

Combined Effect of Theragun & MFR in Neck Function in Association with Trapezius Myalgia

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Abstract: Trapezius Myalgia is a common musculoskeletal condition characterized by severe pain in the trapezius muscle which leads to limited mobility and discomfort during daily activities and can significantly affect the individuals overall quality of life. There are various techniques or methods that have been used to treat trapezius myalgia. Techniques like Myofascial Release (MFR) and the use of a theragun are among the choices of treatment methods. Myofascial Release (MFR) is a treatment method based on soft tissue mobilization. Theragun is a percussive therapy (PT) device that can provide concentrated deep tissue release to specific muscle areas. This study tests the hypothesis that there exists a significant effect of Theragun along with MFR in early pain relief and neck function. The aim of this study is that the integration of Theragun and MFR will lead to greater improvements in pain relief and neck function in the target population with shorter treatment duration. Selection criteria include patients with trapezius myalgia. 100 subjects were recruited for the study based on the selection criteria. Assessment of the intensity of pain and neck disability was done through the VAS and NDI score. If patient history included any specific conditions or skin diseases and the NDI score was less than 5, the subjects were excluded from the study. The treatment protocol starts with the application of Theragun for 1 minute followed by MFR for 2 minutes, the pinch grip technique for the upper trapezius muscle, and the ischemic compression technique for the middle/lower trapezius muscle was applied. Post-treatment assessment has been recorded after 24 hours on VAS and NDI score outcomes. Out of 100 Subjects, 68 were female and 32 were male. The mean age of the subject was 21.95 with SD of 3.079. The Intensity of pain and neck function disability was measured using the VAS & NDI Score respectively. A Wilcoxon Signed Rank Test revealed a significant difference between the score before and after the intervention in both the parameters. The result shows a significant improvement in reduction of pain and improving the disability or functional status of neck. Combined treatment protocol of Theragun and MFR with a shorter treatment duration of only three minutes is highly effective in alleviating pain and enhancing neck function or disability.

Keywords: MFR, Neck Function, NDI Trapezius Myalgia, Theragun, VAS

Introduction: Trapezius Myalgia is a common musculoskeletal condition characterized by severe pain in the trapezius muscle. Myalgia refers to the pain that occurs in any group of muscle. The majority of patients who complain of shoulder or neck pain will almost always exhibit pain in the upper trapezius region, which is slanted between the base of the neck and the shoulder. Study also shows a strong relationship between neck/ shoulder pain with trapezius muscle tenderness or trapezius myalgia. It mostly happens as a result of fatigue, stress, tension, forward neck posture, or sitting for prolonged periods of time. The patient complains of tight, stiff, sore, painful, and limited movement of the neck. In some of the cases, breathing pattern is also hampered. This limitation in mobility may lead to discomfort during daily activities and can significantly affect the patient's overall quality of life. It is essential to assess the underlying causes and explore appropriate treatment options to alleviate these symptoms. It is one of the most common musculoskeletal disorders in today's era. According to various research and studies, around 67% of the population worldwide suffers at least once in a lifetime¹. Effective management strategies may include physical therapy, medication, and lifestyle modifications to help reduce pain and improve functionality. Understanding the multifaceted nature of this condition is crucial for developing personalized treatment plans that address each patient's unique needs. These plans may incorporate ergonomic adjustments, stress management techniques, and exercise programs tailored to individual capabilities. By fostering a comprehensive approach to treatment, healthcare providers can empower patients to manage their symptoms effectively and enhance their overall well-being. Effective management strategies, including physical therapy, ergonomic adjustments, and pain relief interventions, are crucial for alleviating symptoms and improving function. Their work environment and the posture they adopt throughout the day influence the percentage of Indians who experience neck pain. The increasing prevalence of neck pain can be attributed to prolonged periods of sitting, excessive screen time, and poor ergonomic practices. As individuals become more aware of these factors, addressing posture and incorporating regular breaks can be vital in reducing the incidence of this common ailment.

The ratio of prevalence in males and females in India is 1:10, and it is highest in the middle-age group². Office workers frequently experience work-related neck pain, particularly those who use computers extensively and spend a lot of time sitting down. Because of repetitive tasks and non-neutral work postures, extended computer use may put stress and strain on the musculoskeletal systems of the neck and upper extremities. Because the upper trapezius muscle becomes painful and spasmodic, people who work at desks and computers or who drive for extended periods of time are more likely to develop this condition. This kind of musculoskeletal pain is identified by the presence of myofascial trigger points. These points are typically skeletal muscle nodules that are irritable and have taut bands. These can be

examined by palpating the painful area . Physical therapy is the primary treatment of choice. There are various techniques or methods that have been used to treat trapezius myalgia. Techniques like Myofascial Release (MFR) and the use of a theragun are among the choices of treatment methods.

Myofascial Release (MFR) is a soft tissue mobilization treatment method. It is described as "the facilitation of mechanical, neurological, and psychophysiological adaptation potential as interfaced through the myofascial system"³. By employing manual traction and prolonged muscle and stretching of the fascia, it removes adhesions, thereby improving range of motion, reducing pain, and increasing flexibility.

