



EFFECTS OF MASTICATORY MUSCLE ENERGY TECHNIQUE ON CERVICAL SPINE MOBILITY IN MYOGENIC TEMPOROMANDIBULAR DYSFUNCTION AMONG PATIENTS WITH CHRONIC NECK PAIN: A PILOT STUDY.

**Dr. Madhavi S
Doke***

Associate Professor Terna Physiotherapy College *Corresponding Author

Dr. Rajashree Naik

Professor And HOD, Physiotherapy Dept L.T. M. M. C. & Sion Hospital

ABSTRACT Temporomandibular disorders (TMD) are multifactorial musculoskeletal diseases that affect the masticatory muscles and temporomandibular joints, often extending their effects to the cervical spine and contributing to chronic neck pain. The primary aim of this study was to explore the feasibility and generate preliminary data on the impact of the masticatory muscle energy technique on cervical spine mobility. Patients aged 16–50 years with chronic neck pain and pain-related temporomandibular disorders, as identified by the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), were allocated into two distinct groups. Following the acquisition of institutional ethical committee approval, written consent was obtained from the participants. After evaluating neck range of motion (ROM), the patients were divided into two groups. The MET group received the masticatory muscle energy technique in conjunction with neck exercises, whereas the control group received only neck exercises over a period of 4 weeks. After re-evaluation, the data were analyzed using SPSS version 26. The findings revealed that while both the MET and Control groups demonstrated statistically significant improvements in cervical range of motion (ROM) within their respective groups, only cervical flexion exhibited a statistically significant ($p < 0.05$) intergroup difference, favoring the MET group.

KEYWORDS : myogenic temporomandibular disorders, chronic neck pain, masticatory muscle energy technique.

INTRODUCTION:

Temporomandibular disorders (TMD) are multifactorial musculoskeletal diseases that impact the masticatory muscles and temporomandibular joints, often extending their effects to the cervical spine and contributing to chronic neck pain. (La Touche et al., 2009) The masticatory muscle energy technique (MET) is one intervention that aims to address the musculoskeletal imbalances in TMD, potentially influencing cervical spine mobility and reducing neck pain. It has been suggested that therapeutic approaches targeting not only TMJ function but also cervical spine impairments can be beneficial in relieving symptoms (Ferrillo et al., 2022). This is supported by the neuroanatomical and neurophysiological connections between the orofacial structures and the cervical spine, highlighting that segmental limitations at upper cervical levels (C0-C3) and tender points in related musculature are more prevalent in TMD patients compared to healthy controls (Laat et al., 1998). Moreover, research suggests that TMD-related masticatory muscle pain and dysfunction significantly impact cervical muscle activities, with increased electromyographic activities being observed in cervical muscles like the sternocleidomastoid and trapezius in TMD patients (Ndu et al., n.d.). MET may enhance cervical spine mobility and functional outcomes in patients with myogenic TMD and chronic neck pain. To develop effective strategies for addressing these conditions, further research is required to assess the impact of MET on cervical mobility.

Aim And Objective:

To determine the effectiveness of the masticatory muscle energy technique on cervical spine mobility.

Methodology:

Patients with chronic neck pain showing pain-related TMDs on DC/TMD in the age group of 16–50 years were included in the study. Vilanova et al., 2015). After obtaining written consent, patients were assessed for neck range of motion.

Active neck motions were assessed using a tape measure, and the results were recorded in centimeters. (Hsieh & Yeung, 1986) iPhone 13 was affixed to the participant's head using Velcro straps. The C0-C2 rotation range was assessed using the Compass app. (Satpute et al., 2019)

Patients were randomly assigned to two groups. The Experimental group (MET) underwent treatment for neck pain, along with MET targeting the masticatory muscles. The Control group received treatment specifically for neck pain and maintained a home exercise program aimed at improving neck posture.

The Masticatory MET for the temporomandibular joint involves the patient lying supine with the mouth slightly open. The therapist placed

gloved thumbs bilaterally on the lower molars and applied post-isometric relaxation MET. This procedure was administered five times per session, three times a week, over 4 weeks. (Chaitow & Liebenson, 2001) (Figure 1)

The patient performed isometric contractions by pressing down on the therapist's finger under the chin. After holding the position for 7 s and relaxing, an increased mouth opening range was achieved. (Figure 2)

The lateral deviators, including pterygoids, were relaxed using post-isometric relaxation. The patient's neck was rotated. The therapist supported and gently retracted the mandible. The patient resisted, and after contraction relaxation, a new barrier was identified. (Figure 3) (V.MANIVANNAN, 2016)



Figure 1



Figure 2



Figure 3

Control Group: Conventional exercises for neck pain included range of motion exercises in all directions, neck static exercises, and posture correction exercises. Each exercise was performed ten times, and three sets were completed.

