



COMPARISON BETWEEN IMMEDIATE EFFECT OF TRIGGER POINT PRESSURE RELEASE THERAPY VS POSITIONAL RELEASE TECHNIQUE ON PAIN AND ROM IN UPPER TRAPEZIUS TRIGGER POINT

Physiotherapy

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ABSTRACT

BACKGROUND AND OBJECTIVES: Myofascial trigger points (MTrPs) are prevalent in upper trapezius, often associated with pain and reduced cervical ROM. Many treatment options are available in practice to treat MTrP. However a definite line of treatment still hasn't been proved. Positional Release Technique (PRT) and Trigger point (TrP) Pressure Release therapy are commonly practiced manual therapies to deactivate MTrPs. Previous studies have reported these techniques to be effective. The purpose of this research was to study and compare the immediate effects of both the techniques so as to choose a better treatment option in the future. **METHOD:** Total 60 subjects in accordance with the inclusion criteria were randomly divided into group A (n=31) and B (n=29). All the subjects received hydrocollator pack on upper trapezius for 10 mins followed by the intervention. Group A received TrP pressure release and group B received PRT. NPRS was used to measure pain intensity and Cervical ROM assessed with a universal goniometer before and after the treatment. **RESULTS:** Statistically, intragroup analysis showed significant improvement in NPRS and Cervical ranges for both the groups. Intergroup analysis showed no statistically significant difference in NPRS and ROM. **CONCLUSION:** Both the techniques are equally effective to reduce pain intensity and increase cervical ranges.

KEYWORDS

Positional Release Technique, Trigger Point Pressure Release Therapy, Upper Trapezius, Myofascial Trigger Points.

INTRODUCTION :

Myofascial Pain Syndrome (MPS) is a cluster of sensory, motor, and autonomic symptoms characterized by the presence of Myofascial Trigger Points (MTrPs).¹ These are hyperirritable spots in a taut band of a skeletal muscle, which are painful on compression, stretch, overload or contraction of the tissue and present with a referred pain.² According to prior cross sectional studies, the prevalence of latent TrPs in the upper trapezius is 20-23% with a report of neck pain being highest (37.2%) of the adult population.^{3,4} Also, a nationwide survey conducted by Fleckenstein et al. estimated the prevalence of MTrPs to 46.1%. Thus it indicates that MTrPs are one of the commonest sources of musculoskeletal pain.⁵

Upper Trapezius is a superficial muscle that covers the posterolateral aspect of the neck and suprascapular region. It plays a role of agonist in cervical extension, ipsilateral lateral flexion, contralateral rotation, shoulder elevation and often develops TrPs.¹ This causes tenderness over the posterolateral surface of the neck and limitations in a cervical Range Of Motion (ROM). We all know that an adequate degree of cervical ROM is required to perform ADLs such as picking up an object from a ground, eating food, driving or backing up a car, etc.^{6,7} Active as well as latent TrPs cause neck pain with motor dysfunction and if not treated, it may become chronic leading to absenteeism from work.³ Hence, it's essentially important to diagnose and treat upper trapezius TrPs in order to prevent functional loss and suffering of an individual.

Earlier, Ischemic Compression Therapy (ICT) was in a practice to treat TrPs. However, in the recent time, studies have recommended to replace ICT with TrP pressure release therapy as it's less vigorous, patient friendly and equally or more effective.¹ It involves the application of slowly increasing pressure over a trigger point until a taut band is released. Correspondingly, Leon Chaitow has stated the importance of positional release technique (PRT) to deactivate TrP. The technique involves precise positioning of the affected tissues in a way that releases excessive tension & thereby reduces pain & tenderness at the trigger point.⁸

There is a plethora of information on the efficacy of PRT saying that it's quite effective to treat MTrP. On the contrary, very few studies are there about TrP pressure release, however the technique is also found to be effectual to reduce pain and improve ROM. It is clear that both Trigger point Pressure release and PRT are potent techniques. So we conducted this study to investigate which among these techniques is more effective so that a therapist can decide a better treatment option that can

deliver promising results.