The Theragun is a percussive therapy (PT) device that can provide concentrated deep tissue release to specific muscle areas. This PT device will help in order to improve the restricted range of movement. PT, or massage gun technology, is employed by "floating" the device over the skin's surface and applying rapid pulses and vibrations in short bursts of pressure to the tendon or muscle belly.

This study is being undertaken to test the hypothesis that there exists a significant effect of Theragun along with MFR in early pain relief and neck function with shorter treatment duration.

Aims & objective of the Study: Individually Theragun and myofascial release technique has been reported to have positive effects by increasing flexibility, decreasing pain, and improving range of motion. However, there is little evidence to support the early efficacy of Theragun and MFR together. For patients with trapezius myalgia, a successful treatment plan must be developed and implemented in clinical settings.

The aim of this study is that the integration of Theragun and MFR will lead to greater improvements in pain relief and neck function in the target population with shorter treatment duration. The outcomes will be measured through validated pain scales and functional assessments, allowing us to determine the effectiveness of this integrated approach in improving patient outcomes.

Methodology: Over the course of three months, this study was carried out in the Physiotherapy Outpatient Department (OPD) of the Department of Physical Medicine and Rehabilitation (PMR), Himalayan Institute of Medical Sciences (HIMS), which is affiliated to Swami Ram Himalayan University (SRHU), Swami Ram Nagar, Dehradun. Selection criteria include patients with trapezius myalgia. We recruited 100 subjects for the study based on the selection criteria, and we obtained informed consent and voluntarism from the patients. The procedure and benefits were explained to the patient, and they had the right to withdraw at any point in the study. Assessment of the intensity of pain was and neck disability was done through the VAS and NDI score. If patient history included any abnormalities or skin diseases and the NDI score was less

than 5, the subjects were excluded from the study. The treatment protocol starts with the application of theragun for 1 minute followed by MFR for 2 minutes, the pinch grip technique for the upper trapezius muscle and the ischemic compression technique for the middle/lower trapezius muscle was applied. Post-treatment assessment has been recorded after 24 hours on VAS and NDI score outcomes.

Visual analogue scales (VAS) are psychometric response scales used to measure subjective characteristics or attitudes. The VAS is widely used in clinical settings due to its simplicity and effectiveness in capturing the subjective experience of pain. The Neck Disability Index (NDI), a standardized questionnaire that patients complete, measures the degree to which neck pain and related disabilities affect daily functioning. It assesses how neck pain affects a variety of tasks, such as reading, lifting, working, maintaining personal hygiene, and focusing.

Data Management and Statistical Analysis: Microsoft office Excel Version 16.92 was used for the descriptive statistics and IBM SPSS Software Version 20 was used to analyse the data.

Results: There are 100 subjects in all in this study. wherein 32 subjects were men and 68 subjects were women. The mean age of the subject was 21.95 with an Standard deviation (SD) of 3.079.

Comparison of Pain Intensity: The VAS score was used to gauge the level of pain. The mean VAS score value is shown in Table 5.1. The pre-variables display a mean value of 5.58, with a standard deviation of 1.653. With an SD of 1.077 the post-variable mean value is 1.45. The percentage of pain decreased significantly after treatment, from 79% (PRE) to 21% (POST), as shown in chart 5.1.

Variables	Mean	SD
PRE VAS	5.58	1.653
POST VAS	1.45	1.077

Table 5.1 : Comparison of PRE & POST VAS Score.

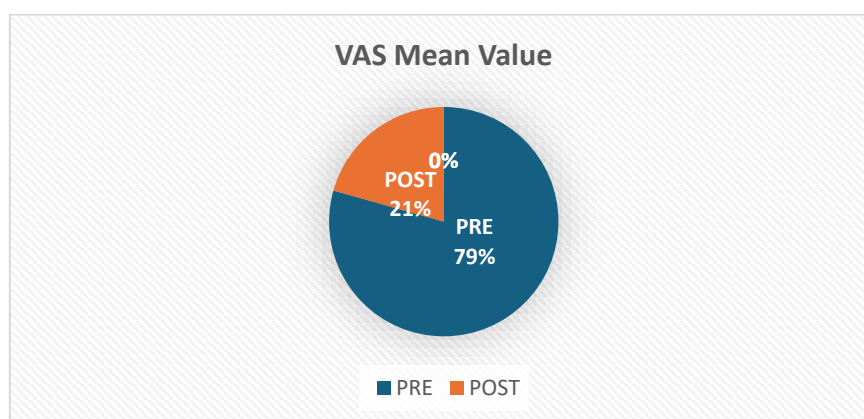
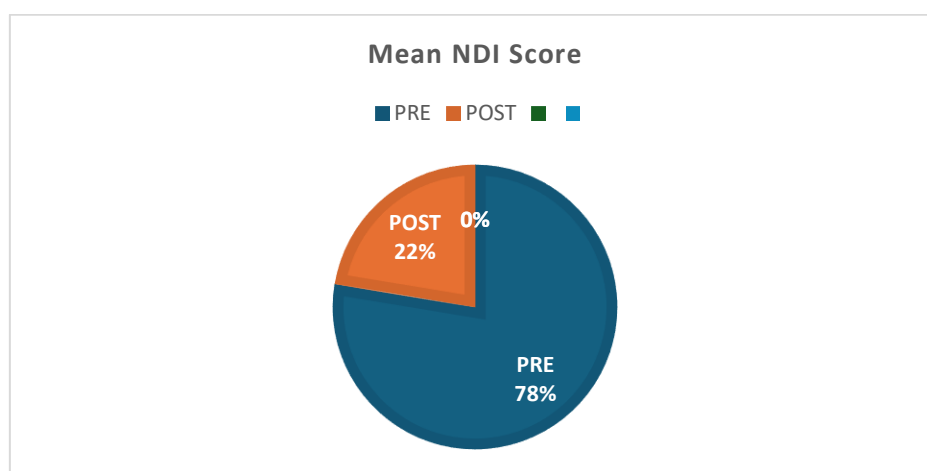


