ORIGINAL ARTICLE

THE EFFECTIVENESS OF MYOFASCIAL RELEASE VERSUS TRANSCUTANEOUS NERVE STIMULATION IN PATIENTS WITH CALF MUSCLE SORENESS

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ABSTRACT

Background: Muscle soreness is a common myogenic condition characterized primarily by pain and tenderness, typically occurring 12–24 hours after unfamiliar or strenuous exercise. This condition, often referred to as delayed onset muscle soreness (DOMS), can significantly impact daily activities by reducing mobility and physical performance.

Objectives: To compare the effect of myofascial release versus TENS on pain management among patients with calf muscle soreness.

Methods: 30 participants were taken in the study and were divided into two groups with age limits of 20-40 (male and female) recruited through simple random sampling. Data were collected from JPMC and South City Hospital Karachi. Pre- and post-Likert scales were used to measure soreness of calf muscle. The subjects were equally divided into two groups: (A) 15 received TENS therapy for 15 minutes thrice a week, and (B) 15 received myofascial release thrice a week. An independent t-test was used to identify mean comparison in both interventions.

Results: The results revealed that the mean comparison of Likert outcomes in the TENS treatment group showed a significant decrease in muscle soreness with $p < 0.01$, whereas the mean comparison of Likert outcomes in the myofascial treatment group also showed a significant improvement in Likert scores with $p < 0.01$.

Conclusion: The study concluded that both TENS and myofascial release have significant effects on the management of calf muscle soreness patients.

Key Words: Likert Scale, Myofascial Release, Muscle Soreness, Pain, TENS

Authors' Declaration: The authors declared no conflict of interest and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors contributed substantially to the planning of research, question designing, data collection, data analysis and write-up of the article.

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This article may be cited as: Ahmad I, Hussain SA, Rehman MU, Deen N, Uddin F, Miran S. The effectiveness of myofascial release versus transcutaneous nerve stimulation in patients with calf muscle soreness. Rehman J Health Sci. 2025;7(1).57-61

Submitted: Jan 29, 2024 Revisions Submitted: Sep 09, 2024 Accepted: Dec 24, 2024

Introduction

Muscle soreness is defined as a general discomfort in a muscle or muscle group resulting from disease, trauma, or physical exertion.[1] It is a common experience, especially among new or untrained athletes. The symptoms can range from mild muscle stiffness to intense, debilitating pain.[1] Muscle soreness usually begins to develop 12-24 hours after the exercise has been performed and will turn out to be the worst pain between 24-72 hours after the exercise has been performed.[2] It is widely believed that muscle soreness develops as a result of microscopic damage to muscle fibers involved in the exercise. This type of injury

likely results from unfamiliar or new stresses experienced during exercise. Muscle soreness appears to be a side effect of the body's natural repair process that occurs in response to microscopic muscle damage.[3] Some researchers have suggested that the nature and severity of delayed onset muscle soreness (DOMS) are similar to those observed in inflammatory muscle conditions. As a result, investigating the mechanisms and treatments of DOMS is justified, given that it may serve as an effective experimental model for such conditions. This could also help in distinguishing between different types of myogenic pain and muscle injury.[4] Myofascial release is generally an extremely mild and gentle form of stretching that has a profound effect upon the body tissues.[5] Myofascial release is a manual therapy tool often used in soft tissue manipulation. The tool focuses on pain that arise from myofascial tissues, the tough membranes that wrap, link and protect our muscles. Receiving myofascial release therapy helps stimulate neuronal receptors that are set inside muscular tissue. Myofascial release increases the temperature of connective tissue and apply pressure to vary the fiber length.[6,7] Myofascial release increases blood circulation to the soft tissues. An increase in blood flow allows more nutrients to reach the tissues and facilitates the removal of waste products.[8]

On the other hand, the use of Transcutaneous Electrical Nerve Stimulation (TENS) for pain management began in the mid-1960s and was supported by the "gate control theory," which suggests that pain signals to the brain can be blocked or interrupted by stimulating specific nerve fibers. TENS is widely used for both chronic and acute pain.[9]

Its physiological effects include reflex vasodilation and a "pumping effect" from muscle contractions, which help reduce edema.[10] Specific indications for the use of TENS include symptomatic relief of chronic, treatment-resistant pain; relief of acute post-surgical and post-traumatic pain; and pain relief associated with inflammatory conditions such as arthritis.[11] Limited literature was found showing effectiveness of myofascial release and TENS therapy among an individual having soreness of calf muscle in Karachi Pakistan.

Methods

An experimental study was conducted in South City and Jinnah Hospital in Karachi. 30 patients were registered, both male and female, between the ages of 20 and 40 years old by a convenient sampling method. They had a history of pain after physical activity. 15 participants were selected in Group A and were given TENS therapy generated by Brand Digital TENS MED S82. The TENS parameters were a symmetrical biphasic pulse current waveform, 1-150 Hz frequency, and 100 μs pulse duration for fifteen minutes.15 participants were selected in Group B who received myofascial therapy, a series of short strokes of 1-2 inches (2.5-5 cm) with fairly deep but not painful pressure applied manually for fifteen minutes. The region of application was the calf muscle (posteriorly). Patients who had a history of neurological disorder and history of musculoskeletal disorder (recent Leg Tibia, Fibula fracture were excluded).

