



IMMEDIATE EFFECT OF INTEGRATED NEUROMUSCULAR INHIBITION TECHNIQUE VERSUS INTEGRATED NEUROMUSCULAR INHIBITION TECHNIQUE WITH SURGED FARADIC CURRENT ON PAIN & RANGE OF MOTION AMONG PATIENT WITH UPPER TRAPEZIUS MYOFACIAL TRIGGER POINT -A COMPARATIVE STUDY

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Abstract:

BACKGROUND- A trigger point is a hyper irritable spot in a skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band. Upper trapezius muscle is designed as postural muscle and it is highly susceptible to overuse. The spot is painful and can give rise to characteristic referred pain, referred tenderness, motor dysfunction and autonomic phenomena.⁹

METHODOLOGY- A comparative study was conducted on 70 patients with trigger points in trapezius muscle female. Subjects were screened according to inclusion & exclusion criteria. They were divided into 2 groups using simple random sampling lottery method. The selected subjects were evaluated for pain using NPRS & contralateral cervical Range Of Motion. Group A received INIT & group B were received INIT with SF. A pre –post Statistical analysis were carried out using paired t test for intragroup comparison & unpaired t test for intergroup comparison..

RESULT- On intragroup comparison using paired t test for INIT the pre intervention mean of NPRS, Contralateral cervical side flexion was 6.686 ± 0.93 , 30.2 ± 4.19 respectively. Obtained p-value after intervention is < 0.0001 which implies there is significance difference between pre- post comparison. On intragroup comparison using paired t test for INIT with surged faradic current the pre intervention mean of NPRS, Contralateral cervical side flexion was 6.85 ± 0.87 , 14 ± 4.4 respectively. Obtained p-value after intervention is < 0.0001 which implies there is significance difference between pre- post comparison.

CONCLUSION- INIT&SF was more effective in decreasing pain. But there is no significant difference between INIT & INIT with SF for increasing cervical side flexion range of motion.

Keywords: [INIT, Myofascial trigger point, NPRS,]

I. INTRODUCTION

Neck pain as a clinical syndrome is common and can be seen in both the presence and the absence of history of trauma and or positive radiographic findings. The cervical spine is the smallest region of the spine, and so are the muscles of this region. Mechanical neck pain has a lifetime incidence of 30-50% in general world population.¹ People have a 70% likelihood of developing neck pain during their lives; thus, neck pain is an important issue affecting economic productivity in modern society. A common cause of neck pain is a mechanical dysfunction, which causes abnormal joint movement.² Mechanical neck pain affects 45-54% of

general population after carrying sitting posture for prolong period of time which may sometimes leads to conditions like trapezitis.³ The exact pathology of mechanical neck pain is not clearly understood. Different authors often assume that mechanical neck pain is associated with muscular, joint and neural impairment. Although, the aetiology of TrP development is currently unknown, recent studies have hypothesized that the pathogenesis results from the overloading and injury of muscle tissue, leading to involuntary shortening of localized fibers.⁷ Fernandez-de-las-penas et al, found a relationship between the presence of muscle trigger points in upper fibres of trapezius muscle and the presence of cervical impairment.⁸ A trigger point is a hyper irritable spot in a skeletal muscle that is associated with a hypersensitive palpable nodule in a taut band. The spot is painful and can give rise to characteristic referred pain, referred tenderness, motor dysfunction and autonomic phenomena.⁹

Chaitow feels that the combination of Muscle Energy Technique, ischemic compression and Strain Counter strain produces the most effective, targeted approach to Trigger Point release. This method is termed as the integrated neuromuscular inhibition technique (INIT).¹⁰Chaitow has suggested that the benefit of the technique lies in its multifaceted approach. The INIT approach allows for delivery of the techniques in a single coordinated manner.¹¹ Upper trapezius muscle is designed as postural muscle and it is highly susceptible to overuse. The pain is present even during rest and is aggravated by activity; it may be referred to other area from the site of primary degenerative. Passive range of motion may be restricted due to pain and protective spasm in antagonist groups of muscle recent studies hypothecated that the trapezitis pathogenesis result from the over loading and injury of muscle tissue leading and injury of muscle tissue leading to involuntary shortening of localized muscle fiber. The area stressed soft tissue receive less oxygen, glucose hence subsequently accumulates high level of metabolic waste product the end result of this event is the development of trigger point.¹²Strong Surged Faradic (SSF) Stimulation is a type of therapeutic electrical stimulation resulting in reduction of pain with improving joint range and mobility. Effect of Surged Faradic current: surge faradic current help in decrease in pain intensity and increase in range of motion. When a muscle contracts as a result of electrical stimulation, there is increased metabolism along with an increased demand for oxygen and foodstuffs also with a rise in the output production of metabolites. The metabolites lead to capillary and arteriolar dilatation causing a considerable increased blood flow to the muscle. This leads to removal of chemicals (metabolites)¹³

MATERIALS & METHODS

Materials

- Electrical muscle stimulator machine
- Electrodes
- Cotton
- Micropore
- Towel
- Universal Goniometer

Study design: Comparative study.

