



Research Article

IMMEDIATE EFFECT OF PAIN RELEASE PHENOMENON VERSUS POSITIONAL RELEASE TECHNIQUE ON TRAPEZIUS MUSCLE TRIGGER POINTS: A RANDOMIZED CLINICAL TRIAL

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ABSTRACT

Aim: To compare the immediate effect of pain release phenomenon (PRP) versus positional release technique (PRT) on trapezius muscle trigger points.

Background: Trigger points are spots which are highly irritable in nature present within taut band of skeletal muscles. It is painful on compression or muscle contraction.

Method: 22 participants with trapezius muscle trigger points were recruited in the study who were randomly allocated in two groups. Group A – pain release phenomenon group and Group B – positional release technique. Subject were given one session and outcome measures were taken pre and post treatment on day 1. Outcome measures were numeric pain rating scale, pain pressure threshold and cervical range of motion.

Results: Data was analyzed using SPSS version 21. Data was evaluated using dependent t-test and Kolmogorov Smirnov test. Significant increase in pain pressure threshold and cervical range of motion, decrease in intensity of pain (NPRS) was seen in both group A and group B (*p<0.05).

Conclusion: Pain release phenomenon technique and positional release technique both are effective in reducing severity of pain, increasing pain pressure threshold and cervical range of motion. But, among both groups pain release phenomenon was found to have greater effects compared to positional release technique in all variables.

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INTRODUCTION

A trigger point is a spot which is hyperirritable in nature which is allied with pain on squeezing or muscle contraction. It responds as referred pain pattern away from the spot and palpable nodules are present which is 2-10mm in size.^{1,2,3,4} Local twitch response, jump sign, referred pain are the typical features of trigger point.^{1,2,3}

Trapezius is one of the muscles connecting the upper limb with the vertebral column. Both right side and left side muscles together form a trapezium, covering upper half of the back. scapula. Nerve supply to trapezius muscle is spinal accessory cranial nerve XI and branches of ventral rami C₂-C₄. The trapezius muscle is a postural and active movement muscle which helps in tilting and turning the head and neck. It also helps in shrugging the shoulders; elevation, depression and retraction of the scapula.⁵

Two types of trigger points – active and latent. Active trigger points have pain complaint along with weakness, paresthesia and temperature changes. Latent trigger points are present with shortening of muscle and pain present only on application of external pressure.^{6,7}

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Pain Release Phenomenon (PRPs) is a manual therapy technique introduced by Brian Mulligan for the Chronic pain management. In this technique, compression (for joints), traction (for joints), contraction (for muscles, tendons) or stretch (for muscles, ligaments, tendons and capsule) is used as the pain provoking stimuli (pressure) and the stimuli is maintained for 15- 20 seconds. If pain reduces within 15-20 seconds, a new PRP can be started in new available range with increased pressure. If pain doesn't reduce within 15-20 seconds, the pressure applied is too high and should be reduced. If pain reduces before 10 seconds after pressure is applied, pressure applied is too low and should be increased.⁸ Positional release technique is a type of manual therapy, was discussed by Dr Lawrence H. Jones (1969) for treating chronic and sub-acute muscle spasm, pain and disability. In this technique patient is positioned comfortably, affected area is palpated. Patient is instructed to relax the area once the affected area is palpated by the therapist. Therapist passively moves the appropriate body part to release tension and stops motion when the pain stops. Patient only feels pressure and this position is maintained for 90 seconds.^{9,10}

Studies are conducted on positional release technique for treatment of trigger points. As there is dearth of literature on comparison between positional release technique and pain release phenomenon on trapezius trigger points. Hence, the current study was intended to compare the effect of pain

release phenomenon and positional release technique on trapezius muscle trigger points.

We hypothesize that there will be difference in the immediate effects of pain release phenomenon and positional release technique on trapezius muscle trigger points in terms of intensity of pain, pain pressure threshold and cervical range of motion.

