

Research Article

# Effectiveness of Myofascial Release Technique and Muscle Energy Technique on Pain and Physical Function among Smartphone Users with Trapezitis

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## I N F O

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## A B S T R A C T

**Introduction:** Trapezitis is the most common musculoskeletal disorder caused by the inflammation of the trapezius muscle which leads to muscle spasms and pain in the neck. The prevalence of musculoskeletal disorders among smartphone users ranges from 1% to 67.8%. The prevalence of neck pain in young adults among smartphone users in the past 12 months was 47.4%. Smartphone usage for prolonged periods of time causes repetitive strain of muscles. Physiotherapists utilise a wide range of interventions in the management of trapezitis including myofascial release technique and muscle energy technique. The purpose of the study is to compare the effects of myofascial release technique and muscle energy technique on pain and physical function among smartphone users with trapezitis.

**Methodology:** 60 subjects were selected for the study and were randomly assigned to one of the two groups. Each group had 30 subjects within the age group of 18-25 years. Group A was given myofascial release technique along with cryotherapy and Group B was given muscle energy technique with cryotherapy. The parameters of the study included: Numerical Pain Rating Scale (NPRS) and Neck Disability Index (NDI) scale pre-test and post-test comparison done between the groups.

**Results:** Approximate descriptive statistics and inferential statistics along with the graphical methods were used. Both pre-test and post-test measures were analysed statistically using t-test to test the effectiveness of each technique. P value between the group NPRS and NDI ( $p < 0.0001$ ) shows significance in the subjects.

**Conclusion:** It was concluded that muscle energy technique was better than myofascial release technique among smartphone users with trapezitis.

**Keywords:** Neck Pain, Trapezitis, Smartphone Users, Myofascial Release, Muscle Energy Technique

## Introduction

A smartphone is one of the most widely used technical gadgets among people of all age groups.<sup>1</sup> According to recent research, 79% of people between the ages of 18 and 44 years use their cellphones with their hands in a flexed position, with just a few hours of their day working without smartphones. Working on computers and cellphones for lengthy periods of time causes repetitive use of postural muscles, resulting in muscle fibre injury, cumulative stress damage,<sup>2</sup> and myogenic tonus, which most commonly affects the neck and shoulders.<sup>3</sup> Neck discomfort in the upper fibres of the trapezius muscle is fairly prevalent. The prevalence of pain is quite high in young people compared to older people, and several studies have reported that trapezititis induces an early defensive muscular spasm during injury, which is uncomfortable and creates muscle stiffness. Muscular spasm leads to the formation of muscle knots known as trigger points, if the tension is not alleviated.<sup>4</sup> Trapezitis-related discomfort and stiffness, are episodic, lasting 3-5 days at a period. Trapezitis demands a diverse approach to treatment. Long-term muscular flexibility must be regained in order to limit the rate of recurrence.<sup>5</sup> The upper fibres of trapezius muscle constitute a postural muscle that is particularly vulnerable to prolonged usage and repeated muscular strain. It is utilised to elevate the shoulder girdle by initiating rotation of the clavicle. Forward bending position may cause the trapezius muscle to shorten because of prolonged use without rest resulting in neck comfort and limited range of motion.<sup>6</sup> The inflammation of the trapezius muscle causes muscular spasms and pain in the neck, making trapezititis the most prevalent musculoskeletal condition. In physiotherapy, the treatment for cervical spine related to muscle spasms includes modalities such as IFT (Interferential Therapy), therapeutic ultrasound therapy, TENS for stimulation, hot water fermentation, cryotherapy and exercises to strengthen muscles, and in addition, techniques like myofascial release technique and muscle energy techniques are also used.<sup>7</sup> The comparison of effectiveness between the myofascial release technique and muscle energy technique among smartphone users with trapezititis has been rarely studied, thus our objective is to compare the effectiveness of both techniques and to find out the beneficial one for smartphone users with upper trapezititis.

## Methodology

This study was conducted at Chettinad Hospital and Research Institute. It is an experimental study where two techniques were compared for effectiveness among smartphone users with trapezititis. Informed consent was obtained before the allocation of participants into groups. This study was performed in the period from April 2022 to August 2022 and was ethically approved by the Institutional

Human Ethics Committee for student research (CARE IHEC-I/0150/21). 60 subjects were selected and the subjects were allocated into two groups using convenient sampling technique, Experimental Group A and Experimental Group B (30 subjects in each group). Participants of both genders between the age of 18 to 25 years with a history of browsing the internet and/ or playing games on smartphones for more than 6 months, and with a pain level of more than 6 based on the Numerical Pain Rating Scale, were included in this study. Participants with a history of cervical trauma (whiplash disorder) and neck lump<sup>8</sup>, disc prolapse and fractures, previous surgeries on the neck and upper limb, and long-distance bike drivers (more than 30 km per day) were excluded from the study.

