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EFFECTS OF MUSCLE ENERGY TECHNIQUE VERSUS INSTRUMENT-ASSISTED SOFT TISSUE MOBILIZATION ON PAIN IN PATIENTS WITH LATERAL EPICONDYLITIS

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ABSTRACT

Background: Lateral epicondylitis, also termed lateral elbow tendinopathy, is a common musculoskeletal condition characterized by pain over the lateral elbow that is typically aggravated by gripping and resisted wrist extension. Manual therapy approaches such as Muscle Energy Technique (MET) and Instrument-Assisted Soft Tissue Mobilization (IASTM) are used in rehabilitation, but direct comparative evidence remains limited.

Objective: To assess and compare the short-term effects of MET and IASTM on pain after four weeks of treatment in patients with lateral epicondylitis.

Materials and Methods: This quasi-experimental study included 38 patients recruited through purposive sampling over an overall study duration of almost nine months. Participants were 25-45 years old, had a clinical diagnosis of tennis elbow with a positive Cozen test, and had mild to moderate subacute pain. Nineteen participants were included in each treatment group. Group A received MET and Group B received IASTM; both groups received moist heat before the principal intervention. Treatment was provided over four weeks. Pain was assessed using the 0-10 Numeric Pain Rating Scale (NPRS) before treatment and after four weeks.

Results: The groups had comparable baseline NPRS scores (Group A: 7.57 +/- 1.26; Group B: 7.63 +/- 1.11; $p = 0.892$). After four weeks, mean NPRS was lower in Group A than Group B (2.68 +/- 0.74 vs 4.63 +/- 0.89; $p < 0.001$). The descriptive mean reduction was 4.89 points in the MET group and 3.00 points in the IASTM group.

Conclusion: Pain scores decreased in both treatment groups over four weeks, with a greater short-term reduction in NPRS observed in the MET group. These findings support MET as a potentially useful short-term pain-management approach for lateral epicondylitis, while interpretation should consider the quasi-experimental design and short follow-up period.

Keywords	Lateral epicondylitis; lateral elbow tendinopathy; muscle energy technique; instrument-assisted soft tissue mobilization; pain; Numeric Pain Rating Scale.
Acknowledgement	The authors acknowledge all study participants for their time and cooperation.
Akram R et al. Short Title	MET Versus IASTM for Lateral Epicondylitis Pain

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INTRODUCTION

Lateral epicondylitis, increasingly described as lateral elbow tendinopathy (LET), is a common disorder of the common wrist extensor origin and is characterized by pain and tenderness around the lateral epicondyle. Symptoms are commonly provoked by gripping, lifting, and resisted wrist extension and may be accompanied by reduced grip capacity and limitations in occupational, recreational, and daily activities (1,2). Contemporary guidance emphasizes that LET has a variable clinical course and can recur or persist in a proportion of patients, making effective conservative rehabilitation clinically important (1). The clinical presentation of LET reflects more than isolated local tendon pathology. Structural tendon changes, altered motor performance, and pain-processing mechanisms can contribute to symptom persistence (1). Evidence indicates that people with tendinopathy may demonstrate pain sensitization, and this appears particularly relevant to lateral epicondylalgia (3). Strength deficits involving the affected upper limb have also been reported, supporting the use of rehabilitation strategies that address both pain and mechanical loading capacity (4).

Diagnosis is primarily clinical and may include pain on palpation of the lateral epicondyle, pain with resisted wrist extension, and provocative tests such as the Cozen test; however, diagnostic criteria vary across the literature (2,5). Conservative management commonly includes education, graded exercise, manual therapy, and other physical therapy interventions. Systematic reviews indicate that exercise-based approaches can improve pain and function, although effect sizes and optimal loading parameters vary between studies (6,7). Muscle Energy Technique is a manual therapy approach in which a patient performs a voluntary muscle contraction against controlled resistance, commonly followed by relaxation and repositioning. Evidence from musculoskeletal populations suggests that MET may reduce pain when used as part of a rehabilitation program (8), and recent work in lateral epicondylitis has specifically examined MET as an adjunctive treatment (9). IASTM uses rigid instruments to apply targeted mechanical loading to soft tissues; however, systematic review evidence across musculoskeletal conditions has shown variable effects and low certainty for clinically important improvements in pain and function (10). Direct comparisons of MET and IASTM for lateral epicondylitis remain limited. Therefore, this study aimed to compare the short-term effect of MET and IASTM on NPRS pain scores after four weeks of treatment in patients with lateral epicondylitis.

