ORIGINAL ARTICLE

Muscle Energy Technique Augmented with Sustained Natural Apophyseal Glides; An Effective Way to Improve Mechanical Neck Pain and Range of Motion: A Randomized Control Trial

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ABSTRACT

Objective: To determine the effect of sustained natural apophyseal glides (SNAGs) along with muscle energy technique (MET) on pain and range of motion in subjects with mechanical neck pain.

Study Design: Blinded randomized controlled trial.

Place and Duration of Study: Kulsum International Hospital Islamabad, from July 16th to December 25th, 2018.

Materials and Methods: The trial included 60 participants with mechanical neck pain who fulfilled inclusion criteria (mechanical neck pain, being vitally stable and physically independent without any serious psychological or systemic issue) and gave written and verbal consent. Subjects were divided randomly by concealed envelope method into two groups: experimental and control with 30 participants each. Experimental group was provided with MET and SNAGs, while control group received SNAGs thrice a week for 8 weeks. Numeric pain rating scale and inclinometer were used as outcome measures. Data was taken at baseline and after 8 weeks of intervention. Analysis was done by SPSS 21.

Results: Pain improved from 7.14±0.88 to 2.33±0.73 (P=0.000) in experimental while 7.25±.98 to 3.18±.87 (P=0.009) in control group. Ranges improved in experimental and control group as; flexion from 73.81±2.6 to 84.88±2.3 (P=0.000) and 73.25±2.8 to 77.00±2.5 (P=0.010), extension from 63.14±2.2 to 69.00±1.2 (P=0.000) and 62.07±1.8 to 65.66±1.5 (P=0.000), right side banding from 33.03±3.6 to 39.77±2.5 (P=0.000) and 32.25±3.0 to 36.00±2.5 (P=0.000), left side bending from 33.55±2.4 to 41.55±1.9 (P=0.000) and 32.44±2.1 to 37.48±1.6 (P=0.001), right side rotation from 79.96±2.70 to 88.48±1.5 (P=0.000) and 79.48±2.60 to 83.59±2.6 (P=0.000) and left side rotation from 80.37±2.4 to 88.92±1.9 (P=0.000) and 79.74±2.5 to 82.88±2.2 (P=0.005) respectively.

Conclusion: SNAGs combined with MET reduces pain and improves range of motion effectively in subjects with mechanical neck pain as compared to conventional treatments with SNAGs alone.

Key Words: *Muscle Energy Technique, Neck Pain, Range of Motion, Sustained Natural Apophyseal Glides.*

Introduction

Mechanical neck pain also known as non-specific neck pain is diagnosed based on symptoms that are not caused by any serious cervical spine pathology i.e., malignancy, trauma, or radiculopathy etc. There are least chances of tissue injuries associated with mechanical neck pain. Common causes of mechanical neck pain are facet joint irritation or dysfunction.[1] Majority of population worldwide must suffer disability throughout their lives because of neck and back pain. Neck pain is fourth leading cause of disability and has the prevalence of 30%. It comes in episodes that resolve without any intervention, but in about 50% of population pain remains the same and causes limitation of participation in daily activities.[2] Two third of the adult population experience neck pain at some point of their lives that causes high socioeconomic impacts.[3] Patients with mechanical neck pain are usually offered symptomatic treatment which alleviates the symptoms temporarily, but the symptoms may reappear. The cases referred to physiotherapy are also less that ultimately leads to

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disability in patients with neck pain.[4]

The common interventions used in physical therapy to alleviate neck pain and improve range of motion are manual therapy techniques, exercises, and modalities. Manual therapy has been observed to improve pain and range in subjects with neck pain.[5] Manual therapy techniques focus on joint function, stability and range of motion as well as symptom severity.[6] Evidences have shown effectiveness of manual therapy alone and in combination with other exercises and modalities as well.[3] Transcutaneous electrical nerve stimulation, ultrasound and active exercise are considered to be best for combination with manual therapy for treatment of neck pain and improvement in range of motion. There are also evidences of strengthening exercises in mechanical neck pain.[7] One of the major manual therapy techniques is Mulligan's sustained natural apophyseal glides (SNAGs) used to manage various spine dysfunctions.[8] SNAGs are observed to alleviate symptoms associated with cervical spine disorders i.e. neck pain, headache and range restriction.[9] Another technique that has been observed to show positive effects on restricted range and improvement in somatic function is Muscle energy technique (MET).[10]

As both techniques have shown effects in improving restrictions and symptoms associated with cervical pain, it would be beneficial for the patient to have combination treatment comprising of SNAGs and MET for earlier relief and hence reducing costs of extended physical therapy sessions. So, study was aimed to determine the effect of sustained natural apophyseal glides (SNAGs) augmented with muscle energy technique (MET) on pain and range of motion in subjects with mechanical neck pain.