Study setting: Physiotherapy OPD, SMBT College of Physiotherapy, Nashik

Study population: Individual with trapezitis

Sampling technique: Simple Random sampling using lottery method

Sample size: 70

Minimum sample size (N)- To test equality of two population means

$$n = \frac{2 S^2 (Z_1 + Z_2)^2}{(M_1 - M_2)^2}$$

Study duration: 6 months

Inclusion criteria:

- Individual with trigger points in upper trapezius muscle
- Individual having pain for about 3weeks up to 3 months
- Having no specific pathology involved
- Age: 18-30 years

- Gender: Male and Female both.
- Pain intensity on NPRS between 2 to 6
- Individual who were willing to take part in study.

Exclusion criteria:

- Individual with any neurological problems related to cervical spine.
- Patients with trauma and surgery around neck and shoulder in past
- Patients with H/o of Hypersensitivity
- Cervical myelopathy, congenital anomalies like torticollis etc.
- Motor weakness of upper limb and fibromyalgia.

Outcome Measure

- NPRS (Numerical pain rating scale).
- Cervical contralateral side flexion (i.e., side flexion opposite to the side of involved muscle). ROM which was taken by universal goniometer

PROCEDURE: To conduct the following study, approval was taken from institutional ethical committee (IEC). Subjects were taken according to the inclusion and exclusion criteria. Prior to starting the study, the procedure was explained and informed written consent forms were taken from the subjects. Pre-measurement of all outcome measures were taken then patient were randomly divided in to either of the two groups using lottery method – Group A participants were received- INIT and Group B were received – INIT and surged faradic current. Pre- post analysis was conducted using paired & unpaired t test.

Group-A Intervention -Integrated Neuromuscular Inhibition Technique. INIT comprises of sequential application of three techniques – ischemic compression, Strain counter strain (SCS) technique and muscle energy technique (MET). As the primary focus of the INIT approach is to deactivate specific TrPs, the practitioners first identified the TrPs to be treated within the upper trapezius muscle. The patient was placed in supine to reduce tension in the upper trapezius muscle. Their arm was positioned in slight shoulder abduction with the elbow bent and their hand resting on their stomach. Using a pincer grasp, the practitioner moved throughout the fibers of the upper trapezius and made note of any active TrPs. Once the TrPs were identified treatment began. The first technique applied was:

Ischemic Compression -The therapist again utilized a pincer grasp, placing the thumb and index finger over the active TrPs. Slow, increasing levels of pressure were applied until the tissue resistance barrier was identified. Pressure was maintained until a release of the tissue barrier was felt. At that time, pressure was again applied until a new barrier was felt. This process was repeated until tension/tenderness was unable to be identified or 90 s had elapsed, whichever came first. All identified TrPs were treated. IC was applied in which firm pressure is applied to the trigger point, but not sustained. Rather an on-and-off pressure application is suggested, 30 seconds of pressure, 2-3 seconds release, followed by a further 30 seconds of pressure, 2-3 seconds release and then again 30 second of pressure, repeated until a perceptible change is palpated, or the individual reports a change in the reported pain sensation. After ischemic compression, SCS is applied.

Strain Counterstrain Technique:

Patients in supine position and pressure was applied at painful spot then arm was moved in to abduction to achieve the position of comfort or ease in such a way that pain is relived or reduced from the palpated point. This position was maintained for about 90 seconds (3 sets). After which isometric contraction of the muscle was elicited in the form of MET.

Muscle energy technique-Patients received treatment as per Lewit's post-isometric relaxation approach. The subjects were placed supine and the practitioner stabilized the shoulder on the affected side with one hand, while the ear/mastoid area of the affected side was held by the opposite hand. The head and neck were then side bent towards the contralateral side, flexed, and rotated ipsilaterally, placing the subject just short of their upper trapezius restriction barrier. The subjects then shrugged the involved/stabilized shoulder towards the ear at a submaximal, pain-free, effort (20% of their available strength). The isometric effort was held for 7–10 s while a normal breathing rhythm was maintained. During the relaxation phase, the head and neck were eased into increasing degrees of side bending, flexion and rotation to advance the stretch placed on the muscle. Each stretch was held for 30 s, and this was repeated for three to five repetitions per session.