MATERIALS AND METHODS

Study Design and Participants

This was a quasi-experimental study with a calculated sample size of 38 patients. Purposive sampling was used to recruit participants, and the overall study duration was almost nine months. Eligible participants were men and women aged 25-45 years with a clinical diagnosis of tennis elbow, a positive Cozen test, and mild to moderate subacute pain (5).

Eligibility Criteria

Participants were excluded if they had a history of elbow fracture, dislocation, or previous surgery in the affected limb; highly reactive or allergic skin; cancer; open wounds around the elbow; a systemic condition; corticosteroid injection or another invasive procedure involving the affected elbow during the preceding three months; or unwillingness to participate. Conservative physical therapy is commonly considered within the spectrum of non-surgical management for LET, whereas injection-based approaches have different short- and longer-term response profiles (12).

Group Allocation and Interventions

Participants meeting the selection criteria were divided into two groups of 19. Group A received Muscle Energy Technique (MET), whereas Group B received Instrument-Assisted Soft Tissue Mobilization (IASTM). Both groups received moist heat before the principal treatment. The intervention period was four weeks. NPRS was measured before the initial treatment session and again after four weeks.

Outcome Measure

Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS), an 11-point self-reported scale ranging from 0 (no pain) to 10 (worst imaginable pain). Lower scores indicate less pain. The NPRS is widely used in musculoskeletal research and has demonstrated acceptable to strong measurement properties, including test-retest reliability and responsiveness in pain populations (11).

Statistical Analysis

Continuous variables were summarized as mean +/- standard deviation (SD), and categorical variables were summarized as frequency and percentage. Between-group NPRS comparisons were evaluated at baseline and after the four-week intervention using independent-samples comparisons, with a two-sided significance level of $p < 0.05$. Exact p-values were reported where available; values below 0.001 were reported as $p < 0.001$. Descriptive mean change was calculated as baseline mean minus post-treatment mean.

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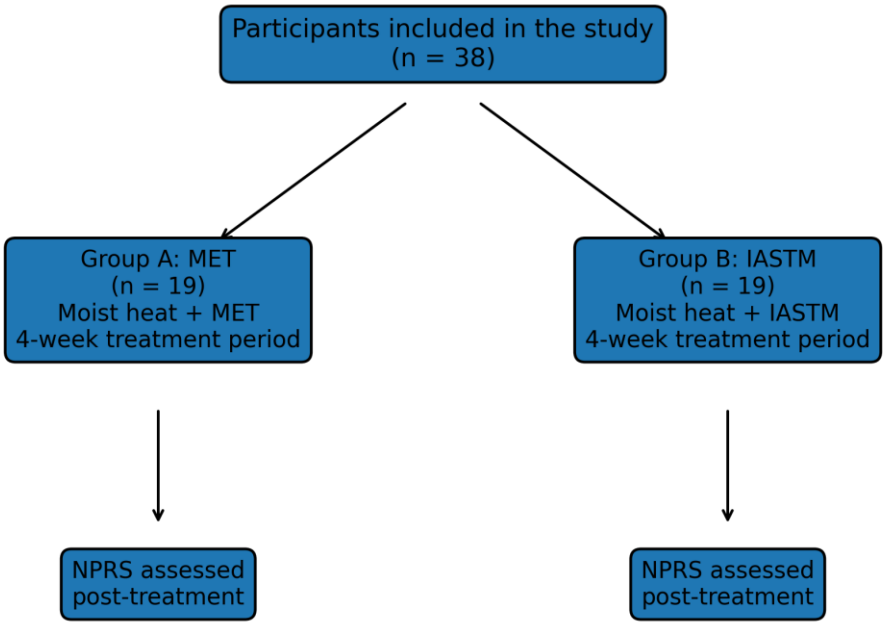


Figure 1. Study treatment flow based on the reported sample, group allocation, intervention period, and NPRS assessment schedule.

