

# A Comparative Study - Effectiveness of Instrument Assisted Soft Tissue Mobilization Versus Ischemic Compression on Pain and Range of Motion in College Going Students with Upper Trapezius Trigger Points

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## Abstract

**Background:** Trapezitis is one of the common inflammatory conditions seen among college going students due to prolonged faulty posture, overuse, stressful neck movement, etc. Students with trapezitis frequently report pain, restricted range of motion, and trouble doing regular tasks. The majority of college-bound youngsters have trigger points over their trapezius muscles.

**Need of study:** There Is few Literatures or Research Work Available on This and No Comparison Is Done on Above Techniques.so this study was done to compare both the techniques.

**Objective:** To compare the effectiveness of IASTM and ischemic compression in trapezius trigger points in college going students.

**Methodology:** In this study, 45 participants were recruited based on inclusion and exclusion criteria. They were divided in 2 groups. group-A(n=23) (IASTM) and group-B(n=22) (IC). Each intervention was administered to them for a period of 2 weeks, 3 sessions per week in respective groups. Pre and post assessment was taken using following outcome measures VAS, NDI and cervical range of motion.

**Result:** Data was analysed by SPSS21, t-test was applied. Statistically significant improvements observed in both groups but more pronounced in group A(IASTM). VAS (3.0504) P (0.0042), NDI (6.20) P<0.0001.

**Conclusion:** The results suggested that IASTM gives better result than ischemic compression in relieving trapezius trigger points in college going students.

**Keywords:** trapezius, trigger points, students, Instrument Assisted Soft Tissue Mobilization (IASTM), ischemic compression.

## Introduction

The most frequent musculoskeletal pain, both

traumatic and non-traumatic, is neck pain. Most of them complain of "non-specific neck pain" brought

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on by poor postural habits or mechanical issues.<sup>(1)</sup> The dorsal side of the neck and trunk is where the trapezius, a sizable muscle, inserts into the thorax. It receives supply from cervical nerves (C3 and C4) and the motor spinal root of the accessory nerve (CN XI).<sup>(2)</sup>

Smartphones are one of the most used technical devices by people of all ages. According to a recent study, 79% of people between the ages of 18 and 44 use cell phones with their hands bent, leaving them with only a few hours of the day without their smartphones.<sup>(3)</sup> Common causes of trigger point triggering include lack of exercise, prolonged poor posture, emotional stress, armrests that are too high, sitting without a firm backrest, head tilt, any position where the shoulder is held for long periods of time can maintain trigger points in this muscle.<sup>(4)</sup>

Trapezititis is inflammation of the trapezius muscle leading to pain, present even at rest and aggravated with activity, inflammation in the muscle causing spasms and tension of the trapezius muscle.<sup>(5)</sup> Pain occurs even at rest and worsens with activity; it can be transferred to another area from the site of primary inflammation.<sup>(6)</sup>

The IASTM includes a number of rigid materials (plastic or steel) instruments of various morphologies that can be manually used by the clinician depending on the depth of pressure applied or the clinical picture. These devices are designed to apply longitudinal pressure along the path of the muscle and/or connective fibres.<sup>(7)</sup>

The IASTM technique contains a protocol for treatment that contains several components: examination, warm-up, IASTM treatment. Currently, benefits derived from IASTM include releasing skin constraints, breaking collagen cross-links, increasing blood flow and possibly increasing cell regenerative activity.<sup>(8)</sup> IASTM also improve muscle strength and joint range of motion. Despite extensive use of IASTM techniques research regarding its effect on myofascial pain reduction, is limited.<sup>(9)</sup>

The idea of using an instrument is said to offer a mechanical advantage to the clinician by allowing deeper penetration and more specific treatment, while reducing stress on the hand.<sup>(10)</sup>

The ischemic compression technique uses the application of sustained pressure with sufficient force and for long enough to slow blood flow and release muscle tension. Once the pressure is removed, blood flows to the area that caused the trigger to stop working.<sup>(11)</sup>

Therefore, the present study has been undertaken to compare the effect of IASTM and IC on upper trapezius trigger points in college going students.

