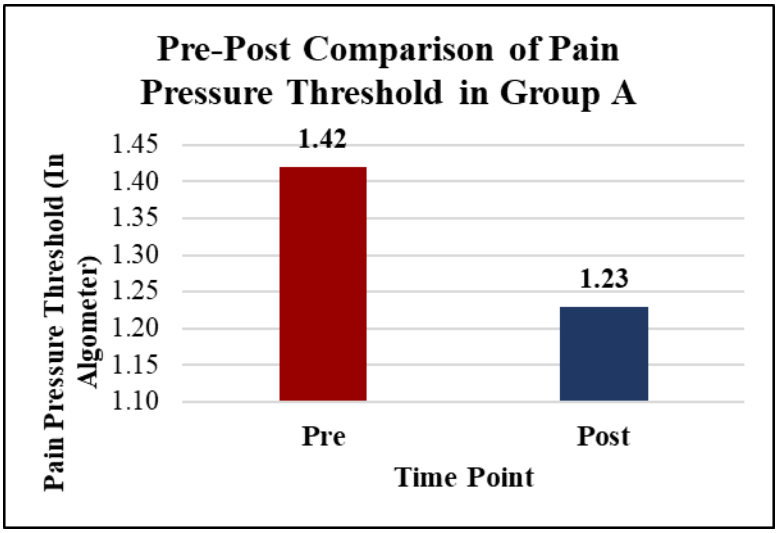
ROM: lateral flexion is significantly increased (40.70 ± 4.80) post treatment than at the beginning of treatment (38.05 ±4.78), and Rotation initially was (45.85 ± 4.75) which increased post treatment (50.90 ± 4.71) of group A (**Below graph 2)**

GRAPH 2



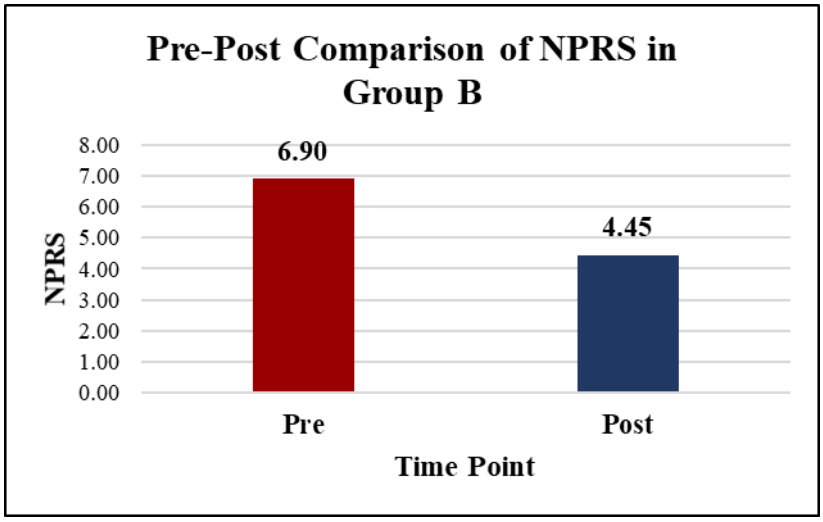
Pain pressure threshold significant decreased post treatment (1.23 ±0.26) than pre range (1.42 ±0.26) of group A (**Below graph 3)**

GRAPH 3



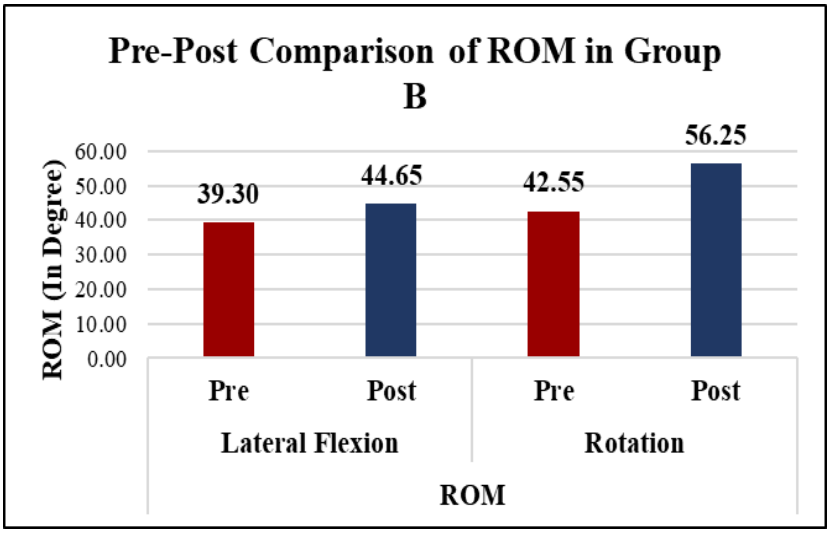
Pain after 6th session (4.45±1.61) is significantly less than pain before starting the session (6.90 ±1.68) of group B and P value (9.54*10 -14) which is less than 0.001 (**Below graph 4**)

