



# **Comparison of Myofascial Release, Muscle Energy Technique and Cervical Manual Therapy in Postural Neck Pain**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. Author BA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AA and MS conducted review search, collected data, implemented treatment protocols. All the authors read and approved the final manuscript.*

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## **ABSTRACT**

Globally neck pain has become common health problem in younger generations. Neck pain occurs due to various pathological reasons. Even though there is variety of management protocols to alleviate the neck pain, their efficacy is still not clear. This study includes three different perspectives of manual therapy technique on the postural neck pain. This study is a single blinded randomized controlled trial. 81 volunteers with postural neck pain were selected randomly. They all underwent various evaluation procedures by a blinded assessor. All the participants were divided into three groups with 27 volunteer in each. Group I underwent Myofascial release therapy (MFRG), Group II underwent Muscle energy technique (METG) and Group III underwent Cervical manual therapy (CMTG). All the treatment underwent for 8 weeks duration and their lateral flexion range of motion, disability and proprioception were measured using goniometer, neck disability index and repositioning error. The result of the study analyzed through SPSS 20.0, it shows that there was no significant difference between the groups in post treatment values, F value for the range of motion is 4.70, Disability is 0.11 and proprioception is 8.71. So this study concluded that there was no difference in improvement of variables following all three modalities.

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## 1. INTRODUCTION

Neck pain is one of the common problems among working population. It has become a major health problem in personal health and overall wellbeing of the public [1]. Multiple pathologies were identified as a causative factor for the neck pain and one of the common factors noted in recent years is poor posture. Occurrence of pain may due to interference of the surrounding tissues around the neck due to poor postural habits [2]. When the head is pronounced forward, Muscles around the neck were forced to abnormally stretched position which predispose to pain [3]. Studies identified that there was a strong association between cervical postural adaptation, with neck pain and disability [4], alteration in the posture can also affects the range of motion of the cervical spine [5].

Acute neck pain would cause early muscle weakness which is the contributing factor for the persistent (chronic) neck pain. Abnormal loading in the muscles occurs due to poor posture, which may pronounce neck instability [6]. Although there are multiple reasons identified for neck pain, poor posture is where the muscles were failed to stabilize the neck. Imbalance in the muscles results in movement dysfunction which directly effect on joint surface lead to early degenerations. These changes are the direct source of pain in the neck and this in-turn result in muscle imbalances [7]. Muscle and the fascia were interconnected; any fascial tightness may result in tightness of the muscle and vice versa. Tightness in the myofascial are due to overuse or trauma to the muscles which support the shoulders and neck [8] usually the myofascial pain presents with deep aching sensations which are like tightness or stiffness at the neck [9].

One of the identifiable causes for the neck pain was due to positional fault in the cervical vertebra, abnormal movements in the neck due to muscle weakness which cause the biomechanical changes in the cervical spine results in restriction of the joint [10]. Reduction in the range of motion, neck muscle strength and reduce endurance would be the common features in the chronic neck pain [11].

Physiotherapy management for neck pain includes electrotherapy modalities, exercises and

manual therapy [12]. Although there are variety of methods in the manual therapy but none of the techniques were identified as the best. There are still inconclusive evidences exist on the selection of which type of manual therapy effects on chronic neck pain. This study tries to identify the effectiveness between the three common manual therapy techniques on disability, range of motion and repositioning error.

## 2. METHODOLOGY

The study was accepted by Institutional ethical committee KG Hospital and post graduate medical institute. Single blinded randomized controlled trail. Notice about the neck pain study was displayed in the Outpatient department of KG College, KG Campus and KG Hospital. Those who volunteer are registered and an appointment was given for the assessment. A separate assessor who is not involved in the study assessed all the registered volunteers and identifies the eligible participants and sends to the second evaluation process. 154 participants were evaluated in the first round from them 112 were sent to the second round. Based on the selection criteria 94 were eligible for the study and all were randomly assigned into three groups, randomization was done for the eligible participants using a computer generated random sequence table by a blinded assessor. The first treatment session was provided to each patient on the same day of the initial assessment. Myofascial release group (MFRG) included 31 participants, 32 participants in Muscle energy technique group (METG) and 31 were included in the Cervical Manual therapy group (CMTG). Sudden dropout was found in all the groups, there were 13 participants withdrawn from the study due to personal reasons. So this study ended with 27 subjects in each group. Participants are with 25-45 years of age group, complains of neck pain more than 7 weeks, clinically diagnosed as mechanical neck pain, neck pain without any radiating symptoms, pain scale not more than 6 in visual analog scale, only restricted lateral movement was identified using movement testing. Participants with radiating pain, severe pain and any symptoms of weakness and neck pain due to systemic involvement are not included. All the testing procedures were completely explained and written informed consent was obtained from all the participants before the initiation of the study.

