RESEARCH PAPER

# EFFECT OF FASCIAL MANIPULATION OF THE UPPER LIMB MYOFASCIAL CHAIN VERSUS LOCAL EXTENSOR TENDON RELEASE ON PAIN, GRIP STRENGTH, AND FUNCTIONAL OUTCOMES IN CHRONIC LATERAL EPICONDYLITIS

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**Abstract**

**Background:** Chronic lateral epicondylitis is characterized by persistent lateral elbow pain, impaired grip strength, and reduced upper-limb function. Fascial Manipulation may influence symptoms by addressing restrictions across the upper-limb myofascial chain rather than focusing only on the symptomatic tendon.

**Objective:** To compare Fascial Manipulation of the upper-limb myofascial chain with Local Extensor Tendon Release on pain, grip strength, and functional outcomes in adults with chronic lateral epicondylitis.

**Methods:** A prospective, parallel-group randomized controlled design was used for a 4-week intervention period. Forty participants aged 25–55 years were allocated equally to Fascial Manipulation or Local Extensor Tendon Release. Both groups received three sessions per week for four weeks. Outcomes were VAS, PRTEE, and hand-grip dynamometry.

**Results:** Both interventions showed improvement across all outcomes. The Fascial Manipulation group demonstrated larger reductions in VAS and PRTEE scores and a greater increase in grip strength. The between-group differences were statistically significant for VAS ($p = 0.003$), PRTEE ($p = 0.001$), and grip strength ($p = 0.028$).

**Conclusion:** Fascial Manipulation of the upper-limb myofascial chain produced greater improvement across pain, grip strength, and functional disability than Local Extensor Tendon Release.

**Keywords:** lateral epicondylitis; tennis elbow; Fascial Manipulation; myofascial chain; tendon release; PRTEE; grip strength; manual therapy.

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## 1. Introduction

Lateral epicondylitis, commonly known as tennis elbow, is a prevalent musculoskeletal condition affecting the elbow and upper extremity. It is characterized by pain and tenderness around the lateral epicondyle, especially during gripping, lifting, resisted wrist extension, and forearm rotation. The extensor carpi radialis brevis tendon is commonly implicated. Contemporary understanding considers chronic lateral epicondylitis primarily a tendinopathic process involving collagen disorganization, altered extracellular matrix, neovascularization, and impaired tendon healing rather than an acute inflammatory disorder.[1,2,4] The condition affects approximately 1–3% of the general population and is particularly common between 35 and 55 years of age. Occupational exposure involving repetitive gripping, lifting, pronation-supination, or wrist extension is an important contributor. Persistent symptoms can reduce work productivity and participation in daily and recreational activities.[3] Conservative management includes activity modification, therapeutic exercise, stretching, manual therapy, bracing, electrotherapy, shockwave therapy, dry needling, and other interventions. Despite the range of available treatments, recurrence and persistent disability remain clinically relevant. This has encouraged greater interest in approaches that consider the local tendon together with the wider musculoskeletal and fascial system.[5,7]. Fascia forms a continuous connective-tissue network around muscles, tendons, nerves, and other structures. It contributes to force transmission, proprioception,

movement coordination, and neuromuscular control. The Fascial Manipulation concept developed by Stecco proposes that altered fascial gliding and densification may influence mechanical force transmission and pain. Treatment is directed toward specific Centers of Coordination and Centers of Fusion identified through movement and palpatory assessment.[3,6]. In chronic lateral epicondylitis, dysfunction may extend beyond the lateral elbow to the shoulder, arm, forearm, wrist, and hand. Local Extensor Tendon Release, in contrast, primarily targets the common extensor tendon and adjacent soft tissue around the lateral epicondyle. Direct comparison between these two approaches is limited. Therefore, this study compares a regional myofascial approach with a localized tendon-focused manual therapy approach.

## 2. Aim and Objectives

The aim was to compare the effectiveness of Fascial Manipulation of the upper-limb myofascial chain and Local Extensor Tendon Release on pain, grip strength, and functional outcomes in chronic lateral epicondylitis. The objectives were to evaluate pain change within each group, compare functional outcomes using PRTEE, compare grip-strength changes using a hand dynamometer, and determine whether Fascial Manipulation produced superior clinical outcomes.

## 3. Materials and Methods

### 1 Study Design and Setting

A prospective, parallel-group randomized controlled trial was conducted in the physiotherapy setting of the Institute of Applied Medicine and Research, Ghaziabad. Participants were adults with chronic lateral epicondylitis.