GRAPH 4



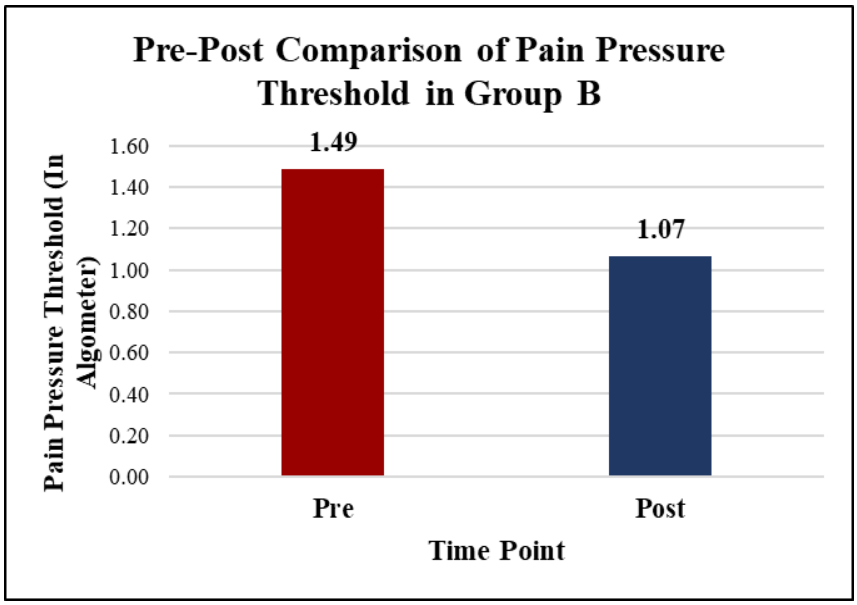
ROM: lateral flexion is significantly increased (44.65 ±1.84) post treatment than at the beginning of treatment (39.30±2.64), and Rotation initially was (42.55 ±3.22) which increased post treatment (56.25 ± 3.71) of group B (**Below graph 5)**

GRAPH 5



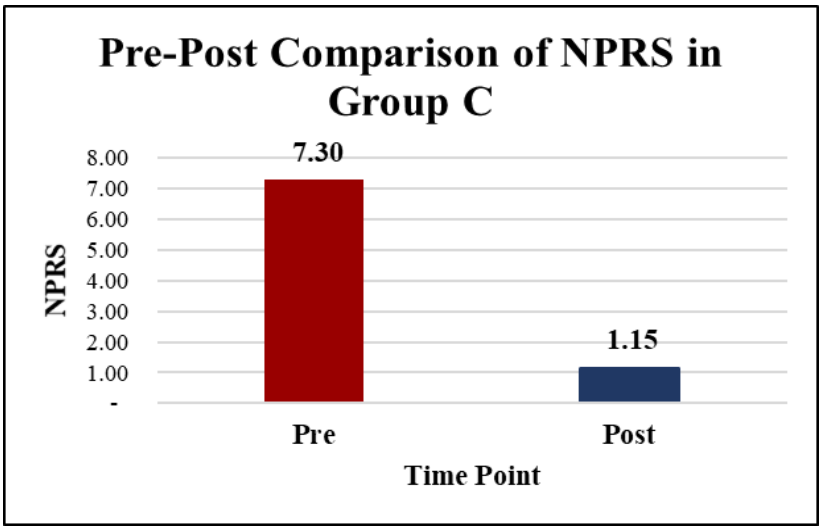
Pain pressure threshold significant decreased post treatment (1.07 ± 0.26) than pre range (1.49 ± 0.28) of group B **(Below graph 6)**

