International Journal of Physiotherapy and Research,
Int J Physiother Res 2016, Vol 4(6):1788-92. ISSN 2321-1822
DOI: http://dx.doi.org/10.16965/ijpr.2016.192

Original Research Article

COMPARISON OF MUSCLE ENERGY TECHNIQUE AND MYOFASCIAL RELEASE TECHNIQUE ON PAIN AND RANGE OF MOTION IN PATIENTS WITH TEMPOROMANDIBULAR JOINT DYSFUNCTION: A RANDOMIZED CONTROLLED STUDY

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ABSTRACT

Background: Temporomandibular joint dysfunction (TMJD) refers to a group of problems related to the temporomandibular joint. The etiology of TMJD is still unclear and is believed to be complex. Temporomandibular Joint (TMJ) disorders are generally divided into two categories; articular disorders (e.g., ankylosis, developmental disorders, disk derangement disorders, fractures, etc.) & masticatory muscle disorders (e.g., myofascial pain, myofibrotic contracture, etc.).

Objective: To compare the effectiveness of Muscle Energy Technique and Myofascial Release Technique on pain and range of motion in temporomandibular joint dysfunction patients.

Materials and Methods: Chronic temporomandibular joint dysfunction patients (N=36) were recruited and randomly allocated into three groups (Muscle Energy Technique- MET; Myofascial Release Technique-MFR and Control; N=12 in each group). All the groups completed 4 weeks of intervention.

Results: The 4 weeks of treatment program resulted in significant improvement in reduction of pain (NPRS $p<0.05$) & increase in range of motion ($p<0.05$) in TMJD patients which was not evident in the control group. However, MET was found to be more clinically effective compared to MFR in all outcome scores.

Conclusions: Both MET and MFR are effective in reducing pain and increasing ROM in chronic TMJD subjects. However, MET was found to be superior to MFR.

KEY WORDS: Temporomandibular joint dysfunction, Muscle Energy Technique; Myofascial Release Technique, NPRS & ROM.

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Access this Article online

Quick Response code

DOI: 10.16965/ijpr.2016.192

International Journal of Physiotherapy and Research
ISSN 2321- 1822
www.ijmhr.org/ijpr.html

Received: 08-11-2016	Accepted: 28-11-2016
Peer Review: 09-11-2016	Published (O): 11-12-2016
Revised: None	Published (P): 11-12-2016

INTRODUCTION

Temporomandibular dysfunction, also referred to as craniomandibular disorders, consist of cluster of pathologies affecting the masticatory muscles, the temporomandibular joint and structures related to it [1,2].

Temporomandibular dysfunction is a musculoskeletal disorder of the masticatory system affecting more than 25% of the general population [3].

TMJD is usually has one or more distinct signs or symptoms: pain in the joint, joint sounds, limitation in jaw movement, muscle tenderness and joint tenderness [4].

Other symptoms affecting the head and neck region such as headache, ear-related symptoms and cervical spine disorders are commonly associated with TMJD [3,5].

Patients with chronic TMJD frequently have reported with symptoms of depression, poor sleep quality and low energy.

Furthermore, chronic TMJD has been found to interfere with normal social activity and interpersonal relationships and to negatively affect the ability to maintain employment [6].

Management of TMJD, however, mostly involves a multidisciplinary approach and conservative treatment is supposed to be considered the treatment of choice which generally includes use of occlusal splints, physical therapy, medication and orthodontic treatment [7].

Many reviews have been published on conservative treatments, often recommending a multidisciplinary treatment approach for TMJD; however, research evidence supporting this approach is usually not provided [8-10].

Muscle Energy Technique (MET) are a class of soft tissue manipulation methods which combine precisely directed and controlled, patient initiated, isometric and isotonic contractions to improve musculoskeletal function and pain [11].

Myofascial Release Technique (MFR) is the technique of application of low load, long duration stretch to the myofascial complex which restores optimal length and thus decreases the pain & improves function [12].

The main aim of the study was to compare the effectiveness between Muscle Energy Technique (MET) and Myofascial Release Technique (MFR) in Study Participants with TMJD.

MATERIALS AND METHODOLOGY

After institutional ethical approval, all the 36 Study Participants completed a detailed assessment. Prior to participation in this study total 50 patients diagnosed with temporomandibular joint dysfunction (TMJD) were referred from various orthopaedic & physician outpatient department, among them 12 patients weren't fulfilling the inclusion criteria, 02 patients declined to participate, so total 36 Study Participants, who fulfilled the selection criteria, were informed about the study and requested to sign Consent Forms.

