

Case Report

Effect of Matrix Rhythm Therapy and Physical Rehabilitation in Postoperative Squamous Cell Carcinoma with Temporomandibular Joint Dysfunction - A Case Report

Om C Wadhokar^{1,2*}; Cicely Rodrigue¹; Sumedha D Kolhe¹; Mudita M Kulkarni¹; Tushar J Palekar¹

¹Department of Musculoskeletal Sciences, Dr. D. Y. Patil College of Physiotherapy, Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India.

²Ph.D. Scholar, Department of Public Health, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research, Sawangi (M), Wardha, Maharashtra, India

*Corresponding author: Om C Wadhokar

Department of Musculoskeletal Sciences, Dr. D. Y. Patil College of Physiotherapy, Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune, Maharashtra, India.

Email: om.wadhokar@dpu.edu.in

Received: March 29, 2024

Accepted: April 23, 2024

Published: April 30, 2024

Introduction

Mouth squamous cell carcinoma (OSCC), which has a detectable preclinical stage, is the most common type of mouth cancer. These organs comprise the sinuses and nasal cavity, as well as the mouth, throat, and larynx. Men are also more likely than women to develop malignant oropharyngeal tumors brought on by the Human Papillomavirus (HPV). Oral cancer risk factors include chewing betel, using smokeless tobacco, having poor oral health, and getting recurrent infections in the mouth, such as the human papillomavirus.

The most prevalent aspect of Temporomandibular Joint (TMJ) dysfunction, which includes restricted mandibular mobility and popping and clicking sounds from the joint during movement, is pain. TMJD is a term used to describe pain and dysfunction of the masticatory muscles. Functional disruption results from disruption of mandibular continuity, and the degree of the defect vary according to the location, size, stage, and severity of the tumour as well as the soft and hard tissues involved.

Trans-mandibular surgery, which includes mandibulotomy (split mandible) to allow access to tumour tissue or mandibulectomy (mandibular resection) in the event that an osseous

Abstract

There are two frequent characteristics of temporomandibular joint dysfunction: pain and range of motion of the joint, be it any cause like oral carcinomas or any issues related to muscles of mastication etc. So, the treatment programme was focused on relieving pain and increasing range of motion of the TMJ joint. The purpose of this study was to find out the effect of conventional therapy along with matrix rhythm therapy in a case of TMJ dysfunction post oral squamous cell carcinoma surgery. Total 4 weeks of intervention was given to the patient. Matrix rhythm therapy was given in the second week and conventional therapy was given in the first, third and fourth week. Outcome measures like Numerical pain rating scale, range of motion, manual muscle testing, Maximum Mouth Opening, Fonseca Anamnestic Index for classification and dysfunction of TMD were used and were taken on Day 1 and after 4 weeks of intervention. Pain, range of motion of the jaw was assessed at day one and at the end of fourth week which revealed that there was maximum jaw opening seen by decreasing the disability of the patient while chewing. Matrix rhythm therapy along with conventional therapy was seen to be effective in relieving pain and increasing range of motion of the temporomandibular joint.

Keywords: Temporomandibular joint dysfunction; Oral squamous cell carcinoma; Matrix rhythm therapy; Case report

tumour is involved, is performed to treat tumours of the mouth cavity and oropharynx. Even with advances in oral oncology, many people have lost their ability to speak owing to complications from surgery, radiation therapy, and/or chemotherapy. These negative effects remain unnoticed, unaddressed, and unrecorded. Important risk factors for dysfunction include large tumours, high radiation doses, and tumour placement, especially when adjacent to the temporomandibular joint and the masticatory muscles. In the Indian population, the typical range of mouth opening is 36mm to 56mm for females and 39mm to 70mm for males. TMJ dysfunction was indicated by a mouth opening larger than 30 mm in patients with oral cancer [1].

Physiotherapy has always been a wonderful aid to improve joint mobility, reduce pain and inflammation through techniques like joint mobilization, soft tissue mobilization and introducing exercises like Rocabado exercises and Goldfish exercises to the regime. In addition, Electrotherapy is frequently utilized to treat TMJ disorders. Modalities like Transcutaneous Electrical Nerve Stimulation (TENS), Therapeutic ultrasound, Low-Level Laser Therapy (LLLT) and Relaxation technique has helped

in alleviating pain, promote connective tissue repair thereby enhancing the functionality of the individual [2]. With the use of vibromassage and a particular physiological pulse, Matrix Rhythm Therapy seeks to promote optimal metabolism. The MRT device stimulates and realigns particular vibrations in the nervous system and skeletal muscles [3]. According to a study by Shrivastava S., MRT promotes tissue elasticity, enhances joint mobility, minimizes pain and swelling, and aids in function restoration. According to research by Taspinar et al., MRT improves peripheral blood flow [4].

