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# A Study to Compare the Effectiveness of Active Release Technique Versus Deep Friction Massage on Pain, Grip Strength and Functional Performance in Patients with Chronic Lateral Epicondylitis

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**Abstract**

**Background and Objectives:** Lateral epicondylitis is a very common overuse syndrome in the elbow. It is an injury which involves the extensor muscles of the forearm. The most frequent location of the involvement is in the musculotendinous junction of the extensor carpi radialis brevis muscle. It leads to pain, reduced grip strength and functional impairments affecting individual's lifestyle. Active release technique and deep friction massage both are effective techniques in the treatment of lateral epicondylitis. This study focuses on the comparative perspective of these soft tissue techniques along with the conventional treatment in terms of relief to the patients suffering from lateral epicondylitis.

**Study Design:** Experimental design comparative in nature.

**Method:** This study was done on 30 subjects who were divided equally into two groups. Group A received active release technique along with the conventional treatment for lateral epicondylitis and group B received deep friction massage along with the conventional treatment. Each patient was assessed on 1st, 11th and 21st day using Numeric Pain Rating Scale (NPRS), hand dynamometer and Patient Rated Tennis Elbow Evaluation (PRTEE) questionnaire.

**Result:** Statistical analysis of the data revealed that both the therapies produced improvement in pain, grip strength and functional activity status among patients with chronic lateral epicondylitis but according to independent t-test there was highly significant difference between active release technique and deep friction massage groups. The study confirmed that the effect of therapy in group B is more effective rather than group A by NPRS scores but on PRTEE and grip strength effect of therapy in group A (ART) was more effective rather than group B (DFM). And by paired sample test there was statistically significant difference between before and after program in group A and group B among chronic lateral epicondylitis patients.

**Conclusion**: The study concluded that active release technique and deep friction massage both are effective treatments if done along with the conventional treatment. Active release technique demonstrated better improvement than the deep friction massage in the management of lateral epicondylitis.

**Keywords:** Chronic lateral epicondylitis, Active release technique, Deep friction massage, NPRS, PRTEE and grip strength.

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## Introduction

Lateral epicondylitis is the most common lesion in the elbow[1].German physician F. Runge is usually credited for the first description of the condition, calling it "writer's cramp" in 1873. Later it was called "washer women's elbow". British surgeon Henry Morris published an article in *The Lancet* describing "lawn tennis arm" in 1882. The popular term "tennis elbow" first appeared in the same year in a paper by H.P. Major, describing as "lawn-tennis elbow"[2,3]. It is an injury involving the extensor muscles of the forearm[4].

The most frequent location of the involvement is in the musculotendinous junction of the Extensor Carpi Radialis Brevis (ECRB) muscle[6]. Due to severe pain, patient becomes unable to participate in the provoking activities like racket sports, throwing etc. Patient feels difficulty with repetitive forearm/ wrist tasks,such as sorting or assembling small parts, typing on a keyboard or using a computer mouse, gripping activities, using hammer, turning a screwdriver, shuffling papers, or playing a percussion instrument[6]. Positive tests of provocation include palpation tenderness on or near the lateral epicondyle, pain with resisted wrist extension performed with the elbow extended (Cozen's test), pain with resisted middle finger extension performed with the elbow extended (Maudsley's test) and pain with passive wrist flexion with the elbow extended and forearm pronated (Mill's test)[4,6].

During the acute phase it is important to prevent further damage and thereby development of chronic lateral epicondylitis by adequate care and support and avoiding the hasty movements of supination, wrist extension, radial deviation and tight grips causing repeated breakdown in the formation of scar tissue which subsequently prolongs the inflammatory reaction and leads to the formation of adhesions[11].

Long established treatment protocol for LE consists of counterforce bracing, non- steroid anti-inflammatory drugs, ultrasound, iontophoresis or phonophoresis for pain relief followed by stretching and strengthening exercises for flexibility and endurance training[6,11]. In recalcitrant cases surgery may be an option[11].

Nowadays, soft tissue technique to gain importance is active release technique (ART). ART was developed by P. Michael Leahy which is a deep tissue technique used for breaking down scar tissue/adhesions and restoring function and movement. ART is application of deep digital tension over tenderness and asking the patient to actively move the tissue from the shortened to lengthened position and thereby breaking the adhesions formed[12].

