Pakistan Journal of Rehabilitation

OPEN ACCESS

RESEARCH REPORT Volume 5 (Issue 2), 2016 | Page No. 47-54

EFFECTS OF MYOFASCIAL RELEASE & VAPOCOOLANT SPRAY WITH STRETCH TECHNIQUE ON UPPER TRAPEZIUS TRIGGER POINTS

ABSTRACT

BACKGROUND

Myofascial pain syndrome is a common source of pain in people with bad postures. The syndrome encompasses mostly trigger points that are formed in the muscles and become chronic and ultimately cause restricted range of motion. Also these trigger points affect quality of life. Upper trapezius trigger points are commonly found in people of all age especially young adults and middle aged adults. Different physical therapy treatmentsand techniques have been used to release these trigger points. Mostly the treatment techniques applied were in combination to see their effects on pain, restricted neck movements and quality of life.

OBJECTIVES

To determine the effects of Myofascial release and spray and stretch technique on upper trapezius trigger points

METHODOLOGY

A sample of 30 individuals was taken who had a history of neck pain for a month through a non-probability purposive sampling technique. These individuals are then allocated to intervention and control group randomly. The intervention group received Myofascial release technique with stretching exercises and the control group received spray and stretch technique. The techniques were applied for three consecutive days and three times per treatment session. A pre-assessment and post-assessment was taken on the basis of range of motion and pain scores on VAS. Post assessment was conducted after about 3 days of given treatment. The assessments were taken for pain and cervical range of motion. The outcome measures of the study were visual analogue scale (VAS) and goniometer.

CONCLUSION

Myofascial release have greater effects in releasing upper trapezius trigger points with significant reduction in neck pain and improved neck movements as compared to spray and stretch technique and there would be minimal chances of early recurrence of trigger points after about 3 days of receiving it.

KEYWORDS

Trigger Points, Myofascial Release, probability, spray and stretch technique, neck pain, range of motion.

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[Shah FS, Tharwani AF, Zehra SN, Jabeen Z, Tahir T. Effects of myofascial release & spray and stretch technique on upper trapezius trigger points. Pak. j. rehabil. 2016;5(2):0-0]

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INTRODUCTION

Myofascial trigger point is a hyperirritable spot that is felt as a nodule in a taut band of skeletal muscle[1]. Manual pressure is used to locate the site of trigger points[1]. These trigger points cause Myofascial pain syndrome and have sensory, motor and autonomic dysfunction[1]. Motor symptoms include decrease muscle strength with stiffness and decrease range of motion while sensory symptoms manifest as local tenderness, referred pain with central and peripheral sensitization[1]. Central sensitization refers to increased excitability of central neurons whereas peripheral sensitization describes the reduction in threshold and increase nociceptors responsiveness[1]. These sensitizations lead to allodynia and hyperalgesia[1].Autonomic symptoms include altered vasoconstriction and vasodilatation, coldness, increased sweating and pilomotor response with hypersecretion[2].

The potential causes of trigger points include overuse activities, trauma or sudden acute overloading of muscle, muscle deconditioning, postural imbalances associated with poor ergonomics, asymmetrical loading while lifting heavy objects[3].

Myofascial trigger points can be active that produce classic pattern of pain and can be latent that are asymptomatic[4]. Further types include primary or secondary trigger points in which the primary is due to acute or chronic overloading while secondary develops as a result of primary trigger point and satellite or associated trigger points that are formed in a reference zone of other trigger points[4]. The radiating pain of trigger points is generally recognizable and the body area to which the pain radiates is known as its reference zone[4]. The radiating pain is dull and aching in nature associated with or without discomfort. Palpation is done to examine the tenderness as latent trigger points cause pain on palpation that is otherwise asymptomatic[4].

Poor head posture leads to hyperactivity in upper trapezius that causes trigger point formation in chronic stages[4]. The associated trigger points can be formed in the contralateral trapezius and ipsilaterall evator scapulae, rhomboids and supraspinatus muscles[4]. Moreover, the satellite trigger points are more likely to develop in temporalis and occipitals muscle[4]. Trapezius has three parts that are parsdescendens, parstransversa, pars ascendens[5]. Pars descendens is the upper part of trapezius that originates from the occipital protuberance, nuchal ligament, spinous processes of 7th cervical and all thoracic vertebrae and are inserted on the lateral third of the clavicle and acromion and spine of the scapula[5].The fibers of the upper part elevate the acromial end of the clavicle, extend the head and stabilize the scapula[5].There are seven motor points in the trapezius muscle among which four are the motor points that are clinically associated with trigger point$_1$(TrP_1)[6].Trigger point$_2$ (TrP_2) is located in the mid portion of anterior border of upper trapezius[4]. The involved fibers are vertical that attached to the clavicle[4]. The referred pain goes from the posterolateral aspect of neck to the mastoid process[4]. This referred pattern is associated with 'tension headache'[4]. The pain is rarely referred to the lateral side of head, temple, back of orbit and jaw angle[4]. TrP_2 is inferior and lateral to the TrP_1 in the mid horizontal fibers[4]. The resultant pain is referred behind the ear and posterior to the zone of TrP_1[4].

