

# Tennis Elbow Pain Reductibility by Eccentric Training in Combination with Isometric Contraction and Stretching Exercises

K. Yogarajan<sup>1\*</sup>, S. Mercy Clara<sup>2</sup>, Dr. B.S. Santhosh Kanna<sup>3</sup>, Sugasri Sureshkumar<sup>4</sup>

<sup>1\*</sup> Associate Professor, College of Physiotherapy, NIEPMD (Divyangjan), Muttukadu, Kovalam. Chennai, Tamil Nadu, India.

<sup>2</sup> Professor, College of Physiotherapy, NIEPMD (Divyangjan), Muttukadu, Kovalam. Chennai, Tamil Nadu, India.

<sup>3</sup> Head of the Department- Therapeutics, Physiotherapy, NIEPMD (Divyangjan) Muttukadu, Kovalam. Chennai, Tamil Nadu, India.

<sup>4</sup> Head of the Department, Department of Neurology, Faculty of Physiotherapy, Meenakshi Academy of Higher Education and Research, Chennai, Tamil Nadu, India.

Email: <sup>2</sup>mercy89@gmail.com, <sup>3</sup>b2skanna@gmail.com, <sup>3</sup>sugasrisuresh@gmail.com

Corresponding Email: <sup>1\*</sup>yogarajanpt@gmail.com

**Abstract: Background:** In this study, patients with tennis elbow (lateral epicondylitis) will be asked to evaluate the effects of eccentric training with isometric contraction and stretching exercises on their pain and ability to do daily tasks.

**Methods:** Twenty male and female patients with tennis elbow were chosen for this quasi-experimental investigation, and their treatment regimens were initiated. Five times a week for two weeks, a supervised exercise program was administered, tailored to the patient's account of how they expressed pain throughout the surgery. Both before and after the intervention, pain reduction and functional activities were measured using a visual analogue scale and a patient-rated Tennis elbow evaluation scale.

**Findings:** indicate that the study's variable pain and functional activities scale pre- and post-intervention values for tennis elbow.

**Keywords:** wrist stretches, tennis elbow, VAS scale, and tennis elbow evaluation scale.

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## 1. Introduction

Lateral Elbow Tendinopathy (LET) is the most frequent tendinopathy in the elbow region and one of the two most prevalent tendinopathies in the upper limb. LET is easily diagnosed, but the best course of action for treatment is still up in the air. Clinicians typically take a conservative approach. The initial line of treatment for LET is typically an exercise regimen, which helps patients function better and experience less discomfort [1]. Isometric exercise has gained popularity in the last ten years as a tendinopathy treatment method. Early reports of isometric exercise providing instant pain alleviation in cases of patellar tendinopathy were encouraging in this regard [2, 3]. The one study that examined the immediate effects of isometric exercise in LET found that pain increased rather than decreased.

The most prevalent overuse syndrome in the elbow is lateral epicondylitis, commonly referred to as tennis elbow. It's a painful ailment brought on by overstretching of the tendons in your elbow, commonly from repeated wrist and arm motions. Both manual laborers and athletes frequently complain about it. Degeneration of the tendon is caused by tears to the main tendon of the extensor carpi radialis brevis or the common extensor origins tendon, or by inflammatory changes brought on by aging, trauma, or continuous misuse. A partial tear of the aponeurotic fibers in the anterior portion of the lateral epicondyle typically results in a painful scar at the tenoperiosteal junction. Exercise programs mostly consist of stretching and strengthening exercises. It has been suggested that stretching activities, such as ballistic, static, and proprioceptive neuromuscular facilitation motions, can improve flexibility[4]. Static stretching is the process of gradually putting a particular muscle-tendon unit in its maximally stretched position and holding it there for a considerable amount of time. The patient's level of moderate discomfort and/or pain dictates this maximal stretching position[5]. Individualized

static stretching exercises are based on patient feedback regarding pain and/or discomfort throughout the operation.

### **Prevalance**

It affects 1-3% of people, most frequently those in their 35–50 year old age range. It is the most prevalent elbow issue, accounting for 7% of all sports-related injuries. It comes with becoming older. It affects people of both genders.

### **Causes**

The extensor origin is overused and strained, usually as a result of using a badminton racquet with an excessively tiny handle or a tennis player with a top spin backhand. There are other contributing variables as well, but they are all related to repetitive injury. Poor sports technique, occupational duty demanding repetition of the wrist and hand (painters, plumbers, carpenters, butchers) degeneration, injury either as main cause or subsequent to degeneration.

