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Effect of IASTM versus Met on Pain, Cervical Range of Motion & Functional Disability in Patient with Upper Trapezitis: Interventional Comparative Study

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Abstract: ***Background: Trapezitis is a classic stress pain. It is designed as postural muscle and it is highly susceptible to overuse. Pain occurs due to placing too much stress or strain over the trapezius muscle in form of fatigue, stress, tension, forward neck posture, sitting for prolonged period of time. Neck pain is 2nd common musculoskeletal disorder after low back pain. Roughly two thirds of the general populations have neck pain at some time in their lives and the prevalence is highest in middle age. Methodology 42 patients, aged 18-35 years based on inclusion criteria, with upper Trapezitis. Patients were randomly divided into 2 groups: group-A (n = 21) received IASTM treatment, group-B (n = 21) received Post Isometric Relaxation of MET treatment. Demographic data, pain on NPRS scale, cervical range of motion and function by NDI was taken. It measured at Pre-intervention and after 2 week (3 sessions in 1 week) of post-intervention. End of first session Participants in both groups were educated for proper ergonomics and given printed brochure for better awareness. Result: Within-group analysis showed significant differences between pre- and post-treatment values of all outcome measures in both groups. (p<0.001). Between group analyses, there was significant difference in NPRS and ROM but no significant difference in lateral flexion and NDI through IASTM compared with MET. Conclusion: Pain, Flexibility and Disability improved in both groups. However, IASTM shown more improvement compared with MET.***

Keywords: IASTM, Post Isometric Relaxation, MET, NDI, Upper Trapezitis

1. Introduction

Trapezitis is a classic stress pain defined as the inflammation of trapezius muscle, which is usually induced due to repeated overuse of the upper trapezius muscle.[1,2] In human body upper trapezius muscle is designated as a postural muscle and it is highly susceptible to overuse.[3,4,5]

Trapezius muscles help with the function of neck rotation, lateral flexion and extension.[2]This muscle lies at the back of the neck and helps in shrugging movement of the shoulders along with upward movement of the head of humerus. upper trapezius fibers initiate rotation of the clavicle to prepare for elevation of the shoulder gridle. As the trapezius muscle works to move the neck in several directions, its degree of tightness or looseness affects neck flexibility to high extent.[1]

Evidence suggests that an increased prevalence of upper Trapezitis was found with an increased durational usage of electronic gadgets in this virtual world. Where incorrect postures are very commonly adopted as a habitual posture while using Smart phones or laptops. [9,10]Abha Sharma et al suggested that too little tissue stress can be damaging as too much (or too frequent, or too prolonged) exposure to biomechanical stress. Prolong exposure may lead to pathological changes in soft tissues and joints. In future consequences it may alter functional efficiency due to pain, stiffness & limited range of motion.[11]

There are many physical therapies approaches that are used for the treatment of trapezitis, like osteopathic manipulative treatment, chiropractic techniques as positional release therapy massage, ultrasound, IFT, TENS, SWD, cryotherapy, kinesiology taping, spray and stretch as well as dry needling & LASER. [13,14]

IASTMis one of the therapeutic techniques which works at cellular level. It helps in soft tissue healing by stimulating body's own natural inflammatory processes, breaking down existing scar tissues & lengthening the tight fascia.[19] It is believed that controlled mechanical forces which are applied during IASTM might produce a localized trauma in the tissue. It provokes the body's natural localized inflammatory process and increases the release of fibroblast. Fibroblast migration increases collagen synthesis, enhance tissue regeneration and thus in-turn speed up the healing process. It also helps to reduce scar tissueby breaking down existing scar tissue in people with soft tissue restrictions. [20,21]IASTM helps the clinicians to apply a greater amount of force to the tissues while minimizing stress on the practitioner's hand. It also helps in greater penetration to better access fascia and release restrictions by improving range of motion. [17,18]

Muscle Energy Technique (MET) is one among the manual therapies which helps to relax and lengthen the muscle fibers. It makes use of muscle's own energy in a form of gentle isometric contractions. It is followed by muscle relaxation via autogenic or reciprocal inhibition. The advantage of MET technique over passive stretching is that the patient is actively participating for improving muscle function.[22]

Post Isometric Relaxation (PIR) technique is used to relax hypertonic and shortened muscles. It is useful where muscle tightness or shortness is a major contributing factor to somatic dysfunction. In this technique a gentle stretch is followed by contraction& relaxation. Evidence suggests that PIR technique reduces muscle tone. [2] When the muscle is held in an isometric contraction it goes in a relaxed state for a brief latent period. Muscle inhibition and muscle fibers relaxion is mediated by the afferent input from the Golgi tendon organ.[23]

