



RESEARCH REPORT

# Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomized controlled trial<sup>☆</sup>



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## KEYWORDS

mechanical neck pain;  
muscle energy technique;  
neck disability index;  
stretching;  
visual analogue scale

**Abstract** *Background:* Mechanical neck pain is one of the common musculoskeletal disorders. Muscle energy technique (MET) may be a useful intervention for treating such disorder. *Objective:* The aim of this study was to compare the effect of MET with passive stretching on pain and functional disability in people with mechanical neck pain.

*Methods:* A randomized controlled trial was undertaken. Sixty patients with mechanical neck pain were randomly allocated to either the MET group or control group. The former group received MET, and the latter group received static stretching. Both groups received conventional therapy. Treatment was given once a day for 6 days. A visual analogue scale (VAS) was used to measure the intensity of pain, and functional disability was assessed using the neck disability index (NDI) was immediately before treatment and again on the 6<sup>th</sup> day.

*Results:* VAS and NDI scores showed a significant improvement in both MET and stretching groups on the 6<sup>th</sup> day postintervention ( $p < 0.05$ ). However, both VAS and NDI scores showed better improvement in the MET group as compared to the stretching group ( $p < 0.025$ ).

*Conclusion:* Muscle energy technique was better than stretching technique in improving pain and functional disability in people with mechanical neck pain.

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## Introduction

Neck pain is one of the most common musculoskeletal disorders in the general population. Point prevalence ranges from 6% to 22% and up to 38% of the elderly population, while lifetime prevalence ranges from 14.2% to 71% [1]. The International Association for the Study of Pain defines neck pain as: "Pain perceived as arising from anywhere within the region bounded superiorly by superior nuchal line, inferior by an unoriginally transverse line through the tip of first thoracic spinous process, and laterally by sagittal plane tangential to the lateral border of neck" [2].

Mechanical neck pain is a generalized neck and/or shoulder pain with mechanical characteristics, including symptoms provoked by maintained neck postures, neck movement, or by palpation of the cervical muscles [3]. The source of symptoms in mechanical neck pain is not completely understood, but has been purported to be related to various anatomical structures, particularly zygapophyseal or uncovertebral joints of the cervical spine [4]. A frequently seen cause of the neck pain is awkward occupational postures, anxiety, stress, heavy lifting, and physically demanding work [5].

Janda [6] described upper crossed syndrome as facilitation of the upper trapezius, levator scapulae, sternocleidomastoid, and pectoralis muscles, as well as inhibition of the deep cervical flexors, lower trapezius, and serratus anterior. These muscle imbalances and movement dysfunctions may have a direct effect on joint surfaces, thus potentially leading to joint degeneration. In some cases, joint degeneration may be a direct source of pain, but the actual cause of pain has been often secondary to muscle imbalance [7].

A wide variety of treatment protocols for mechanical neck pain are available. However, the most effective management remains an area of debate.

Both muscle energy technique (MET) and stretching are widely used techniques in the field of physiotherapy. MET is an advanced stretching techniques [7]. Studies using these two techniques individually in symptomatic as well as in asymptomatic population have shown improvement [8–12], but very few studies have compared these techniques in a symptomatic population, where conflicting results are seen [13–20]. A study done by Mahajan et al [17] compared these two treatment technique in patients with mechanical neck pain. There is lack of evidence to allow conclusions to be drawn about the effectiveness of MET when compared with stretching exercises for relieving mechanical neck pain. Therefore this study will add to the growing body of knowledge that if these two techniques yield comparable outcomes and if one technique is superior to the other, which should be the alternative choice of therapy. Therefore, the study was done to compare effect of MET when compared with passive stretching in reducing pain and functional disability in patients with mechanical neck pain.

## Materials and methods

### Participants

After receiving ethics clearance from the institutional committee of the Sancheti Institute College of

Physiotherapy, 110 patients with neck pain were evaluated from April 2013 to October 2014 according to the following criteria: (1) age 18–50 years; (2) neck pain on visual analogue scale (VAS) 4–8 (moderate cases); and (3) sub-acute or chronic cases (4–12 weeks). Participants were excluded according to the following criteria: (1) signs of serious pathology (e.g., malignancy, inflammatory disorder, infection); (2) history of cervical spine surgery in previous 12 months; (3) history of trauma or fractures in cervical spine; (4) signs of cervical radiculopathy or myelopathy; and (5) vascular syndromes such as basilar insufficiency.

Sixty participants met these criteria. A written consent form was taken from participants and the procedure was explained by the investigator.

### Randomization

Individuals who met the inclusion criteria were randomly allocated to Group A or Group B, using chit method without replacement. The allocation was conducted by the primary investigator prior to the baseline assessment. Group A underwent postisometric relaxation for upper trapezius and levator scapulae, whereas Group B received passive stretching technique for upper trapezius and levator scapulae.

### Outcome measures

Pain and functional disability were assessed at the baseline and repeated at the end of intervention period i.e., on 6<sup>th</sup> day.

Test–retest reliability of VAS has been shown to be good, but higher among literate ( $r = 0.94$ ) than illiterate patients ( $r = 0.71$ ) before and after attending a rheumatology outpatient clinic [21]. For construct validity, in patients with a variety of rheumatic diseases, the VAS has been shown to be highly correlated with a 5-point verbal descriptive scale (*nil, mild, moderate, severe, and very severe*) and a numeric rating scale (with response options from *no pain to unbearable pain*), with correlations ranging from 0.71 to 0.78 and from 0.62 to 0.91, respectively. The correlation between vertical and horizontal orientations of the VAS is 0.99 [21]. VAS is thus considered a reliable and valid tool for measuring the pain level.

The neck disability index (NDI) for measuring disability in patients with neck pain has a pivotal role in research and clinical settings and is interpreted to have good reliability [22,23].

### Intervention

Group A: Postisometric relaxation technique was applied to upper trapezius and levator scapulae muscles for five repetitions using 20% of maximal isometric contraction. Stretch was held beyond resistance barrier for 20 seconds [7]. Group B: Passive stretching was applied to upper trapezius and levator scapulae muscles for five repetitions with 20 second hold [24].

Figure 1 shows the post isometric relaxation and stretching technique for upper trapezius muscle and Figure 2 shows the postisometric relaxation and stretching

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