GRAPH 6



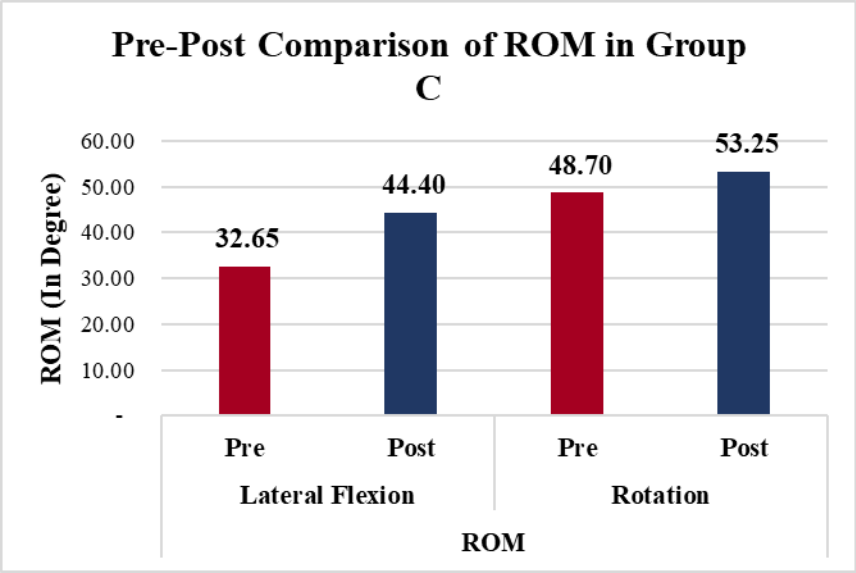
Pain after 6th session (1.15 ± 0.81) is significantly less than pain before starting the session (7.30 ± 1.08) of group C and P value (1.26*10 -17) which is less than 0.001 (**Below graph 7)**

GRAPH NO 7



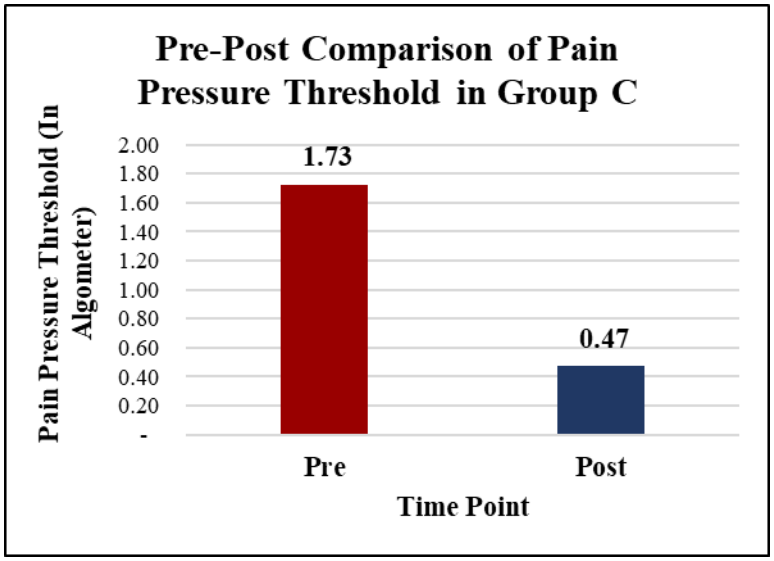
ROM: lateral flexion is significantly increased (44.40 ± 1.98) post treatment than at the beginning of treatment (32.65 ±3.18), and Rotation initially was (48.70 ± 5.85) which increased post treatment (53.25 ± 5.27) of group C (**Below graph 8**)

GRAPH 8



Pain pressure threshold significant decreased post treatment (0.47 ± 0.16) than pre range (1.73 ± 0.10) of group B (**Below graph 9**)