2. Review of Literature

1) Niraj Kumar, Sandeep Kumar, Bharat Puri et al (2021) studied on titled **"Compare the Effectiveness between Isometric Strengthening Exercise and Postural Correction in Patients with Neck Pain**". In this study they assessed 30 subjects having neck pain. They were randomly assigned into 2 groups: A and B. The Group A subjects received isometric strengthening exercise and hot pack. The Group B subjects were advised for postural correction and received hot pack. Isometric strengthening exercise was administered in sitting position for neck flexors, extensors, side flexor, and rotators, contraction with 5 sec hold and 10 repetitions. Outcome measures were VAS for pain and Functional Rating Index (FRI) for functional imitations or disabilities. They concluded that isometric strengthening exercise protocol has been found to be more beneficial compared to postural correction. [24]
2) Mohamed Abdelhamid, EnasF. Youssef et al (2020) studied that "**Trigger Point Release V/S Instrument Assisted Soft Tissue Mobilization on Upper Trapezius Trigger Points in Mechanical Neck Pain: A Randomized Clinical Trial**". In this study they included forty patients aged between 18 to 55 years. They were randomized and allotted into two groups, group A and B respectively. Group A received one session of Trigger Point Release (TPR) and Passive Stretching while group B received one session of IASTM using m2t blade and Passive Stretching in prone position. Therapist applied one minute of IASTM by the m2t blade (fanning strokes at 45 degrees to the muscle fibres) over upper trapezius. They concluded that IASTM using M2t blade and TPR was effective in treating patients with mechanical neck pain and upper trapezius trigger points.[16]
3) Haytham m. El-hafez, Hend a. Hamdy, Mary K. Takla et al (2020) studied "**Instrument-Assisted Soft Tissue Mobilization V/S Stripping Massage for Upper Trapezius Myofascial Trigger Points**". This study included 40 patients (34 women and 6 men), age between 18 to 23 years, with active trigger points in the right upper trapezius. Subjects were divided into 2 groups (A and B). Group A (20 patients) received IASTM using m2t blade twice a week for 4 weeks in addition to stretching exercise. Group B (20 patients) received Stripping Massage (SM) twice a week for four weeks in addition to stretching exercise. The visual analogue scale (VAS) for pain, a pressure algometer for strength, and the Arabic version of the Neck Disability Index (NDI) for function were used to evaluate patients' pre and post treatment status. They concluded that IASTM and Stripping Massage both are effective methods for improving pain, strength and function in patients with in trigger points upper trapezius.[15]

3. Materials and Methodology

Study Site: Vadodara
Study Population: Upper Trapezitis Patients.
Proposed Sample Size: the calculated sample size was 42 (21 in each group).
Sampling Method: Convenient sampling.
Study Design: Interventional Comparative Study

Inclusion Criteria:
1) Subjects those who are willing to participate and giving consent
2) Age group between 18-35 years[34]
3) Both genders included [34]
4) Pain and spasm in upper trapezius > 3 months [34]
5) Unilateral Trapezitis [5]
6) Patients with basic knowledge of writing and reading in English [34]

Exclusion Criteria:
1) Skin disease, allergy/hypersensitivity, any malignant or benign tumours, any recent unhealed scars or wounds, early bruising in and around upper back (as not safe for IASTM) [5,34,36]
2) Any Orthopaedic and Neurological condition as Cervical PIVD, spondylolisthesis[34]
3) Recent surgery and fracture in and around shoulder and cervical region[5]
4) No Physiotherapy treatment taken for neck problems in the past 3 months [34]
5) Patients under medications such as anti-inflammatory or analgesics [34]
6) Known psychiatric condition under treatment or medication [34]

Materials used in the study:

1. Plinth & Stool
2. Bed sheet and Pillow
3. IASTM Tool
4. Lubricant (Vaseline)
5. Chair
6. Disinfectant
7. Paper & Pen
8. Goniometer

Method
In this study 42 patients which were selected and During pre-intervention the following information was collected: demographic data, baseline pain intensity on NPRS scale,

cervical range of motion by goniometry and function by neck disability index (NDI).

Group A: Subjects received Conventional Physiotherapy + IASTM technique treatment protocol + Cold pack.

Group B: Subjects received Conventional Physiotherapy + Post isometric relaxation of Muscle Energy Technique + Cold pack.

