Case report
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# Full Mouth Reconstruction of a Patient with Severely Worn Dentition: A Clinical Report

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**Abstract**

If remained untreated, progressive dental wear can lead to pulpal pathology, occlusal disharmony, and impaired function and esthetics. This case report describes prosthetic rehabilitation of a 53 year-old man with the loss of anterior guidance, severe wear of dentition and vertical dimension loss. Oral rehabilitation was performed by reconstruction of vertical dimension, crown lengthening, conventional implants, and custom cast gold post and cores as well as porcelain fused to metal restorations. Full mouth reconstruction of the patient with severely worn dentition was found to be successful after 4 years of follow up.

**Keywords:** mouth rehabilitation, tooth wear, vertical dimension

## Introduction

Prosthetic rehabilitation of excessive teeth wear using fixed prostheses is among the most difficult cases to restore and needs comprehensive evaluation of oral conditions. Using dental implants in bruxer patients is generally considered a contraindication but the evidence for this is usually based on clinical experience only (1). The precautions of using implants in the restoration of a patient with parafunctional habits are consisted of using of wide diameter implant, two stage surgery, avoiding early loading and cantilevers. Application of bite guard during nocturnal bruxism is advisable (2-4).

This clinical report describes the prosthetic rehabilitation a patient with severely worn dentition with tooth/implant supported fixed prosthesis who was clinically monitored to evaluate the adaptation to the removable occlusal overlay splint provisional restorations for 3 months and then definitive treatment with endodontic and periodontal procedures and definitive prosthetic phase. Patient was not

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reported any complications after 4-year follow up of treatment.

**Case Report**

A 53-year-old man was referred to the Department of Prosthodontics, Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran for replacement of his missing teeth. Examination of medical and dental histories revealed that he was in a good general health, and no contraindications for dental treatments were found. Clinical and radiographic examinations revealed severe tooth surface loss on the maxillary anterior teeth and to some degree on the mandibular anterior teeth. Other teeth had drifted into edentulous areas (Figures 1 and 2). There were not any signs and symptoms in TMJ examination, but the patient reported some parafunctional habits. A remaining root of mandibular left first premolar was observed.

**Diagnostic procedure**

Our diagnosis includes attrition of anterior teeth, perhaps resulting from inadequate posterior occlusal stop and parafunctional habits. During the periodontal examination, oral hygiene was fair, there was no bleeding on probing and the protype of gingiva was thick. During the assessment of VDO, vertical dimension of physiologic rest position was determined by physical measurement and phonetics. The interocclusal distance (VDR-VDO) was determined to be 3mm. Some more space in the anterior region was regained for restoration by guiding the mandible into centric relation position (CRP). The diagnostic casts were made after alginate impressions. For accomplishing interocclusal record, anterior deprograming device was fabricated and mandible was guided into centric relation by Dowson's bimanual manipulation technique by means of baseplate wax supported by the acrylic base plate in the posterior region. CR record was confirmed by small amounts of ZOE paste on the wax over each indented area, and the mandible was guided aging to CR. Using this record and an arbitrary facebow (Denar Mark II), the casts were mounted on a semi-adjustable articulator (Denar D5A Series). The incisal pin was adjusted for a 1 mm opening (according to VD analysis). After a primary wax-up, the interim overlay occlusal splint was fabricated at this new VDO in order to relax the masticatory muscles (Figure 3). The patient was instructed to use these prostheses for 3 months to check the proposed vertical dimension. After 3 months the patient was satisfied with this new VDO without any signs and/or symptoms.

After casts' duplication, they were mounted on a semi-adjustable articulator by means of interocclusal records in centric relation. Then condylar guidance of the articulator was determined according to protrusive record. Occlusal plane orientation was determined by a Broadrick occlusal plane analyzer (Figure 3). A diagnostic waxing of this plane revealed that the right and left mandibular second molars were above the ideal plan and the space for replacement of the left maxillary first premolar and molars were insufficient. The width to length ratio in the maxillary incisors was 3:2 instead of ideal 4:5. It was suggested that this ratio was inappropriate esthetically (Figure 3) (5).

