

# Effect of Low Level Laser Therapy and Eccentric Exercises on Chronic Achilles Tendinopathy for Recreational Badminton Players

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## ABSTRACT

**Background:** There are many treatments given for Achilles Tendinopathy which includes Anti-inflammatory Drugs, Massage, Ultra sound, and iontophoresis. However, studies involving Eccentric exercise training along with Low Level Laser Therapy for management of Achilles Tendinopathy are limited to this date.

**Objective:** To Evaluate The Effectiveness Of Low Level Laser Therapy and Eccentric Exercises In Unilateral Achilles Tendinopathy.

**Methodology:** The study design was quasi-experimental and study type was pre and post-test. 20 subjects were selected according to inclusion and exclusion criteria and written consent form was obtained within the age group of 17-30 years of both male and female were taken and 10 subjects in the Group A received laser therapy with eccentric exercises and 10 subjects in Group B received placebo effect of laser therapy with eccentric exercise.

**Result:** There is a statistical increase in the Visual Analogue Scale (VAS) and Ankle Range of motion.

**Conclusion:** This study concludes that Low level laser therapy with eccentric exercise has significant result in the reduction of pain and improvement in functional activity among patients with Achilles Tendinopathy.

**Keywords:** Low Level Laser Therapy, Eccentric exercise, Achilles Tendinopathy.

Tendinopathy is a common musculoskeletal system disorder and sedentary lifestyles, coupled with the specific requirements of physical and sports activities contributed to its increase<sup>1</sup>, consisting of various pathological features like inflammation, peritendinous oedema, local tenderness and stiffness. Overtime inflammation seems to disappear followed by the onset of structural degeneration of the collagen, tendon rupture, intra tendinous neovascularization, increased concentrations of neuropeptides, and increased cell apoptosis<sup>2</sup>

## Mechanisms of injury

In badminton, Achilles tendinopathy is caused due to fast forward movement of foot and sudden strike of heel, contributed by the eccentric action of triceps surae<sup>5</sup>. Micro trauma could be produced by repetitive practicing movements that causes tension in the Achilles tendon. Another causes that can contribute to Achilles tendinopathy is the shoes that have flat heels, low shock absorption and give no support to the foot<sup>6</sup>.

## Overuse injuries

Overuse injuries occurs as more common and relatively frequent in badminton. About three-fourth of the injuries were recorded as overuse injuries and one-fourth injuries were due to sprains and strain<sup>7</sup>. Recreationally badminton is one of the frequently played sports in the world, but has received very little interest from sports medicine specialists. Badminton is a low risk sport dominated by overuse-injuries. Anatomically most injuries are localized to the foot and ankle, with the most frequent injuries being Achilles tendonitis and tennis elbow. Rupture of the Achilles tendon is rare in older players, but is seen more often in younger recreational players. Over approximately the last fifteen years, use of eccentric exercise in rehabilitation has increasingly gained attention in the literature as a specific training modality. There is evidence in the literature supporting eccentric exercise for the rehabilitation of tendinopathies, muscle strains and rehabilitation<sup>8</sup>. The positivity of eccentric exercises has made it dominant in the treatment of chronic tendinopathies, because eccentric exercises require less oxygen consumption compared to the concentric exercises. Low-level laser therapy (LLLT) is a

## I. INTRODUCTION

The Achilles tendon is a band of fibrous tissue that connects the calf muscles to the heel bone i.e. calcaneum. The tendon consists of three muscles that arise from the femur, tibia and fibula. The shortest muscle among the three muscles is the plantaris and has the longest tendon, the second muscle is the gastrocnemius muscle that has two heads and is a bulky muscle and the third muscle is the soleus muscle. The gastrocnemius and soleus muscle form the thick and bulky part called as the calf, the Achilles tendon is formed by the fusion of the three muscles at the end where all fuse and get inserted into the calcaneum bone. It is an agonist to the action of plantar flexion and an antagonist to the action of dorsi flexion.

treatment that has been around for 26 years in clinical practice and may have the potential to fill a role in tendinopathy management. A successful strategy of treatment for tendinopathy should probably include modulation of inflammation in the acute phase and/or increased regeneration of collagen fibres in chronic tendinopathies. The inflammatory and regenerative process can be fixed by Low Level Laser Therapy

## II. AIM OF THE STUDY

To find the effect of low level laser therapy and eccentric exercises on chronic achilles tendinopathy for recreational badminton players.

