



Single denture as a treatment for a patient with TMD: a case report

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Abstract

Background: Temporomandibular joint disorder is a chronic pain caused by various factors including trauma, occlusal condition, and stress. This case report will explain about TMD case in prosthodontic which is treated with a single denture.

Methods: A 50-year-old woman came to the dental clinic with aches and pains in the jaw and muscles around the head and neck. She has been using a removable denture since two months ago, but she feels uncomfortable with it. We made a new denture with an appropriate vertical dimension for the patient, with the tooth arrangement as close to the compensating curves as possible. We also trained her to do some exercises for the head and neck muscle.

Results: After wearing the new denture and doing a series of muscle therapy, the patient begins to feel that the aches and pains are starting to decrease. She can more easily open and close her mouth and her lower jaw no longer feels so vibrating.

Conclusion: Based on the results of clinical and subjective examinations, apart from tooth loss, all the conditions experienced by the patient also seem to be related to emotional stress due to the problems encountered.

Keywords: Chronic pain, Denture, Jaw exercise, Muscle therapy, TMD

Introduction

TMD or the temporomandibular joint disorder is a chronic orofacial pain problem.¹ This disorder can be caused by various factors.² The etiology of TMD classified into five elements, including trauma, stress, deep pain, occlusal conditions, and parafunctional habit.³ Another literature classifies this disorder as chronic and acute conditions. The acute conditions are associated with a significant injury that can result in fracture or joints displacement.⁴ The chronic pain caused by TMD leads to the disorder that can affect the patients' quality of life.⁵

Some of the TMD pain are related to certain emotional stress.^{6,7} It is one of several psychological factors that can affect the muscle function by increasing the rest activity or bruxism.⁸ The treatments of TMD are various. It classified into definitive treatment and supportive therapy.³ The definitive treatment for occlusal therapy consists of reversible and irreversible therapy. The reversible occlusal therapy is temporarily altering the patient's occlusal condition, while the irreversible occlusal therapy permanently alters the occlusal condition or mandibular position.³ The reversible occlusal therapy provide an orthopedic stability. It used to decrease the symptoms of TMD and the parafunctional activity.^{7,9}

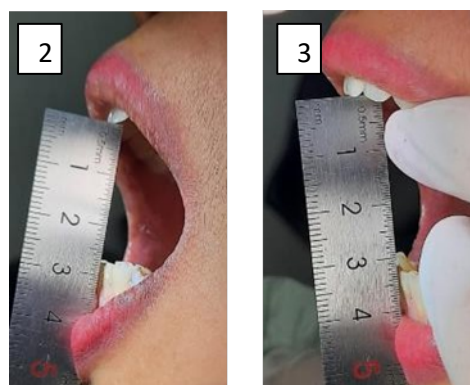
The reversible occlusal therapy consists of selective grinding, orthodontic treatment, restorative procedure that modify the occlusal condition, and surgical procedure.³ One of the reversible occlusal therapies is to use dentures made of acrylic material. Acrylic dentures are dentures made of acrylic material (PMMA, polymethyl meta acrylic) to replace all missing natural teeth and the gingival tissues.^{10,11} Acrylic material is easy to get, available in various dental material providers, easy to manipulate, and relatively inexpensive when compared to metal dentures. The use of acrylic dentures can improve the function of mastication, speech, and aesthetics. In addition, this denture can also correct abnormalities, disorders, and diseases caused by edentulous conditions, one of which is TMD3.

Case Report

A 50-year-old woman came to the dental clinic with aches and pains in the jaw and muscles around the head and neck. She wanted to get a removable denture two months ago, but the patient felt sore when using them, so she only used them for a few days and until now they don't use them anymore. Clinical examination revealed that there are no more teeth in her upper jaw and only eight teeth left in her lower jaw (Fig.1). She has been in this condition in the last 5 years ago. Some of the remaining teeth need to be treated with root canal treatment and restoration. Her lower jaw often has tremors when she opens and closes her mouth, even when she is not doing anything.



Figure 1. Intra oral clinical view.

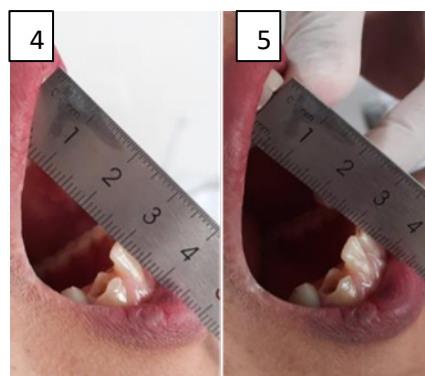


Figures 2 and 3. Maximum mouth opening (Figure 2) without assistance and (Figure 3) with assistance.

The patient has limited mouth opening with a maximum mouth opening without assistance of 27mm and a maximum mouth opening with assistance of 29mm (Fig. 2 and 3). The palpation of the TMJ showed positive

results on the right and left sides. Other parts that gave positive results on palpation were the right and left masseter muscles, right and left temporal, left trapezoid, and left sternocleidomastoid muscles. The patient had clicking in both sides of TMJ when opening and closing the mouth. She had tremor of the mandible when opening and closing the mouth. According to her explanation, her mandible often vibrates even when she is not doing anything. Visual analogue scale (VAS) showed a score of seven at the first meeting. We trained the patient to massage the muscles around her head and neck and trained her to open and close their mouths. The patient was instructed to do the exercise every morning and evening. The exercises will help her muscles to stretch and relax, so it can help relieve the symptoms she is complaining about.