According to PDI classification for partial edentulism, the patient was classified as class IV (6). Therefore, the aim of treatment plan was to improve patient's occlusion, to restore masticatory function, and improve patient's appearance. Intended treatment plan was discussed with the patient, including root canal therapy (RCT) of the right maxillary central incisor, lateral incisor and canine and the right mandibular second premolar, extraction of the maxillary left lateral incisor (because of iatrogenic perforation in RCT) and mandibular left first premolar, crown lengthening of

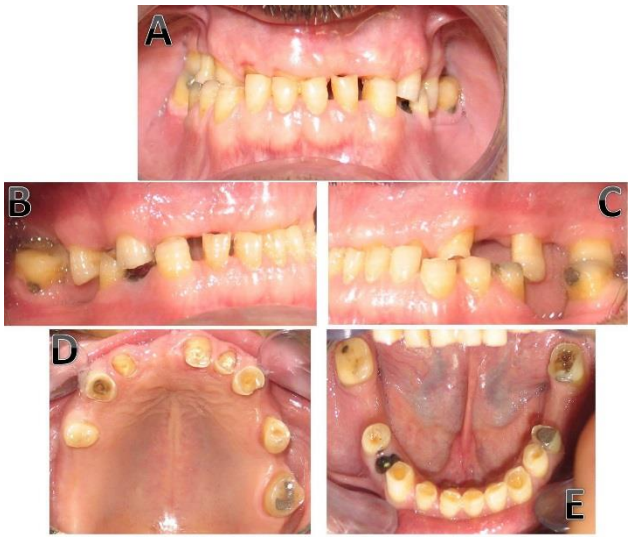


**Figure 1:** Intra-oral photographs of worn before treatment: **A,** frontal view, **B,** left lateral view, **C,** right lateral view, **D,** maxillary occlusal view, and **E,** mandibular occlusal view

maxillary incisors, posterior right maxillary teeth and mandibular incisors

Because of economic problems of the patient the implant insertion were done only in the upper jaw (left first molar and right first premolar)(Figure 4) and in order to solve the complications related to pier abutment in prosthetic treatment (Metal ceramic restoration) we use non-rigid connector in posterior left quadrant.

**Endodontic and Periodontal Procedures and Restoration of Teeth**

After completion of RCTs, mandibular incisors were prepared for laminate veneer with using of the diagnostic wax up index (MDT Laminate kit, Israel); the interim prosthesis were fabricated with composite and cemented. After fabrication of maxillary anterior custom gold post and cores, their preparation was performed (Figure 4). During the healing phase of implants, crown lengthening phase (in mandibular anterior segment and maxillary anterior and right posterior segment) was done using a vacuum shell guide fabricated according to diagnostic wax up (Figure 4). Regarding to the iatrogenic perforation of the upper left lateral incisor we decide to extract this tooth and prepare the ovate pontic into the extraction site for creating a good gingival counter.

Margins of the interim restorations were refined after two weeks. Custom-cast gold post and core was fabricated for lower right second premolar. The preparation of mandibular posterior teeth was done. For correction of the occlusal plan, the preparation of these teeth was performed according to putty index obtained from the diagnostic wax up.

