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# Effectiveness of myofascial release therapy versus isometric strengthening exercises on pain and functional performance in patients with tennis elbow

**Dr. TR Vijitha, Dr. Virupakshi Gomathi, Dr. Syed Rais Rizvi, Dr. Umashankar Panda**

**Abstract**
**Background:** Lateral epicondylitis is a painful and debilitating musculoskeletal condition that affects health care industry, any activity involving excessive and repetitive use of these muscles (eg. Tennis players, instrument typing, manual work) may cause the tendinosis. The purpose of this study is to know the effectiveness of myofascial release therapy versus isometric strengthening exercises on pain and functional performance in patients with lateral epicondylitis.
**Material and Methods**: A pre and post comparative study was done on 30 patients with mean age group of 30-60 years were included in the study. Group-A (Experimental) received myofascial release therapy and Group B (control) received isometric strengthening exercise, respectively. NPRS, PRTEE scales reading were taken before and after intervention. The intervention was given for 30 minutes a day, 3 days a week, for a total duration of 4 weeks with conventional physiotherapy. Data was analysed by Paired and Unpaired t test.
**Results:** According to obtained values the pre and post-test values of numerical pain rating scale and patient rated tennis elbow evaluation questionnaire had shown a significant effect on p values <0.05 in experimental group.
**Conclusion:** The study concluded that MFR (Myofascial release technique) and isometric strengthening exercise both showed significant improvement but MFR showed more effectiveness to improve in NPRS and PRTEE values in patients affected with lateral epicondylitis.

**Keywords:** Lateral epicondylitis, tennis elbow, MFR, isometric strengthening exercises

## Introduction
Lateral epicondylitis, also known as "Tennis Elbow", is the most common condition that presents with pain and tenderness around the common extensor origin of the elbow [1-2]. it's a type of tendinopathy injury involving the common extensor group of muscles in forearm. The lateral epicondylar region of distal humerus gives origin of theses common extensor group of muscles. The painful and debilitating musculoskeletal condition tennis elbow, which affects health care industry [3] and any activity involving excessive and repetitive use of these muscles (e.g. Tennis players, instrument typing, manual work) may cause the Tendinosis. Smoking and obesity have been identified as significant risk factors [4]. Dominant arm is commonly affected in individuals, with a prevalence of 1-3% in the general population but the incidence rapidly increases to 19% between 30-60 years of age and seems to be more severe and long standing in women [5, 6]. Elbow joint is a synovial joint of hinge variety with two articular surfaces of the lower end of humerus mainly capitulum and the trochlear articulates with the upper end of radius (humero-radial) and upper end of ulna (humero-ulnar) respectively [7]. The maximal tenderness area usually present just distal to the common extensor origin of the forearm at the lateral epicondyle of distal humerus. Most commonly, the extensor carpi radialis brevis (ECRB) is involved, but others may include the extensor digitorum, extensor carpi radialis longus (ECRL), and extensor carpi ulnaris [8-9]. The active flexion of the elbow with supination forearm ranges from 0-120° to 0-130° and passive range of flexion is from 0-120° to 0-135° but the ROM of the elbow joint is not affected in lateral epicondylitis. The inflammation commonly occurs in radial humeral bursa (fluid-filled sac) and nearby ligaments. It's caused by microscopic tearing with formation of

