

## Research Article

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## Comparative Study on Effectiveness of Laser Versus Phonophoresis along with Muscle Energy Technique for Jumpers Knee in Badminton Players

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### ABSTRACT

The ability to change direction and position of the body quickly and effectively while maintaining postural stability and orientation are important in badminton sports. There is also harmony related to skill and plan achievement during dynamic balance and agility. The purpose of the study is to compare the effectiveness of the LASER and phonophoresis along with muscle energy techniques in jumpers knee happens in badminton players. Experimental design, comparative study and Random sampling technique is used in this study. 40 samples were used with the duration of 3 months for this study. Group A consists of 20 athletes treated with LASER and muscle energy techniques whereas Group B consists of 20 athletes treated with Phonophoresis using Piroxicam gel and muscle energy techniques. Proforma like age, height, weight, level of competition, hours of practice, medical and surgical history, and limb length measurements (asis to medial malleolus) are collected from each player. The subjects were divided into two equal groups. Group A was given low level laser therapy and muscle energy techniques and Group B phonophoresis and muscle energy techniques Outcome measures are done with VISA -P, LEFS, NPRS, SIT AND REACH TEST. Mean and Standard Deviation were used to assess all the parameters. Paired 't- test' was used to find out the significant difference among the effectiveness of LASER along with Muscle Energy Technique and phonophoresis along with muscle energy techniques on jumper's knee by VISA -P, LEFS, NPRS and Sit and reach test in athletes. LASER therapy associated with Muscle energy technique was effective in improving Jumper's knee when compared with Phonophoresis associated with Muscle energy technique over 7 days of period.

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### Introduction

Regular participation in sports activities and physical exercise is highly encouraged to maintain positive physical, mental and social health and improve quality of life by reducing risk of chronic disease such as cardiovascular disease (CVD), diabetes, obesity, and depression. However, regular participation in sport can sometime have a detrimental effect on health in the form of injury. Badminton court or lawn game played with lightweight rackets and a shuttlecock. Historically, the shuttlecock (also known as a "bird" or "birdie") was a small cork hemisphere with 16 goose feathers attached and weighing about 0.17 ounce (5 grams). These types of shuttles may still be used in modern play, but shuttles made from synthetic materials are also allowed by the Badminton World Federation. The game is named for Badminton, the country estate of the dukes of Beaufort in Gloucester-shire, England, where it was first played about 1873. The roots of the sport can be traced to ancient Greece, China, and India, and it is closely related to the old children's game battledore and shuttlecock. Badminton is derived directly from Poona, which was played by British army officers stationed in India in the 1860s. The first unofficial all-England badminton championships for men were held in 1899,

and the first badminton tournament for women was arranged the next year. Badminton was introduced in the Olympics Games in 1992 Barcelona is played by either two or four players along both sides of net using, lightweight rackets, and a shuttlecock, a cork ball fitted with stabilizing feathers. Typically, it has been played either indoors or outdoors, on a marked-out area 44ft (13.41 m) long by 17ft (5.18 m) wide for the two-player game and 20ft (6.10 m) wide for the four-player game.

### Need of the Study

- In badminton, the aim of the game is to win points by hitting a shuttlecock across the net and into their opponent's court forcing their opponent to make an error and be unable to return the shuttlecock back.
- Purpose of this study is to compare the effectiveness of the LASER and phonophoresis along with muscle energy techniques in jumpers knee happens in badminton players.

### Aim and Objective

#### Aim

- To find out the effect of muscle energy techniques as well as

compare the effectiveness of the treatment by using modalities of LASER and phonophoresis in jumpers' knee among badminton players.