Group-B Intervention**Patient position**

Patient in supine position.

Instruction

The patient was comfortably seated with arm support. Patient was asked to keep the part to be treated still and relaxed and to report any increase pain or other sensation immediately.

Preparation of treatment part

The area was cleaned.

Frequency: 50 Hz

Mode: Surged Faradic

PULSE DURATION: 0.1 – 1 microsecond.

Duration: 10 Minutes.

IV. RESULTS AND DISCUSSION

The entire data of the study was entered and cleaned in MS Excel before it was statistically analyzed in “GraphPad In stat version 3.10”. All the results are shown in tabular as well as graphical format to visualize the statistically significant difference more clearly. The data on quantitative characteristics was presented as Mean \pm Standard Deviation (SD) across study group. The statistical significance of difference of pre-treatment and post-treatment quantitative characteristics in study group (intra-group comparisons) was tested using paired’ test, after confirming the underlying normality assumption of pre- and post-treatment difference of parameters. Unpaired “t” test was performed for post- treatment difference of (inter-group comparison) The p-values less than 0.0001 are statistically significant. All hypothesis was formulated using two tailed alternatives against null hypothesis (hypothesis of no difference). The entire data was analyzed statistically using “GraphPad In stat version 3.10” for MS Windows.

Table 1) The Age Wise Distribution Of Group A Patients

Age In Years	No. Of Patients (n=35)
18-19	7
20-21	12
22-23	14
24-25	2

Table 2) The Age Wise Distribution Of Group B Patients

Age In Years	No. Of Patients (N=35)
18-19	16
20-21	17
22-23	2
24-25	0

Table 3) Intra-group comparison of NPRS mean and SD between pre-treatment & post- treatment for INIT

Parameter	NPRS	Mean	SD	t- value	p-value	significance
NPRS	Pre - NPRS	6.686	0.932 2	22.518	< 0.0001	Extremely Significant
	Post NPRS	3.8	0.867 7			

Table 4) Intra-group comparison of Contra-lateral Cervical Side Flexion mean and SD between pre-treatment & post- treatment for INIT

Cervical Contralateral Slide Flexion	Mean	SD	t-value	p-value	Significance
Pre-CLSF	30.286	4.191	20.806	<0.0001	extremely significant
Post-CLSF	44	3.985			

Table 5) Intra-group comparison of NPRS mean and SD between pre-treatment & post- treatment for INIT+SF

NPRS	Mean	SD	t-value	p-value	Significance
PRE-NPRS	6.857	0.8793	21.798	<0.0001	extremely significant
POST-NPRS	3.829	0.6636			

Table 6) Intra-group comparison of Contra-lateral Cervical Side Flexion mean and SD between pre-treatment & post- treatment for INIT +SF

CONTRALATERAL SIDE FLEXION	MEAN	SD	t-value	p-value	significance
PRE- CLSF	29.143	4.453	24.569	<0.0001	extremely significant
POST-CLSF	43.714	4.064			

Table 7) Inter-group comparison of mean and sd between post-treatment & post- treatment for (NPRS)

NPRS	Mean	SD	t-value	p-value	Significance
Group A	3.8	0.6677	0.1547	0.8775	Not significant
Group B	3.6	0.6636			

Table 8) Inter-group comparison of mean and sd between post-treatment & post- treatment for Contra-lateral Cervical Side Flexion

NPRS	Mean	SD	t-value	p-value	Significance
Group A	44	3.985	0.2962	0.768	Not significant
Group B	43.7	4.084			

DISCUSSION

Group-1

Total 35 subjects were included in the study from age 18-30 of which 19 subjects were between 18-21 years, 2 subjects were between 22-30 years from which 11 were male and 24 were female according to the inclusion and exclusion criteria. For INIT(NPRS) pre-intervention mean for NPRS was 6.686 ± 0.93 and post-intervention mean for NPRS was 3.800 ± 0.86 (p -value<0.001). NDI pre-intervention mean for NDI was 14 ± 4.2 and post-intervention mean for NDI was 7.571 ± 2.6 (p -value<0.001). CLSF pre-intervention mean for CLSF was 30.286 ± 4.1 and post-intervention mean for CLSF was 44 ± 3.9 (p -value<0.001). which implies there is significant decrease in pain and significant increase in lateral cervical flexion using integrated neuromuscular inhibition technique on pain and lateral cervical flexion in patient with subacute trapezititis

