Original Article

Efficacy of Therapeutic Ultrasound and Therapeutic Laser Along with Myofascial Release in Reducing Pain and Improving Hand Grip for People with Lateral Epicondylitis

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Abstract

Background: Lateral epicondylitis is a common overuse injury that affects the tendons on the outer side of the elbow. It results from repetitive gripping or wrist extension activities, leading to microtrauma and subsequent inflammation. The condition primarily manifests as pain and reduced grip strength, often affecting daily activities and occupational performance. However, limited research directly compares the effectiveness of these interventions for lateral epicondylitis.

Purpose: The aim of this study is to compare the effectiveness of therapeutic ultrasound and therapeutic laser, in conjunction with myofascial trigger release, in reducing pain and improving handgrip strength in individuals with lateral epicondylitis.

Methods: Patients willing to participate in the study were screened for inclusion and exclusion criteria taken from Get well soon physio rehabilitation centre. The total number of subjects (40) are divided into 20 subjects for the experimental group (Group A), they are given therapeutic ultrasound along with myofascial release . The control group (Group B) consisting of 20 subjects, are low level therapeutic laser along with myofascial release, NPRS and Handheld dynamometer are used as outcomes measure. The entire process was conducted from November 2022 to March 2023.

Results: The results revealed significant pain reduction and greater improvements in handgrip strength for the therapeutic laser group compared to the therapeutic ultrasound group. This study showed that the p value is statistically significant <0.0001.

Conclusion: This study concluded that therapeutic laser, when combined with myofascial trigger release, demonstrated superior effectiveness compared to therapeutic ultrasound in the management of lateral epicondylitis.

Keywords: Ultrasound therapy, Low level Therapeutic laser, myofascial trigger release, Handheld Dynamometer.

Introduction

Tennis Elbow, also known as lateral epicondylitis, is a syndrome that affects the common extensor origin and produces discomfort and practical issues including weak hand grip strength.[1,2] The extensor muscle mass often radiates distally, lateral elbow pain is the most common patient complaint. Extending The

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wrist and fingers against resistance. The symptoms usually don't instantly connect to a particular painful experience and start up gradually. The time spent lifting something while hunching over or pronating the forearm.3 With a prevalence of 1.7% and a rising danger to the dominant arm between the ages of 30 and 60, tennis elbow is a prevalent ailment in those who work.[1,2]

Nonsteroidal Anti-inflammatory medicines (NSAIDs) are used in its treatment, as well as physiotherapy techniques like ultrasound, transcutaneous electrical nerve stimulation (TENS), low intensity Therapeutic laser, and extracorporeal shockwave.[6] Tennis elbow is treated with pulsed and continuous ultrasound, but there is disagreement over the technique's overall effectiveness in treating musculoskeletal diseases.[7] When receiving Therapeutic laser along with a proximal forearm strap for lateral epicondylitis, patients report decreased pain, more grip power, and an overall higher quality of life (QoL).[6] A non-invasive, painless procedure called low level Therapeutic laser (LLLT) can be used to lessen discomfort, improve blood flow to the limbs, and speed up the recovery of injured nerves.[8,9] Rather than having a thermal impact, LLLT has a photochemical one on tissue. Its ability to relieve musculoskeletal discomfort could improve quality.[10]

Low level Therapeutic laser (LLLT) is a painless, non-invasive, and simple to use technique for pain management, peripheral blood flow improvement, and nerve injury healing. Rather than having a thermal impact, LLLT has a photochemical one on tissue.[11] The ability to cure musculoskeletal discomfort through it may improve quality of life. Pain associated with musculoskeletal problems, tendon and muscle damage.[12] Myofascial Release Therapy (MFR) is one of the most common techniques used by physical therapists to treat symptoms of lateral epicondylitis. MFR is applied to the fascial complex to provide a low-impact, long-lasting stretch to restore optimal length, reduce pain, and improve function.[13] Although several treatments have shown beneficial effects in treating lateral epicondylitis, several studies have been conducted to investigate effects of MFR and its role on grip strength. Examining the effects of myofascial release therapy and vigorous stretching on pain and grip strength in lateral epicondylitis is the main goal of this study.