Conventional Physiotherapy Exercise Protocol:

1) Isometric strengthening exercises for cervical Extensors, Flexors, bilateral side Flexors and Rotators (resistance was about 50% of the patient's maximum strength, hold for 10 seconds, for 10 repetitions).[37]
2) Stretching of the upper fibers of trapezius (stretching was held for 30 seconds, and repeated 3 times).[37]

Figur 10 : Isometric Strengthening Exercises for Cervical Flexors

Figur 11 : Isometric Strengthening Exercises for Cervical Right sideRotators

Figure 12 : Stretching of the Upper Fibers of Trapezius

IASTM Technique Treatment Protocol:

- Patient were seated in a chair comfortably with their forehead rested on their forearm on a table in front of them. A lubricant (Vaseline) was applied to the skin around the neck area prior to treatment and the IASTM tool was cleaned with an alcohol pad. First, the IASTM tool was used to find the exact areas of restriction in the upper trapezius. Then the IASTM tool was used at an angle of 45° and gentle slow strokes were applied along the muscle from its origin to the insertion (Sweeping Technique). This protocol was administered for duration of 1 minute. Care was taken to prevent any discomfort or pain.[15]

Figure 13: Treatment given by IASTM Tool

Post Isometric Relaxation of Muscle Energy Technique Treatment Protocol:

- In PIR protocol the patient was asked to lie down in supine position on the plinth. The therapist sits on a stool at the treatment table near patient's head. Then the therapist holdshead of the patient with cross hands. The head and neck of individual are flexed, side bent away from the side with stabilization of the shoulder with one hand and the ipsilateral mastoid process with the other hand. Patient was asked to take the stabilized shoulder towards the ear, and the ear towards the shoulder against resistance from both sides. The patient was made to breathe in and out in relaxed manner. This exercise was repeated 3 times.[38]

Figure 14: Post Isometric Relaxation of Muscle Energy Technique Treatment

- Cold pack was given over upper trapezius region in sitting position for 20 mins. [8]

Figure 15: Cold Pack over Upper Trapezius

At the end of first session participants in both groups were educated for proper ergonomics and were given Ergonomic Advice Pamphlets (Annexure 3) for better awareness.

Both the groups received treatment for 3 days in a week for 2 weeks. For the remaining days they were advised to follow same conventional exercise protocol at home once in a day for 2 weeks. At the end of 2 weeks the data was collected.

Outcome Measures:

- **Pain**: [43]
- **Cervical Range of Motion**:[40], [41]
- **Neck Disability Index:**[42],[44, 45]

Statistical Analysis

- Data was analyzed using SPSS software version 28.0
- Paired t test &Unpaired t test was used to compared NPRS, cervical ROM and NDI .

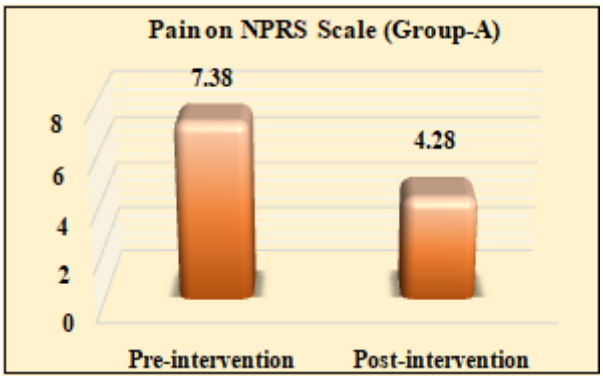
4. Result

Table 1: Distribution of sample by Age group

Age	Mean	Number of Patient	Standard Deviation	Standard Error Mean
IASTM	27.66	21	±5.471	1.193
MET	26.09	21	±5.539	1.208

Table 2: Pre-Post Pain measurement of NPRS in IASTM Group

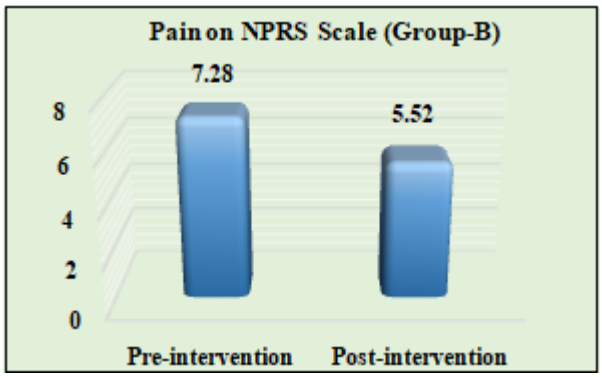
NPRS	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	7.38	±1.20	0.262	10.054	<0.001
Post-intervention	4.28	±1.05	0.230		



Graph 2.1: Pre-Post Pain measurement of NPRS in IASTM Group

Table 3: Pre-Post Pain measurement of NPRS in MET Group

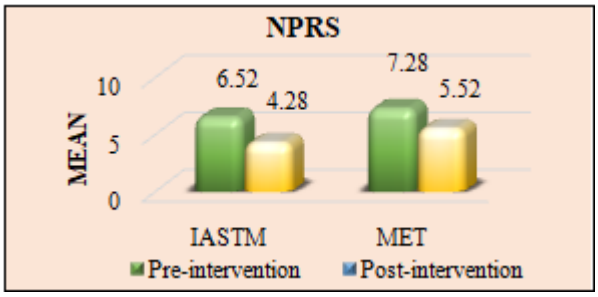
NPRS	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	7.28	±1.23	0.268	9.717	<0.001
Post-intervention	5.52	±1.20	0.209		



