



Original Research Article

Immediate effects of myofascial release and cryo-stretching in management of upper trapezius trigger points – A comparative study

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ABSTRACT

Background: Myofascial release has beneficial effects on trigger points. Many studies have been done on myofascial release but a comparative study with cryo-stretching is lacking.

Aims and Objectives: To find the effectiveness of cryo-stretching on trigger points and compare between myofascial release and cryo-stretching.

Materials and Methods: 54 participants were included in the study and were allocated into two groups: Myofascial release (deep transverse friction, cross-hand technique) and cryo-stretching (static stretch, isometric contraction). Pre and post-assessments were taken for pain using VAS, pressure threshold by digital algometer and cervical lateral flexion using a universal goniometer.

Results: Analysis was done using unpaired t-test and Mann Whitney U test for comparison of ROM and pressure threshold and pain respectively between the two groups. Differences between the two groups were statistically insignificant ($p > 0.05$). Paired t-tests and Wilcoxon's test for within-group study showed significant improvement for VAS PPT, and ROM in both groups.

Conclusion: The study found that both MFR and cryo-stretching were effective in management of upper trapezius trigger point.

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1. Introduction

Neck pain is common in people performing sedentary activities.¹ The involved region is back of the neck and behind the shoulder. Most cases of neck pain are due to taut bands of trapezius muscle located behind the neck region. The taut band of the upper trapezius causes the formation of myofascial trigger points (MTrp)² leading to restricted cervical ranges as well as pain and tenderness. The aetiology of the MTrPs is not currently known. The most accepted hypothesis focuses on the existence of shortening of the muscle.^{3,4} The first authors who systematically described the myofascial pain syndrome were Travell and Simons,⁵ who theorized that this painful condition is due to the presence of myofascial trigger points (MTrPs). MTrPs are hyperirritable points located within a taut band (TB) of

skeletal muscle that causes referred pain, local tenderness, and sometimes autonomic changes. The trapezius muscle plays an important role in connecting the neck to the trunk. The occurrence of trigger points in trapezius muscle is common in the upper part of the muscle. An active MTrp is characterized by spontaneous pain or pain response to movement, while a latent MTrp is a sensitive spot with pain only elicited in response to compression.⁶ The MTrp diagnosis requires detailed history taking and physical examination to confirm the presence or absence of an original set of diagnostic criteria (i.e., taut band, spot tenderness, referred pain, pain recognition, local twitch response). When trigger points (TrPs) persist for more than three weeks; the diagnosis of MPS is made.⁷ Various techniques have been used for treating trigger points such as needling, stretching, hand manipulations. These techniques along with other combinations are used for inactivation of trigger points. The presence of trigger points in upper

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trapezius may cause neck pain along with restricted ranges of the cervical region.⁸ These triggers may get affected due to the abnormal posture of the neck and scapular region. Prolonged flexed neck posture by use of devices may add on to the spasm in the upper back along with tender points. Weaken scapular stability also leads to contracted muscles. The spasm if not treated aptly may lead to the formation of trigger points. Myofascial release in the form of direct manual contact involves the use of deep transverse friction massage from the ulnar border of palm and cross-hand technique involves the use of stretching the muscle from origin to insertion.⁹ The effect of stretching after ice application would result in the reduction of pain from the myofascial tissue. Previous studies did compare the use of cold pack and myofascial release. But there is nostudyconductedfor cryo-stretching. Use of cold pack along with proprioceptive neuromuscular facilitation (PNF) technique of contract-relax interprets that stretching would be more beneficial in improving pain as well as range of neck.¹⁰ This study intends to compare the immediate effects of myofascial release and cryo-stretching in treatment of upper trapezius trigger points.

Myofascial release is used for treating trapezius trigger points. It acts by relaxing the contracted muscle and improves the circulation and lymph drainage. It acts by changing the viscoelastic properties of connective tissue. It restores proper muscle alignment. The use of ice for treatment has been used since a long time. Ice is the most commonly used entity for testing musculoskeletal injuries. Cryotherapy causes vasoconstriction, reduces tissue metabolism, oxygen uptake and inflammation and muscle spasm. Stretching the muscle after trigger point release causes longer pain relief. The study aims to compare the effect of myofascial release and cryostretch in management of upper trapezius trigger point on pain, pressure threshold and cervical range of motion.