Materials and Methods

Blinded randomized control trial was started after taking ethical approval from the study setting; Kulsum International Hospital in July 16th to December 25th 2018. Initially 83 subjects with mechanical neck pain aged 20 to 45 years were assessed; subjects with any history of head, neck or chest trauma, surgery or any serious systemic pathology were excluded. Decision about sample size was done in accordance with evidence from previous literature that was 45-60.[11-13] The sampling method was non-probability purposive sampling and randomization was done using sealed envelope method. In the study 60 participants fulfilled inclusion criteria of having mechanical neck pain, being vitally stable, physically independent and without any serious psychological or systemic issue, were enrolled after taking written and verbal informed consent, participants were randomly divided into two groups; experimental (n=30) and control group (n=30). Participants and outcome assessors were blinded, as the participants were explained about the whole procedure but were unaware about their inclusion in particular group. Baseline assessment was done along with assessment of outcome measures which included Numeric pain rating scale (NPRS) and cervical range of motion through Inclinometer for each participant. There were 3 dropouts from each group, who could not follow up the sessions.

Numeric pain rating scale was used to assess the intensity of pain on a scale of 0 to 10, where 0 is considered as no pain while 10 means worst pain ever felt. 2-Point change in the scale is considered as clinically significant by clinicians as mentioned in the literature.[14] Range of motion was measured through inclinometer, which is used for taking measurements of spinal ranges and has good reliability.[15]

There was not much difference in measurements of outcome variables among the participants of both groups at baseline. Pain was measured through NPRS, while inclinometer was used to access the range of motion. After randomization, subjects in experimental group were provided with MET and SNAGs, while control group received SNAGs thrice a week for 8 weeks. The intervention along with data collection was performed by trained physical therapist. Group A was the experimental group who received MET along with SNAG. For MET, the subject was asked to sit in relaxed position, then end range of cervical muscles was achieved and subject was asked to contract the muscle voluntarily to 20% of total strength. The contraction was held for 6-10 seconds then released. There were 4 repetitions in each session. SNAGs were performed at cervical spine in sitting position with 6-10 repetitions in two sets each in one session with 10 minutes rest between both sets. Whereas group B was the control group and only received SNAGs. Inferential current for 15 minutes and postural education was provided to

subjects of both intervention and control group. Sessions were repeated for 3 times a week for 8 weeks, 6 subjects were dropped out of the study.

Data was evaluated using SPSS 21. As the data was parametric, paired sample test was used for within group analysis while Independent T test was used for between group analysis of the data that was taken at baseline and after 8 weeks of interventions.

Results

There were 54 participants who completed the study and were analyzed, although demographic data was taken initially from all the participants at the start of the study. Gender distribution in both groups is shown in Figure 1.

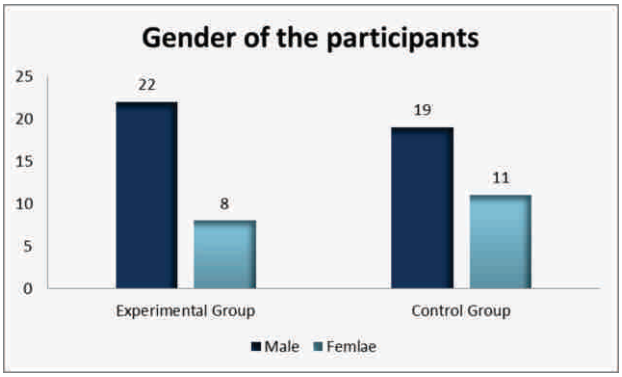

Fig 1: Gender Distribution

Figure 2 represents the baseline characteristics of participants from both groups, including past medical history, surgeries, allergies, and addictions. (GIT= Gastrointestinal Tract)

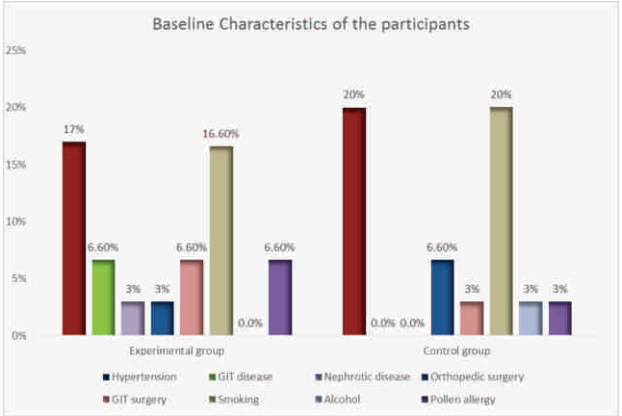

Fig 2: Baseline Characteristics of Participants

Independent T test was used for between group analysis of outcomes post intervention in experimental and control group, and results appeared as described in table I.