Graph 4: Pre-Post Pain measurement of NPRS in MET Group

Table 4: Post NPRS value in IASTM &MET Group

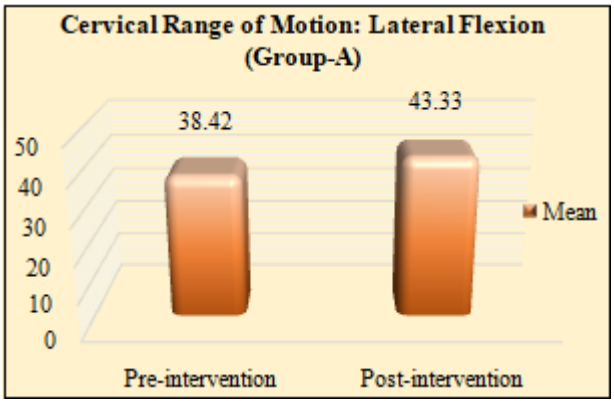
NPRS	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Post-intervention (Group A)	4.25	±1.05	0.230	3.670	0.002
Post-intervention (Group B)	5.52	±1.20	0.263		



Graph 5: Post NPRS value in IASTM &MET Group

Table 5: Pre-Post Cervical ROM: Lateral Flexion measurement of IASTM

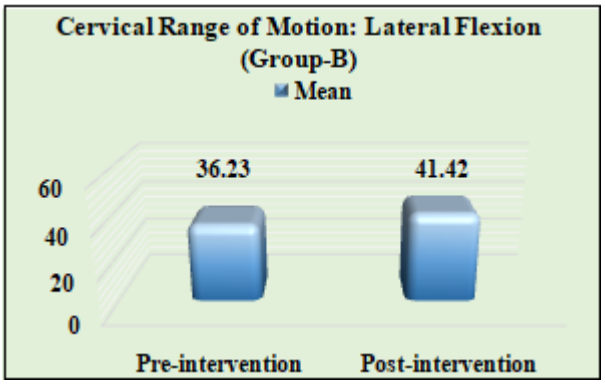
Cervical Range of Motion: Lateral Flexion	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	38.42	±3.39	0.262	8.755	<0.001
Post-intervention	43.33	±1.79	0.230		



Graph 6: Pre-Post Cervical ROM: Lateral Flexion measurement of IASTM

Table 6: Pre-Post Cervical ROM: Lateral Flexion measurement of MET Group

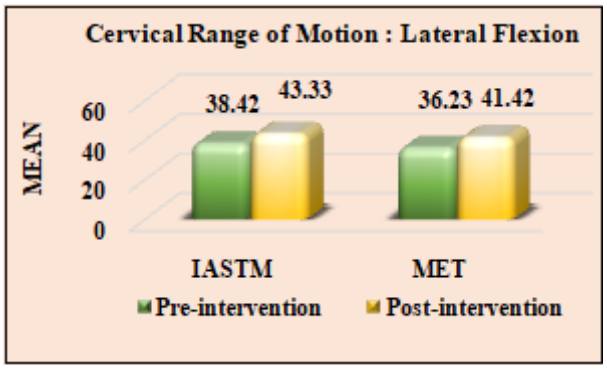
Cervical Range of Motion: Lateral Flexion	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	36.23	±2.46	0.538	10.57	<0.001
Post-intervention	41.42	±2.15	0.470		



Graph 7: Pre-Post Cervical ROM: Lateral Flexion measurement of MET Group

Table 7: Post Cervical ROM: Lateral Flexion value in IASTM &MET Group

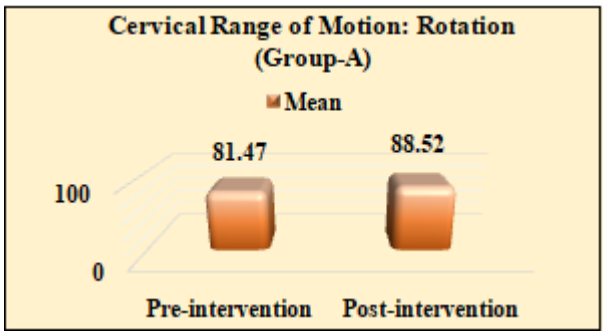
Cervical Range of Motion: Lateral Flexion	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention (Group A)	43.33	±1.79	0.392	3.627	0.002
Post-intervention (Group B)	41.42	±2.15	0.470		