RESULT:

Table 1: Demographic Data

	MET	Control
Male	4	3
Female	6	7
Mean age (year)	38.1 ± 10.5	40.7 ± 10.6
Mild TMD	7	9
Mod TMD	3	1

Normality Testing

The Shapiro-Wilk test was used to assess the normality of the pre- and post-difference scores. In the MET group, cervical extension and left lateral flexion were normally distributed. However, most movements in both groups did not satisfy the normality assumptions, necessitating the use of non-parametric tests, specifically the Wilcoxon and Mann-Whitney U tests, for the analysis.

Table 2: Experimental Group (Within-group Analysis)

Movement	Mean Pre	Mean Post	Mean Diff	P-Value	Significant (p < 0.05)
Flx	10.5	11.65	1.15	0.0071	S

Ext	6.25	7.2	0.95	0.0139	S
Rt lat flx	5.1	5.75	0.65	0.0097	S
Lt lat flx	5.15	6.2	1.05	0.0169	S
Rt Rot	9.05	9.79	0.74	0.0431	S
Lt Rot	9.2	9.85	0.65	0.0114	S
C0-C2 Rt	15.1	17.3	2.2	0.0111	S
C0-C2 Lt	15.3	17.9	2.6	0.0114	S

Participants in the MET group demonstrated statistically significant improvements in mobility, with p-values less than 0.05 for all assessed movements.

Table 3: Control Group (Within-group Analysis)

Movement	Mean Pre	Mean Post	Mean Diff	P-Value	Significant (p < 0.05)
Flx	7.55	8	0.45	0.0139	S
Ext	6.75	7.06	0.31	0.0412	S
Rt lat flx	4.1	4.37	0.27	0.0394	S
Lt lat flx	4.4	4.84	0.44	0.0039	S
Rt Rot	8.25	8.7	0.45	0.0235	S
Lt Rot	8.2	8.9	0.7	0.0158	S
C0-C2 Rt	15.8	17	1.2	0.0141	S
C0-C2 Lt	14.9	16.6	1.7	0.0106	S

In the CONTROL group, statistically significant enhancements were noted in most cervical movements, although these changes were less pronounced than those in the MET group.

Table 4: Inter-Group Analysis (MET Vs CONTROL)

Movement	Mean Change (MET)	Mean Change (CONTROL)	Mean Difference	P-Value	Significant (p < 0.05)
Flx	1.15	0.45	0.7	0.0276	S
Ext	0.95	0.31	0.64	0.0863	NS
Rt lat flx	0.65	0.27	0.38	0.0928	NS
Lt lat flx	1.05	0.44	0.61	0.1752	NS
Rt Rot	0.74	0.45	0.29	0.8276	NS
Lt Rot	0.65	0.7	-0.05	0.9376	NS
C0-C2 Rt	2.2	1.2	1	0.1975	NS
C0-C2 Lt	2.6	1.7	0.9	0.5882	NS

Among the movements assessed, only cervical flexion exhibited a statistically significant difference between the groups, with the MET group demonstrating superior outcomes (p = 0.0276). For other movements, including extension, lateral flexion, and rotation, no significant differences were observed between the groups, although the MET group showed greater improvement.

DISCUSSION

The study findings revealed that while both the MET and Control groups demonstrated statistically significant improvements in cervical range of motion (ROM) within their respective groups, only cervical flexion exhibited a statistically significant intergroup difference, favoring the MET group.

These findings are consistent with the proposed physiological effects of MET, including reflex muscle inhibition, increased muscle extensibility, and improved joint mechanics. However, it is noteworthy that the control group also demonstrated improvements, albeit to a lesser extent, which could be attributed to factors such as natural recovery, attention effects, or minimal active engagement, even in the absence of formal intervention.

The most notable finding was the superiority of MET in improving cervical flexion, as reflected by the significant between-group difference. This may be due to the unique role of deep cervical flexor and suboccipital muscles, which are often targeted during MET protocols and are directly involved in flexion mechanics.(Aggarwal Amita, 2020) The ability of MET to specifically activate and lengthen these structures may explain the greater gains observed in flexion compared to other planes of movement.