Discussion

The study focused on two major symptoms of mechanical neck pain: pain and restricted range of motion and effect of SNAGs with MET on these symptoms. The techniques were found to be effective if given together according to the results

Table I: Between Group Analysis (Post Intervention) – Neck Range of Motion and Pain

Variable	Experimental Group (n=27) (Mean±SD)	Control Group (n=27) (Mean±SD)	P Value
Flexion	84.88±2.3	77.00±2.5	0.000
Extension	69.00±1.2	65.66±1.5	0.000
Right side bending	39.77±2.5	36.00±2.5	0.000
Left side Bending	41.55±1.9	37.48±1.6	0.000
Right side Rotation	88.48±1.5	83.59±2.6	0.000
Left Side Rotation	88.92±1.9	82.88±2.2	0.000
NPRS	2.33±0.73	3.18±0.87	0.000

(SD= Standard Deviation, n= Number of Participants, NPRS= Numeric Pain Rating Scale)

Paired T test was applied for within group comparison of outcome measures as explained in table II.

Table II: Within Group Analysis – Neck Range of Motion and NPRS

Variable	Group	Baseline (Mean ± SD)	Post 8 weeks (Mean ± SD)	Mean Difference	P value
Flexion	Experimental (n=27)	73.81±2.6	84.88±2.3	11.07±3.2	0.000
	Control (n=27)	73.25±2.8	77.00±2.5	3.74±1.7	0.010
Extension	Experimental (n=27)	63.14±2.2	69.00±1.2	5.85±1.7	0.000
	Control (n=27)	62.07±1.8	65.66±1.5	3.59±1.2	0.000
Right Side Bending	Experimental (n=27)	33.03±3.6	39.77±2.5	6.74±2.1	0.000
	Control (n=27)	32.25±3.0	36.00±2.5	3.74±1.7	0.000
Left Side Bending	Experimental (n=27)	33.55±2.4	41.55±1.9	8.00±2.7	0.010
	Control (n=27)	32.44±2.1	37.48±1.6	5.03±1.7	0.001
Right Side Rotation	Experimental (n=27)	79.96±2.7	88.48±1.5	8.51±2.3	0.000
	Control (n=27)	79.48±2.6	83.59±2.6	4.11±1.6	0.000
Left Side Rotation	Experimental (n=27)	80.37±2.4	88.92±1.9	8.55±2.3	0.000
	Control (n=27)	79.74±2.5	82.88±2.2	3.14±2.2	0.005
NPRS	Experimental (n=27)	7.14±0.86	2.33±0.73	4.81±0.87	0.000
	Control (n=27)	7.25±0.98	3.18±0.87	4.07±1.0	0.000

(SD= Standard Deviation, n= Number of Participants, NPRS= Numeric Pain Rating Scale)

obtained from the study.

Many studies have been conducted before to assess the effectiveness of both SNAGs and MET for neck pain. A randomized control trial conducted by Apoorva Phadke et al. in 2016 assessed the effect of muscle energy technique and static stretching on pain and functional disability in subjects with mechanical neck pain. The research showed that muscle energy technique is more effective for mechanical neck pain as compared to static stretching and conventional treatment techniques. Muscle Energy Technique has gross effects in subjects of mechanical neck pain.[16] Current study has shown that if combined with SNAGs, MET can bring even more positive changes in symptoms.

A case report by Sudarshan Anandkumar to check the effect of sustained natural apophyseal glide combined with neurodynamics in the subject of cervical pain and radiculopathy showed that it can reduce symptoms of neck pain and radiculopathy and can improve cervical range of motion and functional abilities. Present study has also shown reduction in symptoms in cervical pain with combination of SNAGs and MET.[17]

Current study has also shown that MET can improves cervical range of motion, augmented with SNAGs to amplify the effects of MET. Burns et al conducted a randomized control trial and studied effects of muscle energy technique on cervical spine and concluded that MET is responsible for improving cervical range of motion.[18]

Another trial conducted by Kanlayanaphotporn et al in 2008 studied effects of mobilization for relief of pain and improvement in range of motion in patients with mechanical neck pain and found that mobilization improved range and reduced pain in subjects on immediate basis.[19] Present study also signifies that SNAGs can reduce pain and improve range in mechanical neck pain; the difference was addition of MET along with SNAGs. Patient's home activities and follow ups along with various other ergonomic and domestic factors also play role in prognosis and improvement.

Conclusion

SNAGs combined with MET improves range of motion and are helpful in reducing pain in subjects with mechanical neck pain as compared to conventional treatments and SNAGs alone, so the approach is recommended and can help the sufferers gaining the restricted range and help then with continuing their daily activities and functions with least hindrance.

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