

A Study to Compare Immediate Effect of Ischemic Compression Technique and Positional Release Technique on Pain and Cervical Range of Motion of Upper Trapezius Trigger Points - A Comparative Study

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DOI: <https://doi.org/10.52403/ijhsr.20260511>

ABSTRACT

Background: Myofascial trigger points, especially in upper trapezius muscle which produce pain and restrict movement, leading to functional limitation. Ischemic compression technique (IC) and positional release technique (PRT) commonly used to treat MTrPs. So, the aimed of the study is to compare immediate effect of IC and PRT on pain and cervical range of motion of upper trapezius trigger points.

Methods: The study was conducted on 30 patients with upper trapezius trigger points randomly divided into group A and group B which consist of 15 subjects in each group. Group A was treated with IC with conventional treatment which consists of US and isometric neck exercise and Group B was treated with PRT with conventional treatment. The outcome measure were active cervical ROM and VAS taken pre and post of treatment.

Results: The results revealed that the Group A (IC) showed significant improvement in cervical ROM and Group B (PRT) showed significant improvement in cervical ROM. Between group comparison revealed no significant difference between the two techniques in ROM of flexion ($z = -0.278$, $p > 0.05$), extension ($z = -1.11$, $p > 0.05$), side flexion ($z = -0.29$, $p > 0.05$), rotation ($z = -0.10$, $p > 0.05$) and VAS value ($z = -0.81$, $p > 0.05$) in subject with upper trapezius trigger points.

Conclusion: It can be concluded that IC and PRT both are equally effective in decreasing pain and increasing active cervical range of motion in patients with upper trapezius trigger points.

Keywords: Ischemic compression technique (IC), Positional release technique (PRT), Myofascial trigger points (MTrPs), Range of motion (ROM), Visual analog scale (VAS)

INTRODUCTION

Mechanical neck pain affects 45–54% of the general population at some time during their lives and can result in severe disability. Simons et al. in 1999 have claimed that

Myofascial trigger points (MTrPs) from neck and shoulder muscles might play an important role in the genesis of non-specific neck pain.¹ The upper trapezius muscle is designated as postural muscle and

it is highly susceptible to overuse.² MTrPs resides mostly in upper trapezius muscle in active working adults aged 20-65 years. Myofascial trigger points (MTrPs) are a highly common condition worldwide having 85% prevalence.³

Multiple non-invasive treatment has been recommended for the management of upper trapezius trigger points. These include manual therapy, electrotherapy, and soft tissues techniques. Among these, two commonly used method are Ischemic Compression Technique and Positional Release Technique.⁴ According to Travell, ischemic compression decreases the sensitivity of painful nodules in muscle.¹ Positional release therapy (PRT) is a method of total body evaluation and a position of comfort (POC) to resolve the associated dysfunction.⁵ Range of motion is a basic technique used for the examination of movement. VAS is one of the most basic pain measurement tools. ROM and VAS both are used as outcome measure in this study.⁶

Many researchers have recommended various methods of treatment in management of upper trapezius trigger points. They exist with their own claims of success without any attempts of comparing the maximal effective methods. So, the aim of study is to compare immediate effect of ischemic compression technique and positional release technique on pain and cervical range of motion of upper trapezius trigger points.

MATERIALS & METHODS

The study was conducted at Shree K. K Sheth physiotherapy center, Rajkot, Gujrat, India. The proposed title and procedure had been approved by ethical committee members. The selection of subject was done by convenient simple random sampling & group allocation by simple random sampling. Thirty (n = 30) subjects who fulfilled the inclusion and exclusion criteria were selected from various physiotherapy OPD Centers in and around Rajkot, for the

study and assigned to either the Group-A or Group-B.

The details and purpose of the study were explained to all subjects. Subjects who fulfilled the evaluation criteria were considered for inclusion criteria : Age 18-55 years, Gender: Both male and female included, Subject with a palpable trigger spot in the upper trapezius muscle reproduction of the subject's pain upon palpation, Subject with positive Jump sign, Subject with restricted neck movements due to pain, Subject with pain of at least three on a visual analogue scale (VAS), Subject with triggers in the upper trapezius which had been present for more than 3 months and who had no previous treatment for these for at least 1 month prior to the study.⁷

Exclusion criteria: Subjects with history of recent surgery or open wounds in the neck region, Subjects with history of cervical spine surgery, Subjects with history of trauma or fractures in the neck or back, Subjects with skin diseases and lesions in the area of trapezius, Subjects with neck and back deformities, Subjects with therapeutic intervention, either invasive or non-invasive or medication for myofascial pain within the past 1 month before the study.⁷

All the subjects were explained about the purpose and the test procedures & written consent was taken from subjects and who were willing to participate in the study. Subjects were divided into two groups. Group A = IC with ultrasound and neck isometric, (n =15) And Group B = PRT with ultrasound and neck isometric, (n=15). VAS and cervical ROM as outcome measurements were taken before and after the program schedule.