The study was conducted for 8 weeks and the measurements were taken for evaluation. MFRG received a set of fascia release techniques described by Manheim 2008 [13], the participant in prone lying and apply unilateral and bilateral gross stretch of the upper trapezius. In addition muscle release technique were applied using cross hand release of the lateral neck, cross hand release of the anterior cervical spine. Gross stretch under the occiput which stretches the suboccipital muscles. Stretch was hold for 90 seconds and until release and repeat again, the release sequence was repeated until end feel was reached. METG received a set of exercises described in Gupta et al. 2008 [14], patient was positioned comfortably in sitting position, the therapist stood behind the patient, hand should be placed on the side of the patient head and then take the agonist muscle to the barrier of tension and maintain in the position, ask the patient to resist the movement and produce contraction of the agonist muscle which is 20% of the strength for 7—10 seconds. Make the patient relaxes for 5 seconds, repeat the movement in the newly restricted barrier with a gentle stretch without pain holds for 10—30 seconds and repeat for 5—7 times. CMTG received unilateral PA glide on the symptomatic side which was explained by Kanlayanaphotporn et al. 2009 [15]. Participants were lay prone and the physiotherapist stood at the head end of the patient. Therapist keeps the thumb at the level of the facet of the selected hypomobile cervical vertebra and applied an unilateral PA oscillatory pressure using Grade I and Grade II initially and followed by Grade III Maitland manual therapy protocol. The oscillatory movement was performed at a frequency of 2Hz for 2 mins and repeated for 5 times. The rest time between each mobilization is 2 mins. Data were collected by a separate assessor to prevent bias. Disability was measured using Neck disability index, Lateral flexion range of motion measured using goniometry and proprioception of neck was measured using repositioning error. All the collected data were analyzed using inferential statistics by SPSS 20.0.

### 3. RESULTS AND DISCUSSION

A detailed analysis was conducted using SPSS 20.0. Three variables were calculated using a blinded assessor and the variables were analyzed. The details of the variables were measured in the beginning of the study (pre test) and at the end of the study (post test). Since the study involves three groups ANOVA was used to

analyze the significance between the groups. When the Anova is significant then post hoc tests will be used to analyze. The significant level was set at  $\alpha$  equal to 0.05.

Table 1 presents the baseline demographic characteristics of the subjects. No significant differences were found between the groups on the baseline level. Study includes 26% of participants with the age of 25 years to 28 years and least in 16% of participants in 41years to 45 years. Most of the person who has longer symptoms works for longer duration, 56% works for 8 hours of work whereas 18% of participants works more than 10 hours. 35% of participant's complaints of 1-2 yrs of duration and more than 6 years only 12% complain of pain. Questions related to physical activity 38% participants answered activity which was less than 30 minutes and only 11% answered for more than 120 minutes. Pain measurement of the participants with less than 5 in visual analog scale marked with a ruler was 62% and more than 5 was 38%.

Table 2 presents the ANOVA analysis for the three variables. Post test were taken for the analysis and the result shows that range of motion of the cervical spine is F 4.70 which is not significant to the table value and the probability of this result assumes the null hypothesis at 0.95. The result of Proprioception of the cervical spine is F 8.71 which is not significant to the table value and the probability of this result assumes the null hypothesis at 0.99. The result of Disability of the cervical spine is F 0.1097 which is not significant to the table value and the probability of this result assumes the null hypothesis at 0.90. Since the Anova analysis shows no significant difference in the values this study accepts null hypothesis. The study shows that there is no significant difference obtained between the groups.