Pre-participation evaluation form consisted of 0-10 Point NPRS, mouth opening evaluation. Pain was assessed by 0-10 Point NPRS and mouth opening through 15cm ruler.

The patients were divided into three groups of 12 each by using Random Table generator (A, B & C) for the treatment duration of 4 weeks.

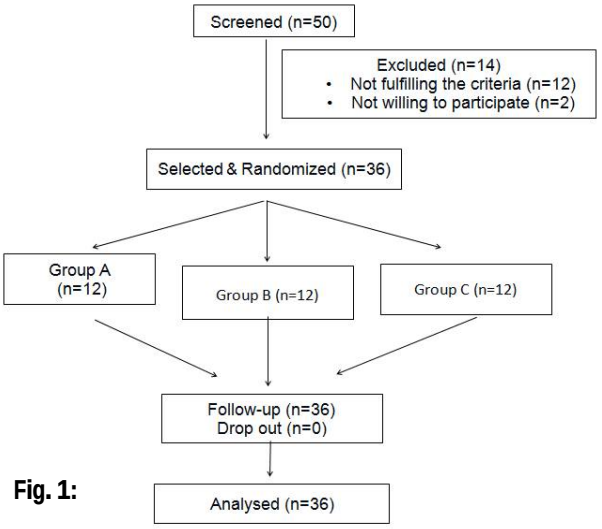

Fig. 1:

The included patients were of age group 18-40 years including both females and males, Symptomatic Chronic TMJ dysfunction (>12 weeks) established by expert physician or orthopaedician and with pain over TMJ between 3 to 6 on NPRS and mouth opening d" 25mm [14,15].

The patients excluded from the study were if they had any of the among symptoms, H/o trauma, surgery, acute infections or any systemic disorders, osteoporosis, Cervical spine or any upper limb dysfunction, neurological impairments, recent steroid infiltration, recently any dental treatment taken or surgery over TMJ, Hypermobile joint and patient not willing to participate [14,15].

Interventions:

Patients in Group A (Control) received Conventional Physiotherapy that included Ultrasound Therapy over TM joint with Mode 1:1, frequency of 1MHz, intensity of 1.5 W/cm2 (Figure: 2), duration of 5 minutes and dosage of

3 times/week, Patients were also taught Jaw & Stick Exercises (Figure: 3 & 4) with dosage of 10 times in 1 set total 5 sets, 3 times/week [14,15].

Fig. 2: Ultrasound therapy

Fig. 3: Stick Exercises

Fig. 4: Jaw Exercises.

Patients in Group B (MET) received Conventional Physiotherapy (Group A) plus MET with Patient lying Supine with slight mouth opened (1st barrier) and with therapist placing gloved thumbs on the lower molars on both sides of the participant's jaw, thus applying Post- isometric relaxation MET (Figure: 5) with dosage of Total 5 times/session and 3 times/week for 4 weeks [11,16].

Fig. 5: MET for Temporomandibular Joint.

Patients in Group C (MFR) received Conventional Physiotherapy (Group A) plus MFR with Patient lying supine and therapist standing besides the patient and applying gross release technique for masseter and pterygoids muscles (Figure:6) with dosage of Total 5 times/session,5SEC rest, and 3 times/week for 4 weeks [17,19].

Fig. 6: MFR to Masseter, Medial Pterygoid & Lateral Pterygoid Muscles.

Statistical Analysis: All the statistical analysis was done using SPSS 16.0 software for windows. Descriptive analysis was obtained by mean & standard deviation. Inter group Comparison of Pre & Post treatment scores of NPRS and TMJ ROM were compared by Kruskal Wallis Test. Intra group comparison of pre & post treatment scores of NPRS was done using Wilcoxon Signed Rank Test & of TMJ ROM was done using paired t test. One-way ANOVA post hoc analysis was done to compare the difference in effectiveness within the groups.

RESULTS AND TABLES

Table 1: Pre-Treatment Group Comparison.

	TMJ ROM (mouth opening)mm				NPRS(pain severity)			
	Min	Max	Mean	P Value	Min	Max	Mean	P Value
Group A	20	26	23.88	0.513	3	6	4.33	0.95
Group B	21	26	23.52		3	6	4	
Group C	20	25	23.25		3	6	4.41	

Table 2: Pre & Post Treatment Comparison (Group A).

	Pre Treatment			Post Treatment			P Value
	Min	Max	Mean	Min	Max	Mean	
NPRS	3	6	4.33	1	2	1.23	0.002
TMJ ROM (Mouth Opening) mm	20	26	23.88	29	32	30.45	

Table 3: Pre & Post Treatment Comparison (Group B).

