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COMPARE THE EFFECTS OF TWO MANUAL TREATMENT REGIMENS ON INDIVIDUALS WITH UPPER TRAPEZIUS TRIGGER POINTS

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Abstract

Background: Myofascial pain syndrome is a chronic disorder in one or more muscle group and it is related with active myofascial trigger points. Myofascial pain syndrome begins from active trigger points at muscle and fascia with symptoms including pain, tenderness, spasm, decrease ROM, weakness and some autonomic problems related to that area. Common muscle affected includes upper fibers of trapezius muscle due to repetitive micro trauma and constant burden due to its antigravity action. Objective: To compare the effect of sustain pressure and Integrated Neuromuscular Inhibition Technique on individuals with upper trapezius TrPs. Methods: The Study Design was Randomized control trial. According to inclusive criteria 26 patients were randomly allocated by sealed envelope method in experimental and control group. Patients were assessed at baseline and 4th day of session on NPRS, NDI questionnaire and ranges were taken by Goniometer and pressure threshold by Algometer. There was 3 drop out and the reason was loss of follow up. Hot pack was applied to both groups for 10mints before session. Sustain pressure was given for 3sec hold and 2sec release till pain decreases in control group. While, in experimental group INIT was used. Sustain pressure was applied on MTrPs for 3sec hold and 2sec release till pain decreases, Post isometric relaxation (MET) was given with 6-10 sec hold and repeat 4 times and at last SCS was given to hold muscle in shortest position for 90sec or pain reduced to 3 out of 10. At last cervical stretches were given and home plan was guided. Results: Between groups the P-value was < 0.01 in terms of pain, NPRS, NDI and range of motion. The pain threshold also showed significant result (<0.01) at right and left side TrP1.While results were non-significant (>0.01) for right and left upper trapezius TrP2. Conclusion: It was concluded that INIT showed better result than Sustain pressure in management of upper trapezius trigger points in terms of pain, neck disability, pressure threshold and ROM.

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INTRODUCTION

Neck pain is a common musculoskeletal complaint that significantly limits daily activities, with a lifetime activity limitation prevalence of approximately 23%.{Chiarotto, 2016 #1} Among the various causes, myofascial trigger points (MTrPs) are frequently implicated, with some clinical reports indicating a prevalence as high as 85% in patients visiting pain management centers. Cervical spine clinics have noted that 55% of their patients present with myofascial pain, and around 30% of these patients have active trigger points, particularly in the upper trapezius region.[1]

Myofascial pain syndrome is more commonly observed in females and individuals with a sedentary lifestyle, typically affecting those between the ages of 27.5 and 50 years

. Despite its high prevalence, MTrPs are often underdiagnosed or inadequately managed due to limited awareness and clinical training in effective manual therapy interventions. The upper trapezius muscle, due to its postural role and stress-bearing capacity, is frequently affected by

There is very less information about creation of trigger points. Some theories are developed to understand the creation and appearance of trigger points but very less have good evidence. [2-4]

Pain is conducted through thin myelinated A delta and unmyelinated C fibers, they can be activated by any painful stimulus and produces pain.

Integrated trigger point hypothesis:

It is more recent hypothesis. By over excitation of motor end plates and sarcomeres changes start at cellular level. It causes inflammation of sarcomeres, depletion of oxygen, less amount of nutrients abnormal shortening of muscle fibers and large demand for oxygen on local tissues. Electrophysiological studies suggest that this is due to motor endplates not muscle spindles. [5] Chan Gunn, MD discovered individuals who had electromyography, there symptoms were reduced and EMG result was negative. So Chan concluded that pain due to nerve root irritation disturbs the function of peripheral nervous system called neuropathic pain. It explains problem directly on nerve root causing local or referred neurovascular signals and formation of MTrPs. When there is spinal segment changes cause pressure on peripheral nerves and there denervated structures cause super sensitivity (Cannon's Law). It results in decrease in length of muscle thus, creates pressure on body and related nerves. [6, 7]

Trigger points in upper trapezius:

Referred pain pattern and location of central trigger point 1 in the middle of vertical fibers of upper part of trap muscle. The central trigger point 2 in the middle of the horizontal fibers of the upper part of the trapezius. Central point 3 is in lower fibers of trapezius muscle. Trigger point 4 is at the lateral attachment of the lower fibers of trapezius muscle. This painful area is enthesopathy at the end of the tight bands associated with trigger point 3. In middle fibers of trapezius trigger point 5 is found, whereas 6th trigger point is found at the lateral attachment of middle fibers. The trigger point 7 is also in middle fibers .[8]

Literature shows that there are many important ways to return the muscle fibers which are damaged by myofascial trigger points in their lengthened form and motor endplates in their normal function. [9]

Integrated neuromuscular inhibition technique:

Myofascial pain is managed better when treatment is applied at the specific point i.e. MTrPs there are many methods used manually for management of trigger points some of them are sustain pressure, MET, positional release technique and INIT. Chaitow combined MET, sustain pressure and strain counter strain for the better management of the trigger points and it is known as integrated neuromuscular inhibition technique and its effect can be obtained by using multidimensional methodology.[1]

Chaitow combined the three techniques muscle energy, sustain pressure and strain counter strain to get the good effective and directed approach to trigger point management. It was named as integrated neuromuscular inhibition technique. Chaitow also said that benefits of this procedure result in multidimensional approach. This technique directly approach in a single coordinated way. There are many studies on the effectiveness of treatment approaches like sustain pressure and strain counter strain in trigger point's management but little evidence about INIT. [10]

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Sustain pressure is most commonly used for the management of trigger points in clinical setups. The purpose of my study to use INIT for the management of trigger points , in this technique we apply sustain pressure along with muscle energy technique post isometric relaxation and Strain counter strain. After the sustain stretch it was necessary to stretch and lengthen the muscles so the reoccurrence of trigger point will be minimize. The strain counter strain normalized the sensory abnormal input to normal input and through this we also minimize the chance of reoccurrence of trigger point.

Methodology:

It was a Randomized control trial. 26 patients diagnosed with upper trapezius trigger points using purposive sampling technique by the seal envelope method are divided into two groups control and experimental group. Experimental group received Integrated Neuromuscular Inhibition Technique (sustain pressure, MET and strain counter strain) on upper trapezius trigger points with conventional treatment whereas control group receive Sustain Pressure with conventional treatment with home plan exercises of both the groups. The sample size of the study was minimum calculated 22 using OpenEpi version 3. Data was collected from 26 patients of upper trapezius trigger points.13 patients are taken in control group with 3 drop out patients and 14 are taken in interventional group with 1 drop out patient. The study was conducted at Pakistan Railway General Hospital Rawalpindi in a duration of 6 months

The patients having upper trapezius trigger points (any) with decreased range of motion (side bending or rotation) including both genders of any age are included in the study.

Non-probability sampling technique is used in this study for the random selection of individuals done with the seal envelops method. The sample is selected and randomly allocated into two groups that are intervention and control group according to inclusive and exclusive criteria. Participants aged 20–50 years with limited side bending or rotation, pain greater than 3 on the NPRS, and at least one active upper trapezius trigger point were included. Participants were excluded if they had radiculopathies, malignancy, infection, a history of trauma, or a positive vertebrobasilar insufficiency (VBI) test.

DATA COLLECTION PROCEDURE:

A total of 26 patients with upper trapezius trigger points were enrolled and treated at the Rehabilitation Department of Railway General Hospital, Rawalpindi. Participants were randomly assigned to experimental and control groups using the sealed envelope method. Assessments were conducted at baseline and on the 4th day using the Numeric Pain Rating Scale, Neck Disability Index, goniometer (for ROM), and algometer (for pressure pain threshold). Three patients dropped out due to loss of follow-up.

Trigger points were identified through flat palpation. Both groups received a 10-minute hot pack before treatment. The control group received sustained pressure (3 sec hold, 2 sec release) until pain reduced. The experimental group received Integrated Neuromuscular Inhibition Technique (INIT), which included sustained pressure, post-isometric relaxation (6–10 sec hold, 4 reps), and strain-counterstrain (90 sec hold or until pain reduced to 3/10). Cervical stretches and a home plan were given to all.

The normality of data was checked by using Shapiro-Wilk test. For normal data parametric test was applied. At baseline and end values between the group Independent T-test was applied whereas for comparison of pre and post values within the groups Paired T-test was applied. For non-normal data distribution non-parametric test was applied. At baseline and end values between the groups Mann-Whitney's test was applied whereas for pre and post values comparison within the groups Wilcoxon test was applied. Data was analyzed by SPSS 21.

