

## Case report: Full mouth rehabilitation of a patient with multiple myeloma and worn dentition



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### ABSTRACT

Treatment planning for a patient with worn dentition and systemic disorder needs to assess different aspects of patient's oral condition and life. This study presents prosthetic reconstruction approach of a patient with worn dentition using metal ceramic restorations, and removable partial denture. It showed that a simple and low cost but careful treatment planning may results in improved patient's quality of life.

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## Introduction

Multiple myeloma (MM) is a plasma cell neoplasm malignancies.(1) This is a multi-centric disease that extensively affects the bone marrow and can involve craniofacial structures. The highest incidence occurs between the fifth and seventh decades(2) and is slightly more common in men than in women. (3) Although median survival is approximately 3 years(4) Some patients with MM can live longer than 10 years. It depends on disease stage. (3) Therefore, management of dental disease before and during cancer therapy poses many challenges to the dental practitioner. Cancer therapy has numerous potential short-term and long-term oral complications that may require modification of dental management strategy.(5)

The goal of prosthodontics rehabilitation is to minimize morbidity and relieve suffering following treatment of head and neck cancer. It encourages the best possible QOL for patients and upholds their self-image during their traumatic psychological adjustments.(6, 7) Rogers et al demonstrated that, following successful treatment of oral cancer, the most important issues reported by patients in terms of QOL were chewing, speech and swallowing, closely followed by appearance, especially in female patients.(8)

Tooth wear results from non-carious processes causing loss of dental hard tissue. Attrition, abrasion, or erosion are different kinds of tooth wear.(9) It may adversely affects the oral conditions including loss of vertical dimension of occlusion, esthetic problems, tooth sensitivity, and compromised oral health related quality of life.(10) Therefore, careful planning which is based on evidence-based treatment protocols is essential for such patients. Using fixed and removable prostheses for managing these patients with worn dentition and loss of posterior tooth support is one of the evidence based treatment options.(11) However, it is a very complex process requiring evaluation of the vertical dimension, mounted study casts and a diagnostic wax-up. In addition to the full mouth reconstruction, controlling the causative factors is so important.(12) This study presents pros-

thetic reconstruction approach of a patient with worn dentition using metal ceramic restorations (MCR), and removable partial denture (RPD).

## Case Report

**Chief Complaint.** A 67-year-old woman referred to the Department of Prosthodontics of the Faculty of Dentistry of Tehran University of Medical Sciences, Tehran, Iran, for prosthodontics treatment of her worn teeth. The patient's chief complaint was attrition on anterior mandible teeth.

### *History:*

In medical history, it was revealed that she had multiple myeloma cancer and history of using Zoledronat, Talidomid, and Metformin. In dental history, a history of endodontic, restorative, and prosthodontics treatment were found.

### *Examination :*

The patient had mild asymmetrical face and competent lips. No signs or symptoms (pain, limited range of jaw opening, or clicking) of temporomandibular joint disorder (TMD) were detected. Facial proportions was almost equal. Patient had straight smile line, facial profile, and symmetrical smile. Clinical examinations revealed severe attrition of the anterior of mandibular teeth. Well-defined facets matching those on the opposing teeth in eccentric occlusion were also detected. The severe tooth wear was attributed to unsuitable restorations, and posterior dental interferences. There was no anterior guidance for posterior eccentric movements (Figure 1).



Figure 1: Intraoral photograph: Frontal view

The patient had moderate oral hygiene with normal mucosa, uneven gingival margin, and normal intra-oral palpation. She had slight stain, sufficient attached gingiva, good periodontal condition with no furcation involvement and no tooth mobility. There were localized mild chronic periodontitis. In patient's panoramic radiograph, it was found that the #5,12,17,18, 19, 20, 28, 29, 30, 31 and 32 were missing and teeth #3, 5, 7, 10, 11, 22 received root canal therapy (RCT) (Figure 2).