Outcome Measures:

Cervical Range of Motion: Cervical Flexion: The subject was seated with the thoracic and lumbar spine well supported and the cervical spine maintained in neutral position with rotation and lateral flexion. The fulcrum of the goniometer over the

external auditory meatus. The proximal arm of goniometer was aligned perpendicular to the ground while the distal arm aligned with the base of the nares. Cervical Extension: The subject was seated with the thoracic and lumbar spine well supported and the cervical spine maintained in neutral position with rotation and lateral flexion. The fulcrum of the goniometer over the external auditory meatus. The proximal arm of goniometer was aligned perpendicular to the ground while the distal arm aligned with the base of the nares.⁶

Cervical Lateral Flexion: The subject was seated with the thoracic and lumbar spine well supported and the cervical spine maintained in neutral position with rotation and lateral flexion. The fulcrum of the goniometer over the spinous process of the 7th cervical vertebra. The proximal arm of goniometer was aligned with the spinous processes of the thoracic vertebrae so that the arm was perpendicular to the ground. while the distal arm aligned with the dorsal midline of head, using the occipital protuberance for reference. Cervical Rotation: The subject was seated with the thoracic and lumbar spine well supported and the cervical spine maintained in neutral position with flexion, extension and lateral flexion. The fulcrum of the goniometer over the centre of cranial aspect of head (vertex). the proximal arm of goniometer was parallel to an imaginary line between the two acromion processes. while the distal arm aligned the tip of the nose.⁶

Visual analogue scale:

The VAS is one of the most basic pain measurement tools. Draw 10 centimetres horizontal line placed on paper. Where 0 is no pain at all and 10 is pain as bad as it could be. Ask the subject mark line relative to the intensity of the pain and then measure the place on the line and convert it into a score between 0 and 10.⁶

Group A: Ischemic compression + Conventional treatment:

Technique: Subject was placed supine on the couch with his supported head and the therapist standing behind the subject. First identify trigger points in upper trapezius muscle. Once located on the trigger point, apply an IC by gradually applying pressure to the trigger point with thumb. The subject was felt referred pain in a question mark pattern. Hold this position for approximately 20 seconds to 1 minute, when subject say that pain had disappear, or until feels the muscle fibres begin to relax under pressure and then gradually release pressure. All identified trigger points were treated. This was repeated for three to five times.⁷

Group B: Positional release technique + Conventional treatment:

Technique: The subject to take supine position and relax completely. The therapist sits or stands at the head of the table by the side of the patient. The scapula was elevated by taking shoulder in about 90⁰ abduction position. Then neck was rotated, extended and side bent to same side. The fine tuning of the release was done through either the neck or shoulder internal- external rotation. This position was held for 90 seconds and after that patient was put back into the normal position. The same technique was repeated for 3 time.⁸

CONVENTIONAL TREATMENT:

Ultrasound therapy: Frequency: 1 MHz, Intensity: 1.4 W/cm², Time: 5 minutes, Mode: Continuous, and Number of sessions: one session.⁹

Neck isometric exercises: was given to the patient. (A set of 15 repetitions with-hold time 10 second against near-maximal resistance).¹⁰

Statistical Analysis

All statistical analysis was done by using SPSS software version 20. Means and Median were calculated as a measure of central tendency for active cervical range of

motion and pain on VAS respectively and standard deviation (SD) was calculated as a measure of dispersion. Normality of data check by Shapiro Wilk test & it shows data was non-parametric type so, pre-treatment and post-treatment data of active cervical range of motion and visual analogue scale was analysed by Wilcoxon Signed-Rank test respectively and comparison between two groups of active cervical range of motion and visual analogue scale was analysed by Mann-Whitney U test

respectively. Level of significance (p value) was set to 0.05.

RESULT

Thirty subjects were randomly divided into two Groups: - Group A Ischemic compression technique with conventional treatment (n=15) and Group B Positional release technique with conventional treatment (n=15). Outcome measure ROM and VAS for pain were taken before and after treatment.

Table 1: Mean and SD of pre-treatment and post treatment Active Cervical ROM of Group A

ROM		Mean	SD	Z	p-value	Result
Flexion	Pre treatment	34.33	6.37	-3.20	<0.05	Significant
	Post treatment	41.06	4.06			
Extension	Pre treatment	34.8	5.59	-3.49	<0.05	Significant
	Post treatment	42.86	3.64			
Side flexion	Pre treatment	33.6	6.12	-3.31	<0.05	Significant
	Post treatment	42.53	3.54			
Rotation	Pre treatment	44.53	8.46	-3.41	<0.05	Significant
	Post treatment	55.06	5.93			

Interpretation: Wilcoxon signed rank test was used for pre and post treatment comparison of Active Cervical ROM of Group A and Group B. Result shows significant difference for pre and post active cervical ROM (Group-A).