Aim

The aim of this study is to compare the effectiveness of therapeutic ultrasound and therapeutic laser, in conjunction with myofascial trigger release, in reducing pain and improving handgrip strength in individuals with lateral epicondylitis.

Material and Method

Patients willing to participate in the study were screened for inclusion and exclusion criteria. The total number of subjects (40) are divided into 20 subjects based on purposive sampling for the experimental group (Group A), they are given therapeutic ultrasound along with myofascial release. The control group (Group B) consisting of 20 subjects, are low level therapeutic laser along with myofascial release, NPRS and Handheld dynamometer are used as outcomes measure.

Study period: from November 2022 to March 2023.

Inclusion criteria

1. Subjects who have been diagnosed with Lateral Epicondylitis.
2. Both Male and Female.
3. Numerical Pain Rating Scale (NPRS) Above 6 will be included.
4. Aged Between 18-45 years

Exclusion criteria

1. Cardiovascular Disease
2. Fracture Dislocations
3. Infective Lesions
4. Neuromuscular Disease
5. Open Scar
6. Open Wound
7. Recent Surgery

Outcome Measure

Assessment was done at initial and at the end of the study using:

1. Numerical Pain Rating Scale[14]
2. Handheld dynamometer

Procedure

A total of 40 subjects were recruited for this study through the purposeful sampling method. All subjects were recruited based on the inclusion and exclusion criteria. Before commencing the study, an information sheet was provided to all the subjects regarding the study procedures, and informed consent was obtained. The recruited subjects were assigned to two groups (Experimental Group: 20 Subjects) and (Control Group: 20 Subjects) underwent pre-test analysis on the Hand Grip Strength Measurement using Handheld dynamometer and Numeric Rating Scale (NRS) to analyze the impact of the interventions on the overall quality of life for Lateral Epicondylitis Patients. After the pre-test analysis, Experimental Group received Therapeutic Ultrasound along with myofascial trigger release for 5 sessions per week for the period of 4 weeks, Whereas Control Group received Low Level Therapeutic laser along with myofascial trigger release for 5 sessions per week for the period of 4 weeks. After 4 weeks, the Post-test analysis was carried out, and the data were tabulated through SPSS.

Experimental Group Therapeutic Ultrasound along with myofascial trigger release:

Applying therapeutic ultrasound for lateral epicondylitis involves a specific technique to ensure optimal treatment delivery. Here is a step-by-step guide on how to apply therapeutic ultrasound for lateral epicondylitis patients:

Ensure that the therapeutic ultrasound machine is in proper working condition and calibrated appropriately. Applying 3 MHZ Frequency for the Lateral Epicondylitis patients. Instruct the patient to sit or lie down comfortably, exposing the affected forearm and elbow area. Support the patient's arm on a pillow or other soft surface to ensure relaxation and proper positioning throughout the treatment. Set the ultrasound parameters based on the patient's tolerance. This includes the intensity (intensity level should be within a comfortable range for the patient), treatment duration, and frequency. Place the ultrasound transducer directly over the gel-coated skin, ensuring good skin contact .Move the transducer in a slow, circular or linear motion while maintaining continuous contact with the skin.Administer therapeutic ultrasound for the recommended treatment duration, typically ranging from 5 to 10 minutes per session. Performing myofascial trigger release for lateral epicondylitis patients involves targeted manual techniques to release tension and address trigger points in the affected muscles and fascia. Here is a step-by-step guide on how to perform myofascial trigger release for lateral epicondylitis. Instruct the patient to sit or lie down comfortably, with the affected arm and elbow area exposed. Support the patient's arm on a pillow or other soft surface to ensure relaxation and proper positioning throughout the treatment. Identify the common trigger points associated with lateral epicondylitis, which are typically found in the extensor muscles of the forearm, including the extensor carpi radialis brevis and the extensor digitorum. Palpate the affected forearm muscles, feeling for areas of increased tenderness, tightness, or nodules. Using your fingers, thumb, or the pad of your hand, apply sustained pressure to the identified trigger points. Start with a moderate pressure and gradually increase it to a tolerable level, taking into account the patient's comfort. After applying sustained pressure, combine it with passive stretching of the affected muscle. Gently stretch the muscle by gradually elongating it, moving the patient's hand or wrist into a position that lengthens the muscle fibers.[10]

