

Effectiveness of Pre–Post Pulsed Muscle Energy Technique in Patients with Scapulocostal Pain: A Clinical Study

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Abstract

Background: Scapulocostal syndrome is a common musculoskeletal condition characterized by pain and functional limitation due to altered scapular kinematics and muscular imbalance. Pulsed Muscle Energy Technique (MET) is a manual therapy approach which is designed to restore muscle function, improve joint mobility, and thus reduce pain.

Objective: To evaluate the effectiveness of Pulsed Muscle Energy Technique on pain intensity and functional capacity in patients with Scapulocostal syndrome using a pre–post experimental model.

Method: A pre–post experimental study was conducted among 20 patients diagnosed with Scapulocostal syndrome who attended the physiotherapy outpatient department at Muthu Neuro Centre, Nagercoil. Participants received Pulsed Muscle Energy Technique (MET) as the intervention. Outcome measures included pain intensity and functional performance of the shoulder. Pain were assessed for immediate effects by using Numeric Pain Rating Scale (NPRS), while functional capacity was evaluated using the Quick Disabilities of the Arm, Shoulder and Hand (Quick DASH) questionnaire before and after the intervention. Statistical analysis was performed using a paired t-test, with the level of significance set at $p < 0.05$.

Results: Mean NPRS score reduced from 7.2 ± 1.1 (pre-test) to 3.1 ± 0.9 (post-test).

Mean Quick DASH score improved from 56.4 ± 8.5 to 28.6 ± 6.3 .

Statistical analysis showed significant improvement ($p < 0.001$) in both pain and functional capacity.

Conclusion: Pulsed Muscle Energy Technique significantly reduces pain and improves functional performance in patients with Scapulocostal syndrome and can be recommended as an effective and excellent physiotherapeutic technique

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1. Introduction

Scapulocostal syndrome is a musculoskeletal condition involving pain and dysfunction in the scapulothoracic region. It commonly results from postural imbalance, muscle tightness, trigger points, and altered scapular kinematics. Individuals with prolonged stooped sitting with repetitive upper limb activity, and poor ergonomics frequently develop this condition. The scapulothoracic joint plays a critical role in shoulder biomechanics, and dysfunction may lead to pain, restricted mobility, and reduced functional capacity. Muscle Energy Technique (MET) is a manual therapy method involving voluntary muscle contraction against therapist resistance, used to restore joint mobility, reduce muscle tightness, and improve neuromuscular coordination. Pulsed MET is a modified rhythmic contraction technique intended to enhance proprioceptive facilitation and reduce muscular spasm. Although MET is widely used in clinical practice, scientific evidence evaluating pulsed MET specifically for Scapulocostal syndrome is limited, necessitating further investigation.

2. Aim

To determine the effectiveness of Pulsed Muscle Energy Technique in patients with Scapulocostal syndrome.

3. Objectives

- To assess pain levels before and after pulsed MET intervention.
- To evaluate functional capacity changes following treatment.

4. Materials and Methods

Study Design

Pre-post experimental study

Study Setting

Physiotherapy outpatient department, Muthu Neuro Centre, Nagercoil.

Sampling Method

A convenience sampling method was used to recruit participants who met the inclusion criteria and attended the physiotherapy outpatient department during the study period.

Sample Size

$n = 20$ participants.

Study Duration

The study was conducted over a period of 4 weeks, during which participants were assessed before and immediately after the intervention

Inclusion Criteria

- Age 20–50 years
- Presence of scapula costal pain and dysfunction
- Positive Scapular Compression Test
- Willingness to participate

Exclusion Criteria

- Shoulder fracture/dislocation
- Neurological disorders
- Recent surgery
- Severe systemic illness

5. Intervention Protocol

Participants received Pulsed Muscle Energy Technique targeting:

- Rhomboids
- Levator scapulae
- Upper trapezius
- Serratus anterior

Protocol

- Isometric contraction: 2-3 seconds
- Relaxation phase: 1-2 seconds
- Repetitions: 6–8 cycles
- Sessions: 1 session

6. Outcome Measures

Pain intensity – Numeric Pain Rating Scale (NPRS)

Functional capacity – Quick DASH Questionnaire

7. Statistical Analysis

Data were analysed using paired t-test. Formula for paired samples:

$$t = \frac{\bar{d}}{\frac{s_d}{\sqrt{n}}}$$

- \bar{d} = mean of differences
- s_d = standard deviation of differences
- n = number of pairs

Significance level: $p < 0.05$

8. Results

Table 1: Pain Score (NPRS)

Pre test		Post Test		Mean difference	t-value	p-value
Mean	SD	Mean	SD			
7.2	1.1	3.1	0.9	4.1	11.52	<0.001

Interpretation: There was a highly significant reduction in pain after intervention.

Table 2: Functional Capacity (QuickDASH)

Pre test		Post Test		Mean difference	t-value	p-value
Mean	SD	Mean	SD			
56.4	8.5	28.6	6.3	27.8	10.94	<0.001

Interpretation: Functional capacity improved significantly following pulsed MET intervention.

9. Discussion

The present study demonstrated a significant reduction in pain and improvement in functional capacity following Pulsed Muscle Energy Technique (MET) in individuals with Scapulocostal syndrome. These effects may be attributed to neurophysiological mechanisms such as post-isometric relaxation, reduction in muscle hypertonicity, improved local circulation, and enhanced proprioceptive input, leading to better scapular biomechanics and neuromuscular control.

The present findings are in agreement with earlier research. **Vijayan et al. (2018)** reported significant improvements in pain and function in Scapulocostal syndrome following MET. Similarly, **Selkow et al. (2019)** demonstrated that MET is effective in reducing pain and improving mobility, while **Kumar and Satapathy (2011)** reported decreased muscle tightness with pulsed MET.

However, the study has limitations. The small sample size and absence of a control group limit the generalizability and causal interpretation of the results. Additionally, only immediate effects were assessed, and long-term outcomes remain unclear. Further randomized controlled trials with larger samples and follow-up assessments are recommended.

10. Clinical Implications

- Non-invasive physiotherapy intervention
- Improves scapular mobility and pain
- Easily integrated into rehabilitation protocols
- Useful for patients with occupational postural strain

11. Recommendations

- Randomized controlled trials with larger sample sizes
- Long-term follow-up studies
- Comparison with other techniques such as: Myofascial release, Scapular stabilization exercises, Dry needling

12. Conclusion

Pulsed Muscle Energy Technique is an effective physiotherapeutic intervention for reducing pain and improving functional capacity in patients with scapulocostal syndrome. The technique can be recommended as a primary management strategy in outpatient settings.

13. References

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