Data was stored and analyzed using IBM-SPSS version 23.0; counts with percentages were given for gender distribution of studied samples, and means with standard deviations were reported for age (years) and pre- and post-scores on the Likert scale. Data was compared at pre- and post-level of treatments; the comparison of studied parameters was done using paired sample t-tests at pre- and post-level of treatment (within treatment group) and independent sample t-tests to compare the post-parameters between TENS and myofascial samples (between group comparison). P-values less than 0.05 was considered statistically significant; bar charts were also used to give graphical presentation of data.

Results

In Group A the mean age of participants was 31.47 (SD=±6.27) years, whereas in Group B the mean age of participants was 30.07 (SD=±4.08) years. Table I shows the mean comparison of Likert outcomes in the

TENS treatment group at pre- and post-level of treatment. Results showed the mean score before treatment was 4.26 (SD=±0.79) units, and after the treatment it was 1.53 (SD=±0.74) units. The paired sample t-test showed in TENS samples there was a significant decrease in pain scores after the treatment with p<0.01. Table I: Pre-treatment and Post-treatment Likert scores showed a mean of 4.27 units (SD = 1.03) in the Pre-treatment group and 1.52 units (SD = 0.63) in the post-treatment group. The paired t-test showed significant decrease in pain scores after the treatment.

Table I: pre- and post-treatment scores in both the groups

TENS (n=15)	Pre (n=15)		Post (n=15)		P-value
	Mean	SD	Mean	SD	
Group A	4.26	0.79	1.53	0.74	<0.01*
Group B	4.27	1.03	1.52	0.63	<0.01*
*p<0.05 was considered significant using Paired Sample t-test					

Table II: comparison of both groups

Outcomes	TENS (n=15)		Myofascial (n=15)		P-value
	Mean	SD	Mean	SD	
Post Likert scale	1.53	0.74	1.52	0.63	0.99
p-value was obtained using Independent Sample t-test					

Table II: Shows the mean comparison of post-mean scores between TENS and myofascial samples after the treatment; the post-mean score of TENS samples was 1.53 (SD = ±0.74), and in myofascial samples it was 1.52 (SD = ±0.63). The improvement of myofascial samples was just better as compared to TENS samples, but it was statistically insignificant with 0.99 obtained using an independent sample t-test.

Discussion

The current study means a comparison of post-Likert scores between TENS and myofascial samples after the treatment. The post-mean score of TENS samples was 1.53, and in myofascial samples, it was 1.52. The improvement of myofascial samples was just better as compared to TENS samples, but it was statistically insignificant with P=0.99 obtained using an independent sample t-test. TENS and myofascial release have a significant role in the management of muscle soreness.

A study was conducted in 2016 for the management of upper trapezius trigger points to compare the effect of TENS and interferential therapy along with home exercises. Study showed that both TENS interferential therapy and home exercises had the same effect in the management of upper trapezius trigger point.[12] A study was conducted in 2017 to clarify the immediate effects of a combined transcutaneous electrical nerve stimulation and stretching protocol. Combined transcutaneous electrical nerve stimulation and stretching had significantly beneficial effects on muscle hardness, pressure pain threshold, and straight leg raising range of motion. These results support the belief that transcutaneous electrical nerve stimulation combined with stretching is effective in reducing pain and decreasing muscle hardness, thus increasing range of motion. This study compared the Likert outcomes of the TENS treatment groups at pre- and post-treatment levels. The results showed that the mean pre-treatment score was 4.26 units, and the mean post-treatment score was 1.53 units. This study showed that TENS was successful in the treatment of myofascial trigger points.[13] A study was

conducted in 2015; the objective of the study was to determine the combined effect of different modalities (TENS therapy), and vibration training results showed that both had equal effect on the management of muscle soreness. Another contrast study 's been proven that muscle spindle stimulation with the aid of using vibration might also additionally boom the afferent sports of muscle spindles, which might also additionally boom historical past anxiety within inside the vibrated muscles.[14] A study was conducted in 2014. The purpose of the study was to compare the TENS to placebo. The result of the study showed that mechanical vibration stimulation augmented the pain reduction. The spot results of a mixed connective tissue electric nerve stimulation and stretching protocol were compared. Combined percutaneous electric nerve stimulation and stretching had substantially useful results on muscle hardness, stress absolute threshold, and direct leg elevating range of motion.[15] another study compared two different procedures, muscle energy techniques and myofascial trigger point release, in patients with chronic plantar fasciitis. The findings revealed that myofascial trigger point release was more effective than muscle energy techniques in treating these conditions. Another study focused on evaluating the impact of long-term transcutaneous electrical nerve stimulation (TENS) therapy on pain relief in patients with degenerative disc disorder in the lumbar spine. The results of the study demonstrated that TENS is an effective method for managing back pain in these patients.[16, 17]

Another study was carried out on trigger points using deep friction massage, and the study showed that there was not only an improvement in pain tolerance but also in the functional outcome of upper limb grip strength. The use of voluntary contraction alternated with passive stretch for relief has been used for releasing tightness in the muscles.[18]

A study conducted in 2020, the aim of the study was to find out the effect of TENS and myofascial release on pain level in nonspecific neck pain patients. Results of the study showed that myofascial and TENS are equally effective in nonspecific neck pain patients. 19

A study was conducted in 2018 to determine the effect of TENS in the management of chronic low back pain. The study showed that isolated TENS therapy is effective in chronic low back patients. In comparison with this study, TENS has a significant effect in the management of muscle soreness and pain.[20]

Conclusion

The study concluded that both TENS and myofascial release have significant effects on the management of calf muscle soreness patients. The effect of combination therapy is equally effective for the management of muscle soreness, after the mean comparison of post-Likert scores between TENS and myofascial release.

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