2. Materials and Methods

In the comparative intervention study, 54 participants between the age group of 20-40years (mean \pm 25.01) participated. Participants were both genders, recruited from the OPD, Sancheti Institute of joint replacement centre, Pune. The study received clearance from Institutional ethics committee by Sancheti College of physiotherapy, Sancheti Hospital, Pune.⁵ Participants were selected if they showed point tenderness on a taut muscle band, local twitch response, and reproduction of usual pain and restricted cervical range of motion. The pain was assessed by visual analog scale.¹¹ Subjects were excluded if they showed a history of referred pain due to cervical pathology, degenerative cervical spine disease, healing fractures over the neck and upper back, dermatitis over upper back or clotting disorder, wound over neck region, shoulder pathology. After the participants signed a consent form,

they were assigned into any of the two groups by random allocation technique. The study received clearance from Institutional ethical committee by Sancheti College of physiotherapy, Sancheti Hospital, Pune.

Measurements of cervical range of motion and pressure threshold were done prior and post-treatment. For measuring cervical lateral flexion range, universal goniometer was placed at C7 vertebra as the fulcrum.¹² The side to be assessed was laterally flexed using the measuring hand. Reference points were drawn on trigger points to assess the pressure threshold using a digital algometer.¹³ The pressure applied was increased as 1kg/cm²/sec.¹⁴ placing the head of the algometer perpendicular over marked points. The digital reading was taken when minimal pain was elicited. The patient was asked to react with minimal pain. The pain assessment was done by VAS for marking the pain on a scale of 0 to 10 cm where subject marked the pain pre and post 10 minutes of study.

In the myofascial release group, the direct method of myofascial release comprised of 10 minutes. The fascia was palpated and pressure applied for 60-90 seconds. The procedure was carried out without sliding over the skin or forcing the tissue until the fascia complex starts to yield. The pressure was applied with the thumb while the patient lay in a supine position. Later the pressure was applied in supine lying by using the ulnar borders of hand.⁹



Fig. 1: Digital algometer

Cryo-stretching consisted of the application of ice for 10 minutes till the part of trigger point was numbed. Later a 65 seconds passive static stretch was given over the upper trapezius with side flexion to the opposite side and within the stretch, 3 sets of 5secs isometric contractions were done for upper trapezius. For the stretch participant was made to sit erect and the therapist applied a stretch for upper trapezius using both hands. One hand was at the lateral forehead while the other hand was at the later border of upper trapezius with the palm facing downwards.

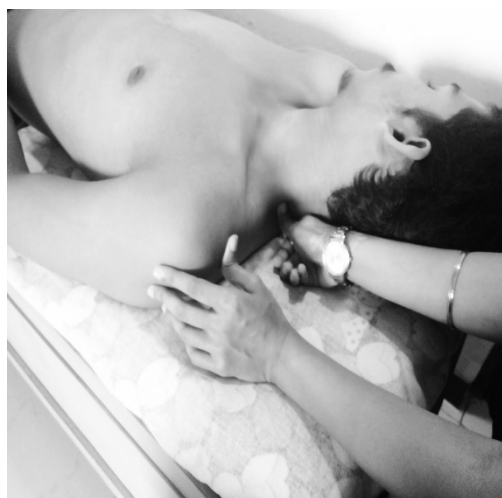


Fig. 2: Supine fascia stretch



Fig. 4: Cryo-stretches



Fig. 3: Cross hand release

Within the stretch, the participant was made to contract isometrically on the therapist's upper hand for 5 secs three times (Figures 1, 2, 3 and 4).

After application of both techniques, each participant was made to do active exercises of the neck including flexion-extension, lateral flexions, rotations and shoulder retractions each with 5 secs hold.¹⁰

Post assessment readings were taken within 10 minutes of the treatment.

3. Results

The analysis of data was done using Instat graph pad software. Paired t test and Wilcoxon's test was used for within group analysis and unpaired t test and Mann Whitney

U test was used for intergroup analysis.

Tables 2 and 3 shows within group comparison between pre and post readings for VAS, cervical lateral flexion and pain pressure threshold (PPT).

Pre and post treatment comparison for VAS (Group-A: $p=0.000$, Group-B: $p=0.006$, PPT (Group-A: $p=0.000$, Group-B: $p=0.00$, and ROM (Group-A: $p=0.000$, Group-B: $p=0.001$, showed highly significant difference ($p<0.05$) within the groups. It indicated both MFR and cryo-stretching were helpful in alleviating pain of trigger points.

Table 4 shows the mean difference and SD for pain, pressure threshold and ROM between two groups. The unpaired t test and Mann Whitney U test for intergroup comparison showed significant changes (p value <0.05) only for lateral flexion range of motion.