However, the absence of significant between-group differences in cervical extension, lateral flexion, and rotation may suggest that the improvements observed were not unique to MET or that the MET protocol used did not provide a sufficiently distinct mechanical or neuromuscular advantage for these motions. It is also possible that the sample size limited the ability to detect subtle between-group

differences, especially when the control group showed modest but consistent gains.

Overall, while MET appears to be a promising intervention for improving cervical ROM, particularly in flexion, the lack of significant superiority over control for most movements suggests that MET may not be universally more effective than basic care or natural progression in all directions of cervical motion.(Bednarczyk et al., 2024) This highlights the need for more targeted or multi-modal approaches when addressing cervical dysfunction, and for future studies with larger sample sizes and longer follow-up periods to better assess the comparative and sustained effects of MET. Although the sample size was small, it was within the acceptable range for an interventional pilot study.

CONCLUSION:

The primary aim of this study was to explore the feasibility of the masticatory muscle energy technique and generate preliminary data on its effect on cervical spine mobility. However, future studies with larger sample sizes are warranted to confirm these findings and establish their clinical significance.

Conflict Of Interest: The authors declare no conflicts of interest related to this study.

Funding: This study did not receive any specific grants from funding agencies.

Ethics Declaration: Ethical approval was obtained from the Institutional Review Board (LTMMC/2022/IEC Protocol-62/22), and informed consent was obtained from all participants before enrolment.

REFERENCES:

- 1) Aggarwal Amita. (2020). Role of Myofascial Release Technique on Mobility and Function in. *Journal of Dental Research and Review*, 7, S84–S87.
- 2) Bednarczyk, V., Proulx, F., & Paez, A. (2024). The effectiveness of cervical rehabilitation interventions for pain in adults with myogenic temporomandibular disorders: A systematic review and meta-analysis. In *Journal of Oral Rehabilitation* (Vol. 51, Issue 6, pp. 1091–1107). John Wiley and Sons Inc. <https://doi.org/10.1111/joor.13671>
- 3) Chaitow, Leon., & Liebenson, Craig. (2001). *Muscle energy techniques*. Churchill Livingstone.
- 4) V.manivannan. (2016). "effectiveness of muscle energy technique and rocabado exercise versus therapeutic jaw exercises for temporomandibular joint. Nandha college of physiotherapy,the tamilnadu dr. M.g.r. Medical university.
- 5) Ferrillo, M., Giudice, A., Marotta, N., Fortunato, F., Di Venere, D., Ammendolia, A., Fiore, P., & de Sire, A. (2022). Pain Management and Rehabilitation for Central Sensitization in Temporomandibular Disorders: A Comprehensive Review. In *International Journal of Molecular Sciences* (Vol. 23, Issue 20). MDPI. <https://doi.org/10.3390/ijms232012164>
- 6) Hsieh, C.-Y., & Yeung, B. W. (1986). Active Neck Motion Measurements with a Tape Measure*. In *THE JOURNAL OF ORTHOPAEDIC AND SPORTS PHYSICAL THERAPY*. www.jospt.org
- 7) La Touche, R., Fernández-De-Las-Peñas, C., Fernández-Camero, J., Escalante, K., Angulo-Díaz-Parreño, S., Paris-Alemany, A., & Cleland, J. A. (2009). The effects of manual therapy and exercise directed at the cervical spine on pain and pressure pain sensitivity in patients with myofascial temporomandibular disorders. *Journal of Oral Rehabilitation*, 36(9), 644–652. <https://doi.org/10.1111/j.1365-2842.2009.01980.x>
- 8) Ndu, A. C., Uv, T. I. S., En, I. N., & Reade, P. C. (n.d.). Electromyographic activity of frontalis and sternocleidomastoid muscles in patients with temporomandibular disorders.
- 9) Rajadurai Viswas. (2011). 2011met on tmd rct. *Asian Journal of Scientific Research*, 71–77. <https://doi.org/10.3923/ajsr.2011.71.77>
- 10) Satpute, K., Nalband, S., & Hall, T. (2019). The C0-C2 axial rotation test: normal values, intra- and inter-rater reliability and correlation with the flexion rotation test in normal subjects. *Journal of Manual and Manipulative Therapy*, 27(2), 92–98. <https://doi.org/10.1080/10669817.2018.1533195>
- 11) Vilanova, L. S. R., Garcia, R. C. M. R., List, T., & Alstergren, P. (2015). Diagnostic criteria for temporomandibular disorders: self-instruction or formal training and calibration? *Journal of Headache and Pain*, 16(1). <https://doi.org/10.1186/s10194-015-0505-9>