



Effect of Variants of Positional Release Technique vs. Ischemic Compression Technique on trigger point in Myofascial Pain Syndrome: A randomized controlled trial

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Abstract: Myofascial pain syndrome is a group of symptoms whose origin might be sensory, motor or autonomic. These symptoms usually results from painful spots in the fascia of the skeletal muscle known as myofascial trigger points (MTrPs). The efficacy of a number of manual techniques as well as combination therapies on MTrP's has been investigated through a number of research studies. Thus, the hypothesis of this study was to see if variants of Positional Release Technique yielded better results than the variants of ischemic compression technique or vice versa on MTrP in cases of Myofascial Pain Syndrome. The primary objective was to determine whether any modifications in the treatment duration of conventional parameters of two most effective soft tissue manipulation techniques i.e. the Positional Release Technique (PRT) and the Ischaemic Compression Technique (ICT) have any effect on the pain pressure threshold. 60 subjects with active MTrP over the upper trapezius were randomly allocated into three subgroups- A1, A2 and A3 for PRT group or group A and B1, B2 and B3 for ICT groups or group B. A1, A2 and A3 differed from each other in terms of starting position where in for A1 the starting position was flexed trapezius; for A2 it was extended or stretched trapezius and for A3 the muscle was moved from flexion to extension throughout the treatment duration. Whereas Group B was divided into B1, B2 and B3. For B1 the treatment duration was 30 seconds, for B2 it was 60 seconds whereas for B3 it was 90 seconds respectively. The intervention was given six days a week for two weeks. Although improvement was seen in all the variants of the PRT and ICT groups, the subjects from the 90 sec variant of ICT group i.e. B3 showed maximum and statistically significant improvement in the pain pressure threshold scores post intervention. The present study concluded that among the two most used soft-tissue manipulation techniques i.e. Positional Release Technique and Ischaemic Compression Technique, the 90 sec variant of Ischaemic compression technique yielded clinically significant results in terms of improving pain pressure threshold in cases of Myofascial Pain Syndrome with active trigger points.

Keywords: Myofascial Pain Syndrome, Positional Release Technique, Ischaemic Compression technique, Trigger point, Pain Pressure Threshold.

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I. INTRODUCTION

Myofascial pain syndrome (MPS) is defined as sensory, motor and autonomic symptoms resulting from muscular or fascial painful spots in the fascia surrounding skeletal muscle known as myofascial trigger points (MTrP's)^{1,2}. It is a chronic condition primarily affecting the muscle-covering called as "Fascia". Simons et al (1999) defined MTrP's as discrete foci, often palpable as a nodule within taut bands of skeletal muscle that are tender on palpation and produce characteristic referred pain and autonomic phenomena. MTrP's can be seen in athletic injuries due to muscle asymmetries and imbalances, postural deficiencies or secondary to repetitive injury and training overload.³ These MTrP's exhibit various signs and symptoms like pain on compression, local twitch response, muscle tightness and local myasthenia. The etiological factors responsible for development of MTrP's include low level muscle contractions, muscle contractures, direct trauma, muscle overload, postural stress, unaccustomed eccentric contractions, eccentric contractions in unconditioned muscle and maximal or sub maximal concentric contraction.⁴⁻⁷ Treatment approach for treating MTrP's include application of conventional physiotherapy modalities like ultrasound, TENS etc. Advanced manual therapy techniques like Positional Release Technique (PRT), Ischemic Contraction Technique, transverse and cross friction massage are a few among the many skillful interventions utilized by the physiotherapist for treating MPS. Positional release technique or strain-counterstrain technique (PRT or SCS) is a passive intervention aimed to relieve musculoskeletal pain and related dysfunction than that from taking medication.^{8,9} Positional Release Technique (PRT) or Strain-Counter Strain (SCS) can relieve pain by relaxing tight (shortened) tissues and improving local circulation.¹⁰ The efficacy of a number of manual techniques as well as combination therapies on MTrP's has been investigated through a number of research studies. Among conservative treatments for MPS, the pressure release technique is one of the most recommended manual therapies for MTrP's of the cervical region.¹¹⁻¹³ On one hand, ischemic compression is a questionable technique for MTrP's inactivation because hypoxia and low pH could be increased by excessive compression.¹⁴ On the other hand, the positional release technique is suggested to be a better treatment option than ischemic compression because its lower compression and thus inturns allows adequate oxygenation to the muscle.¹⁵ Although conventional PRT is known to be effective when given in combination, low pressure and a long duration, or high compression and short duration, may be more effective for immediate pain reduction.¹⁶ There are evidences of numerous research studies which have investigated the efficacy of PRT as well as ICT on MTrP's. But research has been lacking wherein effect of alterations or modifications in these techniques on various outcome measures like pain pressure threshold has been investigated. This idea led to the formulation of the hypothesis that there would be chances of obtaining better and amplified results by incorporating the above mentioned manual therapy techniques with different durations. Accordingly modifications were made in both PRT as well as ICT techniques which are described in detail in procedure. Thus, the hypothesis of this study was to see whether variants of Positional Release Technique yielded better results than the variants of ischemic compression technique