Numerous research studies on MRT have demonstrated its impact on pain and enhanced functionality across a range of musculoskeletal disorders [5].

Table 1: Physical Therapy Management (1st week).

Intervention	Dosage	Rationale
Icing	10 min per day	Reduce pain
ROM exercises to TMJ and neck	10 repetitions × 3 sets	Maintain flexibility of soft tissues
SCM stretching	30 sec holds × 3 repetitions	Improve mobility and break adhesions
Trapezius stretching	30 sec holds × 3 repetitions	Improve mobility and break adhesions
Pectoral stretching	30 sec holds × 3 repetitions	Improve mobility and break adhesions

Table 2: Physical Therapy Management (2nd week).

Intervention	Dosage	Rationale
Matrix Rhythm Therapy (Figure 3)	30 mins on LT SCM and Upper Trapezius	Break adhesions and allow more flexibility
TMJ Mobilization	30 repetitions	Improve mobility
Goldfish Exercises	10 repetitions × 3 sets	Improve mobility and function of TMJ joint
ROM exercises to TMJ	10 repetitions × 5 sets	Maintain flexibility of soft tissues
Neck Isometrics	10 sec hold × 3 repetitions	Improve strength and mobility

Table 3: Physical Therapy Management (3rd and 4th week).

Intervention	Dosage	Rationale
ROM exercises to TMJ and neck	10 repetitions × 5 sets	Maintain flexibility of soft tissues
SCM stretching (Figure 4)	30 sec holds × 5 repetitions	Improve mobility and break adhesions
Rokabado's 6x6 exercises	10 repetitions × 3 sets	Improve mobility and function of TMJ joint



Figure 1: Showing Site of Surgery of patient.



Figure 2: Showing Maximum Mouth Opening.

Patient Presentation

After undergoing tumour excision surgery for maxillofacial squamous cell carcinoma, a 52-year-old female patient presented to the physiotherapy department complaining of difficulty opening her mouth and swallowing for 8 days. She underwent radiotherapy in February 2023. The patient started having severe blister-like formation in the buccal cavity about 5 years ago which did not heal. So, she went to a local hospital and they carried out some investigations which revealed that she had buccal carcinoma. She then went under surgery and was advised to undergo 2 months of chemotherapy. After 3 years she came to Dr D.Y. Patil hospital for check-up as she was finding it difficult to open her mouth to a normal range which led to difficulty in chewing and speech. Hence, she was given few medications for her pain and discomfort and was advised to perform jaw expansion exercises like stacking up ice-cream sticks to increase the length of her mouth opening. After a year of doing so, she did not get any satisfying results. She was then referred to Dr D. Y. Patil College of physiotherapy OPD for further treatment (Figure 1).

Clinical Presentation

Mouth opening was visibly reduced with 1 finger (Figure 2). Range of Motion (ROM) of TMJ decreased cervical ROM. Pain during activity like chewing, clenching was severe as compared to pain at rest.

Physiotherapy Management: Total 4 weeks of intervention was given to the patient.

For 1st week: Icing to reduce pain, ROM exercises to the jaw and neck have been given along with stretching to the Sternocleidomastoid, Trapezius and Pectorals.

For 2nd week: Matrix Rhythm Therapy (Figure 3) was given for a week mainly focusing on Sternocleidomastoid and Upper Trapezius of the left side. Along with that the TMJ mobilization has also been given to improve Rom. Goldfish exercises while pressing the tongue against the roof of the mouth palpates the left TMJ with one finger on the chin. Patient has to perform jaw drop while applying light pressure with each finger while keeping the tongue to the roof. Neck isometrics with hold.

For 3rd and 4th week: stretching exercises (Figure 4) and mobilization along with goldfish exercises were given. Rokabado's 6x6 exercises for TMD jaw pain started at the starting of third week and continued till the end of 4th week.



Figure 3: Showing Application of Matrix Rhythm Therapy on SCM and Upper Trapezius Muscle.



Figure 4: Stretching exercise of SCM Muscle.



Figure 5: Showing increased Maximum Mouth Opening.

Follow Up and Outcome: follow up and outcome measure comparison are mention in the table 5 (Figure 1 and Figure 5).

Informed Consent

The patient was first informed about the study, and then informed consent was obtained.