## III. NEED FOR THE STUDY

Achilles Tendinopathy is the most common injury in the sports field, and only a few researches are available regarding Achilles Tendinopathy and also as these are overuse injuries, these are given least importance. Furthermore awareness over management and prevention of Achilles Tendinopathy in badminton players are quite scares among physiotherapists. Only very few studies been documented over the effect of LOW LEVEL LASER THERAPY on Achilles Tendinopathy and no studies have been done in badminton players especially in Indian population. As recreational sports is also on rise, injuries would be quite common and there is a need for the therapist to manage it, in a better and faster manner and about the exercise to strength the muscle fo prevention. So this study which aims to find the effect of eccentric exercise and low level therapy is done.

## IV. METHODOLOGY

**STUDY DESIGN** : QUASI-EXPERIMENTAL  
**STUDY TYPE** : PRE TEST - POST TEST  
**SAMPLING METHOD** : CONVENIENT SAMPLING  
**SAMPLE SIZE** : 20  
**STUDY DURATION** : 6 WEEKS  
**STUDY SETTING** : SRM MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE, KATTANKULATHUR

### INCLUSION CRITERIA

Age group 17 to 30 year.  
 Both Males and Females.  
 Unilateral Achilles Tendinopathy.  
 Patients either self-referred or referred by their physician for treatment.  
 Points above 5 according to **VICTORIAN INSTITUTE OF SPORT ASSESSMENT**.

### EXCLUSION CRITERIA

If they had received oral or injected corticosteroids within last 26 weeks.  
 Any recent surgery done in the lower limb  
 Bilateral Achilles Tendinopathy.

## MATERIALS REQUIRED

LASER  
 Goggles  
 Goniometer

## V. PROCEDURE

A total of 20 subjects were taken based on the inclusion and exclusion criteria and an informed consent was obtained after explaining clearly about the treatment protocol The VISA-A questionnaire is the only valid, reliable, and that has a specific score to measure Achilles tendon condition. These are questions that assess pain (questions 1-3), function (46), and activity (7 and 8).

The maximum score for each item from questions one to seven is 10 points, while for question eight it can reach 30 points. Thus, a score of 100 represents a healthy person, whilst zero, presents the worst possible outcome<sup>9</sup>, was given along with the informed consent. The subjects were divided into two groups GROUP A and GROUP B with 10 individual in each group.

GROUP A (10 subjects) were treated with LASER therapy and Eccentric Exercise. GROUP B (10 subjects) were treated by Placebo effect of Low Level LASER Therapy along with Eccentric Exercise. Before and after the study duration Visual Analogue Scale (VAS) and Range of motion for dorsi flexion, plantar flexion, eversion and inversion were analyzed.

### GROUP-A (LASER therapy with Eccentric Exercise)

Each individual in this group received LASER therapy for 3 minutes with 4 joules for 5 sessions. Before starting the treatment the subjects were assessed carefully. Following LASER management Eccentric Exercise has been given for one week.

### LASER

#### Position of the subject: Lying

The Subjects in prone lying position were given LASER at the achilles tendon.

As safety measure goggles were worn by both therapist and the patient.

The probe is placed at 90 degrees to the part treated.

### Eccentric Exercise

#### Position of subject: Standing

The subjects were positioned in Toe standing position and were asked to do repetitive heel raise for 15 repetition followed by 3-5 sec rest for 3 sets.

### GROUP-B (Eccentric Exercise with Placebo effect of LASER)

### LASER

The Subjects in prone lying position were given LASER at the Achilles tendon. LASER was placed over the tender area but there was no irradiation given to check the placebo effect.

As safety measure goggles were worn by both therapist and the patient.

The probe was placed at 90 degrees to the part treated.

## VI. ECCENTRIC EXERCISE

The subjects were positioned in Toe standing position and were asked to do repetitive heel raise for 15 repetition followed by 3-5 sec rest for 3 sets.

## VII. CONCLUSION

The study concluded that use of Low Level LASER Therapy along with Eccentric Exercise had a better effect on subjects with Achilles Tendinopathy than compared to Placebo effect of Low Level LASER Therapy with Eccentric Exercise.

## VIII. LIMITATIONS

Long-term effect of LASER was not analysed and The sample size was small.

## IX. RECOMMENDATIONS

The study can be done with larger sample; other strengthening exercises can be studied, Long term effect can be studied, Male and females can be compared, Micro current effects may be taken for future research.

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