Various techniques are used to treat the trigger points such as ice massage, ice sweeps, spray and stretch, sustained deep pressure, electrical stimulation, low-power laser and ultrasound[7]. Application of cold alleviates the pain by decreasing nerve conduction velocity (the speed by which a nerve signal travels)[8]. Also it acts as a counterirritant and desensitizes the nociceptors according to pain gait theory; another effect of decrease in pain is due to the release of endorphins from the descending pathways[8]. Myofascial release refers to a manual massage technique that is applied to release fascia, skin, soft tissues and bone from adherence in order to relieve pain and to improve range of motion[9]. Fascia is a connective tissue that lines the musculoskeletal system and organs as well[9].

Myofascial release encompasses different manual techniques among which sustained manual pressure technique has found to be most effective treatment for releasing trigger points[10].

A study hypothesized that the central nervous system is involved in the pathogenesis of trigger points[11]. This central mechanism explains prolonged plateau depolarization of α-motor neuron that results in continuous discharge from the neurons[11].Myofascial pain syndrome is a musculoskeletal syndrome that is associated with trigger points in the muscles[12]. These trigger points are palpable, focal and tender[12]. On palpation they produce twitch response with or without referral of pain[12].

Myofascial release is a manual technique that implies application of gentle manual pressure to release the fascia adhesions[13]. The technique is applied without any ointment into the direction of adherence[13]. The pressure is sustained for about 90 to 120 seconds minimally[13]**.** Myofascial release technique restores muscular function with postural alignment and promotes relaxation[9]. Basically this technique releases the muscles that are hold abnormally with a tight fascia[9].

Researchers supported the idea of releasing trigger points with vapocoolant sprays[14]. The evidences have explained that the application of cold by the spray inhibits the central nervous system responses including pain signals along with reflex motor and autonomic effects[14]. As the pain is alleviated the muscles become relaxed which can be then stretched and lengthened[14]. This spray and stretch technique is effective, quick and least painful for the treatment of a single muscle myofascial pain[15].

Vapocolant spray provides tactile stimulation in the reference zone of trigger points that blocks the reflex spasm[15]. Thus the pain subsides and the muscle is stretched passively[15]. The main purpose of this study was to see the effects of vapocoolant spray with stretching on myofascial trigger points.

METHODS

Study Design

Randomized control trial (RCT)

Population and Study Sample

30 participants who aged between 18 to 40 years were recruited in the study. A block randomization non-probability purposive sampling technique was used according to which 15 participants were allocated to intervention group and 15 to control group.

Sources of Data

Data was collected from an OPD setting of an orthopedic clinic.

Collection of Data

Data was collected through questionnaires and assessment forms. On the basis of questionnaire the participants were recruited into the study. After recruitment a pre-assessment was taken including VAS score and range of motion for cervical lateral flexion. Pain was elicited by palpating the trigger points and the participants were asked to mark the pain intensity on a VAS scale. Participants who notified bilateral pain on palpation were assessed for range of motion of cervical lateral flexion on both sides that indicated bilateral involvement with trigger point formation.

Procedure

Subjects were equally allocated to two groups A and B. Group A received Myofascial release technique with neck stretching exercise for upper trapezius whereas group B received spray and stretch technique with neck stretching exercises. The treatment was applied for three days consecutively and in each session technique was applied thrice. Post-assessment was done after third session.

Group A

Myofascial Release

Subjects were instructed to sit in a comfortable position with back straight and supported on the armless chair and feet placed on the floor. Sustained manual pressure was applied for 3 times per session. First the trigger points were palpated in the upper fibers of trapezius by thumb moving in a circular direction deeply in different points of upper trapezius, when found deep sustained pressure on the trigger points was applied with thumb and maintained for 60 seconds and then was released in vertical direction.

Stretching of upper trapezius muscle
Therapist laterally flexed the neck followed by forward flexion on opposite side to place stretch on the involved upper fibers of trapezius muscle.

Group B
Spray and stretch
Subjects were instructed to sit in a comfortable position with back straight and support on the armless chair and feet placed on the floor. Then the therapist stretched the upper fibers of trapezius muscle for maximum lengthening with the Myofascial trigger point and pressed the patient's head in forward direction to raise the occiput. At the same time the vapocoolant spray was applied in parallel sweeps from the acromion to the mastoid process.

Data analysis strategies
A Statistical package for social sciences (SPSS 20) version has been used for the analysis of statistical data.

Inclusion criteria:
Individual with history of neck pain or tension headache for at least 3 months and were willing to participate in the study.