Graph 8: Post Cervical ROM: Lateral Flexion value in IASTM & MET Group

Table 8: Pre-Post Cervical ROM: Rotation measurement of IASTM Group

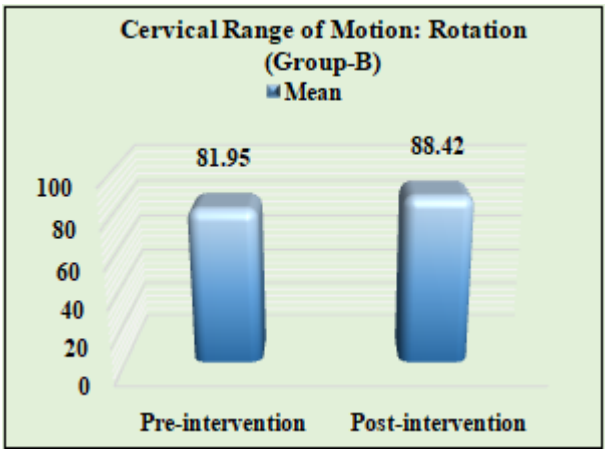
Cervical Range of Motion: Rotation	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	81.47	±1.28	0.281	24.43	<0.001
Post-intervention	88.52	±1.32	0.289		



Graph 9: Pre-Post Cervical ROM: Rotation measurement of IASTM Group

Table 9: Pre-Post Cervical ROM: Rotation measurement of MET Group

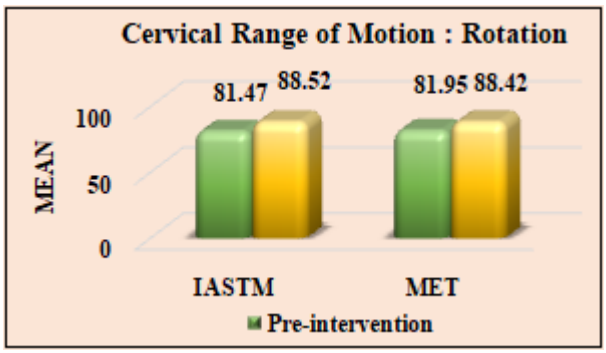
Cervical Range of Motion: Rotation	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	81.95	±1.80	0.393	10.93	<0.001
Post-intervention	88.42	±1.63	0.355		



Graph 10: Pre-Post Cervical ROM: Rotation measurement of MET Group

Table 10: Post Cervical ROM Rotation value in IASTM &MET Group

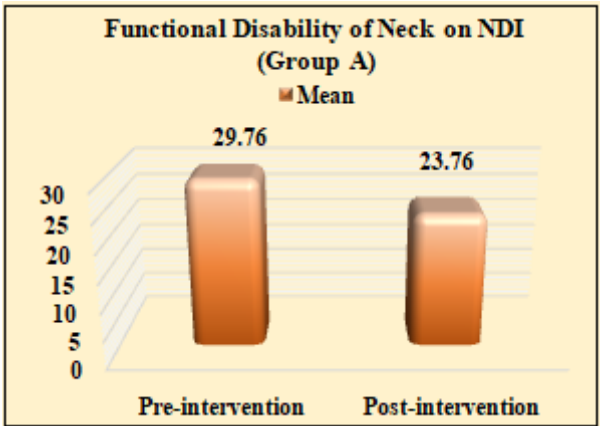
Cervical Range of Motion: Rotation	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention (Group A)	88.52	±1.32	0.289	0.357	0.724
Post-intervention (Group B)	88.42	±1.63	0.355		



Graph 11: Post Cervical ROM: Rotation value in IASTM & MET Group

Table 11: Pre-Post Functional Disability of Neck on NDI of IASTM Group

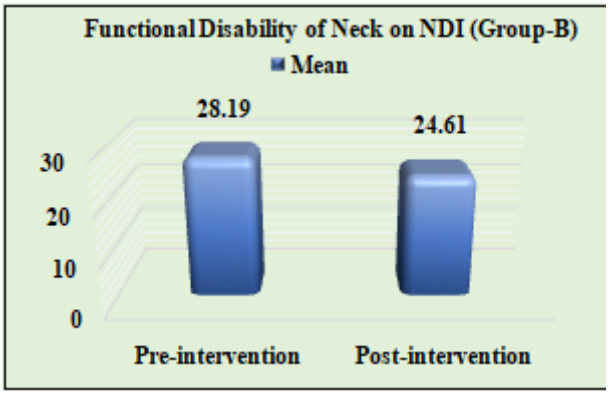
Functional Disability of Neck on NDI	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	29.76	±7.07	1.542	9.544	<0.001
Post-intervention	23.76	±6.96	1.519		



