



## Original Article

## Muscle Energy Technique Versus Dry Needling of Active Trigger Points in Quadratus Lumborum: A Comparative Study on Functional Disability in Low Back Pain

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### ABSTRACT

**Background:** Lower back pain (LBP) is a prevalent condition that significantly impacts the quality of life and mobility of individuals. Active trigger points in the quadratus lumborum muscle are a common source of LBP, often requiring effective physiotherapeutic interventions. Dry needling (DN) and Muscle Energy Techniques (METs) are two commonly used treatments, though their comparative efficacy has not been extensively studied.

**Objective:** The study aimed to compare the effects of DN and METs on the functional disability of patients with active quadratus lumborum trigger points contributing to lower back pain.

**Methods:** In this randomized controlled trial, 24 patients were equally divided into two groups to receive either DN or METs over a three-week period, with sessions conducted twice weekly. The Modified Oswestry Disability Index (MODI) was employed to measure functional disability at baseline, after the first, third, and sixth sessions. Repeated measures ANOVA was utilized for intra-group and inter-group comparisons.

**Results:** Both interventions showed a decrease in MODI scores, indicating an improvement in functional disability. However, DN was significantly more effective than METs in reducing disability scores ( $p < 0.05$ ). Notably, no significant difference was found between the post-treatment NPRS and PPT scores within or between the groups.

**Conclusion:** DN appears to be a more effective intervention than METs for reducing functional disability associated with active trigger points in the quadratus lumborum among LBP patients. Despite the efficacy of both treatments, DN may be prioritized as a preferred modality in clinical settings.

**Keywords:** Lower back pain, dry needling, muscle energy techniques, quadratus lumborum, trigger points, functional disability, physiotherapy.

### INTRODUCTION

Low back pain (LBP), often caused by factors like lifting, bending, and poor posture, leads to tight muscles and reduced range of motion. It's a significant health issue, costing about \$30 billion annually and affecting 5% to 10% of adults each year. Over a lifetime, 60% to 90% of people will experience LBP (1). This pain is frequently linked to structural dysfunctions and is movement-related (2). Myofascial trigger points (TrPs) are commonly found in these cases. Physical therapy, particularly techniques like dry needling (DN) and muscle energy techniques (METs), has proven effective in treating these TrPs (3, 4).

A myofascial trigger point (TrP) is a sensitive area in a muscle, characterized by a palpable nodule in a taut band. It can cause pain, autonomic symptoms, motor dysfunction, and referred pain. Nearly everyone will face low back pain due to TrPs at some point (5, 6). The quadratus lumborum (QL) muscle is often impacted by TrPs in cases of LBP. There are four TrPs in the QL muscle, two superficial and two deep (7). Dry needling, a technique where an acupuncture needle is inserted into the muscle, is used to treat these trigger points. It's a safe, minimally invasive method effective in relieving myofascial pain (8, 9).



In DN, a fine needle (25 mm in diameter) is used. The patient lies on their side, with the non-affected arm raised and the affected knee dropped to the side. The treatment area is cleaned, and the needle is inserted at the TrP for 7 to 10 minutes. Post-treatment, patients are advised to rest and stay hydrated (10, 11). Muscle energy techniques (METs) are non-invasive and aim to improve musculoskeletal function. These techniques enhance muscle flexibility, reduce pain, and improve joint movement (12). METs are particularly effective in maintaining muscle length, preventing TrP reactivation (13).

While both DN and METs are effective for treating lower back pain associated with TrPs, research comparing the two is limited. The invasive nature of DN might influence patients' perception of pain compared to the less invasive METs (12, 14). Previous studies have sought to determine which technique is more effective for treating active TrPs in the quadratus lumborum muscle. Understanding whether DN or METs—or a combination of both—is more effective could improve clinical practice and patient rehabilitation for lower back pain caused by TrPs (15, 16). The objective was to determine the effects of muscle energy technique and dry needling of active trigger points of quadratus lumborum on disability in lower back pain.

## MATERIAL AND METHODS

This randomized controlled trial (RCT) was conducted using a design appropriate for the investigation of clinical interventions. The trial was registered with the Iranian Registry of Clinical Trials, bearing the reference number IRCT20200221046566N1. The study took place at the Riphah Clinic in Lahore, following the approval of the ethics committee of RCRS & Allied Health Sciences. The research spanned over a six-month period, ensuring a robust timeframe for data collection and analysis. For sample size determination, we employed the G Power version 3.1.9.2 program. The calculation was based on a 5% margin of error and a power of 0.80, referencing the standard deviation and mean values obtained from previous studies (17). This process resulted in a sample size of 24 participants.