Figure 2: Patient's panoramic radiograph

### **Diagnostic Procedures:**

After the vertical dimension was clinically assessed, physiologic rest position was determined by facial measurements between nose tip and chin and confirmed by phonetics, esthetic, and freeway space. (13) The interocclusal distance was found to be approximately 2 mm, and the occlusal vertical dimension (OVD) could be restored by approximately increasing it by 2 mm. In addition, the tooth wear resulted in protrusive deviation of the mandible. By guiding the mandible into centric relation, there was space in the anterior region for rehabilitation. Prior to definitive treatment, diagnostic plaster casts were obtained from alginate impressions (Tropicalgin, Zhermack, Badia Polesine, Rovigo, Italy). The mandible was guided into centric relation (CR) by bimanual manipulation technique. The bite registration procedure was accomplished using an acrylic anterior deprogramming jig in the anterior region and zinc oxide eugenol paste (Luralite, Kerr Corp., Orange,

CA, USA) on wax rims. This record and an arbitrary face bow were used to mount the casts on a semi adjustable articulator. The condylar guidance on the articulator was set at average. The curves of Spee and Wilson as well as the orientation of the occlusal plane were determined using a Broadrick occlusal plane analyzer.

After a diagnostic wax-up at this new OVD, a new cast was made (with duplication of diagnostic wax up) and via auto-polymerizing acrylic resin provisional crowns were fabricated using a vacuum formed matrix (Drufolen H; Dreve Dentamid GmbH, Unna, Germany). Teeth were prepared using a putty index made from the diagnostic wax-up (Figure 3).



Figure 3: Final preparation of the mandibular anterior teeth

The provisional fixed restorations were cemented using temporary cement (Temp Bond, Kerr Corp., Orange, CA, USA). The patient used these provisional restorations for 2 months to check the proposed vertical dimension. For two months, provisional restorations were adjusted and used as a guide for definitive oral rehabilitation. During this period, the patient's condition and functions such as muscle tenderness, discomfort of TMJ, mastication, range of the mandibular movements, swallowing, and speech were evaluated.

A treatment plan was developed with the aim of improving occlusion, restoring masticatory function, and improving the patient's appearance. During the following visit, treatment options were discussed with the patient, including root canal therapy or endodontic re-treatment, periodontal therapy (including crown lengthening in all regions), and prosthetic

treatment (metal ceramic restorations (MCRs)).

### **Endodontic and Periodontal Procedures**

The first phase of treatment was RCT of exposed teeth and teeth with insufficient crown lengths and retreatment (reRCT) of teeth with unacceptable RCTs. ReRCT was performed for #11 and 22 teeth. After completion of RCT, crown-lengthening surgery in all regions was performed using a vacuum shell guide according to the diagnostic wax-up. After 1 week, the provisional restorations were adjusted according to the new margins.

### **Prosthodontics Treatment:**

After diagnostic wax up, the putty index was made for fabrication of post and core restorations for anterior maxillary teeth and checkin the final teeth preparation. A complete arch putty-wash impression was made with polyvinylsiloxane (Panasil, Kettenbach, Hesse, Germany) after retracting the gingiva using the retraction cords. Then temporary restorations were made chair side and cemented. An impression was made from the temporary restorations and mounted on the articulator, and anterior guidance table (AGT) was prepared to obtain the condylar guidance. Then the putty index was prepared for fabricating the final restorations. Framework wax up were cut back according to the index. Frameworks try-in was done, and then porcelain veneering was conducted according to the customized anterior guide table. The restorations were glazed after porcelain try-in appointment and establishing mutually protected occlusion. The final restorations were cemented with glass ionomer cements (GC Fuji II, GC America, Illinois, USA) (Figure 4).



Figure 4: Final restorations delivered to the patient

Oral hygiene were instructed to the patient. Patient did not report any problem with his treatment during 2 years of follow-up.

### **Treatment plan**

Producing maxillary fixed prosthesis and anterior mandibular prosthesis with posterior partial mandibular prosthesis.

### **Discussion**

Some systemic conditions that affect the quality of jaw bones, such as osteoporosis, Paget disease, and MM, are also considered to be relative contraindications for dental implant placement. This must be taken into consideration in the dental implant treatment planning.(14) We encountered three significant problems which could hinder the insertion of dental implant in safe condition: (a) MM seriously affects bone quality and the subsequent poor bone condition is not suitable for implant surgery, (b) MM affects immunological process and this patient was very susceptible to microbial infection, and (c) therapeutic medications of MM can alter soft and hard tissue biologically, thus affecting the osseointegration process in dental implant surgery and early failure of dental implant.