METHOD :

A comparative study was conducted at Bhausaheb Sardesai Rural Hospital, Talegaon Dabhade, after procuring a permission from the institutional committee of MAEER's Physiotherapy College, Talegaon Dabhade. Data collection occurred between September 2020 to February 2020. Total 74 subjects have examined, out of which 60 were selected and 14 were excluded as they did not meet the inclusion criteria. Subjects were selected in the study according to the following inclusion criteria: age between 20-40 years, all genders, presence of taut band, hyperirritable spot, referred pain and jump sign, subacute cases, decreased lateral flexion to the opposite side of trigger point, unilateral involvement, Pain of at least 3 on NPRS.^{9,10}

Subjects were excluded if they have a history of whiplash injury or recent surgery in the neck region, skin lesions or any sensory disturbances around the trapezius region, acute or chronic MPS, acute PIVD or radiculopathy, any cervical spine pathology, neck deformities i.e. torticollis, Fibromyalgia.⁹ Subjects who fulfilled the inclusion criteria were informed about the study. Subsequently, a consent was obtained in writing from all the subjects before enrollment. Further, participants were randomly divided into group A (n=31) and group B (n=29) by purposive sampling technique without replacement.

Outcome measures :

1. Pain intensity - Numerical Pain Rating Scale (NPRS) was used to measure pain intensity. It's a single 11-point numeric scale ranging from 0 to 10 with 0 representing no pain and 10 being the worst imaginable pain. A higher score indicates greater pain intensity. Reliability and validity of NPRS have documented previously.^{11,12}

2. Cervical ROM - Cervical ROM was measured with a universal goniometer as it's evident that UG is more accurate and reliable than visual method or tape measure. Its Validity and reliability have established previously in the literature.¹³

Procedure :

After obtaining the consent, we used pincer palpation technique to locate the MTrP. Pain intensity and cervical ranges were evaluated with the help of NPRS and universal goniometer respectively. All the subjects received hydrocollator pack over the upper trapezius for 10 mins in prone lying or sitting. Again after the intervention we evaluated pain intensity and cervical ROM within 5 mins post treatment to compare pre and post values.

Intervention for group A (TrP Pressure release therapy):

Positioning - Patient is in supine lying with the head fully supported on a plinth. Therapist stands at the head of a plinth. (Refer figure 1)

Technique - Lengthen the muscle within the patient's comfort by flexing the neck laterally towards the unaffected side. Place the thumb over the trigger point & gradually start applying pressure with the thumb until the therapist feels tissue resistance. The entire procedure should be painless although the patient may feel slight discomfort. The pressure has to be maintained until therapist senses relief of tension



Figure 1 : TrP pressure release therapy

under the thumb. As soon as the tension relives, increase the pressure to engage new barrier, direction of pressure can be changed while engaging new barrier. The treatment should last for 90 seconds.^{1,14}

Intervention for group B (Positional release technique):

Positioning - Patient is in supine lying with the head fully supported on a plinth. Therapist stands near the affected side. (Refer figure 2)



Figure 2 : Positional Release Technique

Technique - Grasp the muscle belly between fingers and thumb. Gradually apply pressure over TrP to monitor the tenderness till the position of ease is achieved. The ideal position of ease is the position at which pain intensity decreases up to 70% that is achieved by placing the subject's head in lateral flexion to the affected side, shoulder abduction upto 90° with slight shoulder flexion & external rotation. Hold the position for 90 seconds followed by a slow return of the neck and shoulder to neutral. It's a passive technique and therapist is supposed to perform the entire procedure.⁸

Statistical analysis :

Descriptive statistics presented in a form of mean and standard deviation. Intragroup analysis has been carried out by Wilcoxon

signed-rank test and parametric paired-t test for NPRS and cervical ROM respectively. Intergroup analysis has been done by Mann-Whitney U test and parametric unpaired-t test for NPRS and Cervical ROM respectively. P value <0.05 taken as a level of significance. Analysis was performed using InStat software powered by GraphPad Prism (version 8.4.0).

RESULTS :

Intragroup comparison of NPRS in group A –Before intervention, mean pain intensity was 5.80 which was reduced by 36.37% to 3.69. Calculated P value was <0.001 showing statistically significant improvement. (Refer table 1)

Intragroup comparison of NPRS in group B–

Mean NPRS was 5.68 pre-treatment and 3.48 post treatment so there was 38.73 % reduction in NPRS also P value was <0.001 showing statistically significant improvement. (Refer table 1)

Intragroup comparison of ROM in group A-

Parametric paired 't' test was used to compare pre and post values of ROM. Calculated P value is <0.05 which indicates statistically significant improvement post treatment. (Refer table 2)

Intragroup comparison of ROM in group B-

Analysis was done using Parametric paired 't' test. P value is <0.05 which indicates significant improvement in all the ranges post treatment. (Refer table 2)