Participants aged 18 to 45 years, suffering from mechanical lower back pain for at least two months, were included in the study. The primary inclusion criterion was the presence of an active trigger point in the quadratus lumborum muscle, identified based on specific diagnostic criteria. All participants were required to meet medical suitability standards for engaging in physical therapy. The exclusion criteria were comprehensive, encompassing various medical conditions and a history of spinal surgeries. Participants were selected using convenient sampling methods to ensure an appropriate representation of the target population (17).

We utilized the Modified Oswestry Disability Index (MODI) to measure the disability associated with low back pain in the subjects. This questionnaire, consisting of ten questions with six potential responses each, yields scores ranging from 0 to 50. The MODI scores help in interpreting the level of disability, and its reliability and effectiveness in assessing low back pain and related disability have been established in both adults and adolescents (18).

Our study divided the 24 participants into two groups, Group A and Group B, using a randomized allocation method. The primary focus was on individuals experiencing trigger points associated with low back pain. A comprehensive treatment approach was employed, beginning with a detailed case history, followed by a physical examination and assessment of the lumbar spine region. Both groups received a standard treatment protocol comprising moist heat application and muscle stretching exercises (19).

Group A was treated with the Muscle Energy Technique (MET), which involved specific controlled movements and muscle contractions. In contrast, Group B underwent Dry Needling therapy, where fine needles were inserted into the identified trigger points. Each participant underwent six treatment sessions spread over three weeks (19). Post-treatment care instructions were provided to all participants to minimize any potential complications. The data collection was primarily based on subjective measures and was subsequently analysed to evaluate the efficacy of the treatments (20).

## RESULTS

In the study comparing the socio-demographic variables of two groups, no significant differences were observed in age, height, weight, or Body Mass Index (BMI) between Group A (Dry Needling) and Group B (Muscle Energy Technique). The average age of participants in Group A was 36.75 years (SD: 9.03), while in Group B it was 33.17



years (SD: 7.91), yielding a P-value of .321. In terms of height, Group A participants averaged 170 cm (SD: 5.58) and Group B participants 174.08 cm (SD: 18.92), with a P-value of .486. The average weight was 79.59 kg (SD: 15.38) for Group A and 90.08 kg (SD: 19.65) for Group B, resulting in a P-value of .160. Regarding BMI, Group A had an average of 27.50 (SD: 6.13) compared to Group B's average of 29.60 (SD: 4.25), with a P-value of .341.

Table 1 Comparison of Socio-Demographic Variables of Two Groups

Variable	Group A (Dry Needling)	Group B (Muscle Energy Technique)	P-Value
N	12	12	
Age of Participants (years)	Mean: 36.75, SD: 9.03	Mean: 33.17, SD: 7.91	.321
Height (cm)	Mean: 170, SD: 5.58	Mean: 174.08, SD: 18.92	.486
Weight (kg)	Mean: 79.59, SD: 15.38	Mean: 90.08, SD: 19.65	.160
Body Mass Index (BMI)	Mean: 27.50, SD: 6.13	Mean: 29.60, SD: 4.25	.341

The Modified Oswestry Disability Index (MODI) was used to assess the effectiveness of the treatments, with measurements taken at baseline, first visit, third visit, and sixth visit. At baseline, the mean MODI score for Group A was 56 (SD: 9.95), and for Group B, it was 57 (SD: 10), with a P-value of 0.81, indicating no significant difference initially. By the first visit, Group A's MODI score slightly decreased to 53.50 (SD: 10.24), while Group B's score was 54.34 (SD: 10.34), with a P-value of .84, suggesting no significant change in improvement between the groups at this stage.

Table 2 Baseline and Follow-up Measurements for Modified Oswestry Disability Index (MODI)

Time of Assessment	Group A (Dry Needling) MODI Score	Group B (Muscle Energy Technique) MODI Score	P-Value
Baseline MODI	Mean: 56, SD: 9.95	Mean: 57, SD: 10	0.81
First Visit MODI Score	Mean: 53.50, SD: 10.24	Mean: 54.34, SD: 10.34	.84
Third Visit MODI Score	Mean: 26.50, SD: 3.32	Mean: 32.17, SD: 4.47	.002
Sixth Visit MODI Score	Mean: 6.34, SD: 1.67	Mean: 12.34, SD: 2.81	.00

SD = Standard Deviation

However, a notable difference emerged by the third visit, with Group A's MODI score reducing to 26.50 (SD: 3.32) compared to Group B's score of 32.17 (SD: 4.47), resulting in a significant P-value of .002. This difference became more pronounced by the sixth visit, where Group A reported a MODI score of 6.34 (SD: 1.67), significantly lower than Group B's score of 12.34 (SD: 2.81), with a highly significant P-value of .00.