The Bisphosphonate (BP) family is the main medication used for the MM patients, which compromises the tissue healing capacity of these patients. Moreover, the intravenous BPs (eg, zoledronate) has destructive side effects, such as osteonecrosis of the jaw. (15) In the current case, the patient had a history of bisphosphonate medication for six months before dental reconstruction. A study by Bagan et al. (16) showed a direct association between the use of intravenous bisphosphonate therapy and the development of medication related osteonecrosis of jaws (MRONJ) after dental implant placement. Some studies recommended patients taking IV BPs for more than 3 years with no local risk factors and those taking BPs for <3 years together with steroid therapy to take a 3-to-6-month drug holiday prior to dental surgery. (17) Another important concern is considering an optimal surgical timing after chemotherapy. In fact, implant insertion must be done when the

patient is healthy and at the best systemic condition after chemotherapy cycles. Some researchers advise the use of CTX test to evaluate the patient's risk of developing complications—such as MRONJ—following surgical interventions including dental implantation.(16) In the current study a CTX examination was prescribed. Rate of Ctx telopeptide test was 80 pg/ml that was high risk for bisphosphonate related osteonecrosis of jaws (Bronj).(18) In the present case, the permission of the patient's physicians after consultation, inappropriate CTX value, presence of systematics disease that it can alter osseointegration events such as diabetes, moderate oral hygiene justified the planning of this patient treatment on fixed and partial prosthesis.

Inadequate posterior support has been known as an element in severe anterior attrition.(19) The treatment options of choice for patients with worn dentition and lack of posterior occlusal support are implant supported restorations or RPDs.(11, 20) Clinical decision-making in such situation is very difficult and complex since the long-term clinical outcome of treatment are unknown due to insufficient randomized clinical trials and evidence on prosthetic rehabilitation of these patients.(11) For the patient with systemic disorders or financial problems, rehabilitation of patients using anterior restoration and posterior RPD has been suggested when there is lack of anterior guidance and posterior occlusal support. Therefore, low-cost rehabilitation can be performed with great possibility of longevity. (19)

Communication and education are key factors for accepting prosthesis. Successful use of prosthesis may depend on the patient's psychological acceptance of it. Patients' participation in the decision-making process with realistic expectations is of vital significance. They should be educated about the treatment choices and convinced of their personal responsibilities towards the use and care of the prosthesis. The need for professional re-evaluation on a frequent periodic schedule should be emphasized to determine adaptability of specifically RPD to soft tissues, stability, retention, tissue receptivity, occlusion function and esthetics. (6)

## Conclusion

Treatment planning for a patient with worn dentition and systemic disorder needs to assess different aspects of patient's oral condition and life. A careful step by step diagnostic procedure and taking medical and dental history are one of the most important parts of the management of such patients. It can be concluded that a simple and low cost treatment plan may results in improved patient's quality of life.

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## References

1. Bayani M, Anooshirvani AA, Keivan M, Mohammad-Rabei E. Dental implant in a multiple myeloma patient undergoing bisphosphonate therapy: A case report. *Clinical case reports*. 2019;7(5):1043-8.<https://doi.org/10.1002/ccr3.2150>
2. Moura LB, Gabrielli MFR, Gabrielli MAC, Pereira Filho VA. Pathologic mandibular fracture as first sign of multiple myeloma. *Journal of Craniofacial Surgery*. 2016;27(2):e138-e9.<https://doi.org/10.1097/SCS.0000000000002386>
3. Rajkumar SV, Kumar S, editors. Multiple myeloma: diagnosis and treatment. *Mayo Clinic Proceedings*; 2016: Elsevier.<https://doi.org/10.1016/j.mayocp.2015.11.007>
4. Kyle RA, Gertz MA, Witzig TE, Lust JA, Lacy MQ, Dispenzieri A, et al., editors. Review of 1027 patients with newly diagnosed multiple myeloma. *Mayo Clinic Proceedings*; 2003: Elsevier.<https://doi.org/10.4065/78.1.21>
5. Brennan MT, Woo S-B, Lockhart PB. Dental treatment planning and management in the patient who has cancer. *Dental Clinics of North America*. 2008;52(1):19-37.<https://doi.org/10.1016/j.cden.2007.10.003>
6. Mantri S, Bhasin A, Shankaran G, Gupta P. Scope of prosthodontic services for patients with head and neck cancer. *Indian journal of cancer*. 2012;49(1):39.<https://doi.org/10.4103/0019-509X.98917>
7. Rogers SN. Quality of life perspectives in patients with oral cancer. *Oral Oncol*. 2010;46(6):445-7.<https://doi.org/10.1016/j.oraloncology.2010.02.021>
8. Rogers SN, Gwanne S, Lowe D, Humphris G, Yueh B, Weymuller Jr EA. The addition of mood and anxiety domains to the University of Washington quality of life scale. *Head & Neck: Journal for the Sciences and Specialties of the Head and Neck*. 2002;24(6):521-9. <https://doi.org/10.1002/hed.10106>
9. Zeighami S, Siadat H, Nikzad S. Full mouth reconstruction of a bruxer with severely worn dentition:

- a clinical report. Case reports in dentistry. 2015;2015. <https://doi.org/10.1155/2015/531618>
10. Mesko ME, Sarkis-Onofre R, Cenci MS, Opdam NJ, Loomans B, Pereira-Cenci T. Rehabilitation of severely worn teeth: A systematic review. *Journal of dentistry*. 2016;48:9-15. <https://doi.org/10.1016/j.jdent.2016.03.003>
  11. Nokar S, Hendi A, Hemmati YB, Falahchai M. Use of digital-conventional method for managing a patient with severely worn dentition: A clinical report. *Case reports in dentistry*. 2018;2018. <https://doi.org/10.1155/2018/8456143>
  12. Rani S, Devi J, Jain C, Mutneja P, Verma M. Esthetic rehabilitation of anterior teeth with copy-milled restorations: a report of two cases. *Case reports in dentistry*. 2017;2017. <https://doi.org/10.1155/2017/2841398>
  13. Johansson A, Johansson AK, Omar R, Carlsson G. Rehabilitation of the worn dentition. *Journal of oral rehabilitation*. 2008;35(7):548-66. <https://doi.org/10.1111/j.1365-2842.2008.01897.x>
  14. Eskow CC, Oates TW. Dental implant survival and complication rate over 2 years for individuals with poorly controlled type 2 diabetes mellitus. *Clinical implant dentistry and related research*. 2017;19(3):423-31. <https://doi.org/10.1111/cid.12465>
  15. Huang YF, Chang CT, Muo CH, Tsai CH, Shen YF, Wu CZ. Impact of bisphosphonate-related osteonecrosis of the jaw on osteoporotic patients after dental extraction: a population-based cohort study. *PLoS One*. 2015;10(4). <https://doi.org/10.1371/journal.pone.0120756>
  16. Bagan L, Jiménez Y, Leopoldo M, Murillo-Cortes J, Bagan J. Exposed necrotic bone in 183 patients with bisphosphonate-related osteonecrosis of the jaw: Associated clinical characteristics. *Medicina oral, patologia oral y cirugía bucal*. 2017;22(5):e582. <https://doi.org/10.4317/medoral.22133>
  17. Khan AA, Morrison A, Kendler DL, Rizzoli R, Hanley DA, Felsenberg D, et al. Case-based review of osteonecrosis of the jaw (ONJ) and application of the international recommendations for management from the international task force on ONJ. *Journal of clinical densitometry*. 2017;20(1):8-24. <https://doi.org/10.1016/j.jocd.2016.09.005>
  18. Khosla S. Oral Bisphosphonate-induced osteonecrosis: Risk factors, prediction of risk using serum CTX testing, prevention, and treatment. *Journal of oral and maxillofacial surgery*. 2008;66(6):1320-1. <https://doi.org/10.1016/j.joms.2008.01.054>
  19. Mishra SK, Rao SB, Chowdhary R, Patil P. Full-mouth rehabilitation of a patient with severely worn dentition for function and esthetics. *Journal of Indian Academy of Dental Specialist Researchers* | Vol. 2016;3(1):30. <https://doi.org/10.4103/2229-3019.192470>
  20. Doh RM, Park W, Kim KD, Jung BY. Preservation of Hypermobile Teeth by Establishing Posterior Occlusal Support Using Implant Prostheses: A 5-Year Follow-Up. *Journal of Prosthodontics*. 2015;24(6):499-505. <https://doi.org/10.1111/jopr.12241>