

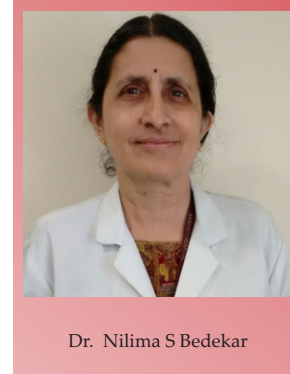
Early Intervention with Muscle Energy Technique has better improvement in pain, range of motion and function in post surgical elbow stiffness: A hypothesis

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Abstract

Background: Stiffness is common post trauma and post surgeries around the elbow. This could result in functional disabilities in the upper limb and may interfere with activities of daily living in the individual. Also, post operative pain is a contributing factor to these disabilities. Optimal joint mobility is essential to overcome stiffness and hence improve the function. Muscle energy techniques (MET) have been used in the treatment of restricted joint mobility to allow relatively pain free range of movement. Hence, the purpose of this study is to evaluate the effects of MET on pain, ROM and function post elbow surgeries in population aged between 18-50 years by an experimental study on 30 participants divided in 2 groups (15 each) in which MET will be given to group A immediately as per the current literature and to group B after 1 week as per the protocol of the institution. The effect of MET given per week will be assessed in a period of 3 weeks.

Hypothesis: The group in which MET will be started immediately post immobilisation will show better improvement in pain, ROM and function in patients with post surgical elbow stiffness.

Clinical Importance: Adding muscle energy technique to the elbow programme early would show better improvement in pain and elbow ROM and in turn improve the function of the upper extremity.

Future direction: To study the long term effects of Muscle energy technique in post surgical elbow stiffness.

Keywords: Muscle Energy Technique, Elbow Stiffness.

THESIS SUMMARY

Introduction

Restriction of joint mobility is a common complication that is seen post elbow surgery [1]. This could be due to immobilization, pain, muscle guarding etc. All these may lead to reduced joint function and may hamper the patient's ability to perform functional tasks, thereby affecting his activities of daily living [2][3].

Muscle energy techniques (MET) are soft tissue or joint techniques which are employed in the treatment of musculoskeletal dysfunctions. Post operative pain is one of the factors that reduce the patient's compliance and does not allow optimal joint and muscle mobilization.

Also, passive rehabilitation techniques may cause adverse effects to the fragile tissues in the post operative period in elbow joint. METs are a group of relatively pain free mobilization techniques which are used to regain mobility, reduce tissue edema, reduce muscle spasm, stretch fibrous tissue and retrain stabilizing function of the intersegmentally connected muscles [4].

The elbow being a highly constrained synovial hinge joint has a high propensity for degeneration and stiffness. Elbow motion is required to position the hand in space. There could be functional losses seen with even less severe loss of range of motion at the elbow. A stiff elbow has

been defined as the one with loss of extension of greater than 30 degrees and flexion of less than 120 degrees [5].

Elbow stiffness could arise due to various reasons, trauma being the most common cause. There can be voluntary or involuntary muscle guarding of the elbow during motion due to prolonged pain. This could lead to contractures in the elbow joint capsule and also to the muscles around it [5]. Contractures which may develop post trauma can impair activities of daily living and may also cause functional limitations in children and adults [6]. There is poor literature on the use of Muscle energy techniques in rehabilitation post elbow surgeries. Elbow is a very functional joint in the upper extremity. An arc of motion of 30-130 degrees is required to carry out activities of daily living. Elbow stiffness is a significant cause of disability which may hamper the function of the upper extremity as a whole. METs are relatively painfree techniques which have been used in clinical practice for restricted ROM. Hence, the purpose of this study is to know the effect of MET on pain, ROM and function in patients with post surgical elbow stiffness.

Hypothesis

The current study aims at studying the effects of MET on pain, elbow ROM and function in patients with post surgical elbow stiffness in participants aged 18 to 50 years. This is an experimental study which will be performed after ethical clearance from the institute's ethical committee. The sampling method will be a stratified random using the chit method after obtaining an informed consent from the participants. Patients with post operative distal end extra-articular or intra-articular humerus fractures and/or proximal radius ulna fractures without any ligament injury with a minimum immobilization period of 3 weeks will be included in the study. Those having pathological fractures, revision surgeries, associated ipsilateral injuries and neuro-vascular disorders will not be included in the study.

For pain evaluation, Visual Analog Scale will be used. For Range of Motion, a goniometer will be used and to assess the function the Disability of arm, shoulder and hand (DASH) questionnaire will be used. Pain, ROM and function will be assessed before starting the treatment and at the end of every week for 3 weeks.