Deep friction massage/Cross friction massage is an another specific soft tissue massage technique that was developed by Cyriax. The purpose of deep friction massage (DFM) is to maintain the mobility within the soft tissue structures of ligaments, tendons and muscles and prevent adherent scars from forming. In situations where adhesions are already formed a more intense friction can help to break them as well. To perform this stroke the fingertips or thumbs are applied, either alone or reinforced by the adjacent finger[1]

## Methodology

**Study Design**: Experimental design comparative in nature

**Source of Data Collection:** Various physiotherapy clinics and hospitals of Indore and back- end departments of various companies.

**Method of Data Collection**: Random purposive sampling

**Sample Size:** 30 subjects

**Sample Design:** The subjects who fulfilled the inclusion and exclusion criteria were selected for the study and a written consent was taken from the selected subjects before undergoing the treatment.

### Study Duration

November 2017 – December 2017

### Inclusion Criteria

- Both males and females
- Pain- >3 months
- Unilateral involvement
- Positive Cozen's test and Mill's test
- Numeric Pain Rating Scale (NPRS) score- 3-6

### Exclusion Criteria

- History of trauma to upper limb and cervical region

- Any surgery of upper limb and cervical region
- Local infections
- Local malignancy
- Acute lateral epicondylitis
- Cervical radiculopathy
- Osteoporosis
- Recent steroid infiltration

## Materials Used in the Study

### Tools used for Intervention

- Therapeutic ultrasound machine.
- Hand dynamometer.
- Couch
- Table
- Chair

### Tools used for Outcome Measures

- Numeric Pain Rating Scale (NPRS)
- Patient - Rated Tennis Elbow Evaluation questionnaire (PRTEE)
- Hand dynamometer.

## Procedure

### Tests used for lateral epicondylitis

1. Cozen's test
2. Mill's test

Patients fulfilling the inclusion and exclusion criteria were randomly divided considering their age and working hours into two groups: group A and group B.

Patients in group A received Active Release Technique (ART) along with conventional treatment and patients in group B received Deep Friction Massage (DFM) along with conventional treatment.

In conventional treatment bracing, ultrasound and exercises were given. Exercise regimen included stretching and strengthening exercises.

**1) Group A-**

**Active Release Technique (ART) –**

Patient position - sitting on chair, elbow flexed resting on table, forearm in mid prone position and wrist in neutral position.

Therapist applied pressure to the extensor carpi radialis brevis muscle distal to their attachment at the elbow.Therapist placed the thumb over ECRB muscle and patient had to extend his/her elbow and pronate the forearm and flex the wrist meanwhile the therapist moved the pressure proximally.

Doses -10 minutes in one session and 3 sessions/ week on alternate day.

**2) Group B-**

**Deep Friction Massage (DFM)-**

Patient position - sitting on the chair, elbow flexed to 90 degree resting on the table, forearm supinated and wrist in neutral position.

Therapist applied pressure by the thumb to the extensor carpi radialis brevis (ECRB) muscle distal to their attachment at the elbow and gave friction massage transversely to the fiber orientation.

Dose: 10 minutes in one session and 3 sessions/ week on alternate day.

3) Ultrasound in both the groups at the tenoperiosteal junction of the ECRB muscle.

Parameters-

Mode- Continues Frequency- 3 Megahertz

Intensity - 1 Watt/square centimeter Duration - 5 minutes

Doses: 3 sessions/week on alternate day.

4) Exercise regimen in both the groups –

Stretching exercise:

Patient position - sitting on chair, forearm pronated, elbow extended and wrist in neutral position.

With the help of another hand or taking help of wall patient had to stretch the muscle for 30 seconds by palmerly flexing the wrist.

Doses - 10 stretches/ session once daily. Strengthening exercise:

Patient position - sitting on chair with elbow in 90 degree flexion, forearm pronated resting on thigh and wrist in neutral position.

Patient had to extend the wrist against the manual resistance applied by another hand on the dorsum of the affected hand and held the position for 10 seconds.

Doses - 10 contractions/ session once daily.