Intergroup comparison of NPRS–

After analyzing the data with Mann-Whitney test, we got U value as 4108.5 and P value of 0.6168 showing that there's no statistically significant difference between NPRS of group A and B. (Refer table 3)

Intergroup comparison of ROM-

Data analysis was done with parametric unpaired-t test. The P value is <0.05. Hence there's no statistically significant difference between cervical ranges of Group A and B. (Refer table 4)

Table 1 : Intragroup comparison of NPRS

| ROM | Group A | | | Group B | | |
|------------------------|---------------|---------------|----------|---------------|---------------|----------|
| | Pre mean ± SD | Pre mean ± SD | P value | Pre mean ± SD | Pre mean ± SD | P value |
| Flexion | 46.06 ± 4.19 | 47.58 ± 3.85 | 0.0119 * | 44.58 ± 5.04 | 47.27 ± 4.05 | <0.0001* |
| Extension | 46 ± 12.47 | 50.87 ± 9.34 | <0.0001* | 48.72 ± 9.63 | 51.06 ± 9.69 | 0.0362 * |
| Lateral flexion (af) | 35.29 ± 6.38 | 38.93 ± 5.26 | <0.0001* | 35.79 ± 6.08 | 38.89 ± 4.91 | <0.0001* |
| Lateral flexion (unaf) | 34 ± 5.34 | 39.80 ± 4.06 | <0.0001* | 34.44 ± 6.90 | 39.44 ± 6.19 | <0.0001* |
| Rotation (af) | 72.58 ± 7.08 | 76.61 ± 6.31 | <0.0001* | 69.37 ± 9.59 | 73.72 ± 6.88 | 0.0002 * |
| Rotation (unaf) | 74.03 ± 6.16 | 77.67 ± 4.13 | 0.0002 * | 68.75 ± 11.63 | 73.27 ± 8.70 | <0.0001* |

SD- Standard deviation; * statistically significant difference.

Table 2 : Intragroup comparison of Cervical ROM

| NPRS | Pre mean ± SD | Post mean ± SD | P value | % of improvement |
|---------|---------------|----------------|----------|------------------|
| Group A | 5.80 ± 1.44 | 3.69 ± 1.48 | <0.0001* | 36.37% |
| Group B | 5.68 ± 1.24 | 3.48 ± 1.40 | <0.0001* | 38.73% |

SD- Standard deviation; af – affected side; unaf- unaffected side; * statistically significant difference.

Table 3 : Intergroup comparison of NPRS

| Outcome measure | Group A MD ± SD | Group B MD ± SD | P value | Mann-Whitney U |
|-----------------|-----------------|-----------------|-------------|----------------|
| NPRS | 2.14 ± 0.73 | 2.20 ± 0.96 | 0.6168 (ns) | 418.5 |

MD– Mean Difference; SD- Standard deviation; ns- not significant.

Table 4 : Intergroup comparison of Cervical ROM

| ROM | Group A MD ± SD | Group B MD ± SD | P value |
|---------|-----------------|-----------------|-------------|
| Flexion | 1.67 ± 2.87 | 2.68 ± 3.07 | 0.2005 (ns) |

| | | | |
|------------------------|-------------|-------------|-------------|
| Extension | 4.87 ± 5.33 | 2.34 ± 5.64 | 0.0848 (ns) |
| Lateral flexion (af) | 3.64 ± 3.72 | 3.06 ± 3.45 | 0.5441 (ns) |
| Lateral flexion (unaf) | 5.70 ± 5.44 | 5 ± 2.87 | 0.5412 (ns) |
| Rotation (af) | 4.03 ± 4.42 | 4.34 ± 5.44 | 0.8108 (ns) |
| Rotation (unaf) | 3.64 ± 4.72 | 4.51 ± 4.76 | 0.4873 (ns) |

MD – Mean Difference; SD- Standard deviation; af – affected side; unaf- unaffected side; ns- not significant

