DOI: https://doi.org/10.54393/pbmj.v5i7.654

PAKISTAN BIOMEDICAL JOURNAL

https://www.pakistanbmj.com/journal/index.php/pbmj/index

Volume 5, Issue 7 (July 2022)

Original Article

Comparative effects of Myofascial Technique Alone and In Combination with Isometrics on Myofascial pain Syndrome Due to Excessive Smartfone Usage

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ARTICLE INFO

Key Words:

Isometrics, Myofascial release technique, Myofascial pain syndrome, trigger points.

How to Cite:

Khalid, A. ., Ahmad, J. ., Michelle, A. ., Nazir, S. ., Khalid, N. ., & Jabbar, F. . (2022). Comparative effects of Myofascial Technique Alone and In Combination with Isometrics on Myofascial pain Syndrome Due to Excessive Smartfone Usage: Effect of Isometrics, Myofascial and Isolated Myofascial Release Technique on Myofascial Pain Syndrome. Pakistan BioMedical Journal, 5(7). https://doi.org/10.54393/pbmj.v5i7.654

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Received Date: 18th July, 2022

Acceptance Date: 25th July, 2022

Published Date: 31st July, 2022

ABSTRACT

Myofascial Pain Syndrome (MPS) is a regional musculoskeletal pain disorder which is caused by the formation of myofascial trigger points. Myofascial trigger point pain is typical and frequently so debilitating that it is vital to receive quick and efficient treatment. This pain is commonly seen in people that are in their teenage or in adults effecting both men and women. Many interventions have been used to treat this condition by physiotherapists and respective health care providers such as trigger point release, massage therapies, acupuncture techniques, and other heat and cold therapies, among others. **Objective**: This study compares the efficiency of myofascial release techniques along with isometrics exercises and isolated myofascial release for the upper trapezius muscles' myofascial trigger points. **Methods**: It was a Randomized clinical trial carried out in the city of Faisalabad. Two groups of the patients were made and randomly assigned by lottery method. Both the groups received myofascial release techniques baseline treatment. Group A received the isometrics with myofascial release technique and group B received the isolated myofascial release technique. The Trapezius muscle's trigger points were assessed using Simon's trigger point criteria. Outcome measures were VAS and Neck pain assessment form. **Results:** Upon completion of the trial, NDI and VAS scores were assessed prior to and after the treatment; before treatment group A of NDI demonstrated average score of 10.7333 and group B showed 14.5333, while after treatment the score was transformed to group A; 3.4000 and group B; 4.8667. For VAS, group A and B before treatment scored 5.7333 and 5.8667, respectively, whereas, after treatment they scored 2.4667 and 2.5333, respectively. **Conclusion**: MFR along with isometrics was slightly more effective as compared to isolated MFR in pain alleviation and improvements of ROM but statistically both of interventions given were effective.

INTRODUCTION

The area between the base of the skull and the clavicles is known as the neck. Despite its modest size, it comprises a number of significant anatomical features. The cervical fascia divides the neck into layers and possible areas. The trachea, oesophagus, thyroid gland, cervical fascia, as well as the muscles, nerves, and blood vessels, are all enveloped inside this fibrous connective tissue. The cervical fascia has two layers: the superficial layer and the deep layer. The superficial layer is deep in the dermis but shallow in the platysma muscle. It is connected with the superficial musculoaponeurotic system and unsheathes the platysma (SMAS). The facial motor neurons, adipose tissue, external and anterior jugular veins, and sensory nerves are all found in the gap between the superficial and deep cervical fascia. The deep cervical fascia is separated into three layers: superficial, medium, and deep. The "rule of twos" might be used to remember the superficial layer of this fascia. It encircles two muscles (trapezius and SCM), two glands (submandibular and parotid), and two neck gaps (parotid and submandibular) (space of posterior triangle and the suprasternal space of Burns in the anterior midline). The deep cervical fascia has an intermediary layer called the peritracheal fascia. The strap muscles, thyroid gland, trachea, and oesophagus are all encased in it. The deepest layer of the deep cervical fascia is the posterior prevertebral layer, which encloses the scalene muscles and the spine [1-3]. Pain in the shoulder region and shoulder joint as a result of myofascial trigger points is very