### Objectives

- To evaluate the symptom severity for athletes with jumpers' knee by using VISA-P Scale, NPRS, LEFS SIT AND REACH TEST.
- To evaluate the effectiveness of treatment by comparing the LASER and phonophoresis along, with muscle energy techniques in jumpers knee happens in badminton players

### Materials and Methodology

#### Materials Used for the Study

- ❖ LASER,
- ❖ VISA-P Questionnaire
- ❖ Numerical pain Rating scale
- ❖ Ultrasound,
- ❖ Ultrasound gel
- ❖ Piroxicam gel
- ❖ Goggles
- ❖ Cotton
- ❖ Couch
- ❖ Sit and Reach Box
- ❖ Stop watch
- ❖ Paper
- ❖ Pencil
- ❖ Eraser

### Methodology

This deals with the type of research approach used the settings of the study, the different variables used the population, sampling techniques and sample selection, the inclusion and the exclusion criteria, the description of the tool, collection of data, procedure for data collection and plan for data analysis which, were used in this study.

- ❖ **Study Design:** Experimental design
- ❖ **Study Type:** Comparative
- ❖ **Sample Method:** Random sampling technique
- ❖ **Sample Size:** 40

Group A consists of 20 athletes treated with LASER and muscle energy techniques.

Group B consists of 20 athletes treated with Phonophoresis and muscle energy techniques.

- ❖ **Study Duration:** 3 months
- ❖ **Study Setting:** Justina badminton academy, Annamalai Nagar, Trichy.
- ❖ **Samples:**

The sampling technique used was random sampling techniques. Study involved was Experimental study. 40 athletes were selected for the study. The subjects were divided into two equal groups. Group A consists of 20 athletes treated with LASER and muscle energy techniques whereas Group B consists of 20 athletes treated with Phonophoresis using Piroxicam gel and muscle energy techniques.

### Inclusion Criteria

- Age- 12 to 20 years of age
- Bilateral sides
- Gender - Both male and female athletes
- Athletes with the current symptoms of patellar tendinopathy
- Tight Hamstring
- Patients undergone preliminary treatment of patellar tendinopathy.

### Exclusion Criteria

- Acute or chronic tendinopathy
- Acute or chronic Hamstring injury
- Athletes with conditions such as fracture and arthritis
- Athletes sensitive towards the drugs

❖ **Dependent Variables:** Pain, Range of motion

❖ **Independent Variables:** LASER, ULTRASOUND, Muscle energy techniques.

### Outcome Measure of The Study

- Numerical pain Rating scale
- Victorian Institute of sports assessment -Patella( VISA -P )
- Lower extremity functional scale
- Sit and reach test

### Procedure

40 healthy athletes' population with Hamstring tightness were randomly allocated to two study groups. Subjects were assessed for Hamstring tightness, pain and functional activities, ability to play sports by above mentioned scales. Group A (n=20) were treated with muscle energy techniques and laser and the other Group B(n= 20)were treated with Phonophoresis and muscle energy techniques (for Comparative study). Before each study pretest was conducted. Treatment was given for 7 consecutive days and a follow up measurement on 10th day was done. The subjects were tested approximately at the same time of treatment. Group A were treated with infra-red laser with the duration of 5 minutes and muscle energy techniques as well , whereas Group B is treated by ultrasound with a frequency of 3 MHz, and the intensity is 1W/ cm<sup>2</sup> for 10 minutes.

Muscle energy technique was performed in the form of post-isometric relaxation and inhibition technique for Hamstring muscle. The contraction was held for 7-10 seconds and relaxed for 2-3 seconds. Appropriate breathing instructions were given. After that, on exhalation, the knee was taken very slightly beyond the restriction barrier and was held there for 10–30 second. After each treatment session, post test was conducted. The subjects were instructed that they will be excluded from the study in case if they develop any pain or injury in lower limbs or back during the training period and subject discontinued during the training program. In this study none of the subjects were excluded.

### Data Analysis

#### Paired 't' Value for LASER with Muscle Energy Techniques by VISA -P Questionnaire

Group	PRE-TEST	POST TEST
MEAN	6.3885	7.9980
SD	0.9968	0.9645
SEM	0.2229	0.2157
N	20	20

The two-tailed P value is less than 0.0001

By conventional criteria, this difference is considered to be extremely statistically significant.