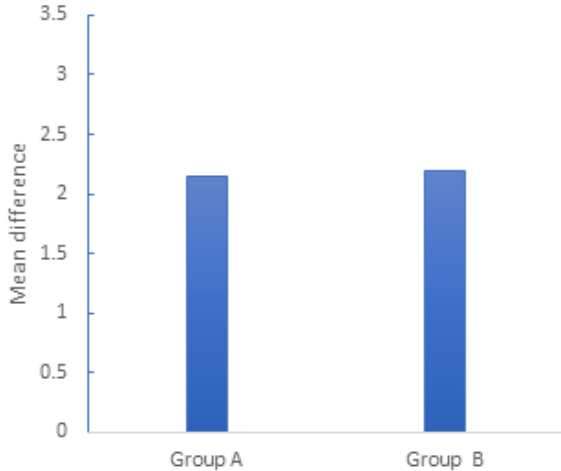


Figure 3 : Intergroup comparison of NPRS post treatment

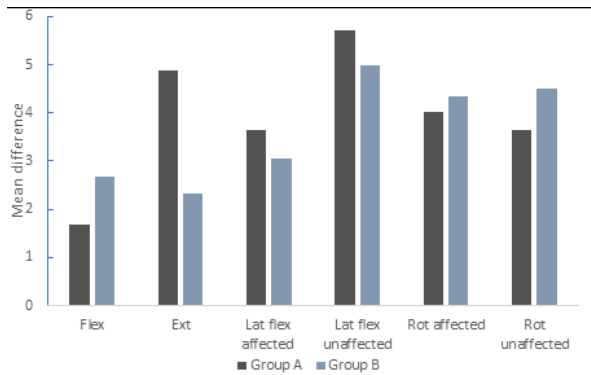


Figure 4 : Intergroup comparison of cervical ROM post intervention

DISCUSSION :

MTrPs are responsible for pain and limitation in various ADLs.⁶ The current concept states that sustained or repetitive mechanical stresses are associated with muscle overload or excessive muscle activity that leads to the formation of TrP. Travell and Simmons have proposed energy crisis model to explain the pathophysiology of TrP. It states that sustained or repetitive trauma is associated with dysfunctional nerve terminal that causes excessive release of calcium from sarcoplasmic reticulum(SR). This results in contraction of sarcomeres followed by localized ischemia. Due to ischemia and lack of ATPs the reuptake of Ca⁺⁺ in sarcoplasmic reticulum is failed which produces a taut band. Also, the formation of TrP is associated with increased gamma motor neuron activity.^{2,15}

A study done by Karen et. Al. revealed that among all the scapular muscles, upper trapezius is most likely to form TrPs. Therefore, present research was conducted on the upper trapezius.¹⁶ The aim of our study was to compare PRT and TrP pressure release therapy to check which technique is better. For the purpose of this study, 60 subjects presenting with MTrP and restricted cervical ROM were included. Out of which, 31 individuals received TrP pressure release while 29 received PRT. Before the intervention hydrocollator pack is placed over Upper trapezius for 10 mins. It increases local blood circulation via vasodilatation and helps to improve the efficacy of the

intervention.¹⁷ NPRS and Cervical ROM were taken as outcome measures.

Our study revealed that TrP pressure release reduces pain intensity and improves cervical ROM¹. Hence, it supports the study of Rob Grieve et al. which concluded that a single intervention of TrP pressure release increases active dorsiflexion range.¹⁴ The technique works by increasing blood flow in the area of trigger point which brings more amount of oxygen and nutrients to hypoxic trigger point area. Subsequently, Calcium ions taken back in SR and reduce excessive muscle tension. In addition to that ,it causes lengthening of the Contractured sarcomeres and releases the taut band.¹

Leon Chaitow has stated the importance of PRT in the treatment of MTrPs.⁸ Results of our study showed that a single session of PRT reduces pain and increases ROM. Hence, our research supports the studies of Ali Ghanbari et al. and Francisco Jose Saavedra et al. which have concluded that PRT reduces muscle tension as well as sensitivity of the TrP.^{18,19} It works by reducing inappropriate activity of muscle spindles and decreases gamma motor neuron activity which in turn decreases basal tone of the previously overactive muscle.^{8,19} Additionally, it also improves local blood circulation that flushes out inflammatory substances i.e. prostaglandins and bradykinin which are responsible for pain.

Intergroup comparison showed in table 3,4 and figure 3,4 indicates that both the techniques are equally effective in alleviating pain and improving ROM. Since both the techniques are clinically as well as statistically potent, a therapist can use either technique to release MTrP and achieve desired results.

CONCLUSION :

It is concluded that both TrP pressure release therapy and positional release technique are equally effective to reduce pain intensity and increase all cervical ranges.

LIMITATIONS :

Present study included subjects between the age of 20-40 years, so the results cannot be generalised to all the age groups. Pain intensity was measured with NPRS so there was a lack of an objective measure to assess pain i.e. pressure algometer. No follow up was done which would have helped us to assess maintenance of the achieved effects. The present study was focused upon immediate effects hence, further research is needed to check long term effects.

Conflict of interest: None.

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