MATERIALS AND METHODS

A randomized clinical trial was conducted on 22 subjects through non-probability sampling design in two groups, group A (Pain release phenomenon group) and group B (Positional release technique group). The study was conducted in Tertiary Health center of Belagavi city, Karnataka, India. Duration of the study was from October 2017 to March 2018. Both genders with age group between of 19-45 years, having trapezius pain for more than 3 months, having presence of taut band or referred pain with painful trigger point on palpation and willing to participate were included in the study. Exclusion criteria was subjects having any shoulder injury or history of upper limb fracture within last 6 months, history of whiplash injury, cervical spine surgery and shoulder surgery, associated neurological symptoms, diagnosed with cervical radiculopathy or myelopathy, open wounds and infections around neck and shoulder.

Procedure

The study was approved by Institutional Research and Ethics Committee (Research and ethical committee, KIPT/94/16-10-17)

After meeting the inclusion and exclusion criteria, written informed consent was obtained from the subjects. The study protocol was explained to them. A brief demographic data was taken i.e. Age, height, weight and Body mass index. The subjects were randomly allocated into 2 groups namely Group A and Group B by using the envelope method. In the envelope, alphabets A and B were written and the envelope were enclosed in a cover. Baseline outcome measure were taken before treatment on Day 1 and post treatment outcome measures were taken on Day 1. Anonymity and confidentiality were assured and all the procedures were performed in compliance with relevant laws and institutional guidelines.

Common intervention

Subjects were treated with therapeutic ultrasound with continuous wave mode setting at a frequency of 1MHz and an intensity of 1.5w/cm² for 6 minutes¹¹ and hot moist packs¹² for 15 minutes.

Group A

In group A (Pain Release Phenomenon), in this technique stretch type of PRP was used. Subject was in sitting position, trigger point on the trapezius muscle was palpated, pain was provoked by applying pressure and muscle was stretched by doing cervical flexion, same side rotation and opposite side lateral flexion. Therapist maintained the pressure for 15-20 seconds. If pain was reduced within 15-20 seconds, a new PRP in new available range were given. This procedure took 2-3 minutes.⁸

Group B

In group B (Positional Release Technique), in this technique subject was in sitting position; with cervical spine in neutral position instruction were given to patient to relax the part as much as possible. Therapist applied pressure with thumb over the trigger point of trapezius muscle until the subject felt the sensation of pressure and pain as one. While maintaining the pressure, the therapist passively moved the affected part to a range where pain was reduced. Position of cervical spine in extension, ipsilateral side flexion and contralateral rotation was more comfortable for many subjects. This position was maintained for 90 seconds and then subject were slowly placed into neutral position. This procedure took 2-3 minutes.^{9,10}

Outcome Measures

Numeric Pain Rating Scale

The Numeric Pain Rating Scale (NPRS - 11) is a 11-point scale from '0' to '10'. It has high test-retest reliability (r=0.96) and validity (0.86-0.95).¹³

Pain pressure threshold

Pressure pain threshold (PPT) is the minimum force applied which induces pain. For quantifying PPT, pressure algometry is used on subjects to diagnose trigger points (Figure 1). Manual pressure algometry has excellent reliability and high validity (0.9).¹⁴



Figure 1 Measuring pain pressure threshold with pressure algometry

Cervical range of motion

It has good intra-tester and inter-tester reliability (0.80).¹⁵ Active range of motion of cervical segments were measured using universal goniometer.¹⁶