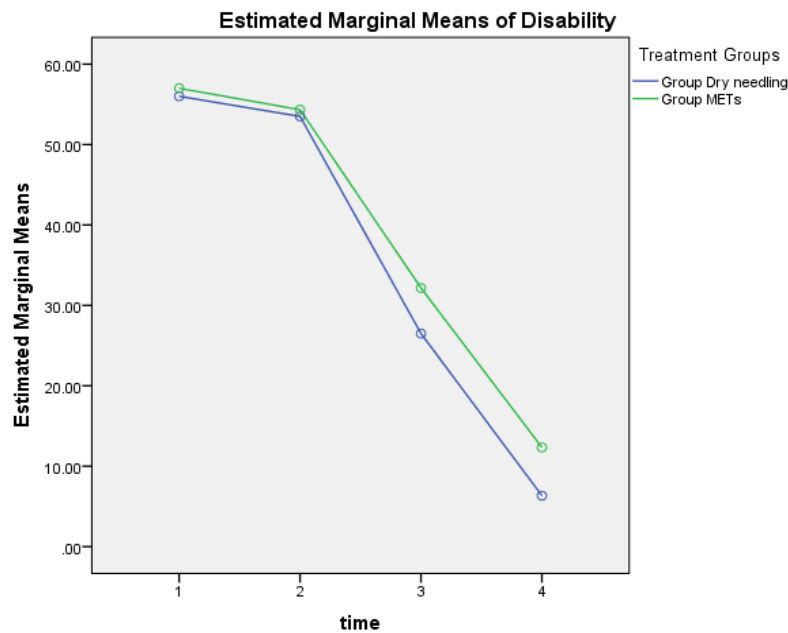


Figure 1 Comparative Line Chart

The line chart titled "Estimated Marginal Means of Disability" compares the disability levels of two treatment groups over time, with the x-axis representing sequential time points and the y-axis indicating the disability scores. Both groups start with similar disability levels, but as time progresses, the group receiving Dry Needling (Group A) shows a steeper decline in disability scores compared to the group undergoing Muscle Energy Techniques (Group B), suggesting a more significant improvement with the Dry Needling treatment by the end of the study period.

## DISCUSSION

The study aimed to evaluate the relative effectiveness of dry needling (DN) and Muscle Energy Techniques (METs) in treating active trigger points in the quadratus lumborum of patients with lower back pain. This randomized controlled trial divided 24 participants into two groups; one received DN while the other underwent METs over a period of three weeks, with sessions twice weekly (21). The effectiveness of these treatments was measured using the Modified Oswestry Disability Index (MODI), with assessments made before treatment, after the first, third, and sixth sessions.

Repeated measures ANOVA indicated a significant difference in the improvement of functional disability between the two treatments, supporting the hypothesis that DN is more effective than METs ( $p < 0.05$ ). The quadratus lumborum trigger points are often overlooked as a source of lower back pain and can mimic more serious pathologies (22). Various factors such as improper lifting, bending with rotation, and sudden trauma can activate these TrPs, which exhibit tenderness, referred pain, and restricted range of motion. The "energy crisis" theory by Travell and Simons provides a pathophysiological explanation for the activation and sensitization of nociceptors in these TrPs (23).

The study's findings revealed that DN led to a greater improvement in the treatment group compared to METs, which is consistent with prior research on the subject. Specifically, DN showed a statistically significant benefit over classical physical therapy treatments (24). METs are known to improve myofascial tissue extensibility and fluid dynamics, potentially increasing hypoalgesia within muscles. However, the study found no significant difference in the post-treatment NPRS and PPT scores between the two groups, aligning with the results from a randomized controlled trial by Joshua Greenberg (25).

Notably, the application of DN disrupted the dysfunctional motor end plates, which could explain its effectiveness in pain relief. The current study corroborates previous findings, such as those from Kelsi H's study on the role of myofascial DN compared with shockwave therapy (27). The comparison revealed that DN, especially when combined with other modalities, offers a superior approach to trigger point treatment. Both groups showed improvement in function, with the DN group's results aligning closely with the study's findings (28).

In conclusion, while both DN and METs were effective in improving functional abilities in individuals with lower back pain, DN was found to be more beneficial in terms of reducing functional disability. Despite its limitations, such as the lack of an independent assessor and categorization based on chronicity, the study suggests that DN



should be considered a priority in the treatment of myofascial trigger points. Future research should focus on long-term effects, larger and more diverse samples, and optimal treatment protocols for various types of trigger points, along with the recommendation of longer rest periods between DN sessions to reduce soreness.

## CONCLUSION

The results indicate that while there were no significant differences in socio-demographic variables between the two groups, the Dry Needling treatment (Group A) showed a more significant improvement in MODI scores over time compared to the Muscle Energy Technique (Group B), especially notable from the third visit onward. The substantial reduction in MODI scores for Group A suggests greater efficacy of Dry Needling in reducing disability associated with lower back pain in this study population.

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