or vice versa on MTrP in cases of MPS. To determine whether any modifications(in duration or procedure)in the conventional parameters of two most effective soft tissue manipulation techniques i.e. the Positional Release Technique (PRT) and the Ischemic Compression Technique (ICT) have any effect on the treatment outcome.

2. MATERIALS AND METHODS

For this experimental study design, the sampling design used was simple random sampling. The method of sampling utilized was the lottery method. Sample size was calculated statistically based on the previous research studies¹⁵. The inclusion criteria were patients with active MTrP's over the trapezius muscle, both male and female subjects between the age group of 18-24 years whereas the exclusion criteria were patients with more than one active MTrP, those having other co-morbidities like diabetes, hypertension etc. The outcome measure was Pain Pressure Threshold (PPT) which was measured using Pressure algometer. Ethical clearance was obtained from the institutional ethical committee. (Ref.no- KIMSDU/IEC/07/2019). About 86 subjects within the age group of 18-24 years were screened for inclusion and exclusion criteria, out of which 60 participants were enrolled for the study. Written and verbal informed consent was taken from the recruited subjects prior to the commencement of the study. Also the baseline values for various anthropometric measures like age, sex, height, weight and BMI were taken after the enrollment of the subjects. The subjects were randomly allocated into two groups-The Positional Release Technique (PRT) or group A (n=30) and the Ischemic Compression Technique (ICT) or group B (n=30). Group A was subdivided into A1, A2 and A3. A1, A2 and A3 differed from each other in terms of starting position wherein for A1 the starting position was flexed trapezius; for A2 it was extended or stretched trapezius and for A3 the muscle was moved from flexion to extension throughout the treatment duration. Whereas Group B was divided into B1, B2 and B3. For B1 the treatment duration was 30 seconds, for B2 it was 60 seconds whereas for B3 it was 90 seconds respectively. The baseline data as well as the pre-intervention data of all the outcome measures for both the groups was recorded prior to the commencement of the study. The duration of the intervention was 2 weeks and it was given as a single session per day for six days a week. Thus, at the end of two weeks, each subject completed 12 sessions of treatment. PPT values were taken in mm of Hg post intervention. Statistical analysis was done. Results were obtained.

3. STATISTICAL ANALYSIS

Statistical analysis was done using the SPSS version 21 software. Mean and standard deviations were calculated from the raw data. The between group and within group comparison was done using ANOVA Results were obtained.

4. RESULTS

Table 1. Pre-Post comparison of variants of group A			
Variants of PRT	Pre-Test Scores	Post-Test Scores	p-value
A1	3.99(0.88)	4.62(0.90)	p>0.1
A2	3.75(1.02)	4.59(1.07)	p>0.1
A3	3.65(1.19)	5.11(0.98)	p>0.1

All the values are in Mean (SD)

Table 1 shows the pre-test and post-test scores of the PRT groups. The A1 group had a pre-intervention score of 3.99(0.88) which increased to 4.62(0.90) post-treatment. A2 group showed an improved post-intervention score of 4.59(1.07) as compared to its pre-treatment score which was 3.75(1.02). Least improvement was seen in the A3 group

whose pre-test and post-test scores were 3.65(1.19) and 5.11(0.98) respectively. Although none of the variants showed statistically significant changes, the A2 group showed the maximum improvement in pain threshold values post-test as compared to its other two variants.