There is a dearth of literature present on Upper Trapezius Trigger Points in College Going Students so this study is aimed to determine the effect of IASTM and IC technique in college going student.

## Aim and objectives

### Aim:

To compare the effect of Instrument assisted soft tissue mobilization and Ischemic compression on upper trapezius trigger point in college going students.

### Objectives:

1. To determine the effect of IASTM on pain intensity and neck disability index in upper trapezius trigger point in college going students.
2. To determine the effect of IC on pain intensity and neck disability index in upper trapezius trigger point in college going students.
3. To compare the IASTM and IC on pain intensity and neck disability index in upper trapezius trigger point in college going students.

### Hypothesis:

- Null hypothesis: There is no significant difference in neck disability and pain in college going student treated with IASTM and IC.
- Alternate hypothesis: There is significant difference in neck disability and pain in college going student treated with IASTM and IC.

## Materials and methodology

- **Source of data:** college going students
- **Study design:** comparative study

- **Study duration:** 6 months
- **Study population:** students with trepezitis
- **Proposed sample size:**45
- **Sampling method:** Convenient sampling method

#### Inclusion criteria

- Participants within the age group of 18-26 years
- male and female both were included.
- VAS value between 4 to 7 out of 10,
- Participants with unilateral or bilateral trapezius tender point, duration of the pain from 7 days to 1 month,
- participants willing to sign the written inform consent form

#### Exclusion criteria

- Recent history of trauma or fracture in cervical spine, recent cervical spine surgery, fracture of upper limb and cervical.
- Participants taking any anti-inflammatory drugs, brachial neuralgia.
- Prolapse intervertebral disc, neck deformities like scoliosis or torticollis.
- Any type of skin infection, Open wounds in upper back area, Hypersensitive skin.

#### Procedure

A comparative prospective study was conducted at MatrusriDavalba hospital, Varnama, Vadodara. It was conducted for duration of six months. Total of 58 participants had participated in the study.

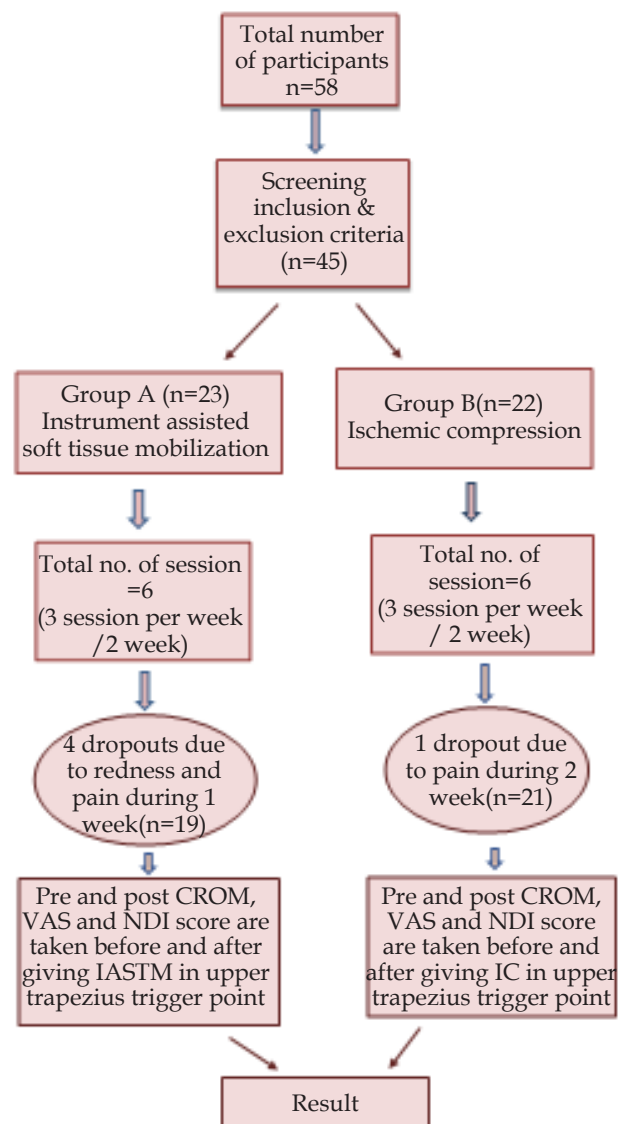
Total 58 participants were included and written informed consent was taken then baseline data and pre and post intervention assessment was done. After that the randomization within the groups was done by even and odd numbers Group A (n=23) (IASTM) and Group B (n=22) (IC).