Group-2

Total 35 subjects were included in the study from age 18-30 of which 33 subjects were between 18-21 years, 2 subjects were between 22-30 years from which 13 were male and 22 were female according to the inclusion and exclusion criteria. For INIT& SURGED FARADIC CURRENT(NPRS) pre-intervention mean for NPRS was 6.857 ± 0.87 and post-intervention mean for NPRS was 3.829 ± 0.66 (p -value<0.001). NDI pre-intervention mean for NDI was 13.2 ± 4.09 and post-intervention mean for NDI was 7 ± 2.3 (p -value<0.001). CLSF pre-intervention mean for CLSF was 29.143 ± 4.45 and post-intervention mean for CLSF was 43.7 ± 3.5 (p -value<0.001). which implies there is significant decrease in pain and significant increase in lateral cervical flexion using integrated neuromuscular inhibition technique on pain and lateral cervical flexion in patient with subacute trapezititis. On intergroup comparison using unpaired t test INIT&SF was more effective in decreasing

pain. But there is no significant difference between INIT & INIT with SF for increasing cervical side flexion range of motion.

Repetitive motions and the use of smart phones and tablets in abnormal head postures can stress the head, neck, and shoulder areas. Additionally, abnormal head posture can cause mechanical dysfunction of the cervical joint, which can lead to pain, fibrosis of soft tissue, adaptive shortening, loss of flexibility, and mechanical deformation reflecting the condition of hypomobility, where there is no movement inside the normal joint capsule.

The present study was carried to compare the effectiveness of INIT along with INIT with surged faradic current to reduce pain and increase lateral cervical flexion range in patient with subacute trapezitis. Initially 35 subjects met the inclusion criteria were recruited into the study on which INIT had been performed and then another group of 35 subjects met the inclusion criteria were recruited into the study on which INIT with surged faradic current had been performed.

The results of this study shows that subjects in experimental group who received INIT along with INIT with surged faradic current there was a significant reduction in pain by a mean change of NPRS, NDI, cervical contralateral side flexion range. INIT and INIT along with surged faradic Current also reduced the participant's neck disability. Our study Agree with the previously published trials indicating the effect of INIT. Study conducted by Mrs. B. Jyothirmai (2015) the effect of INIT on upper trapezius trigger points in subjects with non-specific neck pain on 30 subjects in which Group A comprised of 15 subjects and was treated with integrated neuromuscular technique who received INIT had reduced their pain levels by VAS.

Chaitow, 2001; Farina et al, 2004 integrated neuromuscular inhibitory technique (INIT). The effectiveness of INIT was reported in two case series, which showed rapid results. Travell described that the ischemic compression decreases the sensitivity of pain nodules in the muscles and Simons proposed that the that the local pressure may equalize the length of the sarcomere in the involved muscle and decrease the pain.

The IC therapy with quantified pressure and duration found that it provided immediate pain relief and reduced the MTrP sensitivity of the cervical myofascial pain. Our results are also in agreement with previously published trial, which proved to have significantly greater improvement in VAS score in favor of the INIT group at the 4-week follow-up points. They have compared the effects of two manual treatment regimens (MET and INIT) on individuals with upper trapezius trigger points.

Electrical currents help in reducing the pain by assisting in the process of healing or by altering the transmission and perception of pain. Electrical currents lessen the degree of muscle spasm by reducing the sensitivity of the muscle spindle system which eliminates the mechanical and chemical events stimulating transmission of pain. With the relief in muscle spasm, the ROM

In addition, SCS has been proposed as a mechanism of facilitating unopposed arterial filling which allows for the reduction of tone in muscle and decrease pain. Positional release technique helps in reducing tender point in the affected muscle by the mechanism of automatic resetting of the muscle spindles. The shortened position of the muscle is a nonthreatening position for a muscle in spasm and reduced pain

The MET technique showed significant results in treatment of trapezius muscle spasm. In the present study addition of surged faradic current approach proved to be effective in improving all the three outcomes, these results again agree with the previous research in this area as reports have indicated the benefit of such approach in reducing pain and significantly improving the functional status. In MET, the sequence of muscle and joint mechanoreceptor activation evoked firing of local somatic efferent. This in turn led to sympathy excitation and activation of the periaqueductal gray matter, which resulted in the activation of descending modulation of pain

CONCLUSION

In patients with trapezius myofascial trigger point both, Integrated neuromuscular inhibition technique approach (INIT) and Integrated neuromuscular inhibition technique with surged faradic current to the treatment of TrPs (trigger points) has proven to be more beneficial in relieving pain, reducing stiffness, improving functional ability, and increasing cervical contralateral flexion. INIT&SF was more effective in decreasing pain. But there is no significant difference between INIT & INIT with SF for increasing cervical side flexion range of motion

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