DOI: https://doi.org/10.54393/pbmj.v5i7.654

common in people now a day. This also shows that the chances of occurrence of trigger points is common in the shoulder region as compared to other parts or regions of the body where it is less likely that trigger points will be present [4]. The neck is the body part that joins the head to the rest of the body. It connects the head to the thorax and holds a range of vital organs which is located between the clavicle and the jaw. It has some of the most complex and complicated anatomy in the body and comprises of a variety of organs and tissues that have important structures and functions for normal physiology. Structures in the neck regulate breathing, speaking, swallowing, metabolism regulation, support, and connection of the brain and cervical spine, and also circulatory and lymphatic influx and outflow from the head. The midway of the muscle's upper border is where the trapezius myofascial trigger point is quite often seen [5]. Myofascial trigger points are a common and prevailing condition affecting many people and their daily activities of life but when it comes to clinical based evidence it has been seen that there is less evidence to show how to manage this condition in a successful manner [6]. Myofascial trigger points have a very drastic and negative affect on the life of a person who suffer by such problems once in a while in his or her life. This condition constitutes a very devastating impact on the person affecting the daily work, not only at home but also at a workplace. According to a local survey done in America it has been seen that approximately 15 percent of American population is affected by this problem in their daily life while the numbers increase, each passing day. Hence, there is an elevated number of medical visitations with most of the cases being of myofascial trigger points [7]. Myofascial trigger points are most often mixed by researchers and authors with other problems that are more or less similar to this condition due to the presence of very minor differences. For instance, myofascial pain syndrome is mixed with fibromyalgia because the pattern of pain, character of pain, and radiation of pain is quite similar in characterized with trigger points whereas fibromyalgia consists of tender points. Nevertheless, there is an overall acceptance of the problem among researchers and authors but still ambiguity is present to some extent. Moreover, there is also an overall agreement upon the methods of diagnosis that are used to identify this common problem among people [8]. Most of the times in clinical practice the common method used for the identification for presence of myofascial trigger points in the shoulder region whether they are active or latent, requiring palpation of the taunt band of muscle fibre of the affected region. This method has also been validated by the clinicians and researchers to be performed upon the trigger points of not just shoulder region but also of the other regions of the body [6]. For the proper diagnosis of the presence of myofascial trigger points physical examination of the trigger points is the very first step used in physical therapy to confirm the existence of myofascial trigger points and to confirm the intensity of muscular shortness involved. This physical examination is also used to see how much area has been covered by these trigger points so that the extent of disability and limited functional activities by the affected person can also be confirmed [9]. The physical examination of myofascial trigger points involves a method which is referred to as palpation of the whole area where trigger points have been developed, inert involves palpation of the whole taut band of muscle fibre by using thumbs and fingers followed by application of pressure upon the area so that the trigger points can easily and efficiently be located. This method of palpation provides information to the physical therapist about the structure of the bone. The tone of the affected muscle also gives an idea about the texture, turgidity, and temperature of the involved area of the skin. Specific palpation techniques are frequently used to elicit pain by applying pressure to the affected anatomical structures. These manoeuvres are crucial for diagnosing and treating patients with manual therapy and not just involve the manual palpation of the patient but also involves interviewing the patient by asking him question related to pain and functional disabilities as a result of trigger points [10]. In order to prevent the occurrence of trigger points the most important thing to know is the underlying mechanism of development of trigger points as well as potential risk factors and causes that can lead towards the development of this problem. Once these causes are known it becomes too easier to stop this problem and to reduce the intensity and progression of this problem. Most commonly it is believed by clinicians and researchers that overuse of a muscle for a long period of time of direct injury to the muscle can disturb the overall structure of a muscle and hence lead towards the development of trigger points along the whole length of the muscle fibre. This muscle damage usually occurs as result of various type of forces of different intensities acting upon the muscle directly for a long period of time. These forces can be of low intensity and can also be of medium and high intensity leading towards concentric as well as eccentric contraction and shortening of the muscle fibre [11]. Among various regions of the body, it has been seen that the most commonly affected areas by trigger points in most of the cases are shoulder, neck, upper back, and scapular region. The most commonly affected muscle as shown by literature is the trapezius muscle which is more prone to the development of trigger points and loss muscle function especially in those people that are involved in many types of badminton, swimming, or