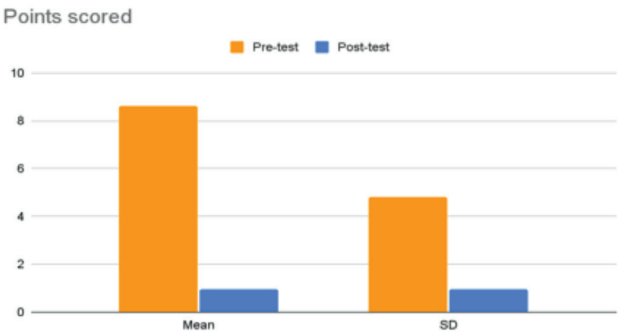
Control Group low level Therapeutic laser along with myofascial trigger release:

Applying Therapeutic laser for lateral epicondylitis involves utilizing low-level Therapeutic laser (LLLT) to stimulate healing and reduce pain in the affected area. Ensure that the Therapeutic laser device is in proper working condition and calibrated according to manufacturer guidelines. Instruct the patient to sit or lie down comfortably, with the affected forearm and elbow area exposed. Support the patient's arm on a pillow or other soft surface to ensure relaxation and proper positioning throughout the treatment. Ensure that both the patient and the therapist wear appropriate eye protection, such as Therapeutic laser safety glasses, to prevent potential damage from the Therapeutic laser light. Hold the Therapeutic laser device approximately 1 to 2 centimeters away from the skin surface. Position

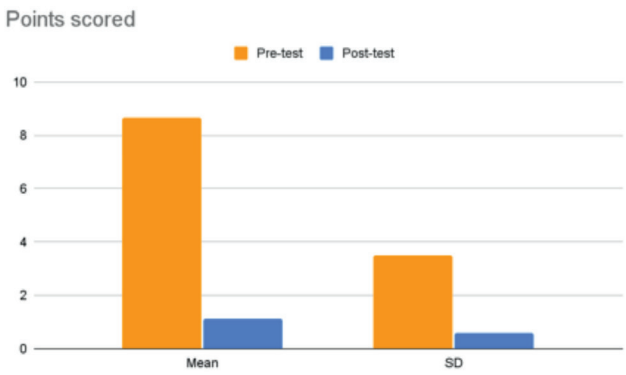
the Therapeutic laser probe perpendicular to the skin, targeting the lateral epicondyle region and the surrounding area. Move the Therapeutic laser probe in a slow, circular or linear motion, covering the entire treatment area. Maintain continuous contact with the skin surface. Administer Therapeutic laser for the recommended treatment duration, typically ranging from a few minutes to several minutes per session.

Data Analysis

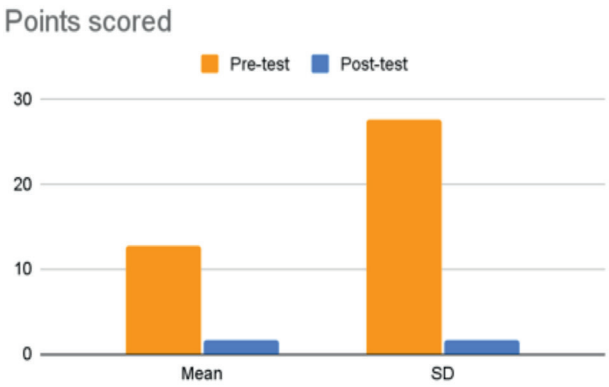
Using tabular and inferential statistics, the gathered data was evaluated. The mean and standard deviation were utilized for all parameters. The statistically significant differences between pre-test and post-test measures were examined using a paired t- test. When utilizing the unpaired t-test to look at significant changes in the experimental group, the significance level of p 0.0001 was determined to be statistically significant.