### **Symptoms**

Elbow function is unaltered. Radiating down to the wrist, there is pain and soreness on the outside of the elbow. Elbow movements that are resisted or passive are complete and painless. Wrist pain was caused by resisting extension and radial deviation. Tenderness in the extensor tendons, lateral epicondyle, and lateral aspect of the forearm

### **Intervention**

This study examines the effects of eccentric training on lateral epicondylitis pain in conjunction with isometric contraction and stretching exercises. By strengthening the muscle at the contraction angle without causing inflammatory symptoms, isometric muscle contractions lessen tendon pain. It was therefore predicted that using these two types of contractions in conjunction with stretching exercises would improve the analgesic impact of contractions in the treatment of tennis elbow and increase arm function. The usefulness of these two types of contractions and stretching exercises for the treatment of lateral epicondylitis has not been well studied.

"Eccentric training combined with isometric contraction and stretching exercises" is the mainstay of our therapy plan. Eccentric contractions seem to provide the most advantageous benefits, according to the majority of therapists.

### **Eccentric Training:**

The two pillars of eccentric exercise are: (1) load (resistance); and (2) speed (velocity).

1) Resistance, or load: It is evident that increasing the load puts more strain on the tendon and is the foundation for the program's advancement. In fact, the foundation of every physical training program is the idea of gradual overloading. Exercises involving eccentric loading should be modified based on the patient's symptoms.

2) Speed (velocity): To better trigger the injury mechanism, the eccentric training speed should be raised during each treatment session. This will increase the load on the tendon. It typically happens at speeds that are somewhat high. It is best to execute eccentric contractions slowly in order to prevent the risk of reinjury.

### **Stretching Exercises:**

Based on patient feedback regarding pain or discomfort during the process, specific static stretching exercises are designed. Just the wounded tendon should be stretched statically; all other tendons in the anatomical vicinity should not be stretched. Static stretching is recommended for the Extensor carpi radialis brevis tendon, which is the most frequently affected region when a person has tennis elbow.

### **Isometric Activities:**

Unlike concentric or eccentric strength training, isometric exercise, often known as isometrics, does not alter the joint angle or the length of the muscle during contraction. Instead of moving across a range of motion, isometric exercises are performed in static positions.

The visual analogue scale (VAS) was the measuring instrument utilized in this investigation for both pain assessment and Functional assessment is done using the Patient Rated Tennis Elbow Evaluation.

### **Aim of the Study:**

The current study aims to present the impact of eccentric training on pain in patients with lateral epicondylitis in conjunction with isometric contraction and stretching exercises.

### **Objectives of the Study**

To track and evaluate the impact of stretching exercises, isometric contraction, and eccentric training on tennis elbow pain and functional activities.

### **Hypothesis of the Study**

**Alternate Hypothesis:** In patients with lateral epicondylitis, eccentric training along with stretching exercises and isometric contraction has an impact on pain.

**Null Hypothesis:** In patients with lateral epicondylitis, there is no difference in discomfort when eccentric training is paired with isometric contraction and stretching exercises.

## **2. Research Design**

**Design Of Study:** quasi experimental design.

**Study Setting:** Home based study

**Sample Size:** 20

**Sampling Methods:** convenient sampling

**Study Duration:** two weeks

### **Selection Criteria**

#### **Inclusion Criteria**

- Elbow pain
- Age group 35 to 60
- Both male and female
- No other lesion in and around the elbow
- No traumatic cause
- Less than 2 years

#### **Exclusion Criteria**

- No history of any lesion other than Tennis elbow
- No history of any joint disease in the elbow
- Chronic tennis elbow more than 2 years

### **Variables:**

Independent variables: Exercises combining isometric contraction, stretching, and eccentric training

Dependent variables: elbow and functional activities.

### **Study Materials:**

- Chair
- Towel
- Dumb bells
- Goniometer
- Assessment form
- VAS scale
- Patient rated tennis elbow evaluation scale
- Data collection form

### **Outcome Measures:**

Two outcome measures taken for this study are:

- VAS scale

- Functional assessment is done using the Patient Rated Tennis Elbow Evaluation.

**Visual Analogue Scale (VAS)**

The degree of pain was measured using a visual analog scale. The Visual Analog Scale (VAS) is a straightforward and reliable method for evaluating pain on a continuous visual spectrum. The VAS is a straight line that the person being evaluated marks to indicate their level of discomfort. The extreme boundaries of pain are represented by the end of the straight line, where 0 denotes no pain and 10 the worst pain a person has ever felt. A common instrument for measuring pain is the visual analogue scale (VAS), and changes in the VAS indicate a relative change in the intensity of pain perception. We have demonstrated that, at least for patients experiencing mild to moderate pain, the VAS possesses characteristics compatible with a linear scale.