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basketball, among others [12]. There are many different types of treatment options that can be utilised to treat myofascial trigger points in the field of physical therapy. Usual care includes the utilization of multiple therapeutic modalities, such as TENS, Ultrasound (US), and short wave diathermy. In addition to these modalities various techniques of myofascial release technique are also used to release the trigger points by applying pressure on them and moving their place. Stretching techniques along with various types of coolant sprays are also used in the treatment of the trigger points. Along with these therapeutic methods of treatment many other complementary treatments are also used such as lifestyle modification, psychological counselling, and patient encouragement. Commonly, it has been reported that various patients suffering from trigger points, if not diagnosed at earliest of stages, it can lead to more chronic complications. In such cases, the pain can also spread from a smaller area to a larger part of the body, increasing the incidence of disability and other functional complexities [13]. In clinical practice among various modalities the commonly used modalities to treat trigger points include hot packs and ultrasound. Moreover, these modalities have been used in different sequences in order to get better therapeutic results regarding trigger points of trapezius muscle. The effect of hot pack and ultra sound upon various tissues of the body is different from one another. Hot pack causes vasodilation of the superficial tissues and increases the blood circulation in the area to which it is applied by releasing a vasodilator known as histamine [14].

METHODS

A private institution's outpatient department participants were screened and recruited for the study. The subjects were female only, between both the ages of 18 to 28, with pain lasting more than one month, constraining neck movements related to pain, distributing pain, and the jump signs, which would be defined by patient voice/withdrawal palpable tender spots on neck and upper back. Participants were excluded from the study who had the history of shoulder and spine surgery, congenital problems, fibromyalgia, myopathy, radiculopathy, trigger point injections, and any recent accidents. A number of 30 participants (n=30) aged between 18-28 years were enrolled after taking a thorough clinical history and fully informed written consents. Two groups of the patients were made and randomly assigned by lottery method. Both the groups received myofascial release techniques baseline treatment. Group A received the isometrics with myofascial release technique and group B received the isolated myofascial release technique. Trigger points of the trapezius muscle were assessed by using Simon's criteria. A quantitative study was conducted which follows the research design of randomized clinical trial. Inclusion and exclusion criteria were used to screen participants that fulfilled the inclusion criteria when further screened by using neck pain assessment form and then the treatment was carried out on these participants. A signed informed consent was obtained from the participants before recruitment into the study. Each subject was permitted to ask the examiner questions about the study. Participants who fulfilled the inclusion criteria were enrolled in the study. The primary outcome measures were Visual Analogue Scale (VAS) graded from 0 to 10, which shows no pain and 10 shows maximum bearable pain and neck pain assessment form to assess the level of pain. The secondary outcome measures were neck disability index to analyse the level of functional limitation as a result of trigger points. The participants were divided into two groups A and B. Group A received isometrics plus myofascial release technique. At first, release was given as baseline, followed by application of pressure upon the trigger points to release them and finally isometrics were applied. Group B received isolated myofascial release technique. First of all, myofascial release technique was applied and then pressure was applied upon the trigger points to release them. The Institutional Review Board granted ethical approval to the study. All 30 participants were randomly assigned with disguised allocation to 1 of 2 treatment groups using a realistic sample technique: Solo MFR; Group-B (n=15); Group-A (n=15) MFR + isometrics (described below in detail). Block randomization was being used to divide the participants into two groups, in which they chose one of two labelled envelopes at random. Participants selected on the basis of neck pain assessment form were divided in to different groups as discussed above. One measurement was taken before treatment by utilization of VAS and NDI. After follow up on the first measurement, last evaluation was conducted at the end of 6 sessions. Neither the treatment nor the subjects' desire to speak with one another during the trial was revealed to the participants. Following a 10-minute period of deep transverse friction, the upper trapezius muscle underwent three sets of 90-second myofascial stretches. The principle trigger point was gently rubbed with the right thumb while the left thumb reinforced it from the top, all while the patient was comfortably seated in an armless chair with both feet firmly planted on the floor. The upper trapezius was then handled with myofascial release using the ulnar border of the therapist's both palms. At that moment, the patient's cervical spine was flexed towards the opposite side. On one of the groups after receiving myofascial release technique were subjected to isometric exercises of neck, including side flexion, cervical

