

## Effectiveness of Cyriax Physiotherapy in Subjects with Tennis Elbow

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### Abstract

Pain over the lateral epicondyle, which is exacerbation by work or recreational activities that involves gripping action of the hand, such as holding tools, shaking hands, and lifting a kettle, usually signals that the individuals has a condition termed lateral epicondylalgia, epicondylitis, or what is more commonly known as tennis elbow.

**Keywords:** Pain; Epicondylitis; Handling tools

### Introduction

Pain over the lateral epicondyle, which is exacerbation by work or recreational activities that involves gripping action of the hand, such as holding tools, shaking hands, and lifting a kettle, usually signals that the individuals has a condition termed lateral epicondylalgia, epicondylitis, or what is more commonly known as tennis elbow [1]. This condition was first named by Morris (1882) who called it lawn tennis arm [2].

Tennis elbow is a syndrome characterized by an insidious onset of elbow pain brought on by wrist extension with pronation or supination and aggravated by gripping [3].

Lateral epicondylalgia affects 1-3% of the population, only 5% of all patients seen are recreational tennis players [4]. Although the syndrome has been identified in patients ranging from 20 to 60 years old, it predominantly occurs in the fourth and fifth decades. Male and female prevalence rates are reportedly equal. Seventy-five percent of patients are symptomatic in their dominant arms [5-7].

The specific muscle most often implicated clinically and surgically is the extensor carpi radialisbrevis with occasional involvement of the extensor digitorum communis, extensor carpi radialis longus, and extensor carpi ulnaris. The possible reason for this more frequent involvement of the extensor carpi radialisbrevis is its location as one of the most laterally situated muscles on the lateral epicondyle with slips taking origin from the radial collateral ligament. The extensor carpi radialisbrevis is intimately attached to the joint capsule, which is continuous with the radial collateral ligament and because of this proximity adhesions are more likely [3].

Cyriax advocated the use of deep transverse friction massage in combination with mill's manipulation in treating lateral epicondylalgia [5,8].

Deep transverse friction (DTF) is also known as deep friction massage is a specific type of connective tissue massage applied precisely to the soft tissue structures such as tendons. It was developed in an empirical way by cyriax and is currently used extensively in rehabilitation practice [5].

Mill's manipulation is the most common manipulative technique used by physiotherapists. Cyriax stated that it should be performed immediately after the DTF is provided that the patient has a full range of passive elbow extension. If passive elbow extension is limited, the manipulative thrust will affect the elbow joint, rather than the common extensor tendon, possibly causing traumatic arthritis. It is defined as a passive movement performed at the end of range—that is, once all the slack has been taken up—and is a minimal amplitude, high

velocity thrust. The aim of this technique, again without properly designed controlled studies to prove this, is to elongate the scar tissue by rupturing adhesions within the teno-oseous junction, making the area mobile and pain free [5].

Cyriax physiotherapy is the technique where DTF and Mill's are used, but very few studies on cyriax physiotherapy using various outcome measures have been conducted. However, the present study is being undertaken to study the effect of cyriax on pain, grip strength and to see change in functional activities level following treatment in cases of tennis elbow.

### Method

#### Design

This study was conducted at the physiotherapy OPD of KLE Dr. Prabhakar Kore hospital and MRC, Belgaum Karnataka.

Participants were referred by public and private medical practitioners for treatment of chronic tennis elbow. 20 subjects were recruited and received Cyriax physiotherapy, Therapeutic ultrasound and exercisers. The intervention was provided at 7 visits occurring over 1 week. Measurements were recorded once pretreatment i.e 1<sup>st</sup> day and once post treatment i.e 7<sup>th</sup> day.

#### Participants

People entering the trial had to meet the following inclusion criteria, both male and female between 20 to 50 years of age, pain on the lateral side of the elbow, tenderness over the forearm extensor origin, pain with 1 of the following tests: Mill's test, Cozens test, all subjects with symptoms for duration of more than 3 months. Exclusion criteria were previous surgical history for elbow, fractures around elbow, restricted extension and laxity at elbow, sensitive skin, allergies to adhesive tape, a recent steroid injection for same complaints (3 months).

#### Intervention

The purpose of this study was explained and a written informed

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consent was obtained from all the participants. The subjects were screened based on the inclusion and exclusion criteria. Demographic data was collected along with initial assessment of VAS, grip strength, Patient rated forearm evaluation questionnaire for lateral epicondylitis.