Table 2: Mean and SD of pre-treatment and post treatment Active Cervical ROM of Group B

ROM		Mean	SD	Z	p-value	Result
Flexion	Pre treatment	34.46	4.20	-3.43	<0.05	Significant
	Post treatment	42.53	3.09			
Extension	Pre treatment	37.13	5.80	-3.31	<0.05	Significant
	Post treatment	42.66	2.70			
Side flexion	Pre treatment	33.6	4.04	-3.41	<0.05	Significant
	Post treatment	42.33	3.79			
Rotation	Pre treatment	46.53	6.81	-3.18	<0.05	Significant
	Post treatment	56.26	2.40			

Interpretation: Results show significant difference for pre & post active cervical ROM (Group-B)

Table 3: Mean and SD of Active Cervical ROM of Group A and Group B

ROM		Mean	SD	Z	p-value	Result
Flexion	Group A	-7.53	4.82	-0.278	>0.05	Non- Significant
	Group B	-8.06	3.75			
Extension	Group A	-8.06	3.82	-1.11	>0.05	Non- Significant
	Group B	-6.53	4.83			
Side flexion	Group A	-8.93	4.87	-0.29	>0.05	Non- Significant
	Group B	-8.73	4.89			
Rotation	Group A	-10.53	5.95	-0.10	>0.05	Non- Significant
	Group B	-9.73	6.11			

Interpretation: The result of Mann whitely U test. Result shows non-significant difference for Active Cervical ROM.

Table 4: Between group comparison of VAS of Group A and Group B

VAS	Z	p	Result
	-0.81	>0.05	Non-significant

Interpretation: Result shows non-significant difference for VAS. There is no significant difference between group comparisons of range of motion & VAS.

Hence, experimental hypothesis is accepted and null hypothesis is rejected.

DISCUSSION

The intent of the study was to find out and compare the effectiveness of ischemic compression technique and positional release technique in upper trapezius trigger points with a conventional physiotherapy in form of ultrasound and neck isometric exercises to both the groups. In present study, when the values of pre-treatment and post treatment of VAS and active cervical ROM were analysed, it was statistically significant in both the groups but when comparison was done between them, both the groups were equally effective in reducing pain and improving ROM. Thus, the results of the present study reject the null hypothesis and supports the experimental hypothesis.

When ischaemic compression is used on the trigger points, local chemistry changes due to blanching of the nodules followed by hyperaemia when compression is released. This flushes out the muscle inflammatory exudates and pain metabolites, breaks down the scar tissue, desensitizes the nerve endings and reduces the muscle tone.⁴

The present study gives similar result as a study conducted by Mukhtar Z, (2015) suggested that grade III unilateral mobilization at C3-C4 facet joint on the symptomatic side and ischemic compression, isometric contraction and stretch of upper trapezius (myofascial trigger point therapy) were equally effective in relieving pain and disability induced by upper trapezius MTrPs.³ Krishnagiri sudaresh et al., (2014) also suggested that IC were more effective in reducing pain in treating myofascial pain syndrome patients.¹¹ According to Travell, ischemic compression decreases the sensitivity of painful nodules in muscle. Simons (2002) proposed that local pressure may equalize the length of sarcomeres in the involved Trigger point and consequently decreases the palpable knot, which reduces the

energy consumption and in turn will cease the release of noxious substances and decrease the pain.¹

Positional release technique is 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 (Chaitow, 2001; Jones 1981).⁹ The present study gave similar results as seen by Priyanka Diwadkar et al., (2012) who found significant pain reduction in acute ankle sprain with positional release technique.¹² In improvement of ROM and VAS, there was other possible mechanism was explained by Mukkanavar P. B. et al., (2008) which demonstrated statistically significant decreased VAS score, in terms of ischemic pressure that probably might have led to temporarily occlusion of blood supply & causing reactive hyperemia, which in turn helped in flushing out the muscle of inflammatory exudates & pain metabolites.¹³

The result of present study consistence with the result of the study done by Cesar Fernandez-de-Las-Penas et al., (2006) who found that immediate effect of ischemic compression technique and transverse friction massage on tenderness of active and latent myofascial trigger points and concluded that Ischemic compression technique and transverse friction massage were equally effective in reducing tenderness in MTrPs.¹⁴ and Gopal S Nambi et al., (2015) concluded that IC and MET may be effective in reducing pain, but for range of motion MET may be more effective than IC in upper trapezius MTrPs to reduce pain and improve the range of motion.⁷

CONCLUSION

Ischemic compression (IC) and Positional Release Technique (PRT) are equally effective in improving active cervical range of motion and reducing pain in subject with upper trapezius trigger points. Hence it can be concluded that both the form of treatment

is an effective option in the treatment of upper trapezius trigger points.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Snehal Amrutbhai Kolipatel, Chetan G. Sakariya. A study to compare immediate effect of ischemic compression technique and positional release technique on pain and cervical range of motion of upper trapezius trigger points - a comparative study. *Int J Health Sci Res.* 2026; 16(5):90-95. DOI: <https://doi.org/10.52403/ijhsr.20260511>