## Procedure

The procedure, purpose, benefits, risks, and outcome of the study were explained to the subjects in their vernacular language. Subjects were allocated into two different groups using the lottery method of sampling technique, Experimental Group A and Experimental Group B. Subjects of Group A were treated with myofascial release technique and cryotherapy and Group B was treated with muscle energy technique (post-isometric relaxation) and cryotherapy. The assessment was taken using the Numerical Pain Rating Scale (NPRS)<sup>9</sup> and the Neck Disability Index Scale<sup>10</sup> before and after the intervention as pre-test and post-test values respectively. Myofascial release technique<sup>11</sup> was given for about 4 weeks (3 days/week). The patient was made to sit on a chair with proper back support and the hands supported on their thighs with feet apart and in contact with the ground. The therapist stood behind the patient and closer to the side to be treated. The patient's head/ neck was maintained in a neutral position. The therapist stabilised the opposite shoulder of the patient with one hand and applied pressure with the lateral one-third of the thumb over the other shoulder and then the line of tension was taken up to the middle-belly of the upper trapezius and towards the base of the neck. This line of tension was carried towards the attachments of the trapezius at the acromial process. This process was repeated for 10 minutes. The same procedure was repeated, while the patient bent his/ her head forward and slowly rotated his/ her head from one side to the other. Increasing the resistance to the contralateral side of rotation, the patient's head was placed horizontally, the same pressure was applied and the line of tension was directed towards the root of the spine of scapula. Muscle energy technique<sup>12</sup> (post-isometric relaxation) was given for about 4 weeks (3 days/week). The patient was placed in supine position and was relaxed completely. The therapist stood behind the patient and closer to the side to be treated, and stabilised the shoulder on the affected side. With the other hand,

the therapist stabilised the neck and flexed it fully while side bending and rotating the neck ipsilaterally towards the side that is being treated for restriction barrier. Then the patient was asked to give mild resistance (20% of available strength) and to elevate (shrug) the shoulder towards the ear with pain-free movement. This contraction was maintained for 7 to 10 seconds. Then the patient was asked to relax and breathe out for 3 seconds, after which the therapist side bent and rotated the neck with an increased range of movement, where the shoulder was stabilised and stretched caudally. This procedure was done 3 times and each time with an increased range. A cold pack was given to all the participants over the upper trapezius muscle after the myofascial release and muscle energy techniques for 20 minutes to avoid skin irritation.

### Statistical Analysis

Statistical analysis was done using descriptive and inferential statistics. Mean and standard deviation was used for all the data collected. To analyse the significant changes between pre-test and post-test measurements, paired t-test was used and to analyse the significant changes between the groups, unpaired t test was used.

### Results

Group A had 11 female and 19 male subjects, and Group B had 18 female and 7 male subjects.

**Table 1. Pre-test and Post-test Values of Numerical Pain Rating Scale in both MFR Group and MET Group**

Group	N	Mean $\pm$ SD		t Value	p Value
		Pre-test	Post-test		
MFR	30	7.40 $\pm$ 0.813	3.90 $\pm$ 0.959	28.097	< 0.0001
MET	30	7.10 $\pm$ 0.959	1.60 $\pm$ 0.674	22.606	< 0.0001

**Table 2. Pre-test and Post-test Values of Neck Disability Index Scale in both MFR Group and MET Group**

Group	N	Mean $\pm$ SD		t Value	p Value
		Pre-test	Post-test		
MFR	30	29.8 $\pm$ 8.2	14.2 $\pm$ 4.9	13.1	< 0.0001
MET	30	29.2 $\pm$ 5.6	9.2 $\pm$ 3.1	18.3	< 0.0001

Tables 1 and 2 show the pre-test and post-test values as per NPRS and NDI scales respectively.

**Table 3. Comparison of Pre-test Values in NPRS and NDI between Group A and Group B**

Outcome	Pre-test		t Value	p Value
	Group A	Group B		
NPRS	7.4 $\pm$ 0.81	7.10 $\pm$ 0.95	1.306	0.197
NDI	29.8 $\pm$ 8.28	29.2 $\pm$ 5.60	0.342	0.734

There was no significant difference between the pre-test NPRS and NDI values of Group A and Group B (Table 3).