Discussion

In the present study physiotherapy treatment was given to Left TMJ and left cervical region which showed improvement on functions, range of motion and improved mobility. A few studies and clinical experience indicate the effectiveness of MRT [6]. In 2022, Maria et al. conducted research on the efficacy of physiotherapy in treating Temporomandibular Joint Dysfunction (TMJD) and its correlation with the cervical spine. The study found that neuroanatomical and neurophysiological structures connect the TMJs and cervical spines. Mutual symptomatology is impacted when a disease exists in one of the two places [7,8]. Uniqueness of the study is Matrix Rhythm Therapy is given on Sternocleidomastoid and Upper Trapezius to release the tightness of muscles which ultimately gives result on TMD [9,0].

Conclusion

This case study made it easier to understand how Matrix Rhythm Therapy affected the patient's temporomandibular joint dysfunction following surgery for buccal cancer. Our study's findings allowed us to conclude that MRT enhanced the temporomandibular joint's range of motion while lowering pain. Fonseca Anamnestic Index a scale proposed to measure the "severity of temporomandibular disorders" construct also showed less severity.

References

1. Mohlin B, Axelsson S, Paulin G, Pietilä T, Bondemark L, Brattström V, et al. TMD in relation to malocclusion and orthodontic treatment. *Angle Orthod.* 2007; 77: 542–8.
2. Wadhokar OC, Patil DS. Current Trends in the Management of Temporomandibular Joint Dysfunction: A Review. *Cureus.* 2022; 14: e29314.
3. Narin AN, Alpozgen AZ, Kulli HD. Effects of matrix rhythm therapy on primary lymphedema: a case report. *J Phys Ther Sci.* 2016; 28: 2418–21.

Table 4: Timeline of the events.

Events	Date	Reasoning
Reference to Physiotherapist	28 th February 2023	For physiotherapy treatment of TMJD
Physiotherapy Treatment	28 th February to 23 rd March 2023	To achieve good functional ability and rom
Follow up dates	Every day for 1 st and 2 nd week, Every other day for 3 rd and 4 th week	For improvement in treatment
Discontinuation of Treatment	23 rd March 2023	Achieved good rom and functions of TMJ

Table 5: Pre and Post Treatment Outcome Measure Comparison.

Measures	Pre-Treatment	Post Treatment
Numeric Pain Rating Scale (NPRS)	On Rest: 5/10 On Activity:8/10	On Rest: 2/10 On Activity:3/10
ROM for TMJ	1 finger opening (Figure 1)	3 fingers opening (Figure 5)
Maximum Mouth Opening	20 mm	48 mm
MMT for TMJ	Poor	Good
Fonseca Anamnestic Index	65 (Moderate)	5 (Absent)

4. Warutkar VB, Samal S, Zade RJ. Matrix Rhythm Therapy (MRT) Along With Conventional Physiotherapy Proves to Be Beneficial in a Patient With Post-Operative Knee Stiffness in Case of Tibia-Fibula Fracture: A Case Report. *Cureus*. 2023; 15: e45384.
5. Maiya GA, Jadhav RA, Harihar A, Gundmi S, Shetty AG, Yadav K H, et al. Effect of novel Matrix Rhythm Therapy (MaRhyThe®) on neuropathic pain and maximum plantar pressure distribution among type 2 diabetes mellitus patients with peripheral neuropathy. *J Diabetes Metab Disord*. 2023; 22: 827–33.
6. Taspinar F, Bas Aslan U, Sabir N, Cavlak U. Implementation of Matrix Rhythm Therapy and Conventional Massage in Young Females and Comparison of Their Acute Effects on Circulation. *J Altern Complement Med*. 2013; 19: 826–32.
7. Paço M, Peleteiro B, Duarte J, Pinho T. The Effectiveness of Physiotherapy in the Management of Temporomandibular Disorders: A Systematic Review and Meta-analysis. *J Oral Facial Pain Headache*. 2016; 30: 210–20.
8. Joshi MV, Kulkarni CA, Wadhokar OC, Wanjari MB. Growing Trends in Scientific Publication in Physiotherapy Treatment of Knee Osteoarthritis: A Bibliometric Literature Analysis. *Cureus*. 2023; 15: e48292.
9. Campos JADB, Carrascosa AC, Bonafé FSS, Maroco J. Severity of temporomandibular disorders in women: validity and reliability of the Fonseca Anamnestic Index. *Braz Oral Res*. 2014; 28: 16–21.
10. Hege AR, Choubisa C, Chitale N, Phansopkar P. Physiotherapy Management Post-operative to Total Extensor Hallucis Longus Rupture: A Case Report. *Cureus*. 2023; 15: e50434.