scar tissue at the area of origin of the ECRB muscle tendon, consequently these small tears and subsequent repair in response may lead to larger tearing and ultimately failure in structural. Due to tenderness over the lateral aspect of the forearm at extensor tendons and in muscle bellies which radiate into the forearm, decreased grip strength and pain on gripping on active wrist extension, it may resisted radial deviation and extension of the middle finger [10], but in chronic stage-usually a loss of end range elbow extension (due to intimate relationships between ECRB and capsule/ligament of the elbow complex).The condition may be irritable, gradual onset or related to a specific incident. Treatment of lateral epicondylitis has focused primarily on the pain management by anti-inflammatory medications, ultrasound and phonophoresis [11] or iontophoresis. Various treatments have been attempted for this condition including drug therapies [12] (corticosteroid injections) orthotic devices [13], laser, electrical stimulation, agronomical advice, acupuncture and orthotics but surgical treatment is indicated in 5-10% [14] of patients who didn't improve their symptoms with conservative treatment approach. Once pain has stopped or improved, physiotherapy exercises strengthening and stretching which helps lengthen the sore tendon and keep the collagen tissue soft and pliable. Cyriax & Cyriax specific manipulation therapy (Mill's manipulation) with deep transverse friction claimed substantial success in treating for acute lateral epicondylitis [15]. MFR (Myofascial release therapy) is a technique being used to treat patients affected with myofascial dysfunction and it also effective to treat lateral epicondylitis but there are few studies reports of its success rate. It is the application of a low load long duration stretch to the myofascial complex, intended to restore optimal length, decrease pain and improves function [16]. The literature on these patients suggests that strengthening and stretching exercises are the main components of exercise programmes because tendon must only be strong but also flexible [17-20]. Most therapists agree that eccentric contractions appear to have the most beneficial effects for the treatment of lateral epicondylitis [18-19, 21-25]. Moreover therapists advocate eccentric exercises only for the injured tendon and not for all tendons in the relevant anatomical region. In some cases, eccentric training effective to improve extensor tendons of the wrist, including the ECRB tendon which LE most commonly affects [19, 22-24]. Flexibility has been defined as the range of motion possible about a single joint or through a series of articulations [26-27]. Static stretching also helps to improve ECRB tendon, the site most commonly affected by LE [19, 23-24]. The numerical pain rating scale [25] (NPRS) and patient rated tennis elbow evaluation questionnaire [26] (PRTEE) both are commonly used valid and reliable tool to measure pain and functional performance of tennis elbow patient's respectively. Most of the studies carried out on lateral epicondylitis patients to reduce pain to facilitate muscle functions, prevent further damage of issues and to improve deviations whereas the effects of myofascial release therapy and isometric strengthening exercises on patients affected with lateral epicondylitis (tennis elbow) has not been studied well. Therefore, the present study was aimed to find out the effect of myofascial release technique and isometric strengthening exercises on patients affected with lateral epicondylitis (tennis elbow).

## Methods

A pre and post comparative study of 30 patients (both male and female) using simple random sampling and allocation with lottery method was done. Patients which were affected with lateral epicondylitis pain aged between 30-60 years included according to inclusion and exclusion criteria. The intervention both myofascial release technique and isometric strengthening exercises were given for 30 minutes a day, 3 days a week, for a total duration of 4 weeks. The inclusion criteria for this study were both male and female patients with 30-60 age group, unilateral symptomatic lateral epicondylitis, suffering from tennis elbow from 1 to 5 months, presence of tenderness on palpation over the lateral humeral epicondyle, presence of pain with gripping activity, patients with positive Mill's test, cozen's test and middle finger extension test and the exclusion criteria were patients with bilateral lateral epicondylitis, suffering from tennis elbow since less than 1 month or more than 5 months, previous surgery or trauma to the region, history of fracture of radius/ulna, history of rheumatoid diseases or neurologic impairment including stroke or head injury, severe neck/shoulder problem likely to cause elbow complaints, elbow bursitis, medial epicondylitis, corticosteroid injection, non-cooperative patient.

### Outcome measures

**NPRS (Numerical pain rating scale)**

The NPRS was used in the study to measure the pain.

**PRTEE (Patient rated tennis elbow evaluation questionnaire)**

The PRTEE was used to measure forearm pain and disability of patients affected with tennis elbow

The study received approval from Institutional Ethical Committee Ref.no. KTG/CPT/IEC/2023/194 of KTG College of Physiotherapy Hegganahalli cross, Vishvaneedam post, Sunkudkatte, Bangalore.