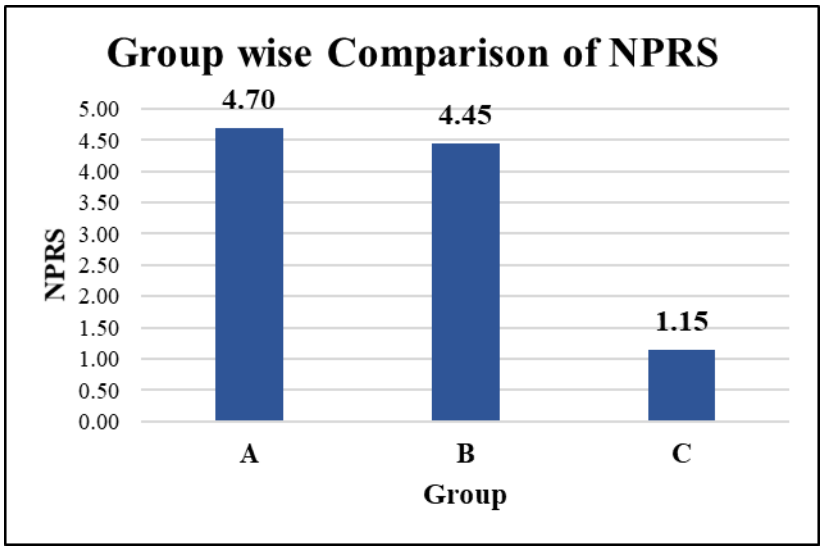
GRAPH 9



ANOVA and Pair wise comparison,

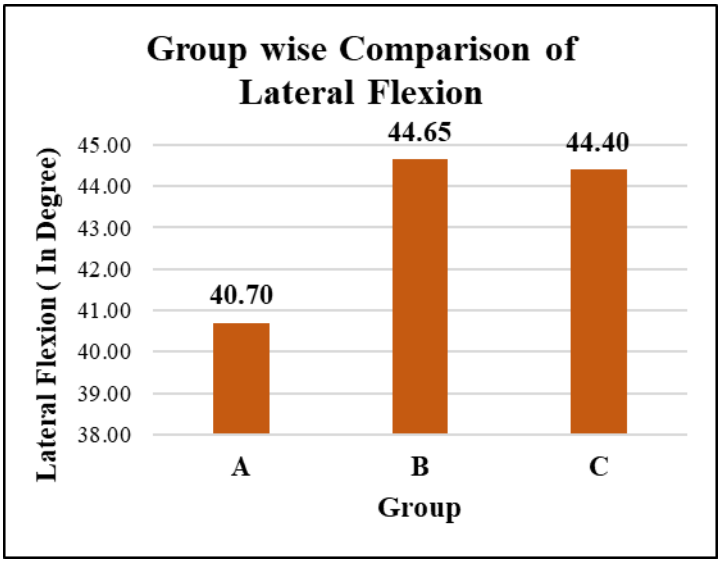
Mean ± SD of NPRS for the group A is 4.70 ± 1.72, for group B 4.45 ± 1.61 and for group C 1.15 ±1.6 There is significant difference in the pain score between group A, B, C (P- value 3.22*10 -11) which is less than 0.05) (**Below graph 10**)

GRAPH 10



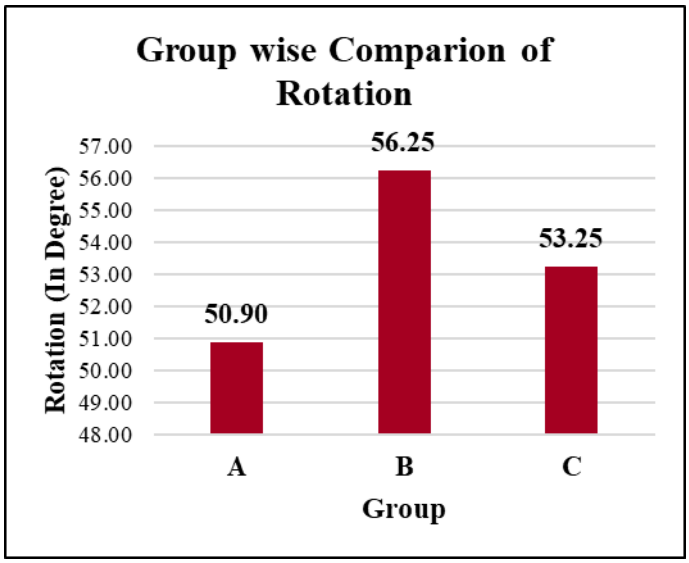
Mean ± SD of ROM for lateral flexion of group A, B, C is (40.70 ± 4.80, 44.65 ±1.84, 50.90 ± 4.71) respectively (**Below graph 11)**

GRAPH 11



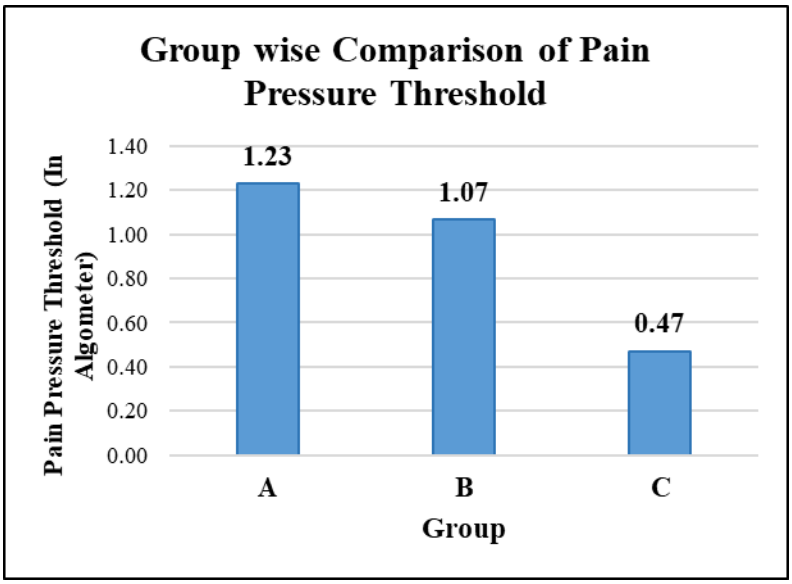
Mean ±SD of ROM for Rotation of group A, B, C is (50.90 ± 4.71, 56.25 ±3.71, 53.25 ±5.27) respectively (**Below Graph 12**)