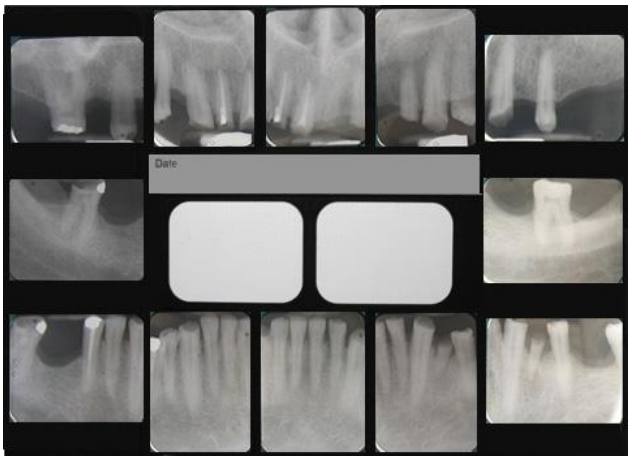

**Figure 2:** Periapical radiographs before treatment

After healing period of conventional dental implants, the dental implants were ready for loading. According to the ideal occlusal plan and wax up index, we selected the temporary abutments (ITI, SynOcta post for temporary restoration, In-stitut Straumann AG, Waldenburg, Switzerland) with appropriate height. The finishing line for the posterior teeth of upper jaw was chamfer. After completion of preparations, condensational silicone impressions (Speedex, Coltene AG, Switzerland) for interim prosthesis were made [with application of impression coping]. Facebow and interocclusal records were used to mounting the casts on articulator. New laboratory-processed interim prosthesis were fabricated


**Figure 3:** Diagnostic procedures. **A,** diagnostic occlusal splint, **B,** occlusal splint in mouth, **C,** occlusal plan evaluation (broadrick method), **D,** diagnostic wax up

and delivered (Figure 4). During adjustment of the temporary restorations we established canine protected articulation bilaterally. For fabrication of customized anterior guide table, alginate impressions were taken from temporary prosthesis and stone casts were mounted on articulator and extrusive movements were recorded on duralay acrylic resin.

**Final Rehabilitation of Missing Teeth**

Process was continued with completion of teeth preparation. Heavy and light body additional silicone impression material (Coltene, Whaledent, Switzerland) were used for final impression for teeth and implants, and interocclusal records were taken (CR record by guiding the mandible using bimanual manipulation and anterior deprogramming device) and utilized for mounting the casts on the articulator.

For better contouring the final restorations, a full contour wax up was accomplished (Figure 5). A non-rigid connector was inserted in the distal of pier abutment (the left mandibular second premolar) (Figure 5). After the cut back procedure, the metal frameworks were fabricated and evaluated intraorally and radiographialy (Figure 5). The laminate veneers of mandibular anterior teeth were cemented (Panavia F 2.0, Kurary, Osaka, Japan) and adjusted and after that we took a pick-up impression of the metal frameworks (Figure 5). Porcelain was applied to complete the crowns. Anterior guide table was utilized to from the lingual contours of the upper incisors. The metal ceramic restorations were cemented with provisional cement. For preventing