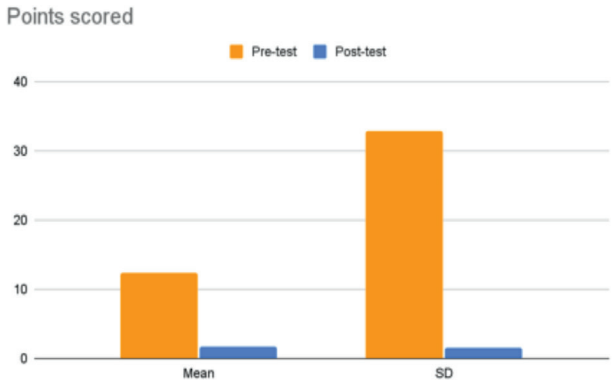
Graph-1: Comparison between Pre-test and Post-test values of Numerical Pain RatingScale (NPRS)



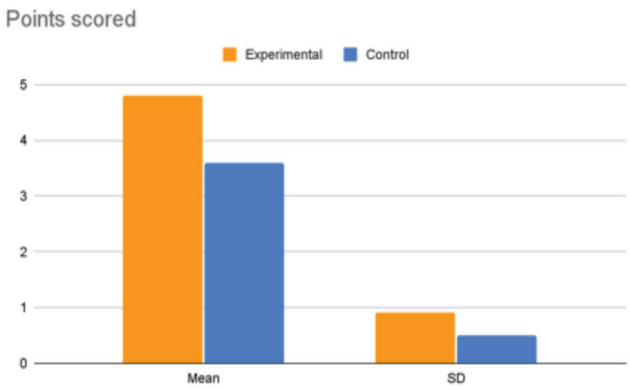
Graph-2: Comparison between Pre-test and Post-test values of Numerical Pain Rating Scale(NPRS) Control Group Therapeutic laser along with Myofascial Trigger Release



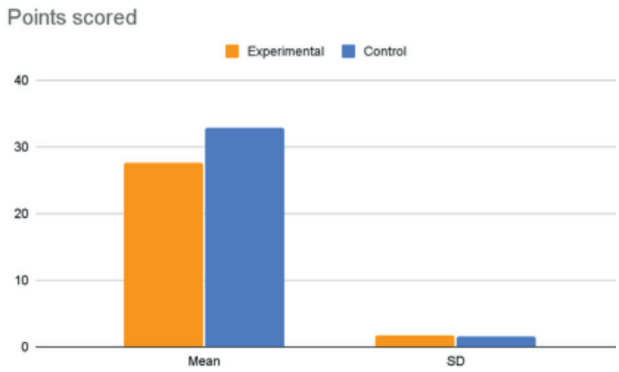
Graph-3: Comparison between Pre-test and Post-test values of Handheld Dynamometer Experimental Group Ultrasound Therapy along with Myofascial Trigger Release



Graph-4: Comparison between Pre-test and Post-test values of Handheld Dynamometer Control Group Therapeutic laser along with Myofascial Trigger Release



Graph-5: Comparison between Post-test values of Experimental Group and Control Group for Numerical Pain Rating Scale (NPRS)



Graph-6: Comparison between Post-test values of Experimental Group and Control Group for Handheld Dynamometer

Results

The Pre-test means of Numerical Pain Rating Scale (NPRS) Experimental Group Ultrasound Therapy along with Myofascial Trigger Release showed 8.60, the standard deviation 0.94, whereas the Post-test mean value of Numerical Pain Rating Scale (NPRS) Experimental Group Ultrasound Therapy along with Myofascial Trigger Release showed 4.80, standard deviation 0.95.This showed Statistically significant-value of less than 0.0001.

The Pre-test mean of Numerical Pain Rating Scale (NPRS) Control Group Therapeutic laser along with Myofascial Trigger Release Showed 8.65, the standard deviation 1.14, whereas the Post- test mean value of Numerical Pain Rating Scale (NPRS) Control Group Therapeutic laser along with Myofascial Trigger Release Showed 3.50, the standard deviation 0.61.This Showed Statistically Significant-value of less than 0.0001.