The patients were treated for three weeks and outcome measures were taken for analysis of the efficacy of the treatment on 1st, 11th and 21st day of the treatment.

## Statistical Analysis

### Sampling

Both probability and non-probability sampling techniques were used for this study. Non probability sampling technique was used to select the required samples from the population of individuals who had chronic lateral epicondylitis while the allocation of a group to a sample done was using probability sampling technique.

## Study Tools

- Numeric Pain Rating Scale (NPRS).
- Patient Rated Tennis Elbow Evaluation Questionnaire (PRTEE).
- Hand dynamometer.
- Therapeutic ultrasound.

## Statistical Methodology

Overall, data of 1st day, 11th day and 21st day were available for the study which were statistically analyzed in order to evaluate the improvement in pain, grip strength and functional activity status.

## Statistical Technique

The statistical analysis was performed using SPSS version 20. This was assumed that the recorded observations had followed a normal distribution.

## Results

In the present study, out of thirty subjects 21 were female and 9 were male. The age of all subjects who had lateral epicondylitis in the study was between 25 to 59 years.

Result of the study shows clearly that there is positive correlation of .783 present between the NPRS scores of 1st and 11th day and there is statistical significance difference between the two scores ($p<0.05$). Similarly, there is positive correlation exists between the 1st and 11th day scores of PRTEE and grip strength also.

It can be clearly seen that there is a positive correlation present between the 11th and 21st day scores of NPRS, PRTEE and grip strength which is showing that there is statistically significant difference present between the 11th and 21st day outcome measures and the change was consistent after training across subjects.

According to the result there is still a positive correlation exists between the pre- intervention and post-intervention outcome measures. Between 1st and 21st day NPRS scores there is a correlation of .550 present and the p value is less than 0.05 (0.05) which shows that there is statistically significant difference between pre and post intervention.

There is a correlation of .453 present between the 1st and 21st day PRTEE scores. Similarly, correlation of .669 present between pre-intervention and post-intervention scores of grip strength in group A.

The mean column in the paired sample t- test displays the average difference between before and

after 11 days program of NPRS scores (2.333), PRTEE scores (20.433) and grip strength scores (2.312) among patients in ART group. The standard deviation column displays the standard deviation of the average difference score. The std. error mean column provides an index of the variability one can expect in repeated random samples of 15 patients similar to the ones in the study. The 95% confidence interval of the difference provide an estimate of the boundaries between which the true mean difference lies in 95 % of all possible random samples of 15 patients similar to the ones participating in the study.

Since the significance value for change in all measurements are less than 0.05 ormn(P=0.000), we can conclude that the average difference of 4.66 per patients of NPRS scores, 36.93 of PRTEE and 3.82 of Grip strength scores are not due to chance variation, and can be attributed to after 21days program i.e. statistically significant difference between before and after program in group A among chronic lateral epicondylitis patients.

## Discussion

The present study was intended to evaluate and compare the effectiveness of active release technique and deep friction massage on pain, grip strength and functional performance in patients with chronic lateral epicondylitis.

The 11- point NPRS is a scale to measure the pain in which patients rate their pain ranging from 0 (no pain) – 10 (worst imaginable pain) over past 24 hours and it has been shown to have concurrent and predictive validity as a measure of pain intensity. The PRTEE estimates the patient's pain and function over the past week.

Our study shows that deep friction massage decreases the pain intensity which was also shown in a study of **Rosemary Yi et al (2017)**. They did a comparative study on "Deep friction massage versus steroid injection in the treatment of lateral epicondylitis". DFM group demonstrated a significant improvement in all outcome measures including VAS pain score, DASH score and grip strength.

Both the techniques, ART and DFM are supposed to breakdown the scar tissue/adhesions and restore the functions and movements. In this study, the NPRS scores of the group which received deep friction massage were improved more than the group which received active release technique. This may be because the deep friction massage produces an analgesic effect which can last up to 24 hours. Whereas, the PRTEE and grip strength scores of the ART group improved more than the DFM group.