The participants will be assigned to 2 groups: Group A will receive active and active-assisted ROM exercises consisting of elbow flexion-extension, pronation-supination, active exercises for the wrist and shoulder and gentle passive stretching and MET in the form of post isometric relaxation and/or reciprocal inhibition immediately. Group B will receive the same treatment but MET will be started after 1 week.

The subjects will be assessed separately for intra-articular, extra-articular, simple and compound type of fractures. For ROM within group and between group analysis, one way ANOVA will be used. For pain and function within group Friedman test will be used and between both the groups Kruskalwallis test will be used.

Discussion

The present study will be undertaken to study the effects of Muscle energy technique when applied immediately and after 1 week of elbow

rehabilitation on pain, elbow ROM and function in patients with post surgical elbow stiffness.

The group in which MET will be started immediately will show better improvement in the parameters mentioned above. The reduction in pain intensity in the groups would be attributed to the hypoalgesic effects of MET which is explained by the inhibitory Golgi tendon reflex, activated during the isometric contraction that in turn leads to the reflex relaxation of the muscles. Also, the muscle and joint mechanoreceptors would be activated leading to leads to sympatho-excitation evoked by somatic afferents and localized activation of the periaqueductal gray matter. This plays a role in the descending modulation of pain.

Also, the hypomobility associated with reflex muscle guarding due to pain would reduce as pain reduces.

MET can be used to improve joint ROM and has an advantage over standard stretching techniques to gain early ROM in post surgically treated fracture cases.[4]

A study done by Gupta.S(2008) on effects of post isometric relaxation versus isometric exercises in non specific neck pain also concluded that MET showed significant improvement in pain and functional status. Convenient sample of 37 non specific neck pain patients between the age group 18-45 years were allocated randomly to each group. Both the groups received the selective treatment for 3 weeks. Pain (VAS), ROM and function was measured with the Neck Disability Index on the 1st, 8th, 15th and 22nd day.[8]

A.Shyam, S.Parmar(2011) did a case study on a 50 year old lady with left supracondylar fracture humerus managed surgically with 2 screws and a plate 7 weeks post operatively. MET was given for 8-10 repetitions once a day for 6 days a week for 40 sessions after which the elbow ROM improved significantly from 30-70 degrees of flexion to 0-135 degrees of flexion and from 10 degrees of pronation to 90 degrees and 50 degrees of supination to 90 degrees. Also, a similar case study was done by them on a 48 year old male diagnosed with closed fracture right humerus with elbow link protocol 3 weeks post operatively. MET was given for 8-10 repetitions once a day for 6 days a week for 30 sessions after which the elbow ROM improved significantly from 40-90 degrees of flexion to 0-140 degrees of flexion and from 30 degrees of pronation to 90 degrees and 25 degrees of supination to 90 degrees.[4]

Our results of ROM improvement could be supported with a study done by Stephanie M in 2011 titled the immediate effects of muscle energy technique on post shoulder tightness in which they concluded that a single application of MET provides significant improvement in shoulder adduction and internal rotation ROM.[9]

Davila SA, Johnston-Jones K(2006) in their study, "Managing the stiff elbow: operative, nonoperative and post-operative techniques" stated muscle energy technique, active range of motion exercises as one of the many treatment techniques for managing the stiff elbow.[10]

Apoorva Phadke, Nilima Bedekar(2016) in their study,"Effect of muscle energy technique and static stretching on pain and functional disability in patients with mechanical neck pain: A randomized control trial" concluded that muscle energy technique was better than stretching technique in improving pain and functional disability in

people with mechanical neck pain.[11]
Active ROM, Active- Assisted ROM, passive ROM and stretching would help in improving the range of motion. This is supported by Joy C MacDermid et al(2015) in their study “A Survey of Practice Patterns for Rehabilitation Post Elbow Fracture” which concluded that active ROM exercises, active-assisted ROM exercises, passive ROM exercises and stretching have high consensus as components in the rehabilitation post elbow fractures.[12]

MET will show better improvement in elbow range of motion. This could be explained by the hypothesis suggested by Taylor et al in their study done in 1997, suggested that a combination of contractions and stretches (as used in MET) might be more effective in producing viscoelastic changes than passive stretching alone, because the greater forces produce increased viscoelastic change and passive extensibility.[11][13]

Lenderman in 1997 proposed that passive stretching would elongate the parallel fibers but have little effect on the ‘in series’ fibers; however, the addition of an isometric contraction would place loading on these fibers to produce viscoelastic or plastic changes above and beyond that achieved by passive stretching alone.[14] Active muscle contraction has been shown to have neurophysiological effects, including pain inhibition, thus allowing the muscles to be stretched further.[11][15]

Hence, early intervention with muscle energy technique will show better improvement in pain, range of motion and function in patients with elbow stiffness post surgery.

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