**Patent Rated Tennis Elbow Evaluation (PRTEE)**

The patient rated forearm questionnaire (PRFEQ), formerly known as the PRTEE, is a 15-item assessment tool used to gauge forearm discomfort and disability in tennis elbow patients. The PRTEE comprises three items pertaining to pain, special activities, and routine activities, allowing patients to score their degrees of disability and tennis elbow discomfort on a scale of 0 to 10. A total score can be calculated on a scale of 100 (0 = no disability) where pain and functional issues are equally weighted, in addition to the values from each individual subscale.

**3. Methodology****Treatment:**

Stretching exercises and isometric contraction combined with eccentric training for tennis elbow pain

Treatment procedure 1: Eccentric training

Position of the patient: Patient is sitting in a chair with wrist extended and forearm pronated, causing it to hang over the edge of the chair support.

Position of the therapist: Therapist approaches the patient from the side

Procedure: From the starting position, patient flexes his wrist slowly while counting 10 then returns to the starting position with the help of the other hand and the patient follows a supervised exercise program consisting of slow progressive eccentric exercises of the wrist extensor, isometric exercises of the wrist extensor and static stretching exercises of the extensor of the wrist.

Treatment procedure 2: Isometric contraction

Position of the patient: Patient is sitting in a chair with wrist extended and forearm pronated, causing it to hang over the edge of the chair support.

Position of the therapist: Therapist approaches the patient from the side

**Procedure:**

The initial stance of the forearm with the palm down. Use the opposite hand to prevent the hand at the wrist from rising. An isometric wrist extensor contraction was used to finish the part in ten seconds. The patient completed the isometric contraction first, then the eccentric contraction, and so on. In every therapy session, patients performed sets of ten repetitions of gradually increasing wrist extensor exercises, interspersed with 30-second rest intervals. Patients were advised to continue with the activity even if they experienced little discomfort. Free weight was added to the load until the patient could perform the exercise with only minimal pain or discomfort.

Treatment procedure 3: Stretching exercises

Position of the patient: Patient is sitting in a chair with wrist extended and forearm pronated, causing it to hang over the edge of the chair support.

Position of the therapist: Therapist approaches the patient from the side

**Procedure:**

The extensor carpi ulnaris, extensor carpi radialis longus, and extensor carpi radialis brevis are the wrist extensors; to completely extend these muscles, you must extend your elbow. Use the second hand to draw the other hand down and out while keeping your elbow straight and your palm toward the floor. During each treatment session, the wrist extensor static stretches exercise was performed six times: three times prior to and three times following the exercise, with a 30-second rest period in between.

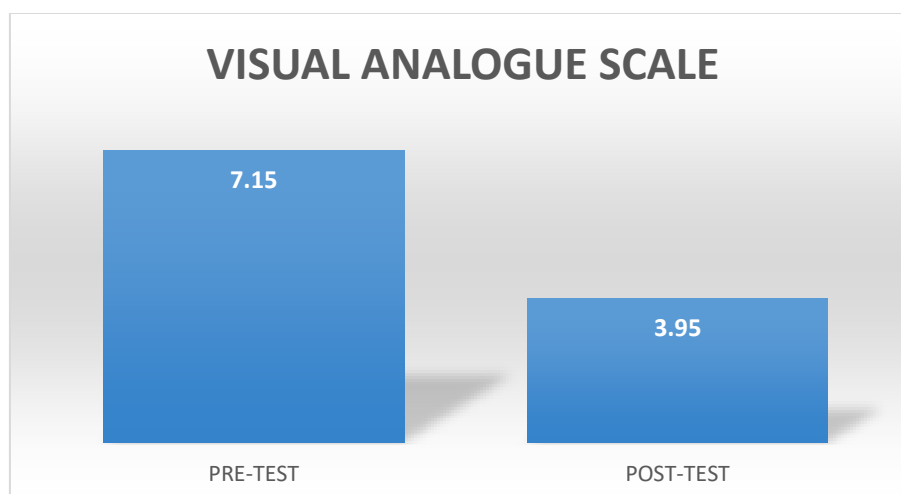
For a duration of two weeks, a supervised exercise program was administered five times a week, tailored the patient's description of pain during the surgery.