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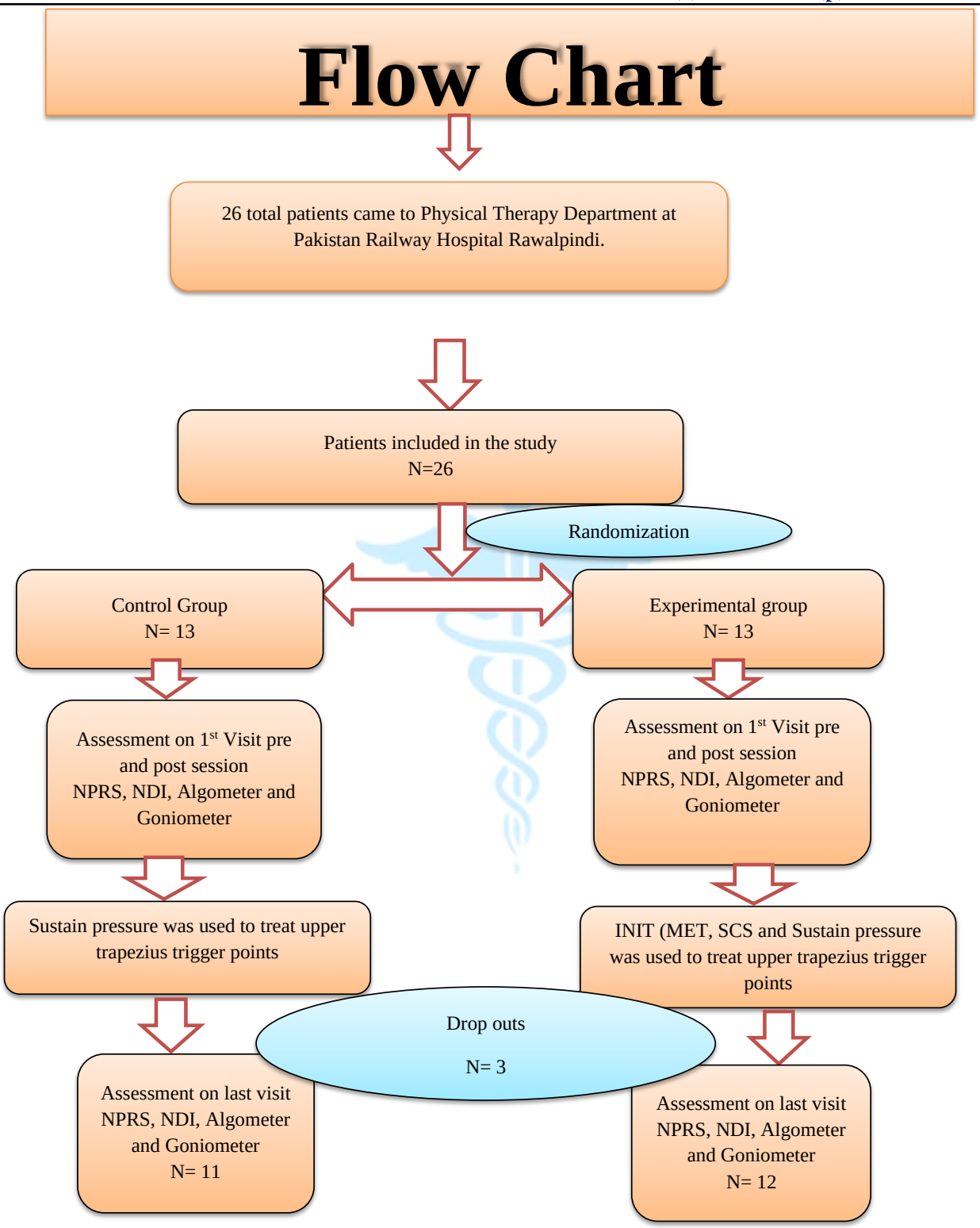

Figure1: Consort Diagram

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Results:

The overall mean age of participants was 32.13 ± 8.02 years, with 31.64 ± 7.67 years in the control group and 32.50 ± 8.72 years in the experimental group. The sample comprised 7 males and 16 females (control: 2 males, 9 females; experimental: 5 males, 7 females). Occupational status revealed that 26.1% were housewives, 17.4% students, and 30.3% engaged in other work.