	Pre Treatment			Post Treatment			P Value
	Min	Max	Mean	Min	Max	Mean	
NPRS	3	6	4	1	2	0.53	0.001
TMJ ROM (Mouth Opening) mm	21	26	23.52	34	40	37.61	

Table 4: Pre & Post Treatment Comparison (Group C).

	Pre Treatment			Post Treatment			P Value
	Min	Max	Mean	Min	Max	Mean	
NPRS	3	6	4.41	1	2	1.02	0.002
TMJ ROM (Mouth Opening) mm	20	25	23.25	32	37	35.78	

Table 5: Post-Treatment Group Comparison.

	TMJ ROM(Mouth Opening) mm				NPRS			
	Min	Max	Mean	P Value	Min	Max	Mean	P Value
Group A	29	32	30.45	0.001	1	2	1.23	0.002
Group B	34	40	37.61		1	2	0.53	
Group C	32	37	35.78		1	2	1.02	

Table 6: ANOVA for NPRS.

Dependent variable	GROUPS		Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Post NPRS	Control	MET	0.28721	0	0.6089	2.0577
		MFR		0.02	0.1089	1.5577
	MET	Control		0	-2.0577	-0.6089
		MFR		0.273	-1.2244	0.2244
	MFR	Control		0.02	-1.5577	-0.1089
		MET		0.273	-0.2244	1.2244

Table 7: ANOVA for TMJ ROM.

Dependent variable	GROUPS		Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Post TMJ ROM	Control	MET	1.32	0.013	-9.33	-2.66
		MFR		0.037	-6.83	-0.17
	MET	Control		0.013	2.67	9.33
		MFR		0.046	-8.34	5.83
	MFR	Control		0.037	0.16	6.83
		MET		0.046	-5.83	0.83

DISCUSSION

4 weeks of present study results of intergroup comparison show that p value is > 0.05, Hence proving that the groups are homogenous. For proving the improvement of individual group, Intra group comparison of pre & post treatment scores of NPRS & TMJ ROM was done. The results of Intra group comparison of pre & post treatment scores show a significant improvement ($p<0.05$) in each groups. Post-hoc analysis by annova shows significant difference more in group B. The results of this study support MET and MFR which can be effective in reducing pain and improving the range of motion (mouth opening) patients suffering from TMD.12 females and 24 males fulfilled the criteria of inclusion. This difference in numbers between the genders can be explained by the higher prevalence of TMD in males [19]. During the treatment, subjects in all groups had to perform exercises, which were to stretch structures that tended to be shorten and to strengthen structures that tended to be weaken [13]. The treatment of TMD has been attempted using varieties of intervention in previous studies, few of the studies were strongly suggesting to any specific treatment strategy [20]. This study of 4 weeks of MET & MFR technique was found to have significant improvement in pain (NPRS) & range of mouth opening compared to control group. The superior effect of MET group compared to MFR & control group is similar to finding of previous authors. MET reduces tension in the jaw muscles and subsequently decreases pain [21]. The present study range of mouth opening increased which is similar to the findings by Anderson [22]. This may be because MET stimulates muscle spindles & golgi tendon organs reducing excessive activity [23]. The reduction in pain by MET is similar to the findings by lewit & simons [24] & Brodinn [25].

CONCLUSION

Our study leads to conclusion that both Muscle Energy Technique and Myofascial Release Technique are effective in the management of Chronic Temporomandibular Joint Dysfunction but Muscle Energy Technique was found superior than Myofascial Release Technique in the management of Chronic Temporomandibular Joint Dysfunction.

Limitations of the study: The study duration was short, only 4 weeks and the results apply to short term effects. No long term follow-up was done to ascertain the differences in long term gains in the protocol, Sample size was small and blinding was not done.

Scope for further research: The same study can be done on large sample with long term follow up and the study can be done with subjects with post traumatic stiffness with reduction of the mouth opening.

Conflicts of interest: None

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How to cite this article:

Parth Trivedi, Preeti Bhatt, Sathiyavani Dhanakotti, Gopal Nambi. COMPARISON OF MUSCLE ENERGY TECHNIQUE AND MYOFASCIAL RELEASE TECHNIQUE ON PAIN AND RANGE OF MOTION IN PATIENTS WITH TEMPOROMANDIBULAR JOINT DYSFUNCTION: A RANDOMIZED CONTROLLED STUDY. Int J Physiother Res 2016;4(6):1788-1792. **DOI:** 10.16965/ijpr.2016.192