previous parafunctional occlusal wear a hard acrylic resin occlusal splint was

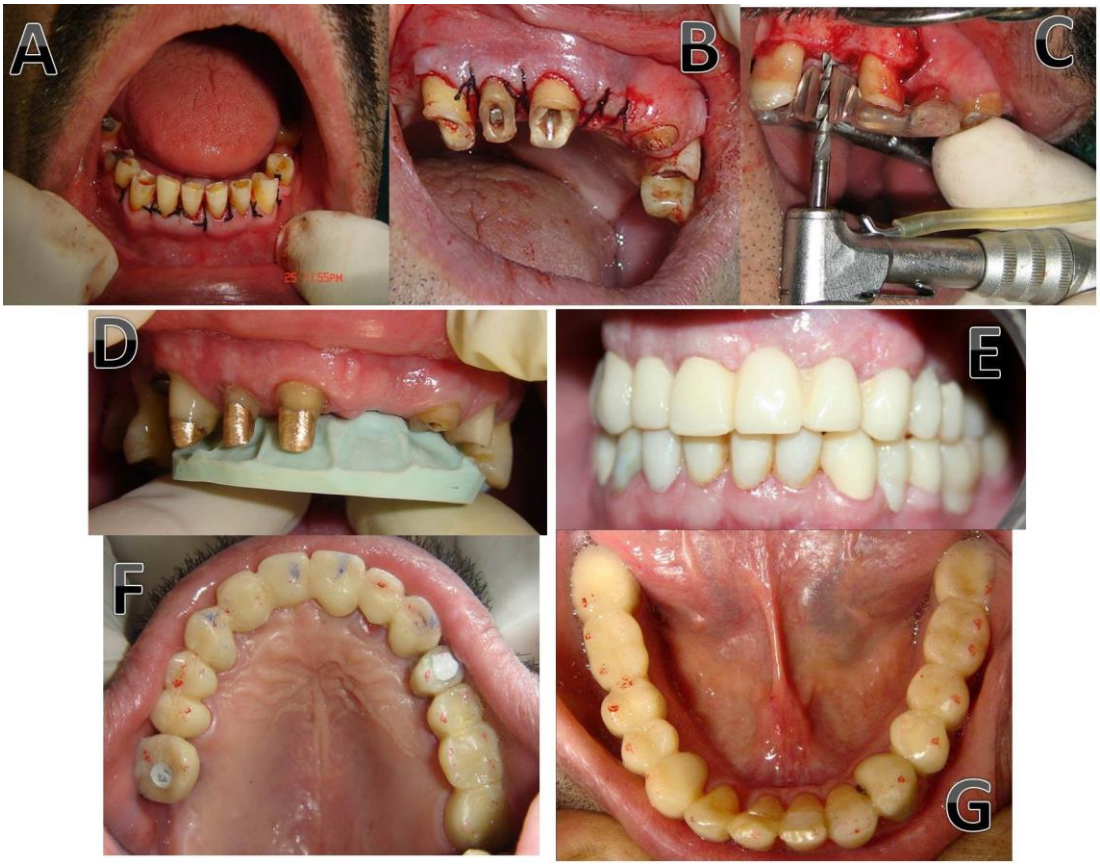


**Figure 4:** Clinical procedures, **A,** implant insertion surgery, **B,** Crown lengthening procedure, **C,** Crown lengthening procedure, **D,** Post fabrication with index, **E,** Frontal view of the interim prosthesis, **F,** maxillary interim prostheses, **G,** mandibular interim prostheses

fabricated for nocturnal use (Figure 5). The supplemental adjustments were done at three post insertion visits. After one month the temporary cement was replaced with polycarboxylate cement. Patient was followed-up for 6-month and 4-year intervals. During short- and long-term intervals there was not any signs and symptoms of TMD complications and no fractures in the teeth or restorations and no decementation was seen (Figure 5).

## Discussion

Excessive worn dentition has been classified according to the VD loss amount and restoration space (7). Erosion, attrition, abrasion, and abfraction are different types of tooth surface loss (8). It is essential to diagnose probable causes of tooth wear before beginning of any restoration processes. In this patient, posterior bite collapse and nocturnal clenching were the associated factors. For this, prosthetic rehabilitation was performed by means of tooth/implant supported FPDs of anterior and posterior regions after confirmation of reconstructed VDO by overlays during 3-months (9-11).

Prosthetic rehabilitation was established after required RCTs and crown lengthening. Implant insertion was performed only in upper left first molar and right first premolar because of financial constraints. Other edentulous areas were planned to be constructed by tooth-supported FDPs. After fabrication of custom gold Dowel and cores temporary prosthesis were delivered. Final impression was done and final metal-ceramic restorations were

delivered. Because of previous history of teeth wear, a night-guard was fabricated and patient was administrated to use it. The patient was followed for about 4 years and no evidence of fractures in the teeth or metal ceramic restorations and tempromandibular joint problems were seen.


**Figure 5:** Final restorative procedures, **A,** Full counter wax-up for final restorations, **B,** Non-rigid connector, **C,** anterior laminates, **D,** frame-work try-in, **E,** porcelain try-in, **F,** frontal view of the completed treatment with MCRs **G,** maxillary final prostheses, **H,** mandibular final prostheses

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