Clinically, 34.8% of participants reported muscle spasm (control: 36.4%, experimental: 33.3%), 30.4% had neck pain (control: 36.4%, experimental: 25%), and 15% presented with trigger points. Referrals were mainly from orthopedics (43.5%) and self-reports (43.5%). A total of 43.5% had previously sought orthopedic treatment, 13% self-medicated, and 39.1% had not received prior treatment. Prior physical therapy was reported by 39.1% of participants. Over half (52.2%) experienced pain lasting more than one month. The onset of pain was gradual in 47.8%, sudden in 30.4%, and without apparent cause in 21.7%.

Aggravating factors were activity (26.1%), work (17.4%), and other causes (56.5%). Rest alone (39.1%) or rest combined with medications (34.8%) were the main relieving factors. Active trapezius stretch was painful in 78.3% (right) and 47.8% (left). Passive trapezius stretch was painful in 60.9% on the left. Trigger point testing (TT) showed variable results: TT1 was mostly active on the right (60.9%) but absent on the left (43.5%), while TT2 was latent on both sides (39.1%).

At baseline, groups were statistically comparable except for right rotation, which differed significantly ($p = 0.029$).

Within-group analysis showed significant improvements in both groups, though greater in the experimental group. In the experimental group, all cervical ranges of motion improved markedly ($p < 0.001$), along with significant reductions in NPRS (7.17 ± 1.93 to 2.25 ± 0.62; $p < 0.001$) and NDI (44.92 ± 17.84 to 17.92 ± 8.23; $p < 0.001$). The control group also demonstrated improvements but with smaller effect sizes (NPRS reduction: 6.36 ± 1.43 to 4.55 ± 1.21; NDI reduction: 45.64 ± 11.11 to 33.73 ± 10.44; both $p < 0.001$).

Between-group comparisons at the end of treatment revealed significantly greater improvements in the experimental group for right and left side bending ($p = 0.003$ and $p = 0.022$), left rotation ($p = 0.003$), pain (NPRS, $p < 0.001$), and disability (NDI, $p = 0.001$).

Algometer readings showed significant within-group improvements. In the experimental group, all trigger points (except left TP2) demonstrated significant post-intervention changes ($p < 0.05$). In the control group, significant changes were observed in right TP1, right TP2, and left TP2. End-session comparison showed significantly higher pressure pain thresholds in the experimental group for right TP1 ($p = 0.024$) and left TP1 ($p = 0.002$).

Overall, both interventions were effective; however, the experimental group demonstrated superior outcomes in pain reduction, disability improvement, cervical range of motion, and pressure pain threshold.

Table 1. Baseline characteristics of study participants

Variable	Control Group (n=11)	Experimental Group (n=12)	p-value
Age (years, mean ± SD)	31.64 ± 7.67	32.50 ± 8.72	0.78
Gender (M/F)	2 / 9	5 / 7	0.26
Baseline NPRS (mean ± SD)	6.36 ± 1.43	7.17 ± 1.93	0.21
Baseline NDI (mean ± SD)	45.64 ± 11.11	44.92 ± 17.84	0.89
Symptom duration >1 month	54.5%	50%	0.82

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Table 2. Pre- and post-treatment outcomes within and between groups

Outcome Measure	Control Group (n=11) Mean ± SD	Experimental Group (n=12) Mean ± SD	p-value (between groups, post)
NPRS	Pre: 6.36 ± 1.43 Post: 4.55 ± 1.21	Pre: 7.17 ± 1.93 Post: 2.25 ± 0.62	<0.001
NDI	Pre: 45.64 ± 11.11 Post: 33.73 ± 10.44	Pre: 44.92 ± 17.84 Post: 17.92 ± 8.23	0.001
Cervical ROM	Improved, small effect (ns)	Improved significantly in all planes	<0.05 for SB & rotation

Table 3. End-session comparison of algometer (pressure pain threshold, PPT)

Trigger Point Location	Control Group (n=11) Mean ± SD	Experimental Group (n=12) Mean ± SD	p-value
Right TP1	1.85 ± 0.42	2.34 ± 0.39	0.024
Left TP1	1.72 ± 0.41	2.41 ± 0.36	0.002
Right TP2	1.90 ± 0.44	2.05 ± 0.40	0.28
Left TP2	1.83 ± 0.47	2.12 ± 0.38	0.14