Graph 12: Pre-PostFunctional Disability of Neck on NDI of IASTM Group

Table 12: Pre-PostFunctional Disability of Neck on NDI of MET Group

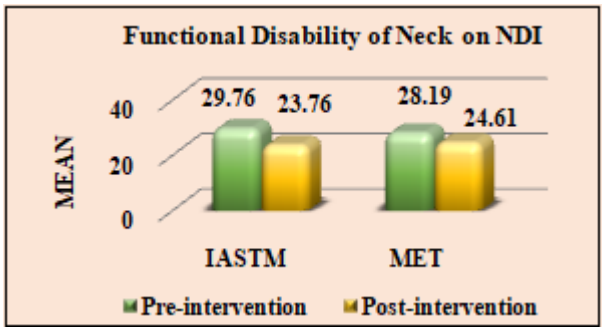
Functional Disability of Neck on NDI	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention	28.19	±4.69	1.02	11.699	<0.001
Post-intervention	24.61	±4.88	1.06		



Graph 13: Pre-PostFunctional Disability of Neck on NDI of MET Group

Table 13: Post Functional Disability of neck on NDI value in IASTM &MET

Functional Disability of neck on NDI	Mean	Standard Deviation	Standard Error Mean	t-value	P-value
Pre-intervention (Group A)	23.76	±6.96	1.51	0.522	0.607
Post-intervention (Group B)	24.61	±4.88	1.06		



Graph 14: Post Functional Disability of neck on NDI value inIASTM &MET

5. Discussion

In the present study 42 patients among which 17 male and 25 females were included. All the patients were randomly allocated in two groups in a ratio of 1:1, among IASTM group (Group-A) or Post Isometric Relaxation of MET group (Group-B). There were 21 patients in Group-A and 21 patients in Group-B. The demographic characteristic of the sample recruited for this study had a mean age was 27.66±5.47 years in Group-A (IASTM) and 26.09±5.53 years in Group-B (MET).

The main finding of the present study showed that both the groups showed post intervention improvement in pain, flexibility and function. While comparing Group-A (IASTM) with Group-B (MET), IASTM showed significantly more improvement in pain and flexibility as compared to the MET. However, comparing the difference in NDI score in Group-A and Group-B, it showed that the result was not found to be statistically 5% of significance.

Significant improvement of pain in Group-A is supported by Some theories that suggest IASTM works on pain by gate control theory. The gate control theory proposes that the perception of pain decreases when constant non-painful stimulus is applied to an area. This non-painful stimulus is often presented in the form of pressure. The non-painful stimulus "closes the gate" to painful stimulus resulting in decreased perception of the painful stimulus. With IASTM, more mechanical stress is applied to the body when compared to the use of bare hands. The increased neural activity may lead to a decreased perception of pain (Ge, Roth, and Sansone, 2016).[46]

Soumik Basu et al 2020 suggested that IASTM brings about a local minor trauma to soft tissue, which causes haemorrhagic changes in the capillaries and thus stimulates the body's inflammation process. This inflammatory process restarts the healing process by increasing the supply of blood, nutrients, and fibroblasts to the area, thus enhancing collagen formation, deposition, and maturation. [6]

Bulbuli et al (2020), tested the effect of M2T blade in subjects with heel pain. They found reduction in pain and increased activity level at the end of the treatment. They also explained that M2T blade can be used to soften tight fascia by applying rhythmic strokes over the fascia till the adhesions and cross-linkages are broken and the release of the fascia occurs.[15]

Varun Naik et al (2017) compared the effect of M2T blade and kinesiotape in treating shoulder pain subjects. At the end of the study, they concluded that both of the interventions reduced pain with M2T blade being more effective among the two. They stated that applying M2T lead to stretch of the restricted fascia. This lead to removal of compression on pain nerve fibres and increased joint mobility.[47]

A study conducted by Basavaraj Motimath et al (2017) evaluated the immediate effects of IASTM with M2T blade technique in treatment of trapezitis pain. In his study patients had shown significant improvement in trapezitis pain reduction. M2T Blade works on the principle of Myofascial Release. As in myofascial release a stretch was applied on the tight fascia which is maintained for 90-120 seconds thus lengthening the tight fascia. Similarly, IASTM also causes a stretch of the tight fascia till the adhesion were broken leading to release of fascia. They used the blade on the tight fascia till the adhesions were broken and the fascia softened. Due to this fascia tightness around the shoulder joint was reduced, the pain sensitive structures (blood vessels and nerves) were alleviated, and the length of the fascia was restored. This reduced the pain and increased the range of motion at the joint. IASTM causes petechiae which is controlled microtrauma to the tissue, thus increasing the blood flow to the area. Thus, they prove that using IASTM on tight fascia reduces the fascia tightness, reduces pain and increases the range of motion.[13,48]

A study done by Neeti Mishra et al 2018 said that mechanism for the reduction in pain in the MET group can be attributed to the hypoalgesia effects. This can be explained by the inhibitory Golgi tendon reflex activated during the isometric contraction. This lead to reflex relaxation of the muscle which in turn lead to reduction of pain.[14]

According to Nawal M et al (2021) Activation of muscle and joint mechanoreceptors lead to sympatho excitation by somatic efferent and caused localized activation of periaqueductal grey matter that played a role in descending modulation of pain.[49]

Regardless of the treatment protocol, both the IASTM and MET group demonstrated significant decrease in pain overtime from baseline to the completion of study. However, Group-A showed more reduction in pain when compared to Group-B.