Table 2. Pre-Post comparison of variants of group B			
Variants of ICT	Pre-Test Scores	Post-Test Scores	p-value
B1	3.91(1.14)	4.61(1.03)	p>0.1
B2	4.10(0.74)	4.88(0.86)	p>0.1
B3	3.95(1.08)	5.17(1.05)	0.0802

All the values are in Mean (SD)

Table 2 shows the pre-test and post-test scores of the ICT groups. B1 group showed improved post-test values of 4.61(1.03) as compared to its pre-test values of 3.91(1.14). The pre-test values for B2 group were 4.10(0.74) which increased to 4.88(0.86) after the completion of the treatment duration. Whereas for the B3 group, the pre-test and post-test values were 3.95(1.08) and 5.17(1.05) respectively. Among the three variants of B group, B3 showed maximum improvement in terms of pain-threshold scores followed by B2 and B1. As compared to B1 and B2 groups, B3 group showed statistically significant improvement (p=0.0802) in the pain pressure threshold scores post-intervention.

5. DISCUSSION

Many treatment approaches such as trigger point injections, stretching exercises as well as physical therapy modalities have been used to manage MTrP's.^{18,19,20} The hypothesis of the present study was to see whether any modifications in the conventional parameters of two most effective soft tissue manipulation techniques i.e. the Positional Release Technique (PRT) and the Ischemic Compression Technique (ICT) had any effect on the treatment outcome. Despite the lack of well designed studies, the available literature suggests that MTrP's develop due to muscle overuse along with other contributing factors like eccentric overload and submaximal sustained as well as sub-maximal concentric contractions.⁷ Conventionally PRT is administered by keeping the muscle in position of greatest comfort. The variants of PRT were administered by modifying the starting positions of the technique. In A1 group, the PRT was given by keeping the muscle in flexed position; in A2 group by keeping the muscle in extended position and in A3 group by moving the muscle to be treated throughout its available range of motion passively. Modifications in conventional PRT were made in this study. Although statistically significant results were not obtained within the variants of group A, improved PPT scores were seen for A3 followed by A2. The least of the improvement was seen in the A1 group. The variants of

group B were of different pressure duration. For B1 group, the submaximal pressure in the form of compression was applied for 30 seconds, for B2 group it was 60 seconds and for B3 group the total duration of sustained compression was 90 seconds. Improvement was seen only in the B3 group. A study by Iqball et al. (2009) was done to find out the efficacy of muscle energy technique in addition to strain counter strain in managing upper trapezius myofascial trigger point pain. The inter group comparison of the study revealed that trigger point sensitivity was significantly reduced when muscle energy technique was combined with strain-counterstrain technique than muscle energy technique alone. The mechanism relief of pain and increased pain pressure threshold by Strain-Counter strain technique is also thought to achieve its benefits by means of an automatic resetting of muscle spindles which would help to dictate the length and tone into the affected tissues.¹⁷ Although results of the PRT group did not show statistically significant improvement, it could be beneficial from the clinical point of view for people with MTrP's. Among all the three subgroups, the group wherein PRT was administered by constantly moving the muscle passively throughout its available full range of motion. Thus it can be assumed that maximum resetting of muscle spindles as well as re-alignment of muscle fibres takes place if muscle is treated dynamically using PRT. In this study, statistically significant improvement in post-intervention scores was seen in the B3 group subjects (p=0.0802) Similar findings were evident in another study conducted by Gemmell et al.¹¹ He established that ischemic compression and pressure release (30 s and 60 s) did not significantly impact PPT and side bending CROM compared to a switched-off ultrasound placebo control group. In present study also, the relatively shorter treatment durations of 30 secs and 60 secs respectively failed to show significant improvements in PPT scores. On the other hand treatment duration of 90 secs was proven to be most effective in improving pain tolerance of the MTrP. Future studies should be directed towards establishing the beneficial modifications in the existing techniques which would ultimately improve their therapeutic effect. The possible drawback of this study

could be attributed to the utilization of more reliable outcome measures as well as less sample size.

6. CONCLUSION

Although both the techniques showed equal statistical significance, the present study concluded that among the two most used soft-tissue manipulation techniques; the 90 sec variant of Ischemic compression technique may provide clinically significant results in terms of improving pain pressure threshold in cases of Myofascial Pain Syndrome with active trigger points.

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7. AUTHORS CONTRIBUTION STATEMENT

Dr. Prasannajeet. P.Nikam being the primary as well as the corresponding author was responsible for conceiving the idea, arrangement of the pre-requisites for the data-collection and over-all editing and submission of the study. Dr. Govindhan Varadharajulu provided guidance and performed the role of an active reviewer throughout the process.

8. CONFLICT OF INTEREST

Conflict of interest declared none.