GRAPH 12



Mean ± SD of ROM for Pain Pressure Threshold of group A, B, C is (1.23 ±0.26, 1.07 ±0.26 ,0.47 ± 0.16) respectively (**Below Graph 13)**

GRAPH 13



DISCUSSION

The aim of the study was to compare the effectiveness of IASTM and Theragun in treating participants with unilateral trapezitis. Based on the inclusion criteria, a total of sixty subjects with trapezitis were selected, and they were then anonymously assigned to one of three groups. Group A (Conventional therapy, Group B (Convention therapy + IASTM) and Group C (Conventional + Theragun). The current study found a significant difference in group C (Theragun with Conventional Therapy) outperformed group B in terms of Pain and pressure threshold, and group B (Conventional with IASTM) showed improvement in cervical ROM. Improvement was seen in all outcome measures for all the groups. The reality that IASTM practitioners make close contact with the tissue during stroke application, enabling them to sense any limits with ease, could account for the benefits seen in these subjects. Consequently, the right amount of force can be used based on the subject's tolerance level and the existence of any involved trigger sites. IASTM additionally alleviates spasmed muscle by boosting circulation, which in turn helps to break away adhesions in the fascia and promote flexibility.

Theragun application produces a mechanical stress that activates the parasympathetic nervous system and releases chemicals like endorphins.

By removing away, the unpleasant stimuli and releasing the pressure on nociceptors, these substances lessen pain. The findings of such study supported those of Chao Yang et al. [6] who studied the effects of percussion therapy on the thoracolumbar fascia in a group of healthy men. 66 guys between the ages of 18 and 30 were divided into one of the two groups for this investigation. For fifteen minutes, one group received percussion treatment, and the other was instructed to relax. They found that percussion therapy can lessen stiffness in the body and the thickness of the thoracolumbar fascia. In the present study, we found that Theragun in conjunction with traditional therapy reduces pain more effectively than IASTM. Additionally, Skillgate et al.[7] looked at how massage helped reduce neck discomfort and discovered that following treatment, patients' activity and pain perception improved considerably.

Additionally, following ten massage sessions, Sherman et al. [8] reported that massage can enhance neck dysfunction more than self-care. The improvement in the IASTM group may be attributed to its ability to induce micro-trauma in the tissue. Consequently, this triggers the inflammatory process locally and raises fibroblast release. The migration of fibroblasts accelerates the healing process by increasing collagen synthesis and tissue regeneration. Furthermore, improved tissue oxygenation and the elimination of local waste metabolites may be facilitated by friction between the tool and the tissue, which raises tissue temperature and blood flow. These outcomes were consistent with those of Motimath et al. [9] who found that the M2T blade IASTM technique is a helpful instrument that can help people with upper trapezius spasm improve range and experience an immediate reduction in pain. The M2T blade can be utilized to loosen tight fascia by applying rhythmic strokes over it until adhesions and cross-linkages are broken down, resulting in fascia release and long term muscle lengthening. Bulbuli et al.[10] tested the M2T blade on subjects with heel pain and observed a reduction in pain level and improvement in activity levels. A pilot study by Naik et al., concluded when M2T was used to patients with shoulder pain, they observed a significant decrease in pain after treatment.[11] Furthermore, Naik et al. compared the effectiveness of kinesiotape and M2T blades in treating patients with shoulder pain. They found that while both therapies helped to reduce pain and improve shoulder range, M2T was the more successful. According to their statement, using M2T leads to expand the constricted fascia, relieving pressure on pain nerve fibers and extending the

range of motion in the afflicted joint.[11] Exercises that stretch the muscles can also help to relax spasms. The stretching exercise improved the muscle fibers' viscoelastic qualities and promoted relaxation. This causes the target muscle to deform and become more flexible, much like when a steady external load is applied gradually to a shortened muscle.[12]

CONCLUSION

The present study showed significant difference in all the three groups, but Group B (IASTM along with Conventional Therapy) showed more effectiveness in improving Range of motion (lateral flexion and rotation) then group C and Group C (Theragun along with Conventional Therapy) showed significant reduction in Pain score (NPRS) and pain pressure threshold in Subjects with trapezitis.

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