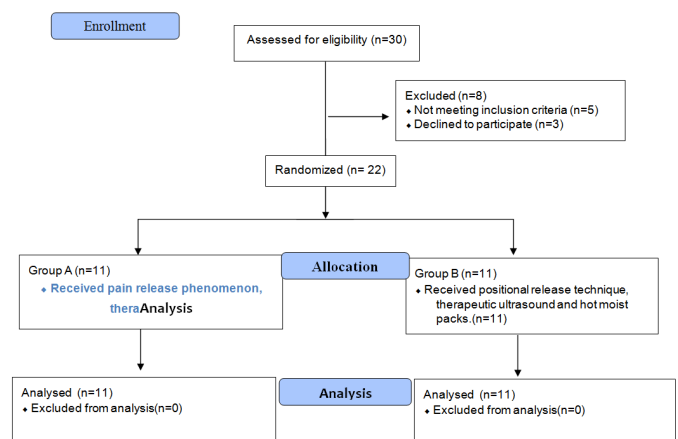


Figure 2 Consort Flowchart

RESULTS

All statistical calculations were carried out using SPSS (Statistical Package for Social Science) version 21 for Microsoft windows. Normality testing of pretest and posttest scores was done using Kolmogorov Smirnov test, showed that all scores follow normal distribution; therefore, parametric tests were applied.

Table 1 Showing distribution of gender and age in Group A and Group B

Variable	Group A	Group B
Male	4	1
Female	7	10
Average (age in years) (±standard deviation)	29.36±9.91	29.27±8.56

Table 2 Comparison of Group A and Group B with respect to pretest and posttest pain pressure threshold scores and numeric pain rating scale scores

Groups	Pretest Mean SD	Posttest Mean SD	Difference Mean SD	Percentage of change
Pain pressure threshold scores				
Group A- Pain release phenomenon	2.87±0.22	3.55±0.24	0.68±0.22	23.73%#, p=0.0001*
Group B-Positional release technique	2.76±0.38	3.27±0.38	0.51±0.19	18.42%#, p=0.0001*
t-value	0.8199	2.0853	1.9702	
p-value	0.4219	0.0500*	0.0628	
Numeric pain rating scale scores				
Group A- Pain release phenomenon	5.55±0.82	0.55±0.52	5.00±0.63	90.16%#, p=0.0001*
Group B-Positional release technique	5.64±1.21	1.64±0.67	4.00±1.18	70.97%#, p=0.0001*
t-value	-0.2067	-4.2426	2.4721	
p-value	0.8383	0.0004*	0.0225*	

*p<0.05, #applied paired t test

Table 3 Comparison of Group A and Group B with respect to pretest and posttest flexion scores and extension scores

Groups	Pretest Mean SD	Posttest Mean SD	Difference Mean SD	Percentage of change
Flexion scores				
Group A- Pain release phenomenon	38.27±4.47	40.82±3.09	2.55±1.51	6.65%#, p=0.0002*
Group B-Positional release technique	36.09±6.02	37.91±4.85	1.82±1.60	5.04%#, p=0.0037*
t-value	0.9643	1.6782	1.0968	
p-value	0.3464	0.1089	0.2858	
Extension scores				
Group A- Pain release phenomenon	38.36±5.22	41.09±4.28	2.73±1.56	7.11%#, p=0.0001*
Group B-Positional release technique	36.73±5.46	39.64±5.71	2.91±1.04	7.92%#, p=0.0001*
t-value	0.7184	0.6759	-0.3219	
p-value	0.4808	0.5069	0.7509	

*p<0.05, #applied paired t test

Table 4 Comparison of Group A and Group B with respect to pretest and posttest lateral flexion-left scores and lateral flexion-right scores

Groups	Pretest Mean SD	Posttest Mean SD	Difference Mean SD	Percentage of change
Lateral flexion- left scores				
Group A- Pain release phenomenon	31.18±5.23	35.00±5.69	3.82±1.25	12.24%#, p=0.0001*
Group B-Positional release technique	27.82±7.17	30.91±7.38	3.09±1.38	11.11%#, p=0.0001*
t-value	1.2573	1.4556	1.2978	

p-value	0.2231	0.1610	0.2091	
Lateral flexion-right scores				
Group A- Pain release phenomenon	34.18±4.21	36.64±4.15	2.45±0.69	7.18%#, p=0.0001*
Group B-Positional release technique	30.36±6.38	32.73±6.71	2.36±1.50	7.78%#, p=0.0003*
t-value	1.6568	1.6429	0.1826	
p-value	0.1132	0.1160	0.8570	