RESULTS

Participant Characteristics

Thirty-eight participants were included, with 19 in each treatment group. The mean age was 32.94 +/- 5.23 years in Group A and 34.21 +/- 5.33 years in Group B. Group A included 13 men (68.4%) and 6 women (31.6%); Group B included 12 men (63.2%) and 7 women (36.8%).

Table 1. Distribution of age and sex by treatment group

Group	n	Age, mean +/- SD (years)	Age range (years)	Male, n (%)	Female, n (%)
Group A (MET)	19	32.94 +/- 5.23	26-42	13 (68.4)	6 (31.6)
Group B (IASTM)	19	34.21 +/- 5.33	26-43	12 (63.2)	7 (36.8)

Pain Outcome

Baseline NPRS scores were similar between groups (Group A: 7.57 +/- 1.26; Group B: 7.63 +/- 1.11; p = 0.892). After four weeks, Group A had a lower mean NPRS score than Group B (2.68 +/- 0.74 vs 4.63 +/- 0.89; p < 0.001). Based on the displayed means, the between-group post-treatment difference was 1.95 NPRS points in favor of Group A. The descriptive reduction from baseline was 4.89 points in Group A and 3.00 points in Group B.

Table 2. Between-group comparison of NPRS before and after intervention

Time point	Group A (MET), mean +/- SD	Group B (IASTM), mean +/- SD	Mean difference*	p-value
Pre-treatment	7.57 +/- 1.26	7.63 +/- 1.11	-0.06	0.892
Post-treatment	2.68 +/- 0.74	4.63 +/- 0.89	-1.95	<0.001

**Mean difference calculated as Group A minus Group B from the displayed means. NPRS, Numeric Pain Rating Scale; MET, Muscle Energy Technique; IASTM, Instrument-Assisted Soft Tissue Mobilization.*

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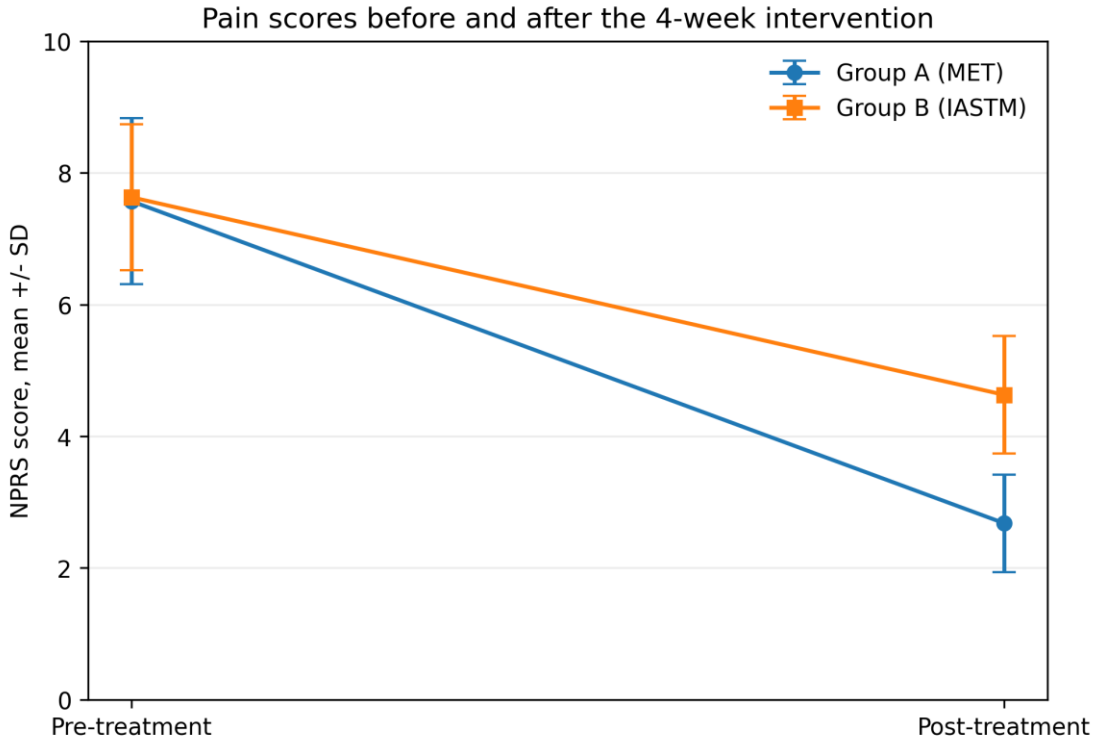


Figure 2. Mean +/- SD NPRS scores before and after the four-week intervention in the MET and IASTM groups.