Exclusion criteria:
Individuals with who have one of the following conditions were excluded from the study.

- open wounds
- Fever
- Skin infections
- Impaired circulation
- Disc herniation
- Recent spine surgery
- History of cervical fracture

Myofascial Release	Preassessment	Postassessment	
	Mean ± std.Deviation	Mean ± std.Deviation	p-value
Pair-1 VAS	6.07 ± 1.710	1.93±1.033	<0.01*
Pair-2 right cervical side flexion	36.5333±7.33744	46.3333±8.26928	<0.01*
Pair-3 left cervical side flexion	36.467±8.74942	44.3333±7.65942	<0.01*

RESULTS

This study analyzed the comparative effects between two techniques that are Myofascial release with sustained pressure and spray and stretch techniques in the treatment of Myofascial pain syndrome caused by upper trapezius trigger point. Stretching exercises of neck are incorporate with both techniques. Participants were selected on the basis of questionnaires and assessment (i.e. VAS score and range of motion of cervical side flexion). Sample of 30

participants were included in the study with mean age of 18 to 40 years. It was seen that out of 30 randomly selected patients, 21(70%) were female and 9(30%) were male.

		Frequency	Valid %
Gender	Male	9	30.0
	Female	21	70.0
	Total	30	100.0

Comparison of Both Groups

Table: 1

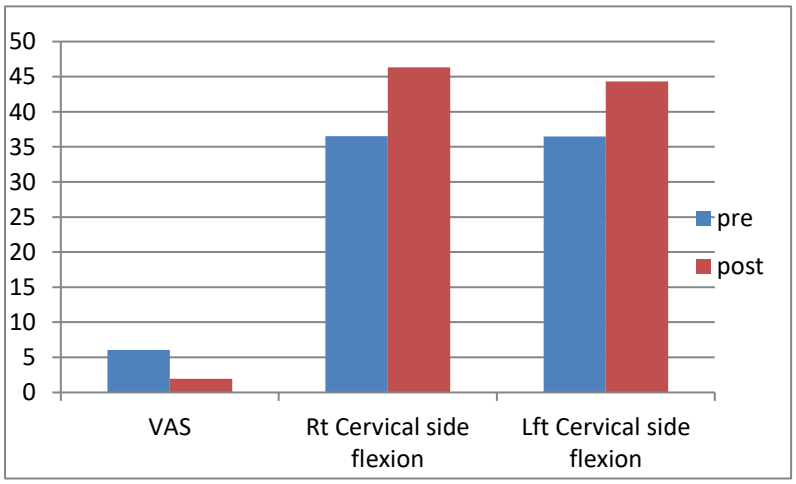
P<0.05 is considered as significant in paired t-test

Table: 2

P<0.05 is considered as significant in paired t-test

Patients were equally divided into two groups i.e. 15 patients per group. Group A was treated by myofascial release with exercises while group B was treated by spray and stretch technique with exercises. Pre and post range of motion of cervical side flexion were noted of the respective treatment given. The data was analyzed from the SPSS statistical analysis program on the basis of mean and standard deviation by using t-table.

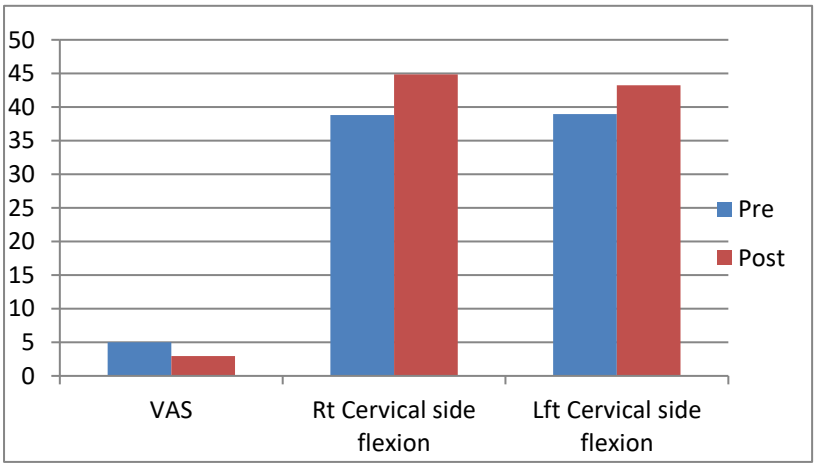
Spray and stretch technique	preassessment	Postassessment	
	Mean ± std.Deviation	Mean ± std.Deviation	p-value
Pair-1 VAS	5.00±1.604	2.93±1.335	<0.01*
Pair-2 right cervical side flexion	38.000±6.23584	44.8667±5.68038	<0.01*
Pair-3 left cervical side flexion	38.9333±9.92448	43.2667±7.14609	0.06