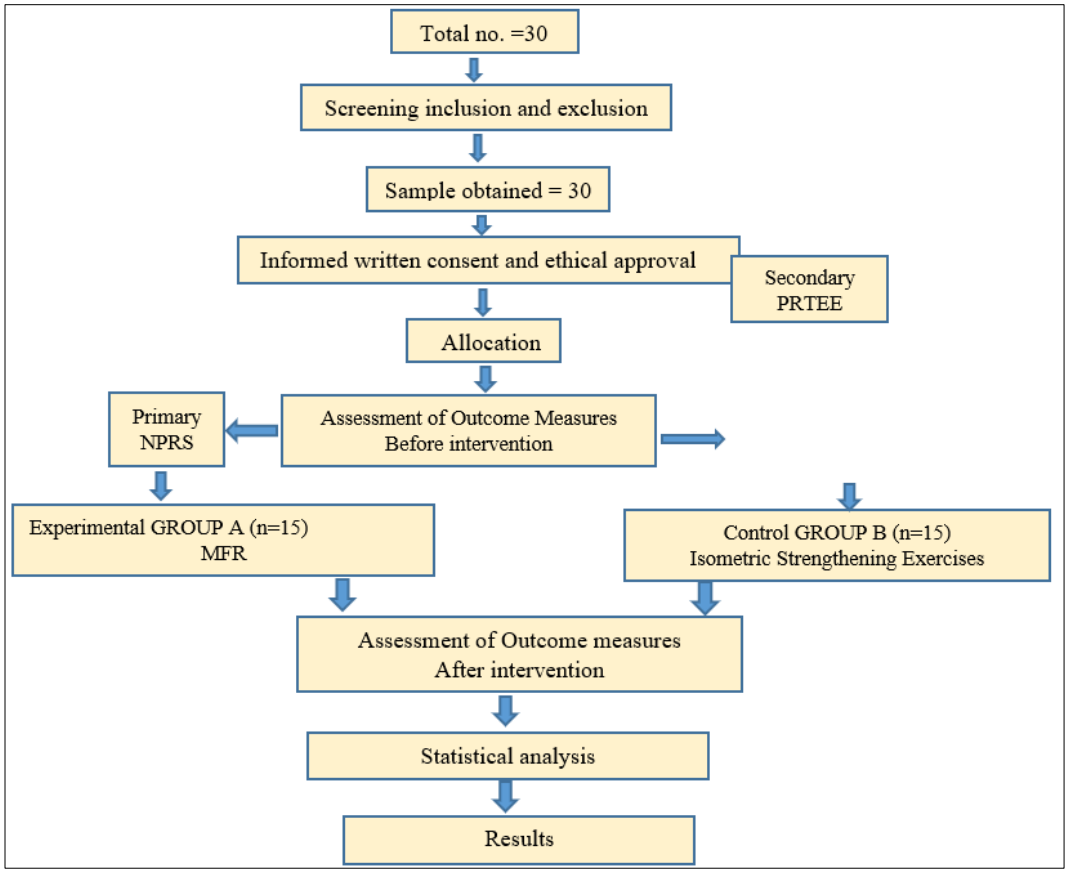



**Fig 1:** Flow chart representing the procedure of selection of patients

## Results

Paired t test and unpaired t test were applied to analyse the data. All statistical analysis was done with utilizing the trial version of Graph Pad Instat software and $p<0.05$ is considered as level of significance.