4. Discussion

The comparative study between MFR and cryo-stretching showed significant improvement in pain (p -value <0.05). MFR proved to be effective in improving ROM in upper trapezius trigger points as compared to cryo-stretching. Previous studies on MFR showed the efficacy of this intervention for PPT.¹⁵ Marzieh M and Soraya P performed a study on trigger points using deep friction massage and the study showed that there was not the only improvement in pain tolerance but also in functional outcome of that of upper limb grip strength.¹⁶ Use of voluntary contraction alternated with passive stretch for release has been used for releasing tightness in the muscles. Post isometric relaxation is a simple technique of muscle used for taking up slack in the muscle. When MFR is applied on trigger points there occurs a blanching effect leading to hyperemia, washing out

Table 1: Descriptive data (mean; SD) at baseline of all measurable variables

Variable	mean (SD)	Myofascial release N=27	Cryostretch N=27
Age	25.01(5.44)	25.92(6.34)	24.14(4.33)
side	R=29 L=26	R=15 L=12	R=14 L=14
VAS	5.13(1.55)	5.30(1.76)	4.96(1.34)
Ppt	2.46(1.93)	3.20(2.20)	1.75(1.31)
ROM right	37.8(5.96)	38(5.97)	37.62(5.94)
ROM left	37.8(6.21)	37(6.90)	38.59(5.32)

Table 2: MFR

Outcome measures	Pre Mean (SD)	Post Mean (SD)	P value
VAS	5.30(1.7)	3.19(1.49)	0.00
ROM R	38(5.97)	41.26(4.25)	0.024
ROM L	37(6.90)	40.07(10.53)	0.00
PPT	3.20(2.20)	4.46(3.05)	0.00

Table 3: Cryostretch

Outcome measures	Pre Mean (SD)	Post Mean (SD)	P value
VAS	4.96(1.34)	2.66(1.33)	0.006
ROM R LFLEXION	37.62(5.94)	38.96(5.68)	0.001
ROM L LFLEXION	38.59(5.32)	40.48(4.70)	0.001
PPT	1.75(1.31)	2.48(1.61)	0.00

Table 4: Mean difference and Standard deviation for all variabes between MFR and Cryostretch

Outcome measures	Group A Difference mean (Sd)	Group B Difference mean (Sd)	P value
VAS	2.11(1.24)	2.29(1.20)	0.5195
ROM R LFLEXION	3.26(3.70)	1.33(1.17)	0.0081
ROM L LFLEXION	4.53(3.89)	1.77(1.57)	0.0065
PPT	1.25(1.51)	0.85(0.72)	0.110

of metabolites and inflammatory exudates thus improving the muscle tone. By myofascial release, there is a change in the viscosity of the ground substance to a more fluid state which eliminates fascia's excess pressure on pain-sensitive structures and restores proper alignment.⁷ Thus myofascial release technique can be used for immediate improvement in cervical ranges compared to cryo-stretching. The major treatment methods are patient training, elimination of trigger factors, medical treatment, superficial & deep heat applications, electrotherapy, stretching and spray technique, acupuncture, local injections, massage and exercise.¹⁷ Perceived pain and cervical ROM has shown a consistent rise on the subject who was treated using Laser. This is an apparent indication of pain relief caused in the management of MTrP. Thus it was concluded that laser can be used as an effective treatment regimen in the management of myofascial trigger points thereby reducing disability caused due to the musculoskeletal pathology.¹⁴ Ischemic compression therapy provides alternative treatments using either low pressure (pain threshold) and long duration (90s) or high pressure (the average of pain threshold and pain tolerance) and short duration (30s) for immediate pain relief and MTrP sensitivity suppression. Results

suggest that therapeutic combinations such as hot pack plus active ROM and stretch with spray, hot pack plus active ROM and stretch with spray as well as TENS, and hot pack plus active ROM and interferential current as well as myofascial release technique, are most effective for easing MTrP pain and increasing cervical ROM.¹⁷ The combined effect of interferential current and myofascial release therapies results in more pain relief, suppression of MTrP sensitivity, and an increase in cervical ROM. The mechanism of interferential current therapy maybe because of the effects of the directly applied electrical current with stronger intensity on the involved muscle to enhance muscle circulation, to reduce muscle spasm, to eliminate muscle pain, and to increase muscle strength. Pain relief from the myofascial release technique may result from breaking the limitation of muscle or connective tissue around the joint, from stimulating the mechanoreceptor, from increasing the blood flow and neuron conductance, or from local or systemic relaxation.¹⁵ Myofascial release is a highly interactive stretching technique that requires feedback from the patient to determine the direction, force, and duration of the stretch and to facilitate maximum relaxation of the tense tissues. This technique recognizes that a muscle cannot be

isolated from the other structures of the body so all muscle stretching is the stretching of myofascial units.

5. Conclusion

Myofascial releases, as well as cryo-stretching, were effective in reducing pain. The myofascial release showed immediate greater improvement in cervical lateral flexion range of motion as compared to cryo-stretching.

6. Source of Funding

None.

7. Conflict of Interest

None.

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