DOI: https://doi.org/10.54393/pbmj.v5i7.654

extension, right and left rotation, and flexion at the neck joint. Every exercise is performed for 10 repetitions with a 5-second hold [15]. A software called SPSS version 20.0 for Windows was used to enter and analyse the data. Utilizing Windows software, the Shapiro-Wilk method was conducted to test the data's normality. The mean and standard deviation were determined for quantitative variables. The independent t-test was used to compare the efficacy. P value of 0.05 or less was recognized as statistically significant. Data analysis was done by using SPSS 20.0 version and Independent T-test was also applied.

RESULTS

Descriptive statistics of neck disability index in table 1 shows that after applying independent t-test, the mean value for group A before treatment was 10.73 and +SD for group A was 4.13. Mean value for group B before treatment was 14.53 and +SD for group B was 6.76. This table also shows that mean value for group A after treatment was 3.40 and +SD for group A after treatment was 1.5 whereas mean value for NDI for group B after treatment was 4.87 and +SD for group B after treatment was +1.81. Statistically, the mean NDI score before applying treatment for group-A and group-B is equal as indicated by the p-value (0.074) using 5% level of significance, whereas the mean NDI score after applying treatment for group-A and group-B is not equal as indicated by the p-value (0.022). Descriptive statistics of visual analogue scale in table 1 shows that after applying independent t-test mean value for group A before treatment was 5.73 and +SD for group A was 1.34. Mean value for group B before treatment was 5.87 and +SD for group B was 1.25. This table also shows that mean value for group A after treatment was 2.47 and +SD for group A after treatment was 0.91 whereas mean value for VAS for group B after treatment was 2.53 and +SD for group B after treatment was 0.99. Statistically, the mean VAS score before applying treatment for group-A and group-B is equal as indicated by the p-value (0.779) using 5% level of significance, whereas the mean VAS score after applying treatment for group-A and group-B is not equal as indicated by the p-value (0.850).

Parameter	Groups	N	Mean + SD	p-value
Score of NDI before treatment	Group A	15	10.73+4.13	0.074
	Group B	15	14.53+6.76	
Score of NDI after treatment	Group A	15	3.40+1.5	0.022
	Group B	15	4.87+1.81	
Score of VAS before treatment	Group A	15	5.73+1.34	0.779
	Group B	15	5.87+1.25	
Score of VAS after treatment	Group A	15	2.47+0.91	0.850
	Group B	15	2.533+0.99	

Table 1: Scores of NDI and VAS before and after treatment

	No. of groups	N	Mean + SD	Std. error mean	p-value
Difference of NDI score before and after treatment	A = control group	15	7.3333+ 3.30944	0.85449	0.199
	B= case group	15	9.6667+ 6.01981	1.55431	
Difference of VAS score before and after treatment	A = control group	15	3.2667+ 0.70373	0.18170	0.765
	B= case group	15	3.3333+ 0.48795	0.12599	