In the present study Group-A (IASTM) showed more reduction in NPRS score in comparison with Group-B (MET). This result was supported by Motimath et al. who had found immediate pain relief in subjects with upper trapezitis. He explained the reason for immediate pain reduction was obtained due to regional inflammatory process and increase in the release of fibroblast. The fibroblast migration increases collagen synthesis and tissues regeneration that speeds up the healing process. Apart from this, the study also emphasized that IASTM process increases tissue temperature and blood flow due to friction offered by the tool movement. The raised level of temperature vasodilates the small capillaries. It enhanced tissue oxygenation and helped in removal of local waste metabolites and of “p” substance. Thus, IASTM showed more reduction in NPRS compared with MET. [15]

According to Mohamed N.H. et al (2020) the improvements in Range of motion with IASTM could be explained through loosening and removal of scar tissues and adhesions secondary to skin scraping which decreased soft tissue consistency and improved range of motion. It also induced vasodilation response and microvascular haemorrhage which provided oxygen, nutrients, removed metabolic end products and inflammatory mediators which improved pain level and pain pressure threshold. Fibroblastic activity and its proliferative invasion were boosted leading to better collagen deposition.[50]

Two more factors that have to be considered for improving ROM: Firstly, increase in the length of sarcomere. Secondly, increase in the blood flow to trigger points. Both of the changes took place due to the dragging procedure of the IASTM and the creation of micro trauma. This lead to localised vasodilation and started the healing of the soft tissue which leads to decrease in pain and improvement of ROM.[6]

A Review done by Nawal M et al (2021) the effects of MET for increase in ROM post intervention can be explained on the basis of reflex muscle relaxation following contraction that has been proposed to occur by activation of the Golgi tendon organs and their inhibitory influence on the α-motor neuron pool.[49]

A Review done by Ujwal L Yeole et al (2017) suggested that Muscle Energy Technique has its effects over the stretch receptors called as Golgi tendons and spindles which react to overstretch of the muscle and inhibit further muscle contraction. When GTO is triggered, afferent nerve impulses enter spinal cord dorsal root and reach inhibitory motor neuron which stopped impulses discharge from efferent motor neuron. This prevented muscle contraction causing lengthening and relaxation of agonist. They also reacted to the movements of body and this may have led to the relaxing effect over the muscle. When muscle gets shorten, the discharge through spindle decreases and it relaxes the muscle. MET may be effective due to production of viscoelastic change and passive extensibility of muscle.

In this study Group-A showed more improvement in Cervical Range of Motion: Lateral Flexion as compared to the Group-B.[5]

Range of motion, pain, and functional disability has a symptomatic relationship. This relationship is demonstrated by pain which may be caused by a lack of range of motion which in turn may be caused by pain perception. In both treatment groups, IASTM and MET, pain and tightness are reduced, flexibility was improved. Thus, leading to reduction in functional disability and improvement of quality of life and NDI.

The findings of the present study are in agreement with Zeinab Ahmadpour et al (2021), suggested that Dry Needling and Soft Tissue Mobilization with IASTM may have similar effects on of the upper Trapezius muscle. It included

reduction of the pain intensity (measured with NPRS), increase in the ROM of cervical lateral flexion, and decrease in the Neck Disability Index (NDI). Although IASTM was more effective in increasing cervical lateral flexion in these patients. IASTM is a unique method that, based on the available evidence, enables therapists to effectively and efficiently identify and treat soft-tissue injuries and musculofascial tissue involvements. When combined with proper exercises, this method can result in painless restoration of muscle ROM and function. It also affects the soft tissue by creating a controlled microtrauma, which some studies suggest will improve the tissue repair by stimulating the fibroblast proliferation. There was clinical evidence which supported the hypothesis that IASTM increases the mobility of musculofascial tissue and reduces the effects of local ischemia by increasing blood flow to the vessels.[19]

The effect of IASTM on pain reduction of a weightlifter with subacromial pain syndromehas been examined (Coviello et al., 2017). Patients with subacromial pain syndrome often have posterior glenohumeral joint capsule tightness and abnormal scapular kinematics. An imbalance in musculature often results in decreased upward rotation and posterior tilt of the scapula. The use of IASTM may not only decrease tightness in the joint capsule but may also aid in pain reduction. The treatment was applied to the patient's pectoral muscles and brachium with a gradual increase in pressure. Pain free active shoulder flexion was achieved post-treatment. This study suggested pain was decreased due to a reduction in soft-tissue adhesions limiting movement unlike the previous hypothesis of activation of the gate control theory. [51]