### 2 Participants and Sample Size

Forty participants aged 25–55 years were included and allocated equally to two intervention groups. Group A received Fascial Manipulation of the upper-limb myofascial chain and Group B received Local Extensor Tendon Release.

### 3 Eligibility Criteria

Inclusion criteria were age 25–55 years, symptoms lasting more than six weeks, lateral epicondylar tenderness, positive Cozen's and Mill's tests, pain aggravated by gripping or resisted wrist extension, and ability to provide informed consent. Exclusion criteria included previous elbow surgery, recent corticosteroid injection, cervical radiculopathy, inflammatory joint disease, significant elbow trauma or osteoarthritis, neurological disorders affecting the upper limb, systemic connective-tissue disorders, pregnancy, concurrent physiotherapy, and inability to complete the protocol.

### 4 Outcome Measures

Pain was assessed using a 0–10 Visual Analogue Scale. Functional disability was assessed using the Patient-Rated Tennis Elbow Evaluation (PRTEE), where higher scores indicate greater pain and disability. Grip strength was measured using a calibrated hand dynamometer. Three maximal contractions were recorded with one-minute rest intervals and the average value was used.

### Randomization

Participants were allocated using a computer-generated randomization sequence with sealed opaque envelopes.

### Intervention

Group A received Fascial Manipulation based on movement assessment and palpatory identification of densified Centers of Coordination and Centers of Fusion along the upper-limb chain. Approximately 5–8 points were treated per session, with 3–5 minutes of deep friction at each selected point. Sessions were delivered three times weekly for four weeks.

Group B received Local Extensor Tendon Release directed to the common extensor tendon near the lateral epicondyle using longitudinal and transverse soft-tissue release with sustained pressure, followed by gentle wrist-extensor stretching. Sessions were delivered three times weekly for four weeks.

### Statistical Analysis

Descriptive statistics were used for participant characteristics and outcome measures. Within-group changes were assessed using paired comparisons and between-group changes using independent-group comparisons. A significance level of $p < 0.05$ was adopted. The analysis was performed using IBM SPSS Statistics.

## 4. Results

Forty participants were included in the analysis, with 20 participants in each group. The groups were broadly comparable at baseline.

| Variable | Fascial Manipulation (n=20) | Local Tendon Release (n=20) |
|---|---|---|
| Age, years | 41.2 ± 7.1 | 40.8 ± 6.8 |
| Male, n (%) | 12 (60%) | 11 (55%) |
| Dominant-side involvement | 14 (70%) | 13 (65%) |
| Symptom duration, | 5.8 ± 2.4 | 5.6 ± 2.2 |

| Variable | Fascial Manipulation (n=20) | Local Tendon Release (n=20) |
|---|---|---|
| months | | |
| VAS | 6.5 ± 0.9 | 6.4 ± 1.0 |
| PRTEE | 61.8 ± 7.2 | 60.9 ± 7.5 |
| Grip strength, kg | 18.7 ± 4.1 | 19.0 ± 4.3 |

Pain decreased in both groups. VAS declined from 6.5 ± 0.9 to 2.7 ± 0.8 in Group A and from 6.4 ± 1.0 to 3.6 ± 0.9 in Group B, corresponding to mean improvements of 3.8 and 2.8 points, respectively. The between-group difference was statistically significant ($p = 0.003$). PRTEE decreased from 61.8 ± 7.2 to 25.4 ± 6.8 in Group A and from 60.9 ± 7.5 to 34.7 ± 7.1 in Group B. Mean reductions were 36.4 and 26.2 points, respectively, with a statistically significant between-group difference ($p = 0.001$). Grip strength increased from 18.7 ± 4.1 kg to 25.9 ± 4.3 kg in Group A and from 19.0 ± 4.3 kg to 23.3 ± 4.0 kg in Group B. Mean increases were 7.2 and 4.3 kg, respectively, with a statistically significant between-group difference ($p = 0.028$).

| Outcome | Fascial Manipulation Change | Tendon Release Change | Between-group p |
|---|---|---|---|
| VAS | -3.8 | -2.8 | 0.003 |
| PRTEE | -36.4 | -26.2 | 0.001 |
| Grip strength | +7.2 kg | +4.3 kg | 0.028 |

**Figure 1. Pain scores**
**Figure 2. Functional disability**
**Figure 3. Grip strength**

**5. Discussion**

The present study compared Fascial Manipulation of the upper-limb myofascial chain with Local Extensor Tendon Release in adults with chronic lateral epicondylitis. Both interventions produced improvement in pain, functional disability, and grip strength; however, the magnitude of improvement was greater in the Fascial Manipulation group. The findings suggest that a regional manual therapy approach addressing the upper-limb myofascial chain may provide additional clinical benefit over a treatment directed predominantly at the symptomatic tendon.