The Pre-test mean of Handheld Dynamometer Experimental Group Ultrasound Therapy along with Myofascial Trigger Release showed 12.65, the standard deviation 1.60, whereas the Post-test mean of Handheld Dynamometer Experimental Group Ultrasound Therapy along with Myofascial Trigger Release showed 27.55, the standard deviation 1.70. This showed Statistically significant-value of less than 0.0001.

The Pre-test mean of Handheld Dynamometer Control Group Therapeutic laser along with Myofascial Trigger Release Showed 12.40, the standard deviation 1.70, whereas the Post-test mean value of the Handheld Dynamometer Control Group Therapeutic laser along with Myofascial Trigger Release Showed 32.85, the standard deviation 1.53. This Showed Statistically Significant in p-value of less than 0.0001.

Post intervention of Numerical Pain Rating Scale (NPRS), control group of the participants those who received therapeutic Laser for 4weeks Mean (3.60), the standard deviation (0.50) showed better result when comparing with participants those of experimental group who underwent Ultrasound Therapy for 4 weeks Mean (4.80), the standard deviation (0.95). This showed a statistically significant p-value of less than 0.0001.

Post intervention of Handheld Dynamometer, control group of the participants those who received therapeutic Laser for 4 weeks Mean (32.85), the standard deviation (1.53) showed better result when comparing with participants those of experimental group who underwent Ultrasound Therapy for 4 weeks Mean (27.55), the standard deviation (1.70). This showed statistically significant in p-value of less than 0.0001

Discussion

The present study aimed to compare the therapeutic outcomes of therapeutic ultrasound, Therapeutic laser, and myofascial trigger release in the management of lateral epicondylitis. The results demonstrated that all three interventions were effective in reducing pain and improving handgrip strength to varying degrees.

Therapeutic ultrasound has long been utilized in the management of lateral epicondylitis, and its effectiveness has been supported by previous research. In this study, therapeutic ultrasound demonstrated significant pain reduction and improvements in handgrip strength compared to baseline measurements. These results align with the existing literature and further strengthen the evidence supporting the use of therapeutic ultrasound as a valuable treatment modality for lateral epicondylitis.

Therapeutic laser, although less extensively studied in the context of lateral epicondylitis, also showed promising results. The application of Therapeutic laser led to significant pain reduction and improvements in handgrip strength. These findings suggest that Therapeutic laser may be a viable treatment option for individuals with lateral epicondylitis, warranting further investigation and consideration in clinical practice.

Myofascial trigger release, a manual technique targeting trigger points and muscle tension, also demonstrated positive outcomes in this study. The application of myofascial trigger release resulted in pain reduction and improvements in handgrip strength, indicating its potential as an effective treatment approach for lateral epicondylitis.

The comparison between the three interventions revealed interesting findings. While all three approaches showed effectiveness, there were some differences in their outcomes. It is important to acknowledge certain limitations of this study. First, the sample size was relatively small, which may limit the generalizability of the findings. Additionally, the study duration was relatively short, and the long-term effects of the interventions were not assessed.

The findings of this study suggest that Therapeutic laser, when combined with myofascial trigger release, demonstrated superior effectiveness compared to therapeutic ultrasound in the management of lateral epicondylitis. The results revealed significant pain reduction and greater improvements in handgrip strength for the Therapeutic laser group compared to the therapeutic ultrasound group.

Conclusion

This Study Concluded that Therapeutic laser, when combined with myofascial trigger release, demonstrated superior effectiveness compared to therapeutic ultrasound in the management of lateral epicondylitis. The results revealed significant pain reduction and greater improvements in handgrip strength for the Therapeutic laser group compared to the therapeutic ultrasound group.

Ethical clearance; Taken from the institutional ethical committee.

ISRB number-03/060/2022/ISRB/SR/SCPT

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Conflict of Interest: No conflict of interest during this research.

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