Chart 5.1 : Comparison of PRE & POST VAS Score.

Comparison of Neck Function: The NDI score has been used to measure the difficulty of neck function. The NDI score mean value is shown in Table 5.2. The pre-variables display a mean of 6.41, a standard deviation of 1.491. With an SD of 1.184, the post-variable mean value is 1.85. According to chart 5.2, the percentage of functional neck disability dropped dramatically following treatment, from 78% (PRE) to 22% (POST).

Variables	Mean	SD	SE
PRE NDI	6.41	1.491	0.149
POST NDI	1.85	1.184	0.118

Table 5.2: Comparison of PRE & POST NDI Score.



Graph 5.2 : Comparison of PRE & POST NDI Score.

A Wilcoxon Signed Rank Test was conducted to determine whether there was a statistically significant difference between the PRE & POST treatment evaluation following the intervention of the combined treatment approach of the application of theragun and MFR technique. The result revealed a significant difference between the score before and after the intervention in both the parameters that one is intensity of pain measured on the VAS scale and another one is the function of the neck measured on the NDI scale, with $z = -8.751$, $p = 0.000$ and $z = -8.778$, $p = 0.000$, respectively. The result shows a significant improvement in the reduction of pain and the improvement of the disability or functional status of the neck.

VARIABLES	Z VALUE	P VALUE
POST PRE VAS	-8.751	0.000
POST PRE NDI	-8.778	0.000

Table 5.3 : Wilcoxon Signed Rank Test Statistics

Discussion: Trapezius myalgia is a common musculoskeletal condition characterized by severe pain in the fibres of the trapezius muscle. This limitation in mobility may lead to discomfort during daily activities and can significantly affect the individuals overall quality of life. It is one of the most common musculoskeletal disorders in

today's era. There are many techniques or methods that have been used to treat trapezius myalgia. Techniques like MFR and the use of a theragun are among the choices of treatment methods. MFR is a treatment method based on soft tissue mobilization, and theragun is a percussive therapy (PT) device that can provide concentrated deep tissue release to specific muscle areas.

The MFR technique has significant effects in reducing fibrous adhesion, increasing flexibility, optimizing fascial slip, enhancing recovery, and helping relieve symptoms as proven by Ozan Cetinyol *et al.* in their study "Acute effects of myofascial release technique on flexibility and pain: Outcome for chronic low back pain, randomized control trial" published in 2024.

The Percussive Therapy delivered by massage guns, can promote an acute response in muscle strength, flexibility, and experiences of pain with a single application as proven by Lorna Sams *et al.* in their study "The Effect of Percussive Therapy on Musculoskeletal Performance and Experiences of Pain: A Systematic Literature Review, published in 2023.

This study also provides the statistical evidence and support in favour of using theragun, a percussive therapy device and myofascial release technique together as already proven individually in the above statements.

This study efficiently proves a difference in its outcome measures, like VAS and NDI, that indicates that a combined approach of the theragun and MFR with a total duration of only 3 minutes of treatment time can be an effective adjunct to other physiotherapy treatments in early pain reduction and percentage of neck functional disability in the patient diagnosed with trapezius myalgia.

LIMITATION OF THE STUDY: One of the limitations may be the possibility of variability in the results due to the study's shorter duration. College-bound students between the ages of 17 and 33 served as the sample subjects. This might be among the restrictions. Additionally, because MFR is subjective in nature and depends on the patient's comfort level with different compression and pressure levels, it may result in inconsistent outcomes or be one of the study's limitations.

FUTURE RESEARCH: Future studies should concentrate on a larger sample size, a diverse population, and subjects of different ages. Subjects with moderate and severe NDI scores should be the focus of future research.

Conclusion: Treatment protocol of Theragun and MFR with a shorter treatment duration of only three minutes is highly effective in alleviating pain and enhancing neck function or disability.

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