Confidence interval:

The mean of Group One minus Group Two equals -1.6095

95% confidence interval of this difference: From -1.8432 to -1.3758 Intermediate values used in calculations:

t = 14.4145

df = 19

standard error of difference = 0.112

**Paired ‘t’ Value for Phonophoresis with Muscle Energy Techniques by VISA -P Questionnaire**

Group	PRE-TEST	POST TEST
MEAN	5.8495	6.1160
SD	0.9361	0.8774
SEM	0.2093	0.1962
N	20	20

The two-tailed P value equals 0.0014  
 By conventional criteria, this difference is considered to be very statistically significant. Confidence interval:  
 The mean of Group One minus Group Two equals -0.2665

95% confidence interval of this difference: From -0.4162 to -0.1168 Intermediate values used in calculations:  
 t = 3.7261

df = 19

standard error of difference = 0.072.

**Numerous Pain Rating Scale**

**Paired ‘t’ Value for LASER with Muscle Energy Techniques**

Group	PRE TEST	POST TEST
MEAN	2.800	3.550
SD	0.430	0.414
SEM	0.096	0.092
N	20	20

**P Value and Statistical Significance**

The two-tailed P value is less than 0.0001  
 By conventional criteria, this difference is considered to be extremely statistically significant.

**Confidence Interval**

The mean of Group One minus Group Two equals -0.750  
 95% confidence interval of this difference: From -0.810 to -0.690  
 Intermediate values used in calculations:  
 t = 26.2586  
 df = 19  
 standard error of difference = 0.029

**Numerous Pain Rating Scale**

**Paired ‘t’ Value for PHONOPHERESIS with Muscle Energy Techniques**

Group	PRE TEST	POST TEST
MEAN	2.800	3.160
SD	0.430	0.339
SEM	0.096	0.076
N	20	20

**P Value and Statistical Significance**

The two-tailed P value is less than 0.0001  
 By conventional criteria, this difference is considered to be moderately statistically significant.

**Confidence Interval**

The mean of Pre test minus Post test equals -0.360  
 95% confidence interval of this difference: From -0.489 to -0.231  
 Intermediate values used in calculations:

t = 5.8319  
 df = 19  
 standard error of difference = 0.062

**Sit and Reach Test**

**Paired ‘t’ Value for LASER with Muscle Energy Techniques**

Group	PRE TEST	POST TEST
MEAN	10.76	21.86
SD	5.10	6.56
SEM	1.06	.89
N	20	20

**Sit and Reach Test**

**Paired ‘t’ Value for Phonophoresis with Muscle Energy Techniques**

Group	PRE TEST	POST TEST
MEAN	16.12	20.4
SD	5	5.34
SEM	1	.78
N	20	20

**Result**

The collected data were tabulated and analyzed using statistical package (SPSS version 17). Mean and Standard Deviation were used to assess all the parameters.

Paired ‘t- test’ was used to find out the` significant difference among the effectiveness of LASER along with Muscle Energy Technique on jumper’s knee by VISA -P Questionnaire, NPRS, lower extremity functional scale and Sit and reach test in athletes.

Paired‘test’ was used to find out the significant difference among the effectiveness Phonophoresis along muscle energy technique with by VISA -P QUESTIONARIE, NPRS, lower extremity functional scale and Sit and reach test in athletes

The Pretest and Post-test mean values of VISA -P questionnaire in experimental group is analyzed by Paired ‘t’ test for jumpers knee.

As the calculated value on above said scale is greater than the table ‘t’ value, the null hypothesis is rejected. Hence there is a significant improvement in pain and functional activities of athletes with jumpers knee

**Discussion**

This randomized controlled study to find the effectiveness of LASER therapy combined with Muscle energy techniques over Phonophoresis using Piroxicam gel with muscle energy techniques in patellar tendinitis .LASER therapy combined with Muscle energy techniques can produce greater improvements in knee pain, Range of motion of knee joint, quadriceps muscle strength and endurance for athletes with patellar tendinopathy than Phonophoresis combined with Muscle energy techniques. 40 healthy athletes population with Hamstring tightness were randomly allocated to two study groups. Subjects were assessed for Hamstring tightness by sit and reach test. Group A(n=20) were treated with muscle energy techniques and laser and the other Group B (n= 20) were treated with Phonophoresis and muscle energy techniques (for Comparative study).