#### 4. Result and Data Analysis

##### Visual Analogue Scale (VAS SCALE)

Table 1: Showing the number of participants with differences values between the Visual analogue scales pre - and post tests (VAS Scale)

Sl.No.	Pre-Test	Post-Test	Differences
	Base Line	2 <sup>nd</sup> Week	
Mean Value	7.15	3.95	3.1



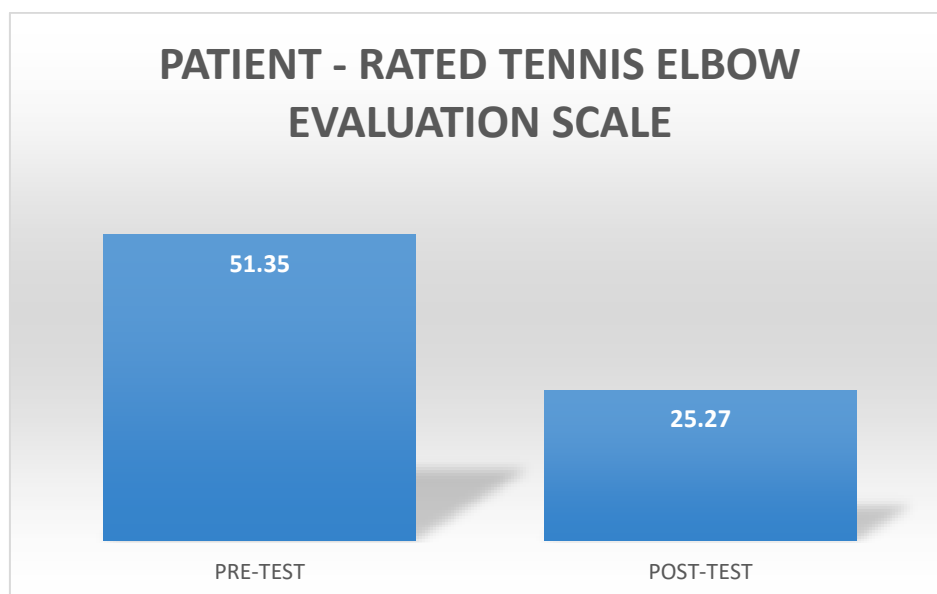
##### Results & Analysis

The scores of the current study were analyzed and results were obtained. In this visual analogue scale (VAS) study, the post-test mean value 3.95 is less than the pre-test mean value of 7.15, indicating that there is reduction in pain after the treatment.(table 1)

##### Patients Rated Tennis Elbow Evaluation Scale

Table 2 : Showing numbers of participants with differences values between pre-test and post-test of patient rated tennis elbow evaluation scale.

Sl.No.	Pre-Test	Post-Test	Differences
	Base Line	2 <sup>nd</sup> Week	
Mean Value	51.35	25.27	26.08



### Results & Analysis

The scores of the current study were analyzed and results were obtained. In this Patient rated tennis elbow evaluation (PRTEE) scale study, the post-test mean value 25.27 is less than the pre-test mean value of 51.35, indicating that there is reduction in pain after the treatment. (**Table 2**)

### 5. Discussion

To alleviate and control tendon discomfort, isometric exercise is suggested as a first line of treatment since it can strengthen the tendon at the angle of contraction without causing inflammatory symptoms [6]. Isometric exercise does not seem to be better than isotonic exercise in the treatment of chronic tendinopathy, according to the research [7]. Additional research is required to validate this discovery in the context of LET management. Because it may be advantageous for some people, isometric exercise can be included in supervised progressive loading exercise programs or clinical placement exercise programs [8] It is currently unclear how eccentric exercise should be used to treat lateral epicondylitis. Eccentric exercise has been shown to be a promising treatment for lateral epicondylitis, according to a systematic review conducted by Malliaras et al.10[9].The most prevalent overuse syndrome in the elbow is lateral epicondylitis, commonly referred to as tennis elbow. It's a painful ailment brought on by overstretching of the tendons in your elbow, commonly from repeated wrist and arm motions.

Studies on the impact of eccentric training along with stretching and isometric contraction exercises on elbow discomfort have not been conducted. The study's goal is to learn more about tennis elbow using eccentric training in conjunction with isometric contraction and stretching activities.

### 6. Conclusion

The findings of this study indicate that for individuals with lateral epicondylitis, eccentric training in conjunction with isometric contraction and stretching exercises is more beneficial. With tennis elbow, the exercise regimen that included isometric, static, and eccentric stretching movements for the wrist extensors had enhanced functional activities and lessened pain.

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