The effectiveness of intervention was assessed using the outcome measure visual analogue scale (VAS), cervical range of motion by universal Goniometer and Neck Disability Index Questionnaire (NDI).

#### Group A (IASTM)

- Subjects received six sessions given in two weeks treatment of instrument assist soft tissue mobilization.
- Position of patient – sitting on chair hand supported on table and head resting on hand.
- Position of therapist- behind the patient towards involved side.
- Technique: hot pack was given 15 min prior to treatment, treatment area exposed properly then gel was used for lubrication then instrument used at angle of 45 applied slow strokes on the muscle from origin to insertion (sweeping technique) for 3 min.

#### Group B (IC)



**Fig 1: Flow Chart representing the procedure of selection of participants**

- Subjects received six sessions given in two weeks treatment of ischaemic compression and trigger point pressure release.
- Ischaemic compression consisted of sustained deep pressure with the thumb on the upper trapezius trigger points for 30secs-1min.
- Pressure was released when there was decreased tension in the trigger point or when the trigger point was no longer tender or 1 min had elapsed whichever occurred first.
- Trigger point pressure release is non-painful slowly increasing pressure with the thumb was applied over the trigger point until a tissue resistance barrier is felt
- This level of pressure was maintained until release of the tissue barrier is felt, at which time pressure is increased until a new barrier is reached.
- This process was repeated until there is no trigger point tension/ tenderness or 90 sec has elapsed, whichever occurred first

#### Outcome Variables:

**VAS:** It is a measurement instrument that tries to measure the characteristics or attitude that is believed to range across a continuum of values. A straight horizontal line of fixed 10 cm length with the ends defined as the extreme limits of the pain to be measured, oriented from left (no pain) to right (severe). (ICC=0.97).<sup>(12)</sup>

#### Cervical Range of Motion:

All the motions were assessed by using Universal Goniometer. This test has satisfactory psychometric properties with ICC measurements for intra and inter examiner reliability that ranges from 0.80 to 0.93.<sup>(12)</sup>

#### Neck Disability Index:

It is a patient - completed condition specific functional status questionnaire with 10 items. It has sufficient support and usefulness to retain its current

status as the most commonly used self - report measure for neck pain. Each section is scored on a 0 to 5 rating scale, in which zero means 'No pain and 5 means 'Worst imaginable pain'.<sup>(12)</sup>

#### Statistical Analysis

Descriptive statistical analysis obtained using frequency, percentage, mean, SD, CI, median and IQR. Paired t-test was used for the comparison of

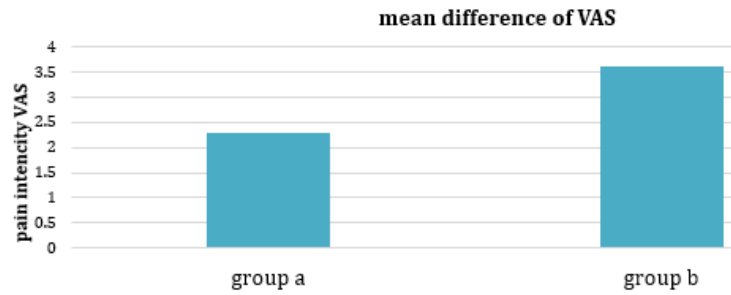
Pre and post data within the group. Unpaired t-test was used for the comparison of data between group A and Group B. All the statistical analysis was performed by using IBM SPSS version 29.0.0.