A comparison of the post - test and pre - test values of the pain and functional activities for the groups showed that there was a

significant improvement in group- A. Whereas non significant improvement in group - B. It can be proven that 30 seconds as the optimal duration for an effective stretch MET which can maintain optimal muscle elongation for this duration may produce increase in muscle length by combination of LASER. An increase in muscle flexibility after muscle energy techniques occurred due to biochemical and neuro physiological changes or due to an increase in tolerance of stretching. Thus it may be said this technique is effective individually in improving flexibility of the Hamstring. Thus the analysis of muscle flexibility after 72 hours of the end of the training did not reveal a significant was being followed during that period and the subjects were not undergoing any active and passive stretching regime during those 72 hours. Thus the study can be concluded that LLLT combined with MET is superior to Phonophoresis combined with MET reduce pain and improve function in patients with patellar tendinopathy. Single-leg wall squat test is a simple isometric strength test to assess quadriceps muscle endurance and has been shown to be reliable and valid in physical fitness assessment. In this study, quadriceps muscle endurance in patients with patellar tendinopathy was measured using the functional test; while quadriceps muscle strength was measured using the leg extension ergo-meter. With respect to quadriceps muscle endurance, LLLT combined with Muscle energy technique increased the squat test time after treatment by 85.0% and 84.7%, respectively. With respect to quadriceps muscle strength, LLLT and Muscle energy technique increased the relative strength after treatment by 42.1% and 50.0%, respectively. Therefore, LASER combined with Muscle energy technique seem more effective for strength improvement than Phonophoresis combined with Muscle energy technique in the treatment of patellar tendinopathy. The results indicated that LASER therapy can increase strength and endurance of the quadriceps muscle and range of motion of knee joint as well in the treatment of patellar tendinopathy.

### Conclusion

The present study tried to assess the effectiveness of techniques between LASER along with Muscle energy techniques and Phonophoresis along with Muscle energy techniques among badminton players who is having Jumper's knee.

The researcher selected badminton players randomly in Trichy, Tamilnadu. The study adopted a survey method where the researcher randomly distributed the questionnaire to 50 male and female athletes in a badminton academy. Through simple random sampling the researcher selected 50 samples for the study based on inclusion and exclusion criteria. 10 questionnaires were invalid, so it cannot be included in the study and only 40 samples data were analyzed.

The tools used to collect data was VISA - P scale, lower extremity functional scale and NPRS scale. The data were analyzed using "t" test.

**The analysis revealed there is a significant improvement in pain, functional activities of knee joint of athletes who were undergone the techniques of LASER along with muscle energy techniques when comparing with the athlete who were undergone the techniques of Phonophoresis along with muscle energy techniques.**

The present study also found that athletes do not differ significantly on the basis of demographic variables in LASER along with muscle energy technique and also it was found that athletes do not significantly differ on the basis of selected demographically

variables in Phonophoresis along with muscle energy techniques.

### Limitations of the Study

- o One major limitation of this study is research is limited to only Badminton players, a little more variety of data might have been obtained if other types of athletes had been included.
- o The sample for this study consists of 200 samples only and being included Jumpers knee condition only 10 % of them have caused misinterpretation with statements due to their misinterpretation of symptoms.
- o The present study only conducted in Trichy. Geographical extension is required
- o The study was done with smaller samples.
- o Short duration of the study.
- o The results obtained in this study could not be extrapolated to the athletes involved in the other sports.
- o Individual's nutrition factors were not controlled.

### Further Recommendations

- o Further studies need to be conducted to prove the efficacy of the procedure and techniques involved in this study with
- o Different badminton academy
- o Larger samples.
- o Different fields of players and sports.

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