It is transpired from the descriptive analysis that mean range of Myofascial release with exercises pre and post cervical side flexion of right side are 36.53 and 46.33, which shows an increase in range of 9.8 in right cervical side flexion while the mean range of myofascial release

with exercises pre and post cervical side flexion of left side are 36.46 and 44.33 which shows an increase in range of7.87 in left cervical side flexion.
At the same time, mean range of spray and stretch technique with exercises pre and post cervical side flexion of right side are 38.00 and 44.86 which shows an increase in range of 6.86 in right cervical side flexion while the mean range of spray and stretch technique with exercises pre and post cervical side flexion of left side are 38.93 and 43.26 which shows an increase in range of 4.33 in left cervical side flexion.
Pain was also calculated via Visual Analogue Scale (VAS) in candidates of both groups i.e. A and B. Group A, calculated pain was 6.07 before treatment and 1.93 after treatment. While group B, pretreatment pain was 5.00 and post treatment pain becomes 2.93.
By above results, it was known that both these techniques are effective in relieving pain and restoring range of motion in participants with myofascial pain syndrome caused by upper trapezius trigger point with p-value 0.00 by applying paired sample test.
In comparison, it is evident that results of myofascial release with exercises in terms of pain reduction and increase in range of motion are more significant as compared to the results of treatment with spray and stretch technique with exercises.

Myofascial Release with sustained Pressure
Spray and Stretch Technique



DISCUSSION

Myofascial pain syndrome is a major health issue that affects the individuals by reducing mobility with disabling pain. It therefore has impact on sense of well-being[16]. This syndrome comprises the painful taut bands of muscle that contain palpable, hypersensitive nodules known as myofascial trigger points[16]. It has been reported that individuals with trigger points not only show a reduced functional status but also suffer from mood changes and have an indirect effect on quality of life[16].
Individuals who have trigger points report local persistent pain with decreased range of motion[17]. Mostly the trigger point formation occurs in postural muscles[17]. Postural muscles of the neck are the most frequently affected ones including trapezius especially[17]. It has been suggested that active trigger points in the upper trapezius muscle were associated with chronic tension type headache. It was also reported that individuals with active trigger points had been suffering with more severe type of tension headache as compared to those having latent trigger points[18].On Histological examination of muscle biopsies from myofascial trigger points reveals that hyper contracture is formed that is associated with sustained sarcoplasmic reticulum calcium release due to intense neural activation and action potential generation[16]. Sustained contraction with increased metabolic stresses and reduced blood flow causes secondary changes in the muscle and leads to persistent trigger points[16].

The proposed mechanism behind myofascial release with sustained pressure is basically the neuromuscular relaxation. This relaxation is achieved by the stimulation of Golgi tendon organs which alter the mechanical tension of the muscle with resultant reduction in neuromuscular sensitivity to mechanical pressure and stretch[18].
In a 1998 study, Simons concluded that spray and stretch technique is the most effective noninvasive technique in deactivating trigger points[19].A temperature reduction of 2 to 5 degrees is enough to cool the tissues and the resultant beneficial effects include analgesic, vasomotor, anti-inflammatory and muscle relaxation effects[19,20].
According to Travell and Simons, vapocoolants have a cooling effect on the area being affected. This causes the transmission of sensory impulses to the spinal cord that result in an inhibitory effect on local pain. The same inhibitory effects actually break the pain spasm pain cycle due to which the muscle ultimately becomes relax and the stretching further aids in elongation of the muscle[18].In Spray and Stretch technique, the affected muscle is passively stretched[21,22]and dichlorodifluoromethane-trichloromonofluoromethane (Fluori- Methane) or ethyl chloride spray is applied simultaneously on the skin.[18]
The mean range of Myofascial release with exercises pre and post cervical side flexion of right side are 36.53 and 46.33, which shows an increase in range of 9.8 in right cervical side flexion. And the mean range of myofascial release with exercises pre and post cervical side flexion of left side are 36.46 and 44.33 which shows an increase in range of7.87 in left cervical side flexion.
At the same time, mean range of spray and stretch technique with exercises pre and post cervical side flexion of right side are 38.00 and 44.86 which shows an increase in range of 6.86 in right cervical side flexion. And the mean range of spray and stretch technique with exercises pre and post cervical side flexion of left side are 38.93 and 43.26 which shows an increase in range of 4.33 in left cervical side flexion.
Pain was also calculated via Visual Analogue Scale (VAS)[23-25] in candidates of both groups i.e. A and B. Group A, calculated pain was 6.07 before treatment and 1.93 after treatment. While group B, pretreatment pain was 5.00 and post treatment pain becomes 2.93.

It was acknowledged that both these techniques are effective in relieving pain and restoring range of motion in participants with myofascial pain syndrome caused by upper trapezius trigger point with p-value 0.00 by applying paired sample test.

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