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To Find the Acute Effect of Integrated Neuromuscular Inhibition technique (INIT) and Active Release technique on Numerical Pain Rating Scale and Lateral Cervical Flexion ROM in Patients with Subacute Trapezitis - A Comparative Study

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Abstract: ***Mechanical neck pain affects 45-54% of general population while carrying sitting posture for prolong period of time which may sometimes leads to conditions like Trapezitis. It is the most common musculoskeletal disorder. Active release technique aims to return complete translation or relative motion to the full length of the affected soft tissue and to its adjacent soft-tissue structures. INIT is a combination of IC, PRT, MET.30subjects were selected and randomly allocated in either of GroupA–INIT or GroupB–ART. Pre and Post data were taken, treatment was given for 4days. Result of present study shows there is significant improvement in ROM and NPRS in both the groups. Inter-group comparison shows no significant difference for ROM, and NPRS between the two groups as P>0.05.This study concludes that either treatment can be used clinically for decreasing cervical pain and improving ROM.***

Keywords: ART, INIT, cervical lateral flexion, NPRS, Trapezitis

1. Introduction

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.[1] A common cause of neck pain is a mechanical dysfunction, which causes abnormal joint movement. [1] 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. [2]

Trapezitis is defined as inflammation of upper, middle and lower fibres of trapezius muscle. [3] Upper trapezius muscle is designated as postural muscle and it is highly susceptible to over use. [4]The pain is present during rest and is aggravated by activity it may be referred to other area from the site of primary inflammation. [3]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. [5] 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. [6]

Pain is classified in to three categories based on the duration of onset – Acute, Subacute, and chronic. [7]When pain persists for about 22-84 days i.e. around 3 months it is classified as Subacute pain. [7]

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). [8] Chaitow 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. [9] Active release technique(ART) is a manual therapy for treating soft tissue problems in muscles, joints, and connective tissue. [10]

The effectiveness of ART has been reported for carpal tunnel syndrome, Achilles tendonitis, and tennis elbow, all of which involves soft tissue near joints in the distal parts of the body. [10]Active Release Technique is based on the theory of cumulative trauma disorder (CTD). CTD is a soft tissue injury that results from acute injury, repetitive injury, or a constant pressure/tension injury [11]

Outcome measures for this study were cervical contralateral side flexion (i.e. side flexion opposite to the side of involved muscle) ROM which was taken by universal goniometer, and NPRS for subjective pain assessment during movement.

Mechanical neck pain is a common disabling condition in today's technological era. Due to constant flexion of neck for reading, writing or typing the postural muscles of neck like upper trapezius & levator scapulae tend to go for shortening which leads to pain and restricted range of motion. [12]

There are articles showing effect of INIT and ART on pain in Trapezitis but there are very few literatures where both these techniques are compared, and observe its effect on trapezitis pain and cervical lateral flexion ROM. So the need of the study is to compare the effect of INIT and ART on neck pain and cervical lateral flexion ROM.

2. Literature Review

- A research by Dr. Pooja Wakde on Effectiveness of integrated neuromuscular inhibitory technique in sub-acute trapezitis: a single case study in VIMS Physiotherapy Journal of Case Reports 2016; and concluded that there was decrease in pain and disability, improving muscle strength, ROM in participant with subacute trapezitis following INIT.[9]
- A research by James W. George et. al on the effect of active release technique on Hamstring flexibility: A Pilot study inJournal of Manipulative and Physiological Therapeutics 2006 Volume 29, Number 3. Concluded that ART improves flexibility of hamstring muscles in a group of healthy participants.[10]

The hypothesis under investigation was therefore, that there is a significant difference between the effectiveness of both the treatment techniques on cervical contralateral side flexion and NPRS during movement and null hypothesis suggest that there is no significant difference between both treatments techniques.

3. Materials and Methods

A comparative study was conducted at Shri K.K. Sheth physiotherapy college, Rajkot on 30 individuals satisfying the selection criteria. Inclusion criteria were: Age: 18-30 years, Gender: Male and Female both, individual having neck pain with trigger points in trapezius muscle, individual having pain for about 3weeks up to 3 months, individual who are willing to take part in study. Exclusion criteria were: Patient with any neurological problems related to cervical spine e.g. Cervical Radiculopathy, patients with trauma and surgery around neck and shoulder in past one year, cervical myelopathy, congenital anomalies like torticollis etc., motor weakness of upper limb and fibromyalgia. After screening process, procedure was explained to the participants and written consent were taken from them. Pre-measurement of all outcome measures were taken then patient was randomly divided in to either of the two groups – Group A INIT and Group B – ART.

Group– A Integrated Neuromuscular Inhibition Technique.
INIT comprises of sequential application of three techniques – ischemic compression, Strain counter strain (SCS) technique and muscle energy technique (MET). [8] For Ischaemic compression(IC) (Figure 1) the subjects was sitting in the comfortable position and trigger point or the taut band was palpated. [8] 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, 5 seconds of pressure, 2-3 seconds release, followed by a further 5 seconds of pressure, and so on, repeated until a perceptible change is palpated, or the individual reports a change in the reported pain sensation.[8]

After ischaemic compression, SCS is applied. [8]For SCS (Figure 2) subject 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 20 seconds. After which isometric contraction of the muscle was elicited in the form of MET.


Figure 1: IC **Figure 2:** SCS

Figure 3: MET

For MET [8] (Figure 3) – The head and the neck side-bent towards the opposite side flexion the subject's being placed just short of his upper trapezius restriction barrier. Then was asked to shrugged the involved shoulder towards the ear with a 20% of their maximum strength. The isometric effort was held for 7 to 10 seconds. Followed by relaxation phase, in which the head and the neck were eased into increasing degrees of side bending and rotation, this position was held for 30 seconds.