This may be because the ART effectively treats the underlying cause of the disorder resulting in increased range of motion, increased strength and improved circulation. ART helps to relax the deeper tissues in the forearm throughout the length whereas DFM targets only a smaller area. ART provides effective and long lasting relief from pain and increases the strength of the muscle thus grip strength increases. The cumulative effect of reduced pain and increased muscle strength results in improved functional activity status of the patient.

In our study the grip strength among the subjects of ART group improved which was proved in an another study of **Dr Soumik Basu et al (2017)** also. They did a comparative study on "Effectiveness of active release technique in the treatment of chronic lateral elbow pain". Each patient was assessed pre and post treatment program using hand held dynamometer for grip strength, PRTEE for functional activity status evaluation and goniometer for checking the range of motion. They came to the conclusion that ART group demonstrated better improvements in grip strength, functional performance and range of motion than the control group. In an another study by **Jordan A. Gliedt et al (2014)** on a 48 year old man with complaint of lateral elbow pain found that by the application of ART during the three weeks treatment program, patient's pain was significantly reduced and functional activity status of the patient also got improved. Study conducted by **KM Harneet et al (2012**) also supports our findings in which they evaluated the efficacy of ART on functional performance by PRTEE and pain free grip strength (PFGS) in patients with tennis elbow. They included 30 patients with lateral epicondylitis divided into two groups. One group received ART in combination with conventional treatment and in another group only the conventional treatment was given. They concluded that ART showed better results by improved grip strength and functional activity status than another group.

Thus we can conclude from results of our study with support of previously done studies that deep friction massage and active release technique both are effective in the management of chronic lateral

epicondylitis whereas deep friction massage being more effective for short term pain relief and active release technique being more effective for long lasting relief in pain and improvement in grip strength and thus the functional activity status of the patients of chronic lateral epicondylitis.

## Limitations Of Study:

1. Sample size taken for the study was small.
2. Long term effect of the intervention was not assessed in our study.

## Scope for Further Study

1. Study with large sample size is recommended.
2. Long term effect can be considered.
3. A comparative study can be done between ART and other soft tissue techniques.

## Conclusion

The study confirmed that the effect of therapy in the DFM group is more effective rather than in ART group by Numeric Pain Rating Scale (NPRS) scores but on Patient Rated Tennis Elbow Evaluation (PRTEE) questionnaire and grip strength effect of therapy in ART group was more effective rather than DFM group. And by paired sample test there was statistically significant difference between before and after program in group A and group B among chronic lateral epicondylitis patients.

**Ethical clearance**: Taken from Institutional ethics committee of Choithram college of paramedical sciences( EC/NOV/17/19)

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## Bibliography

1. Goguin JP, Rush. Lateral epicondylitis- what is it really? Current orthopaedics. 2003; 17: 386-9
2. Flatt AE. Tennis elbow. Proceedings (Baylor University Medical Center). 2008; 21(4): 400-2
3. Major HP. Lawn- tennis elbow. BMJ.1883; 2(1185): 557
4. Magee D. Orthopaedic physical assessment. 6th edition Saunders Elsevier; 2014: 407- 8
5. Ebnezar J, John R. Essentials of orthopaedics for physiotherapists. 3rd edition. Jaypee Brothers Medical Publishers (P) ltd; 2017; 292-4
6. Kisner C, Colby LA. Therapeutic exercises- foundations and techniques. 6th edition. Jaypee Brothers Medical Publishers (P) ltd: 636-40
7. Cyriax JH, Cyriax PJ. Cyriax illustrated manual of orthopaedic medicine. OM publications; 1993: 66-7
8. Basu S, |Bhatia D et al. Effectiveness of active release technique in the treatment of chronic lateral elbow pain. International Research Journal of Human Resources and Social Sciences. 2017, 4(5); 24-32
9. Gliedt JA et al. chiropractice treatment of lateral epicondylitis: a case report utilizing active release technique. Jounal of Chiropractice Medicine. 2014; 13(2): 104-9
10. Van Rijn RM, Huistede BM et al. Associations between work related factors and specific disorders at the elbow: a systematic literature review. Rheumatology (oxford). 2009; 48(5): 528-36
11. Joshi J, Kotwal P. essentials of orthopaedics and applied physiotherapy. 2nd edition. Saunders Elsevier; 2011.497-8