**Table 4. Comparison of Post-test Values in NPRS and NDI between Group A and Group B**

Outcome	Post-test		t Value	p Value
	Group A	Group B		
NPRS	3.9 $\pm$ 0.95	1.60 $\pm$ 0.67	10.74	< 0.001
NDI	14.25 $\pm$ 4.96	9.23 $\pm$ 3.11	4.69	< 0.001

Between Group A and Group B, there were significant differences as seen from the above tables with the data representation in terms of post-test values of NPRS and NDI. The mean reduction in NPRS and NDI by Group B was 1.6 and 9.23 respectively. This was greater than that of Group A which was 3.9 and 14.25 respectively (Table 4). Hence, we concluded that treatment in Group B was more effective than that in A in terms of average reduction.

The statistical analysis revealed a significant difference ( $p < 0.0001$ ) between pre-test and post-test values of visual analogue scale (NPRS) and Neck Disability Index (NDI) scale in myofascial release technique and muscle energy technique groups. The post-test values for NPRS and NDI in myofascial release technique were 3.9 and 14.25 respectively, whereas, for muscle energy technique groups, they were 1.6 and 9.23 respectively, thus showing a statistically significant difference in NPRS and NDI values between the groups ( $p < 0.0001$ ).

### Discussion

The goal of the study was to see the efficacy of myofascial release technique and muscle energy method in reducing pain and improving the physical function of smartphone users with trapezititis. The results of this study showed that statistically, both pre-test and post-test measures of pain and disability differed significantly. However, a comparison of the post-test results between the groups showed a statistically significant difference indicating that muscle energy technique has a better outcome than myofascial release technique among smartphone users. Over the last decade, the use of smartphones has increased dramatically. Excessive smartphone usage can lead to a variety of physical and mental health issues in these people. The relationship between musculoskeletal symptoms and mobile phone use and illnesses has been studied by several researchers. The neck, upper back, wrists, and hands were the most painful body areas among the individuals, according to the data. Some participants complained of pain in their back region including upper and lower backs, neck and wrists. They also stated that they were unable to work for a day or more.

Physical therapists practice manual therapy techniques like Muscle Energy Technique (MET) and Myofascial Release technique (MFR) to treat musculoskeletal disorders,

and hence can treat trapezitis. The myofascial release technique has emerged as one of the most well-researched manipulative techniques for a variety of disorders, including muscular tightness, arterial stiffness, muscle soreness, fascial adhesions, and so on, making it the most widely used therapy among athletes and the general public. Its effectiveness in treating trapezitis has also been proven.<sup>13</sup> This inhibitory effect causes a reduction in engine driving forces and, as a result, unwinding (autogenic inhibition), which enhances hyperactive muscle resting length. MET may help to alleviate articular restrictions, improve range and lengthen muscle fibres. The mechanisms of MET and its therapeutic activity might include a range of tissue fluid alterations and biomechanical changes and also neurophysiological changes.<sup>14</sup> The MET and trigger point release, comes under osteopathic manipulative treatments and its endogenous cannabinoids (anandamide and 2-arachidonoylglycerol) that bind to receptors in the higher centre of the brain, resulting in a decrease in pain perception.<sup>15</sup> The efficacy of the MFR approach is assumed to be based on a number of theories. The first concept is focused on the issues that cause tightness. Tightness leads to weakness, which leads to misalignment. Both biomechanical and neurological reactive aspects are held in place by this tightness. Reciprocal inhibition occurs when a muscle is tight and its antagonists become relaxed. The fascia around the hypertonic or tight muscle is shortened, necessitating relaxation in the opposite direction. This process promotes muscular contracture by causing increasing tightness. The second concept is that MFR application causes alterations in the neuro-reflexive system. Sensory stimulation of receptors transmits information to the spinal cord and other higher centres; sensory stimulation normally causes motor responses, but it can also cause efferent inhibition. When the tissues are sensory stimulated and subsequently motor inhibited during the administration of the MFR release technique, the second phenomenon occurs, causing relaxation in tight structures. The third concept is the release phenomenon. When MFR is used, stress or load is applied to the treated region, which causes the tissues to release and soften. The function and shape of the muscle are improved as a result of tissue relaxation.<sup>16</sup>

## Conclusion

Thus, we have seen that the muscle energy technique with cryotherapy was found to be more effective than the myofascial release technique with cryotherapy in reducing pain and improving functions among smartphone users with trapezitis.

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