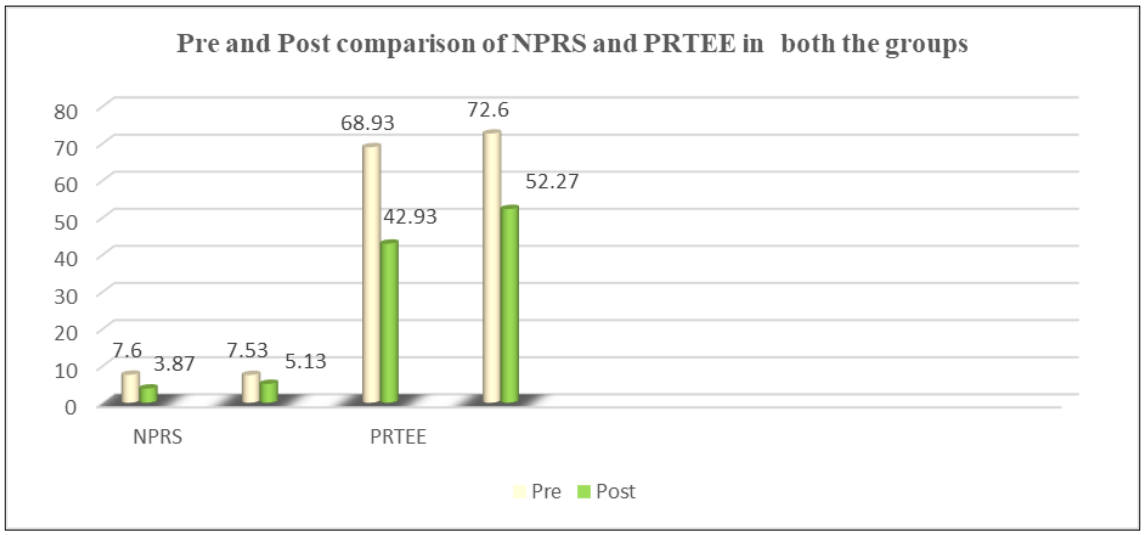
**NPRS:** The mean difference in group A and group B after intervention was 3.87±1.06 and 5.13±1.19 respectively**.**

**PRTEE**

The mean difference in group A and group B after intervention was 68.93±11.38 and 42.93±8.36 respectively.

**Table 1:** Pre and Post comparison of NPRS, PRTEE in both the groups

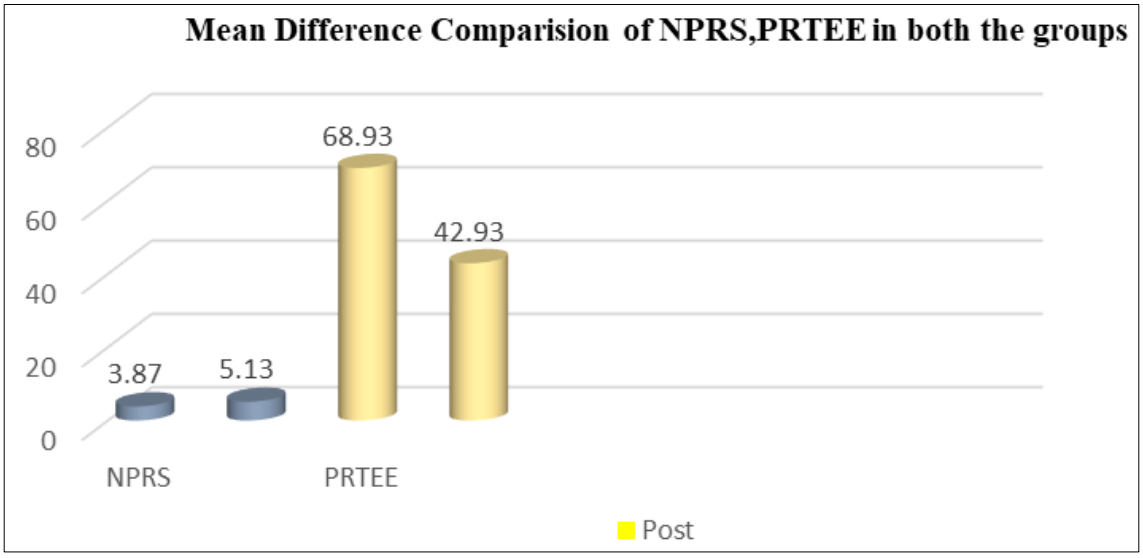
| Parameters | Groups | Pre | Post | Mean difference | p-value | t-value | Result |
|---|---|---|---|---|---|---|---|
| NPRS | Group A | 7.60 ±1.12 | 3.87±1.06 | 3.87±1.06 | 0.00001 | 16.3618 | Significant |
| | Group B | 7.53±1.19 | 5.13±1.19 | 5.13±1.19 | 0.00001 | 12.6158 | Significant |
| PRTEE | Group A | 68.93±11.38 | 42.93±8.36 | 68.93±11.38 | <0.00003 | 11.93 | Significant |
| | Group B | 72.60±8.68 | 52.27±9.96 | 42.93±8.36 | <0.00003 | 9.28 | Significant |