*p<0.05, #applied paired t test

Table 5 Comparison of Group A and Group B with respect to pretest and posttest rotation left scores and rotation right scores

Groups	Pretest Mean SD	Posttest Mean SD	Difference Mean SD	Percentage of change
Rotation - left scores				
Group A- Pain release phenomenon	43.82±9.16	47.09±8.49	3.27±1.68	7.47%#, p=0.0001*
Group B-Positional release technique	41.09±9.17	43.27±9.14	2.18±1.60	5.31%#, p=0.0011*
t-value	0.6977	1.0148	1.5596	
p-value	0.4934	0.3223	0.1345	
Rotation -right scores				
Group A- Pain release phenomenon	43.55±10.22	46.18±10.25	2.64±1.69	76.05%#, p=0.0004*
Group B-Positional release technique	39.36±7.41	42.36±8.09	3.00±1.34	7.62%#, p=0.0001*
t-value	1.0988	0.9695	-0.5590	
p-value	0.2849	0.3439	0.5824	

*p<0.05, #applied paired t test

Both the groups showed significant improvement in pain pressure threshold, numeric pain rating scale and cervical range of motion.

DISCUSSION

The present study was designed to compare the immediate effects of pain release phenomenon versus positional release technique in subjects with trapezius trigger points. Trigger points present on the trapezius muscle are said to be commonly seen in people with sedentary lifestyle⁶ and other causes are due to repetitive overuse of muscle in shortened position, carrying heavy weights, postural stress and poor posture, lack of exercise.^{17,18,19}

As per our knowledge this was the first only compared study done on pain release phenomenon versus positional release technique on trapezius trigger points. In a conference of IFOMT,²⁰ pain release phenomenon technique on Achilles peritendonitis showed reduction of pain similarly in our study post pain release phenomenon intervention significant difference is seen in numeric pain rating scale scores. The possible mechanism of reduction of pain, improved range of motion and increased pain pressure threshold is that during pain release phenomenon the trigger point was under continuous pressure for 15-20 seconds along with stretching of trapezius muscle which helps by flushing of blood and stretching improved muscle elasticity and flexibility, also increased range of motion

Dole *et al*²¹ found that positional release therapy was not useful when compared with deep transverse friction massage on gluteus medius trigger points in terms of pain threshold, in our study positional release therapy help to increase the tolerance of pain pressure threshold, reduce the pain and increase the cervical range of motion.

Kojidi MM *et al*²² studied the intensity of pain and pain pressure threshold in computer users. They reported that the

group who were subjected to positional release technique in shortened position achieved significant pain reduction on visual analogue score and increased pain pressure threshold. However, in comparison of the efficacy of positional release technique and sham control (with upper trapezius muscle in neutral position) on the myofascial trigger points of upper trapezius on computer users concluded that positional release technique was no more effective than sham techniques. When compared to our study we have reduced pain intensity, increased pain pressure threshold and cervical range of motion post intervention. Positional release technique helped to control muscle spasm as it acts on the muscle spindle mechanism. It reduced hyperactivity of the stretch reflex and also the referred pain. Reduction in muscle spasm increased range of motion, reduced pain, a normal blood circulation and improved lymph drainage.

The advantages of some of these studies was that the therapeutic ultrasound use was similar to those suggested by Pillay MG¹⁸, Hou CR¹⁹ use of hot moist pack along with other techniques such as stretching, T.E.N.S, interferential currents or massage similarly in our study application of hot moist packs along with the intervention improved cervical range of motion and reduced pain.

Limitations

Only immediate effect was seen in terms of pain pressure threshold, numeric pain rating scale and cervical range of motion. No follow-up was taken to check whether pain was aggravated again or same.

CONCLUSION

Pain release phenomenon and positional release technique both interventions are beneficial in treatment of trapezius trigger points to reduce pain, increase pain pressure threshold and cervical range of motion.

Conflict of interest

The author declares no conflict of interest.

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