#### Result

- Table 1 depicts Comparison of mean of VAS score between Group A and B Group. The mean value of VAS score in group A  $2.30 \pm 1.26$  (P value  $< 0.0001$ ) and group B  $3.60 \pm 1.43$  (P value  $< 0.0001$ ).
- Graph 1 depicts Comparison of mean in post intervention between Group A and Group B using VAS where t value is 3.0504 and (p value  $> 0.0042$ ).
- Table 2 depicts Comparison of Post treatment mean difference values between Group A and Group B of cervical ROM between both the groups.
- Graph 2 depicts Comparison of mean cervical range of motion between Group A and Group B.
- Table 3 depicts Comparison of mean in post intervention between Group A and Group B using NDI questionnaire and these table suggested that group A NDI score is less than 22% and group B NDI score is more than 22%.
- graph 3 depicts Comparison of mean difference between Post NDI values between both the groups.

**Table 1: Comparison of mean of VAS score between Group A and B Group**

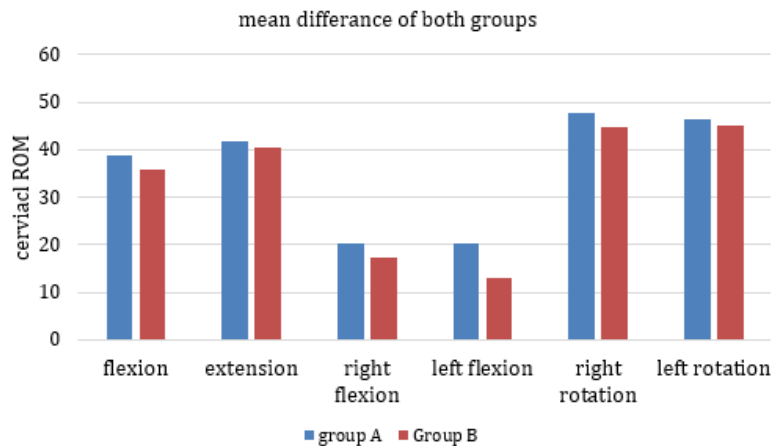
VAS	Mean $\pm$ SD	Mean $\pm$ SD	't value'	'p value'	Result
	pre	post			
Group A	5.50 $\pm$ 1.15	2.30 $\pm$ 1.26	13.5	$< 0.0001$	Extremely significant
Group B	5.70 $\pm$ 0.98	3.60 $\pm$ 1.43	4.97	$< 0.0001$	Extremely significant
Group A V/S Group B	Group A post 2.30 $\pm$ 1.26	Group B post 3.60 $\pm$ 1.43	3.0504	0.0042	Very significant



**Graph 1:** Comparison of mean in post intervention between Group A and Group B using VAS where t value is 3.0504 and p value >0.0042 which is statistically significant, whereas within the group it was significant

**Table 2:** Comparison of Post treatment mean difference values between Group. cervical ROM between both the groups are as follow: Flexion: 38.85±3.42and 35.80±1.79 (p -Value: <0.0011), Extension:41.92±4.32 and 40.44±5.01(p-Value:0.269), Left Flexion: 20.16±1.40and 12.85±2.65 (p - Value:<0.0001), Right Flexion: 20.25±1.52 and 17.35±1.73 (p -Value: <0.0001), Left Rotation: 46.40±2.44 and 45.15±1.69(p -Value: 0.0673), Right Rotation: 47.80±2.24and 44.80±1.47 (p -Value :<0.0001).