**Graph 1:** Pre and Post comparison of NPRS, PRTEE in both the groups

**Table 2:** Mean difference comparison of NPRS and PRTEE of both the groups

| Parameters | Group A (Mean Difference) | Group A (Mean Difference) | P value | T value |
|---|---|---|---|---|
| NPRS | 3.87±1.06 | 5.13±1.19 | 0.00003 | 3.0822 |
| PRTEE | 68.93±11.38 | 42.93±8.36 | 0.00003 | 11.93 |




**Graph 2:** Mean Difference Comparison of NPRS, PRTEE in both the groups

## Discussion

The main purpose of this study was to determine the effect of myofascial release technique and isometric strengthening exercise on NPRS and PRTEE on patients with tennis elbow (lateral epicondylitis). Most of the studies have focused on the use of myofascial release technique and isometric strengthening exercise along with conventional physiotherapy in patients with tennis elbow but there are very less evidence of these techniques on patient affected with tennis elbow. Many studies support to use of myofascial release technique and isometric strengthening exercise to reduce pain and increase functional performance of affected extremity with lateral epicondylitis**.** The result obtained in this study indicates that, there was highly significant difference in the NPRS, PRTEE after four weeks of intervention.

### NPRS (Numerical Pain Rating Scale)

The pre intervention mean value of NPRS in patients of group A (LTG Group) was 7.60 ±1.12 and after 4 weeks mean value of NPRS was 3.87±1.06. The differences between the pre and post values of NPRS in group A was 3.73. Before the intervention of the mean value of NPRS in patients of group B (CTG Group) was 7.53±1.19 and after 4 weeks of intervention mean value of NPRS was 5.13±1.19. The difference between the pre and post values of NPRS in group A was 2.4. Students unpaired t test used between group A and group B after 4 weeks revealed that was statistically significant difference between two groups.

### PRTEE (Patient rated tennis elbow evaluation questionnaire)

The pre intervention mean value of PRTEE in patients of group A (LTG Group) was 68.93±11.38 and after 4 weeks mean value of PRTEE was 42.93±8.36. The differences between the pre and post values of PRTEE in group A was 26. Before the intervention of the mean value of PRTEE in patients of group B (CTG Group) was 72.60± 8.68 and after 4 weeks of intervention mean value of PRTEE was 52.27± 9.96. The difference between the pre and post values of PRTEE in group A was 20.33. Students unpaired t test used between group A and group B after 4 weeks revealed that was statistically significant difference between two groups.

The incidence of tennis elbow is thought to be a degenerative process resulting in vascular proliferation and hyaline degeneration of the ECRB (extensor carpi radials brevis) and extensor digitorum communis (common extensor origin) at the lateral epicondyle [27]. Microscopic tears in the origin of the ECRB with subsequent lack of repair in the tendons and replacement with immature reparative tissue due to overuse injuries. Although the tensile strength of the healing tendon improves over time, it does not reach the levels of uninjured, healthy tissue. Histopathologic examination shows a degenerative, non-inflammatory process with tissue characterized by the presence of disorganized collagen with immature fibroblasts and neovascularization, a process described as angio-fibroblastic tendinosis [27-29]. The results of this study demonstrate that both the groups of Myofascial release therapy and Isometric strengthening exercises shown significant improvements, to reduce pain and improving in functional status of the patients after following treatment sessions. Both groups experienced significant improvements in outcome measures for all variables in comparison to one another but there were more improvement in experimental group. A recent study [30] has shown that treatment with MFR after repetitive strain injury resulted in normalization in apoptotic rate, cell morphology changes, and reorientation of fibroblasts. It is possible that treatment with MFR after lateral epicondylitis may result in a halt in the degenerative process of the tendons at the lateral epicondyle by facilitating the healing process and the tendon architecture to return toward normality. According to Schleip [31] under normative conditions, fascia and connective tissues tend to move with minimal restrictions. However, injuries resulting from physical trauma, repetitive strain injury, and inflammation are thought to decrease fascial tissue length and elasticity, resulting in fascial