Neck pain is a common musculoskeletal disorder in modern times. Causative factors of neck pain were poorly defined. Neck pain as consequences of weakness of the muscles, fibrous contractures in the joint structures, and spasm over the muscles which show the way to early fatigability of muscles and restricted range of motion. These macro changes alter the whole neck function which results in functional disability of neck.

Myofascial release therapy is one of the passive therapies which would reduce the fascial tightness and bring back the normal movement in

the fascia [16]. It has played a major role on reduction of pain since it alters the matrix viscosity of the fascia and converts it from solid to liquid and removes pressure of fascia from the pain sensitive structures and causes realignment of the fascial structures [17]. It also plays a major role in stretching the capsule and cause sympathetic stimulation by somatic efferent and local activation of periaqueductal gray matter which plays the role of descending modulations [13]. It is assumed that pain reduction which automatically improves the functions, and the neck pain which impact on the movement control and functional deficits. Removing the impairments existing in tissues and reducing the restrictions can consequently improve the range of motion, reduction in tissue tension and stiffness [18].

Muscle energy technique is an active method of voluntary contraction of muscle against the counterforce of the movement [19]. Mechanism of the MET's on pain reduction and activity improvement are clearly unknown, but various hypothesis suggest that muscle and joint

mechanoreceptors which involve centrally mediated pathways including periaqueductal gray matter in midbrain and noradrenergic plays a major role in descending inhibitory pathways. MET increases range of motion since the muscle extensibility is increased in around neck pain and there is a reflex relaxation and viscoelastic changes which could cause change in the stretch tolerance [20].

Joint mobilization has potential benefit in reducing pain, disability and range of motion in chronic neck pain. Joint mobilization would play a role on pain reduction by the mechanism of neurophysiological mechanisms which have been found to produce hypoalgesia following mobilization [21]. Pain relief by the mobilization is due to altered inputs from the higher centers. Pain reduction could improve the mobility in the cervical region as well as the disability reduces [11]. Joint Mobilization promotes activation of the mechanoreceptors which improves the awareness of the position sense and movement sense in the neck [21].

**Table 1. Demographic variables**

Baseline characteristics		Mean	S.D	p value
Age	MFRG	33.22	5.80	0.000
	METG	34.01	6.24	
	CMTG	34.18	6.27	
Duration of the symptoms	MFRG	31.74	5.40	0.000
	METG	34.67	5.85	
	CMTG	34.97	6.52	
Hours of Work	MFRG	33.37	6.08	0.000
	METG	34.41	6.49	
	CMTG	33.59	5.73	
Physical activity	MFRG	33.37	6.99	0.000
	METG	34.96	5.16	
	CMTG	33.04	5.91	
Pain scores	MFRG	4.93	0.73	0.000
	METG	4.86	0.718	
	CMTG	4.96	0.808	

**Table 2. Measurement variables**

Source of variation	ROM		Source of variation	Proprioception		Source of variation	Disability	
	Between	Error		Between	Error		Between	Error
Sum of Square	1.407	1167	Sum of Square	2.963	13.26	Sum of Square	1.284	456.4
Mean Squares	0.7037		Mean Squares	1.4815		Mean Squares	0.642	
F value	4.7015		F value	8.715		F value	0.1097	
	(p<0.05)			(p<0.05)			(p<0.05)	

Current study would not support any of the manual therapy techniques used in this study, since all the groups show equal amount of improvement there is no notable superior effect. In manual therapy group there would be a slight increase on proprioception when compared with the other groups. There were a few limitations in this present study, first the participants were selected voluntarily and they all were using computer for daily work. They are not representing any major group of populations. Second, the participants were recruited in a single setup which has lack of demographic and clinical characteristics. Third the Goniometer was used to measure cervical ROM which is not the most valid and reliable way to measure cervical ROM. Finally there is no pure control group used in the study to identify the differences in the effect of the groups.

#### 4. CONCLUSION

All the three groups showed no improvement on all the outcomes measured from the baseline to post treatment. The study concluded that application of all techniques provides same result in range of motion, and functional disability but there was a significant improvement in the proprioception on manual therapy group when compared with the other groups.

#### CONSENT

All the testing procedures were completely explained and written informed consent was obtained from all the participants before the initiation of the study.

#### ETHICAL APPROVAL

The study was accepted by Institutional ethical committee KG Hospital and post graduate medical institute. Single blinded randomized controlled trail.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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