Table 2: Average mean difference of scores before and after treatment

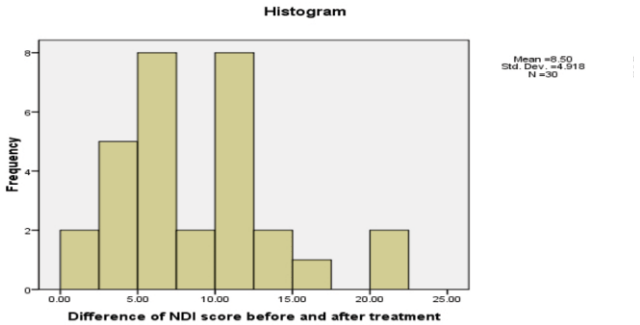

Figure 1: Difference between NDI score before and after treatment

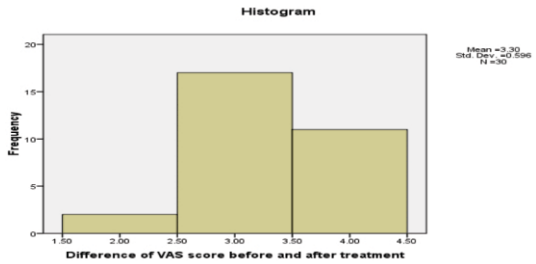

Figure 2: Difference between VAS score before and after treatment

Descriptive statistics of average mean difference of group A and B before and after treatment in table 2 shows that the difference of NDI score before and after treatment for group A has mean value 7.3333 and +SD value was 3.30944 and the difference of NDI score before and after treatment for group B has mean value 9.6667 and +SD value was 6.01981. Table 2 also shows that difference of VAS score before and after treatment for group A has mean value 3.2667 and +SD value was 0.70373 and the difference of VAS score before and after treatment for group B has mean value 3.3333 and +SD value was 0.48795. Statistically, the mean difference of NDI score before and after treatment for group A and B is equal as indicated by p-value (0.199) using 5% level of significance whereas the mean difference of VAS score before and after treatment for group A and B is also equal as indicated by p-value (0.765).

DISCUSSION

To determine the comparative effectiveness of isometrics and myofascial release versus isolated myofascial releases, this interventional study was carried out in a time period of 3 months. Neck disability index demonstrated for

DOI: https://doi.org/10.54393/pbmj.v5i7.654

group A mean +SD decreased from 10.7333 + 4.13118 to 3.4000 + 1.50238 whereas for group B neck disability showed that mean +SD decreased from 14.5333 + 6.75983 to 4.8667 + 1.80739. Visual analogue scale showed for group A that mean +SD decreased from 5.7333 + 1.33452 to 2.4667 + 0.91548 whereas for group B neck disability showed that mean +SD decreased from 5.8667 + 1.24595 to 2.5333 + 0.99043. The average mean difference of group A and B before and after treatment shows that the difference of NDI score before and after treatment for group A has mean value 7.3333 and +SD value was 3.30944 and the difference of NDI score before and after treatment for group B has mean value 9.6667 and +SD value was 6.01981. This table also shows that difference of VAS score before and after treatment for group A with mean value 3.2667 and +SD value 0.70373 and the difference of VAS score before and after treatment for group B has mean value 3.3333 and +SD value was 0.48795. The average mean difference of NDI score before and after treatment for group A and B is equal as indicated by p-value >0.05 whereas the mean difference of VAS score before and after treatment for group A and B is also equal as indicated by p-value >0.05 so there is no statistically significant difference between group A and group B. The results of this study revealed that treating myofascial trigger points with MFR or MFR paired with isometric exercises was successful. When myofascial release is applied to TrPs, the local chemistry changes as a result of the nodules blanching and then producing hyperaemia. This breaks down scar tissue, desensitises the nerve terminals, washes out the inflammatory exudates and pain metabolites from the muscles, and lessens muscle tone [16]. Thus myofascial release has essentially the same mechanism of action on the trigger point as the injection therapy. However myofascial release is a non-invasive technique that does not produces post treatment soreness or haemorrhage [20]. According to literature interpretation, extending the muscle after treating the trigger point will result in longer-lasting pain alleviation [17-19]. The results of the study may be advantageous to the population with a clinical diagnostic of myofascial pain syndrome with insidious start. One cannot conclude that the good benefits of MFR and isometrics plus MFR exhibited at the sixth session of treatment would end in long-lasting changes because to the brief intervention and monitoring periods. To observe for long-term symptom relief, additional controlled studies with extended observation are needed.

CONCLUSION

According to this study it was concluded that both isometrics plus myofascial release versus isolated myofascial release are useful for treating myofascial pain syndrome in the short term. In terms of pain relief and ROM improvements, MFR combined with isometrics was marginally more effective than isolated MFR, although statistically both therapies were successful.

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