restriction. It is also possible that pain relief due to MFR is secondary to returning the fascial tissue to its normative length by collagen reorganization; this is a hypothesis that merits investigation. As with any massotherapy techniques, the analgesics effect of MFR can also be attributable to the stimulation of afferent pathways and the excitation of afferent A delta fibbers, which can cause segmental pain modulation [32] as well as modulation through the activation of descending pain inhibiting systems.[33] Some other studies also shown more improvement in MFR group, P. Ratan Khuman *et al*. [34] designed RCT to find the effectiveness of Myofascial Release Technique (MFR) on pain, functional performance and grip strength in Chronic Lateral Epicondylitis (CLE) subjects on 30 patients for four weeks. The pain, functional performance and grip strength were assessed at baseline and post treatment (4th week) using NPRS, PRTEE and HD. There was a significant decrease in pain, improvement in functional performance and grip strength in both the groups. However, MFR group was found to have a greater effect on all outcome measures in LE subjects. M.S. Ajimsha *et al*., [35] conducted RCT to investigate whether myofascial release (MFR) reduces the pain and functional disability of lateral epicondylitis (LE) in comparison with a control group receiving sham ultrasound therapy in computer professionals. The simple main effects analysis showed that the MFR group performed better than the control group in weeks 4 and 12. Patients in the MFR and control groups reported a 78.7% and 6.8% reduction, respectively, in their pain and functional disability in week 4 compared with that in week 1, which persisted as 63.1% in the follow-up at week 12 in the MFR group. Parth Trivedi *et al*. [36] designed to compare the effectiveness of ART and MFR in the treatment of chronic lateral epicondylitis. Thirty six patients included in the study after four weeks of the treatment with ART and MFR the study shown more improvement in MFR group. In addition the proprioceptive activity decrease due to repeated injury in tendons and it delays in healing. The isometric exercises it may help to increase proprioception but mechanism by which isometric exercise provides pain relief in tendinopathy is not yet fully understood and should be clarified in the future [37-38]. For the time being, isometric exercise is associated with a reduction in motor cortex inhibition [39]. It is proposed that isometric exercise be used at the beginning of treatment to reduce and manage tendon pain, increasing the strength at the angle of contraction without producing inflammatory signs [40]. Dimitrios Stasinopoulos has proven the effects of isometric exercises for the management of tennis elbow pain. The present study had demonstrated that both MFR and Isometric strengthening exercises are more effective in relieving pain and improving functional performance of the extremity but MFR was found to be more effective in patients with lateral epicondylitis.

**Clinical Implication for practice**

In the present study four weeks of MFR (myofascial release technique) and Isometric strengthening exercise resulted in significant changes in NPRS and PRTEE. The effect of MFR (myofascial release technique) and isometric strengthening exercise in patients with tennis elbow proved efficient to decrease pain, improve the functional performance of the extremity. So these interventions can be use as therapeutic intervention in clinical practice for the better and long term improvement.

**Limitation of Study**

1. At times, sample size is less.
2. Sometimes patients not able to concentrate on isometric strengthening exercise.

**Suggestion for future research**

1. Future study can be done with larger sample size
2. Study can be done with long term follow up

**Conclusion**

The present study concludes that, MFR (myofascial release technique) and isometric strengthening exercise both are effective to reduce pain and improve functional performance of upper extremity with lateral epicondylitis but MFR showed to be more effective to improving pain and functional performance of the upper extremity. Hence, it reject Null hypothesis and accepts the alternate hypothesis.

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