The subjects received the selected treatment for 7 sessions at 1 session per day.

**Therapeutic Ultrasound:** Subject received ultrasound and exercises before performing deep friction massage and manipulation. Subject were seated on the chair with shoulder in neutral position, elbow in right angle and fully supported. The ultrasound was administered for 10 minutes in pulsed mode at 1 w/cm<sup>2</sup> with ultrasound gel Binder, over the later epicondyle or area of tenderness.

### Exercises

Each exercise were repeated 10 times in 3 series, Clenching fist strongly, resisted wrist flexion and extension, wrist rotation with a stick and end range stretching for wrist flexors and extensors for at least 30 sec.

Following these subjects received Cyriax physiotherapy.

### Cyriax physiotherapy

Position of the patient-the patient sits with elbow bent to right angle and full supination. The physiotherapist places one hand at the patients' wrist and holds the forearm in supination.

The pad of the index finger, middle finger or thumb is placed directly over the involved site, the remaining fingers should be used to provide further stabilization of the therapists hand, no lubrication is used, the patient's skin must move along with the therapist's fingers.

Beginning with light pressure, the therapist moves the skin over the site of the lesion back and forth in a direction perpendicular to the normal orientation of the fibers of the involved part.

The massage is given for 2 minutes then stopped for 1 to 2 minutes then repeated of 2 minutes, working up to 12 to 15 minutes, followed by the manipulation.

### Manipulation

Position of patient- patient sits upright with the arm abducted to the horizontal and so far medially rotated that the olecranon faces upward. The physiotherapist stand behind the patient, the patients forearm must be fully pronated and the wrist flexed.

The physiotherapist now places his left hand on the olecranon, thus extending the elbow, while the tension is strongly maintained; he suddenly forces full extension at the elbow with his left hand with a smart jerk.

This is carried out once each visit, immediately after friction.

### Outcome Measures

#### Pain intensity

By Visual analogue scale-A scale of 10 cm to evaluate intensity of pain where 0 represents no pain and 10 represent unbearable pain.

Grip strength

Grip strength was measured by hand held dynamometer.

### Physical function outcome

Patient rated forearm evaluation questionnaire for lateral epicondylitis.

### Statistical Analysis

Statistical analysis for the present study was done using statistical package of social sciences (SPSS) version 14 so as to verify the results obtained. For this purpose data was entered into an excel spread sheet, tabulated and subjected to statistical analysis. Comparison of the pre and post intervention outcome measures within the group was done by using paired-t test. Probability values less than 0.05 were considered statistically significant and probability values less than 0.0001 were considered highly significant.

### Results

VAS-VAS score pre session on 1<sup>st</sup> day and post session on 7<sup>th</sup> day was 6.0 ± 1.3 and 1.3 ± 1.0 respectively. On comparing these values there was significant difference.

Grip strength-The mean grip strength score pre session on 1<sup>st</sup> day and post session on 7<sup>th</sup> day was 15.3 ± 2.3 which increased to 18.3 ± 2.3 respectively.

Finally on comparing the pre and post treatment values of PRTEEQ i.e, pre 55.4 ± 14.0 following which post treatment decreased to 21.0 ± 6.2.

### Discussion

The present experimental trial was conducted to study the effect of, Cyriax physiotherapy with conservative treatment of therapeutic ultrasound and supervised exercise in subjects with lateral epicondylitis (Tennis elbow). Results of this study were focused on pain relief where Pain assessment was done by visual analogue scale (VAS), [9] improvement of grip strength, grip strength was measured with the help of hand held dynamometer, [10] and reduction in function activity impairment scores based on Patient rated forearm evaluation questionnaire for lateral epicondylitis. It was noticed that there was improvement in all the above parameters.

In this study the age group of the participants was between 20 to 50 years, the mean was 41.15 ± 7.73. According to a study by Halpren it was stated that, peak age at which tennis elbow occurs is 40 to 50 years [11]. There is a decrease in the occurrence of tennis elbow cases after 50 years of age, this may be due to diminished intensity of play or activity at these older ages as suggested in a study by Gruchow et al. [12].

Subjects of present study consisted of 11 males and 09 females. According to a study by Alireza Shamsoddini et al. [8] and few others, tennis elbow is equally distributed between men and women. But according to Gruchow et al. [12] there was a fourfold increase in prevalence among men and nearly two fold increases among women. In this study men had a marginally higher prevalence rate than women, but there was no statistically significant difference between men and women prevalence.