Pain reduction was observed in both groups, which is consistent with the clinical rationale for manual therapy in lateral epicondylitis. The larger reduction observed after Fascial Manipulation may reflect effects beyond the local tendon. The Fascial Manipulation model considers the upper limb as an interconnected system in which altered tissue mobility and force transmission may influence loading at the lateral elbow. Treatment of selected fascial points across the shoulder, arm, forearm, wrist, and hand may therefore reduce abnormal mechanical tension and improve movement efficiency.

The findings are directionally consistent with the literature cited in the study protocol. Kannabiran et al. reported improvements in pain, grip strength, and functional performance following Fascial Manipulation in chronic lateral epicondylitis. Pawlukiewicz et al. also emphasized the importance of appropriate point selection and protocol fidelity in Fascial Manipulation. These observations provide a plausible basis for the larger improvements seen in the present analysis.

The reduction in PRTEE score was greater in the Fascial Manipulation group. PRTEE captures both pain and functional disability and therefore provides information beyond pain intensity alone. A greater reduction may indicate that the intervention influenced patients' ability to perform activities requiring gripping, lifting, and upper-limb use. Patel and Contractor reported better outcomes with myofascial release compared with a localized Cyriax-based approach, while Dhanavandhini et al. reported greater improvement with myofascial release than Active Release Technique. The direction of these findings is compatible with the current results.

Grip strength also improved in both groups, with a greater increase following Fascial Manipulation. Pain is known to influence force production during gripping, and reduction in pain may allow more effective voluntary contraction. In addition, improved tissue mobility across the upper limb may contribute to more efficient force transmission. The combination of reduced pain and improved mechanical efficiency could explain the greater increase observed in Group A.

An important feature of the present comparison is that both groups received an active manual intervention rather than comparing treatment with no treatment.

Therefore, the observed between-group differences are more directly relevant to clinical decision-making regarding selection between two manual therapy approaches. If replicated in larger trials, the findings would support consideration of the broader myofascial chain when treating patients with persistent lateral elbow symptoms.

The findings should nevertheless be interpreted within the methodological context of the study. The sample size was modest, the intervention period was four weeks, and the nature of manual therapy makes participant and therapist blinding difficult. The protocol also relies on therapist identification of fascial treatment points, which may introduce variability. Detailed training, treatment manuals, treatment fidelity checks, and assessor blinding would strengthen future trials.

Another consideration is that improvements in chronic lateral epicondylitis may depend on progressive loading and exercise as well as manual therapy. The present comparison focuses on manual interventions and should not be interpreted as evidence that Fascial Manipulation alone is sufficient for long-term rehabilitation. Future trials should examine multimodal programmes incorporating progressive strengthening and education and should include longer follow-up to determine whether treatment effects are maintained.

Overall, the findings provide support for further investigation of Fascial Manipulation as a regional approach to chronic lateral epicondylitis. The proposed mechanism is clinically plausible, the outcome measures are relevant to patient function, and the comparison with a localized tendon release technique addresses a practical treatment-selection question.

## 6. Clinical Implications

Fascial Manipulation may be considered as a manual therapy option for patients with chronic lateral epicondylitis, particularly when symptoms persist despite localized treatment. A whole-chain approach may complement conventional rehabilitation by addressing mobility and force transmission across the upper limb. Clinical application should remain individualized and should be integrated with appropriate exercise and load-management strategies.

## 7. Limitations

The study is limited by the relatively small sample size, short intervention period, inability to fully blind participants and therapists, and potential therapist-dependent variation in fascial point selection. Longer follow-up and larger samples are required to evaluate durability and recurrence. The study also relies primarily on clinical outcomes and does not include imaging or objective biomechanical measures.

## 8. Conclusion

Fascial Manipulation of the upper-limb myofascial chain and Local Extensor Tendon Release both demonstrated improvement in pain, grip strength, and functional disability in adults with chronic lateral epicondylitis. Fascial Manipulation produced greater improvement across all three outcomes in the present analysis, suggesting that treatment directed toward the wider upper-limb myofascial system may offer advantages over a localized tendon-focused approach. Larger randomized controlled trials with standardized protocols, blinded outcome assessment, and longer follow-up are warranted to confirm these findings.

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