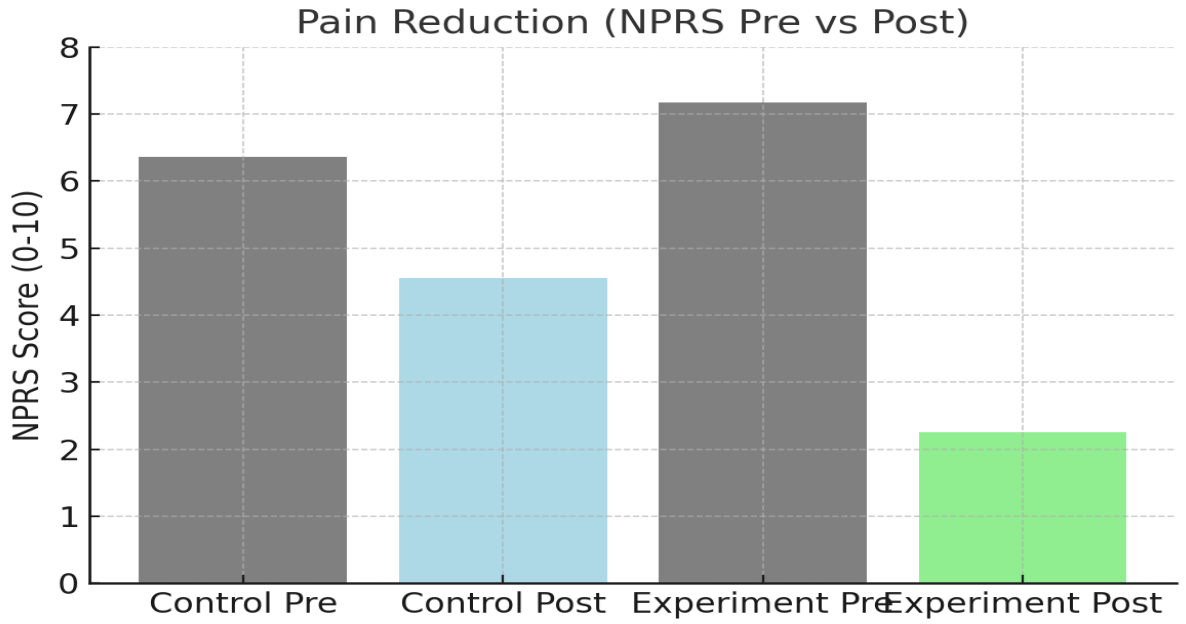

Figure 1

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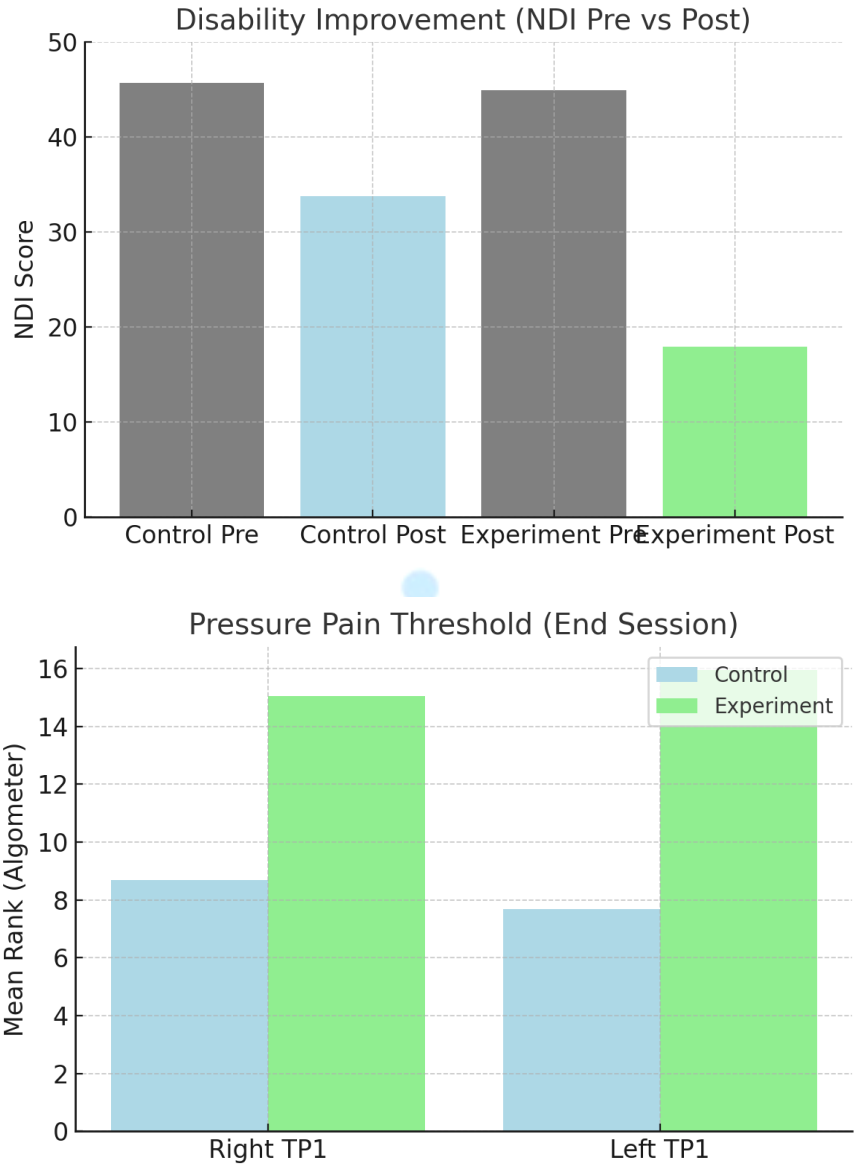

DISSCUSIONS:

In the present study, 27 patients with upper trapezius trigger points were randomly divided into control and experimental groups using sealed envelopes. Each patient received four consecutive treatment sessions. Assessments were conducted using the Numeric Pain Rating Scale (NPRS), Neck Disability Index (NDI), goniometer for range of motion (ROM), and algometer for pressure tolerance. Readings were taken before and after the first and fourth sessions. In the control group, hot packs were applied followed by sustained pressure until pain decreased. In the experimental group, treatment included hot packs, sustained pressure, post-isometric relaxation (MET), and strain counterstrain (SCS). Results showed greater improvement in NPRS, NDI, pressure tolerance, and ROM in the experimental group.

The findings align with several previous studies. Ravichandran et al. (2016) demonstrated that ischemic compression produced better outcomes compared to ultrasound in trapezius trigger points. Similarly, Hafiz Waseem et al. (2016) found that adding SCS to conventional therapy yielded greater improvements. Sedgh et al. (2016) reported that

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sustained pressure of both 30 and 90 seconds improved pain thresholds more than sham ultrasound, supporting the current study's results on sustained pressure. Kaur (2014) showed enhanced outcomes with low-level laser plus ischemic compression compared to compression alone, whereas the current study still found benefits with sustained pressure. Fryer (2005) also confirmed that manual pressure release significantly reduced pain and improved tolerance, a finding echoed here.

Further evidence comes from Schenk, who highlighted MET's role in improving cervical ROM, and Sibby et al. (2009), who showed both INIT and laser with stretching as effective. The present study similarly found INIT beneficial in reducing pain and disability while improving ROM. Nayak (2013) also reported positive outcomes with INIT combined with therapeutic ultrasound, while Nagrale demonstrated superior results with INIT (SCS, MET, and sustained pressure) compared to MET alone. Lastly, Yeganeh (2015) concluded that MET, dry needling, and their combination were effective in reducing pain and improving thresholds and ROM, consistent with the present findings where INIT showed notable benefits.

In conclusion, this study supports the effectiveness of integrating multiple manual therapy techniques (sustained pressure, MET, and SCS) within INIT for managing upper trapezius trigger points. The improvements in pain, disability, pressure tolerance, and ROM observed here corroborate earlier evidence, suggesting that multimodal interventions may provide superior clinical outcomes compared to single techniques.

Conclusion:

It was concluded that Integrated Neuromuscular Inhibition Technique showed better result than Sustain pressure in management of upper trapezius trigger points in terms of pain, neck disability, pressure threshold and range of motion.

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Conflict of interest: [No conflict of interest.]

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