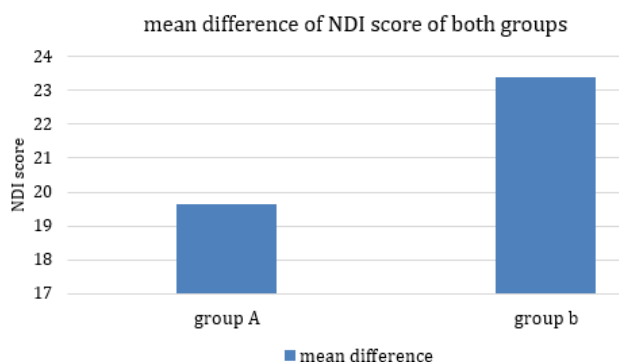
CROM	GROUP	Mean (difference)	SD	SEM	'p' value	't' value	Significance
Flexion	A	38.8500	3.42	0.76	<0.0011	3.53	Very significant
	B	35.8000	1.79	0.40			
Extension	A	41.9200	4.32	0.86	0.269	1.11	Not significant
	B	40.4400	5.01	1.00			
Left Flexion	A	20.1600	1.40	0.28	<0.0001	10.76	Extremely significant
	B	12.8500	2.65	0.54			
Right Flexion	A	20.2500	1.52	0.33	<0.0001	5.63	Extremely significant
	B	17.3500	1.73	0.38			
Left Rotation	A	46.4000	2.44	0.54	0.0673	1.88	Quite significant
	B	45.1500	1.69	0.37			
Right Rotation	A	47.8000	2.24	0.50	<0.0001	5.00	Extremely significant
	B	44.8000	1.47	0.32			



**Graph 2:** Comparison of mean cervical range of motion between Group.

**Table 3: Comparison of mean in post intervention between Group.using NDI questionnaire where t value is 6.20 and p value which is 0.0001 statistically significant, whereas within the groups it was significant**

NDI	Mean ±SD		't' value'	'p' value	Result
	pre	post			
Group A	45.90±2.97	19.65±1.81	26.25	<0.0001	Extremely significant
Group B	46.15±2.70	23.40±2.01	22.75	<0.0001	Extremely significant
Group A v/s Group B	Group A Post	Group B Post	6.20	<0.0001	Extremely significant
	19.65±1.81	23.40±2.01			



**Graph 3: Comparison of mean difference between Post NDI values between groups.**

**Discussion**

The present study aimed at finding out the effects of instrument assisted soft tissue mobilization and ischemic compression in reducing pain on VAS scale and improving the cervical range of motion and NDI score in students with trapezitis. The results of the present study showed that both techniques effective for reducing pain and disability but IASTM produced better results with respect to pain, cervical range of motion and NDI.

Clinicians claim that IASTM is a type of soft tissue mobilization technique that can more effectively reach tissues deeper in the body than the hands can, relieving myofascial adhesions, borders, tightness, fibrous nodules, crystalline deposits, and scar tissue. (13)

IASTM causes a localized minor injury to soft tissue that results in haemorrhagic changes in capillaries and other small blood vessels, which in turn triggers the body’s inflammatory response and launches the body’s reparative system. (14)

These results were in line with a study conducted by Dr. Basavaraj Motimath et al. In their study they

found the immediate effect of Instrument Assisted Soft Tissue Mobilization (IASTM) With M2T blade technique in trapezitis. (15)

**Conclusion**

In the current study, application of IASTM once in 3 days for 2 weeks to trigger points in upper trapezius muscle produced significant increase in flexion, both lateral flexion and rotation of cervical spine. It also reducing pain measured by VAS. These findings were more Statistically and clinically significant when compared with IC. Our study concludes that IASTM is more effective with trapezitis than IC. so here our alternat hypothesis is accepted and our null hypothesis is rejected.

**Clinical implication**

IASTM is feasible, safe, fast and effective method for patients with trapezitis.

**Limitation of the study**

Small sample size and short period of intervention.

**Future scope**

Future research with more sample size and long period of intervention and cupping therapy could be compare with other techniques

**Acknowledgement**

All our best wishes to those valuable participants & supporter of this study.

**Conflict of Interest:** none

**Source of Funding:** none

**Ethical Clearance**

Approval was taken by ethical committee.

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