After a week, the patient came back, and a thorough examination was done again. The examination showed the maximum mouth opening without assistance of 29mm and the maximum mouth opening with assistance of 32mm (Fig. 4 and 5). The patient begins to feel that the aches and pains are starting to decrease. The VAS score shown at this meeting is six. The positive results from the muscles palpation were still the same but in a lighter pain condition.



Figures 4 and 5. Maximum mouth opening without assistance (Figure 4) and with assistance (Figure 5) after a week.

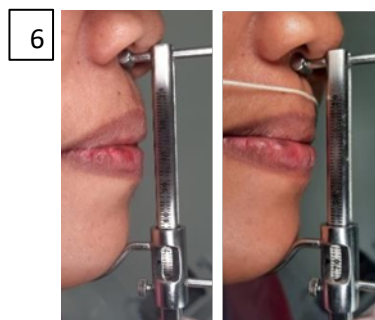


Figure 6. Left: Vertical dimension of occlusion (VDO) while wearing the denture; Right: Vertical dimension at rest (VDR) without wearing the denture.

Figure 6 shows the VDO when using dentures and the VDR without using dentures. It was seen that the VDO with the old dentures was higher than without the dentures. We ended up making a new denture by previously analyzing the model for the old denture and doing the recorded using a facebow (Figure 7). We performed preliminary impressions to obtain diagnostic models and making an individual trays. After that, we conducted the final impressions for upper and lower jaws. We first performed border molding on the individual trays, then using the ZOE impression paste. We obtained the working model and arranged the teeth. The results of the arrangement of the teeth were then tested on the patient. A week later, a new denture was inserted. Figure 8 shows the results of the patient's VDO measurements with the latest bite registration analysis. After the insertion of a new denture, the patient was instructed to continue the self-therapy at home and to continue for weekly follow-ups. The results of the measurement of mouth openings and the reduction of pain were getting better (Figure. 9).

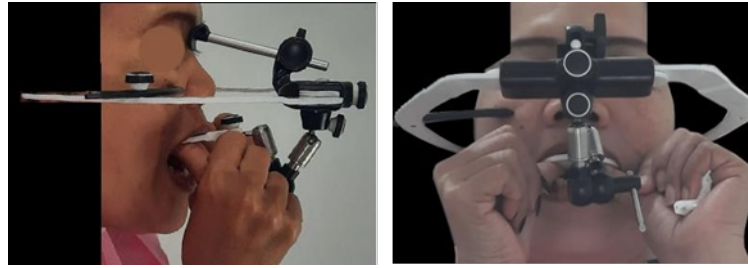


Figure 7. Facebow record of the patient.



Figure 8. The new vertical dimension of occlusion measurement



Figure 9. The opening mouth measurement at third appointment.

Acrylic dentures have several components, they are the dental artificial elements and the base. The base is the component that is in contact with the soft tissue, which serves as the support for the supporting tooth or tissue. It is made of acrylic resin material (PMMA, poly methyl meta-acrylate).^{10,11} PMMA is a polymer material composed of large or many macromolecules that have internal covalent bonds. Most polymers are organic compounds and are composed of hydrocarbon molecules. The main skeleton of a polymer is usually a series of carbon atoms.^{11,12}

The use of acrylic dentures in TMD treatment can modify the patient's occlusion to reduce TMD symptoms.^{13,14} The incidence of functional complications in patients with VDO increase should be conducted.¹⁵ The dentures needed for occlusal therapy in management of TMD.^{16,17} We made the single dentures for this patient for the occlusion and articulation rehabilitation, as has been done by Marquezan et al in 2017.¹³ The single denture also improve in the interarch relationship by reduces or increases the occlusal vertical dimension of occlusion (VDO), and repositions the mandible.¹⁸ The TMD patients tend to be more introverted, more neurotic, and more trait anxiety. For the common emotional states, the therapies are divided into four types. The first therapies are education and cognitive awareness. The patient should be educated that there is a relationship between emotional stress, the hyperactivity of their muscle and their problem.¹⁹ The second therapy is restrictive use of masticatory system to avoid painful movements. In this therapy, patient instructed to function within a painless range of movement.²⁰ The third therapy is voluntary avoidance. The patients instructed to quickly disengage their teeth contacting other than functional tooth contacts (chewing, swallowing, and speaking).¹ The fourth therapy for emotional states is relaxation therapy. It consists of substitutive and active therapy. The substitutive therapy is behavioral modification. The patients can have any activity they enjoy that removing them from the

stressed situation. The active therapy is regular exercise as a stress-releasing mechanism.³ In this treatment, we made a new single denture for the patient. It is a procedure that modify her occlusal condition and to decrease the symptoms associated with TMD.

Conclusions

The denture made for the patient with TMD will be helpful to relieve the head and neck muscle and joint pain. The denture should be made with an optimal teeth arrangement and vertical dimension to give the best result for the treatment. The TMD can caused by inappropriate occlusal condition or any occlusal changes and cannot be separated from the emotional condition of the patient. We also need to perform the four types of emotionally therapy to relax the muscles to alleviate TMD symptoms. Therefore, clinicians should consider not only the clinical but also emotional examination and treatment.

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Declarations of competing interest

No potential competing interest was reported by the authors.

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