DISCUSSION

This study compared the short-term effects of MET and IASTM on pain in patients with lateral epicondylitis. Baseline NPRS values were similar between groups, whereas after four weeks the MET group had a lower mean pain score than the IASTM group. The mean NPRS decreased by 4.89 points in the MET group and 3.00 points in the IASTM group, indicating a larger descriptive reduction with MET. Because the study assessed pain as the primary reported outcome, the findings should be interpreted specifically as short-term changes in pain rather than as evidence of differences in strength, tendon structure, or overall function. The findings are compatible with growing evidence that active and progressively loaded rehabilitation is important in tendinopathy management. A large systematic review across tendinopathies reported that exercise dose and loading characteristics may influence clinical outcomes, although protocols remain heterogeneous (13). Similarly, a recent network meta-analysis of LET treatments highlighted uncertainty regarding the relative superiority of individual interventions and emphasized the limited strength of evidence for many short-term comparisons (14). These observations support cautious interpretation of any single treatment comparison and reinforce the need to consider rehabilitation within a broader multimodal framework.

Evidence specific to MET in lateral elbow pain is also relevant. Bagcaci et al. reported that MET used alongside a home exercise program improved pain, grip strength, and function compared with a control program, although MET was not superior to mobilization with movement (15). A 2024 trial comparing eccentric training with MET as adjuncts to low-level laser therapy further supports the clinical activity of MET while demonstrating that outcomes may differ according to the accompanying intervention and treatment protocol (9). More broadly, systematic review evidence suggests that MET can reduce pain in some musculoskeletal populations, particularly when integrated with other treatment components, but certainty is limited by heterogeneity and risk of bias (16). Therefore, the greater NPRS reduction observed with MET in the present study should not be interpreted as universal superiority across all rehabilitation contexts. The IASTM findings also require context. The 2023 systematic review by Nazari et al. found very low-certainty evidence and no consistent clinically meaningful advantage of IASTM across a range of musculoskeletal conditions (10). In contrast, a recent randomized trial in lateral elbow pain reported clinically relevant improvements in pain, grip strength, and function with IASTM when it was combined with exercise and compared with extracorporeal shock wave therapy or exercise alone (18). Differences in co-interventions, treatment dose, outcome selection, participant characteristics, and comparator treatments may explain why IASTM performs differently across studies. The present findings therefore indicate a relative short-term pain advantage for MET under the study conditions rather than an absence of therapeutic value for IASTM.

Current LET guidelines and trials emphasize the importance of exercise, progressive loading, and patient-specific rehabilitation (1,6,17). In clinical practice, the observed pain reduction with MET may be useful when short-term symptom modulation is needed, but treatment decisions should also consider functional limitations, grip capacity, occupational demands, symptom irritability, and longer-term loading progression. Future comparative studies should use randomized allocation, standardized intervention protocols, validated functional outcomes, and longer follow-up to clarify whether early pain differences translate into sustained functional benefit.

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LIMITATIONS

The study had several methodological limitations. The quasi-experimental design and purposive sampling may have introduced selection and allocation bias. The sample size was small and the study was single-centered, which limits generalizability. Follow-up was restricted to four weeks, so persistence of treatment effects and recurrence cannot be evaluated. Pain was assessed using NPRS as the reported outcome; objective measures such as grip strength and validated functional disability scores would provide a broader assessment of treatment response. A separate untreated or standard-exercise control group was not included. Finally, participant and therapist blinding is difficult for hands-on interventions, leaving the study susceptible to performance and expectation effects.

CONCLUSION

Both MET and IASTM groups demonstrated lower mean pain scores after four weeks of treatment. The MET group had a lower post-treatment NPRS score and a larger descriptive reduction from baseline than the IASTM group. Within the limits of this quasi-experimental study, MET appears to provide greater short-term pain reduction in patients with lateral epicondylitis. Larger randomized studies with standardized treatment protocols, functional outcomes, and longer follow-up are warranted.

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