Figure 4 (a): ART **Figure 4 (b):** ART

Group – B Active Release Technique (Figure 4a and 4b)
For active release technique, individual sits comfortably on chair leaning backwards both the hands were placed on knees. [13] The trigger point was trapped by the therapist's hand by applying pressure or tension. Then individual was asked to perform the contra lateral side flexion movement actively in order to achieve lengthening followed by relaxing.5 to 7 repetition was given for ART.[14]. Treatment protocol was given for 4 days in a week for 1 week and then post data for all outcome measures were taken and was then analyzed.

Stastical Analysis
Statistical analysis was done by SPSS software version 21. Significance level was kept at 5%. Intragroup comparison was done by Wilcoxon test and intergroup comparison was done by Mann Whitney U test. Non –parametric test was applied as data was not following normality distribution according to Shapiro Wilk test.

4. Result

Mean age of participants for Group A – 24.5±4.0 yrs, and for Group B – 25.7±3.8 yrs. Comparison of difference in pre – data and post-data for group A: INIT is given in table 1 and comparison of difference in pre – data and post-data for group B: ART is given in table 2. Between group comparison that is between group A and group B is given in table 3.

Table 1 shows mean and standard deviation of Group A before and after the treatment on cervical side flexion ROM, and NPRS.

Table 1

Group A – INIT				
	PRE Mean ±SD	Post Mean ±SD	Z Value	P value
NPRS	5.07±1.39	2.60±1.68	-3.360[b]	.001
Cervical Lateral Flexion ROM	31.13±6.14	41.27±7.25	-3.414[b]	.001

Table 2 shows mean and standard deviation of Group B before and after the treatment on cervical side flexion ROM, and NPRS.

Table 2

Group B – ART				
	PRE Mean ±SD	Post Mean ±SD	Z Value	P value
NPRS	6.00±1.46	3.13±1.60	-3.336[b]	.001
Cervical Lateral Flexion ROM	29.13±7.23	37.2±7.37	-3.420[b]	.001

Table 3 shows mean and standard deviation of between group analysis after the treatment on cervical side flexion ROM, and NPRS.

Table 3

Between Group Analysis				
	GROUP-A Mean ± SD	GROUP-B Mean ± SD	Z value	P Value
NPRS	2.47±0.99	2.87±1.19	-1.138	.255
Cervical Lateral Flexion ROM	9.87±3.04	8.07±2.25	-1.659	.097

Thus it suggests that there is improvement in ROM and reduction in pain among both the group when compared pre and post values. But there is no significant difference between group comparison($p>0.05$) for NPRS and ROM, thus here supporting our null hypothesis suggesting that there is no significant difference between the effect of two treatment techniques on pain and side-flexion ROM.

5. Discussion

The purpose of this study was to find the effective treatment for increasing ROM for cervical lateral flexion and for reducing pain.

Total 30 subjects (20-F, 10-M) were assessed for the study and selected according to criteria. Then subjects were divided randomly in to two groups – Group A – INIT, Group B – ART. Both group shows improvement in ROM and reduction in pain. The effect of INIT can be due to the pain reduction which may be due to the stimulation of mechanoreceptor which has influence on pain gate during the application of trigger point pressure release and increased circulation, after releasing the pressure which ultimately resulted in pain reduction. [15] Also the improvement in ROM in INIT may be due to PRT and MET which mainly works on decreasing the spasm or tightness of muscle by first resetting the muscle spindle and inhibiting the muscles by activating the golgi tendon organ. This phenomenon is called post isometric relaxation. [16]

In ART trigger point is trapped by the therapist and active contraction is elicited by subject. [17] ART is a method for treating the soft tissues such as tendon nerve and myofascias and is performed for repetitive stress injury. [17] ART is effective for reducing the adhesion of the scar tissue and the soft tissue that causes pain, spasm and muscle weakness etc. [17]The combined effect of tension and compression during ART protocol may be the mechanism by which the therapeutic effects are borne. [17]

A study by Jun Ho Kim et. al on effects of the active release technique on pain and range of motion of patients with chronic neck pain and concluded that ART for the treatment of chronic neck pain may be beneficial for neck pain and movement.[1]

Another study by Golnaz sadria et. al on A Comparison of the Effect of the Active Release and Muscle Energy Techniques on the Latent Trigger Points of the upper Trapezius and concluded that Both manual techniques of ART and MET reduced the symptoms of LTrPs in the upper trapezius in the two groups equally, neither technique being superior to the other.[15]

PrajanaParamita et. al conducted a study on efficacy of INIT with therapeutic ultrasound vs INIT with placebo ultrasound in a treatment of acute myofascial trigger points in upper trapezius and concluded that INIT plus therapeutic ultrasound was more effective then INIT plus placebo ultrasound.[18]

In the present study limitation were male participants were less as compared to female participants. Participants of all professions were included.

6. Conclusion

This study concludes that there is significant improvement in pain scale (NPRS) and cervical lateral flexion in both the groups. But there is no significant difference found in ROM improvement and NPRS between both the techniques when compared and analysed. Hence both treatments can be effective for decreasing cervical pain and improving ROM.

Clinical Implication

As study result suggest that both groups are showing improvement and both the techniques are equally effective either of the technique can be used for reliving patient from trapezius muscle pain and limited ROM.

7. Future Scope

Further recommendation could be similar study can be conducted by focusing on individual of any one profession. And also other cervical ROM can be considered, or other scales can also be used.

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