The study result is supported by Aneri Jhaveri et al (2018) improvement in NDI score in Trapezitis suggested that MET had showed more effect than MFR in reducing pain, cervical disability and improving cervical range of motion in patients with upper Trapezitis. This was due to the stretching effect on muscle and stimulation of nociceptive endings connected to A-delta fibres. Stretching exercise can also relax the spasmed muscle. Also stretching exercise worked on viscoelastic properties of muscle fibers and induces relaxation. On applying constant external load slowly on shortened muscle leads to deformation and increasing flexibility of the target muscle.[12]

The results of the Post Isometric Relaxation group came in agreement with Gupta et al (2015) who evaluated the efficacy of Post Isometric Relaxation (PIR) in patients with non–specific neck pain. They concluded that PIR may be more effective in decreasing pain and disability and increasing cervical range of motion in patients with non–specific neck pain. The results of this study showed that the use of post-isometric technique was more superior than that of the static stretching because of Post Isometric Relaxation. PIR modifies stretch perception and nociceptive nerve endings in the joint and muscle. It also plays an important role via neurotransmitter modulation or gate control. Repetitive light muscle contractions increase venous, lymphatic drainage and relieve paraspinal congestion.[33]

According to M. Srikanth (2015) Perceived pain showed a statistically significant and cervical ROM showed a consistent rise on the subject who were treated using MET. This was an apparent indication for pain relief caused in the management of myofascial trigger point treatment. Efficiency and ease of administration of this technique ensures its frequent usage by clinical practitioners. They concluded that MET can be used as an effective treatment regimen in the management of myofascial trigger points thereby reducing disability caused due to musculoskeletal pathology. Post Isometric Relaxation refers to the subsequent reduction in the tone of the agonist muscle after isometric contraction. This occurs due to stimulation stretch receptors called Golgi tendon organs which are located in the tendon of the agonist muscle. Strong muscle contraction against equal counter force triggers the Golgi tendon organ. The afferent nerve impulse from the Golgi tendon organ enters the dorsal root of the spinal cord and meets with an inhibitory motor neuron. This stops the discharge of the efferent motor neurons impulses and therefore prevents further contraction; the muscle tone decreases. Reciprocal inhibition of the agonist. This happens due to stretch receptors within the agonist muscle fibers, muscle spindles. In response to being stretched, muscle spindles discharge nerve impulses, which increase contraction, thus preventing over-stretching. The spindles discharge impulses which excite the afferent nerve fibers or the agonist muscle; they meet within excitatory motor neuron of the agonist muscle (in the spinal cord) and at the same time inhibit the motor neuron of the antagonist muscle which prevents it from contracting. This results in the relaxation of the antagonist.[2]

Regardless of the treatment protocol, both the IASTM and MET group demonstrated significant decrees over time for functional disability of neck from baseline to the completion of study.

According to James Joseph IASTM shown immediate effect on reducing pain, improved ROM, decrease disability, improve function and patients satisfaction level with improvement in quality of life that's why Group-A showed more reduction in functional disability of neck when compared to Group-B.[29]

In this study patients were also educated proper posture & ergonomic advice to improve patients' functional status and quality of life which leads to improved NDI.

Apart from IASTM and MET patients were also educated posture correction that may education regarding reduced the pain and improve flexibility component due to breaking of monotonous repeated abnormal& habit which may help in restoring cervical joint biomechanics and muscle function.

6. Conclusion

The integrated use Instrument-Assisted Soft Tissue Mobilization (IASTM) & Post isometric relaxation of Muscle Energy Technique (MET) with the Conventional Physiotherapy is effective in the rehabilitation to reduce pain, improve Cervical Range of Motion (lateral flexion and rotation) &reduce functional disability in Upper Trapezitis patients. Moreover, IASTM obtained better results when compared with MET.

7. Limitations

- During this study we found that pain intensity was reduced earlier through IASTM. The limitation of this study was post intervention data had only taken at end of 2 weeks(after 6 Sessions) instead of taken in between treatment duration to see better efficacy of IASTM or MET for pain relief.
- The sample size of the present study (n= 42) was too small so couldn't be generalized to the whole population of Upper trapezitis.
- Gender distribution between both the groups was not equal.
- No long-term follow-up was taken.

8. Future Study

- Large sample size can be taken for future studies.
- Homogenous sample with age and gender distribution can be taken for future studies.
- Long term treatment protocol for IASTM and MET group can be taken.
- Follow-up taken after every week.
- Same study will perform to see the immediate effect of IASTM compared with MET in upper trapezitis.

9. Clinical Implications

By implicating IASTM and MET in clinical practice as per this study result both are significantly effective for reduction in Pain, Disability and improved cervical ROM in trapezitis but IASTM can better improves Pain, flexibility and Disability within the short duration compared to MET.

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