The mean values of data from present study showed reduction in pain score on VAS, improved grip strength on hand held dynamometer and functional improvement graded on PRFEQ.

When the intra group mean values of VAS were analyzed it was found statistically significant. In the present study reduction in

pain level, as quantified by the VAS with the application of Cyriax is consistent with the findings of previous studies.

It is a common clinical observation that application of DTF leads to immediate pain relief. The patient experiences numbing effect during the session and reassessment immediately after the application of DTF shows reduction in pain and increase in strength and mobility [13] several theories have been put forth to explain the pain relieving effect of DTF. According to Cyriax and Cyriax, DTF also leads to increased destruction of pain provoking metabolites such as Lewis's substances [5]. Another mechanism by which reduction in pain may be achieved is through diffused noxious inhibitory controls, a pain suppression mechanism that releases endogenous opiates.

The latter are inhibitory neurotransmitters which diminish the intensity of pain transmitted by higher centres [5].

Mill's manipulation is performed immediately after DTF, where it is done to elongate the scared tissue by rupturing adhesions within the teno-osseous junction making the area mobile and pain free [5,8].

Amit V Nagrale et al. in his study between Cyriax and phonophoresis found Cyriax physiotherapy to be superior treatment approach compared to phonophoresis in terms of pain, pain-free grip, and functional status [14].

It is important to note that all participants were given ultrasound and supervised exercises as a common conventional method. Ultrasound refers to mechanical vibrations which are essentially the same as sound waves but of a higher frequency. Such waves are beyond the range of human hearing and can therefore also be called ultrasonic [15].

In a study by D'Vazet al. [16], they studied the effect of pulsed low-intensity ultrasound therapy for chronic lateral epicondylitis. They concluded that low-intensity ultrasound (LIUS) was no more effective for a large treatment effect than placebo for recalcitrant LE. This is in keeping with other interventional studies for the condition.

Ultrasound has been used over a period of time to control acute and chronic pain over a localized area. Several studies have demonstrated the effectiveness of ultrasound in reducing pain. In study by Binder et al., where they checked for the effectiveness of ultrasound in treating soft tissue lesions, where they conclude that Ultrasound enhances recovery in most patients with lateral epicondylitis [17].

Timnoteboom et al. [18], in his study mentioned that chronic symptoms are commonly associated with inadequate muscle power and endurance. Reduction in grip strength was noted in these subjects and to overcome supervised exercises were prescribed.

This strengthening of these muscles strengthening the damaged attachment of wrist extensors resulted in better repetitive wrist movements performed by the subjects with tennis elbow [19].

It was claimed that the eccentric training results in tendon strengthening by stimulating mechanoreceptors in tenocytes to produce collagen, which is the key cellular mechanism that determines recovery from tendon injuries. Strengthening may improve collagen alignment of the tendon and stimulate cross linkage formation both of which improve the tensile strength of tendon [19].

Literatures suggest that strengthening and stretching both are main components of exercise program, because tendons must be flexible along with strong. Positive effects of exercise program for tendon injuries may be attributable to lengthening of muscle tendon unit by stretching and strengthening exercise which could achieve

loading effect within muscle tendon unit along with hypertrophy and increased tensile strength of the tendon [20].

The results of this study showed significant increase in grip strength.

PRTEE Formerly known as the Patient-Rated Forearm Evaluation Questionnaire (PRFEQ) seems to be a reliable tool for assessing pain and function in patients with chronic lateral epicondylitis. The PRTEE has shown greater reliability and has sufficient width scale to reliably detect improvement or worsening in most subjects. For these reasons, the PRTEE appears to be the one of most commonly reported measure of health status in patients with Tennis elbow [21].

In the present study the means of PRTEE were analyzed, where intra group analyses showed significant improvement.

On comparing pre and post values it showed significant improvement in terms of pain, grip strength and functional performance in subjects with tennis elbow. Therefore it can be concluded that Cyriax physiotherapy can be incorporated with conservative physiotherapy management for better results.

Limitations of the study were, subjects could not be followed up for longer period of time, to assess long term benefit, and occupation relevance was not compared.

Future Scope of the Study, studies with longer follow-up period are recommended to assess long term benefits, Conduct the study with larger sample size, Range of Motion could be taken in to consideration

## Conclusion

The present study provided evidence to support the use of Cyriax physiotherapy in relieving pain, improving grip strength and functional performance in subject with tennis elbow.

## Conflict of Interest

The author's report no conflict of interest.

## References

1. Vicenzino B, Brooksbank J, Minto J, Offord S, Paungmali A (2003) Initial effects of elbow taping on pain-free grip strength and pressure pain threshold. *J Orthop Sports Phys Ther* 33: 400-407.
2. James Cyriax (2000) *Book of Orthopaedic Medicine* (11<sup>th</sup> edn, Vol 1) AICBS Publications; Delhi
3. Kushner S, Reid DC (1986) Manipulation in the treatment of tennis elbow. *J Orthop Sports Phys Ther* 7: 264-272.
4. Wendy-Ann Wood, Aimee Strwart (2006) Lateral epicondylalgia; an overview. *J Physical therapy* 11: 155-160
5. Stasinopoulos D, Johnson MI (2004) Cyriax physiotherapy for tennis elbow/ lateral epicondylitis. *Br J Sports Med* 38: 675-677.
6. Ciccotti MC, Schwartz MA, Ciccotti MG (2004) Diagnosis and treatment of medial epicondylitis of the elbow. *Clin Sports Med* 23: 693-705, xi.
7. Stoeckart R, Vleeming A, Snijders CI (1987) Anatomy of the extensor carpi radialisbrevis muscle related to tennis elbow. *ClinBiomech* 4: 10-12.
8. Alireza Shamsoddin, Mohammad TH (2008) Initial effect of taping technique on wrist extension and grip strengthening and pain of individuals with lateral epicondylitis. *Iranian Rehabilitation Journal* 8: 11.
9. Verhaar JA, Walenkamp GH, van Mameren H, Kester AD, van der Linden AJ (1996) Local corticosteroid injection versus Cyriax-type physiotherapy for tennis elbow. *J Bone Joint Surg Br* 78: 128-132.
10. Ng GYF, Fan ACC (2008) Does elbow position affect strength and reproducibility of power grip measurements? *Physiotherapy* 87: 68-72

11. Darlene Hertling, R M Kessler Management of common musculoskeletal disorders, Lippincott Williams and Wilkins
12. Gruchow HW, Pelletier D (1979) An epidemiologic study of tennis elbow. Incidence, recurrence, and effectiveness of prevention strategies. Am J Sports Med 7: 234-238.
13. De Bruijn R. Deep (1984) transverse friction: its analgesic effect. Int J Sports Med 5: 35-36
14. Nagrale AV, Herd CR, Ganvir S, Ramteke G (2009) Cyriax physiotherapy versus phonophoresis with supervised exercise in subjects with lateral epicondylalgia: a randomized clinical trial. J Man Manip Ther 17: 171-178.
15. John Low, Ann Reed (2000) Electrotherapy Explained, principles and practice (3rd edn) Butterworth Heinemann.
16. D'Vaz AP, Ostor AJ, Speed CA, Jenner JR, Bradley M, et al. (2006) Pulsed low-intensity ultrasound therapy for chronic lateral epicondylitis: a randomized controlled trial. Rheumatology (Oxford) 45: 566-570.
17. Binder A, Hodge G, Greenwood AM, Hazleman BL, Page Thomas DP (1985) Is therapeutic ultrasound effective in treating soft tissue lesions? Br Med J (Clin Res Ed) 290: 512-514.
18. Noteboom T, Cruver R, Keller J, Kellogg B, Nitz AJ (1994) Tennis elbow: a review. J Orthop Sports Phys Ther 19: 357-366.
19. Manias P, Stasinopoulos D (2006) A controlled clinical pilot trial to study the effectiveness of ice as a supplement to the exercise programme for the management of lateral elbow tendinopathy. Br J Sports Med 40: 81-85.
20. Söderberg J, Grooten WJ, Ang BO (2012) Effects of eccentric training on hand strength in subjects with lateral epicondylalgia: a randomized-controlled trial. Scand J Med Sci Sports 22: 797-803.
21. Leung HB, Yen CH, Tse PY (2004) Reliability of Hong Kong Chinese version of the Patient-rated Forearm Evaluation Questionnaire for lateral epicondylitis. Hong Kong Med J 10: 172-177.

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