Full-Mouth Rehabilitation of Severely Worn Dentition: A case report

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ABSTRACT

Aesthetic and functional restoration of severely worn dentition presents a significant clinical challenge. One of the most demanding aspects of such cases involves the development of sufficient restorative space, while simultaneously fulfilling aesthetic, occlusal, and functional parameters essential to long-term success. This paper focuses on the fixed prosthetic treatment options for such patients and the utilisation of fixed restorations to create inter-occlusal space.

INTRODUCTION

Tooth wear is a potential threat for dentition and masticatory function. Many factors may combine to produce the worn dentition and the etiology often remains unidentified. Tooth-to-tooth friction causes the form of wear called attrition. Occlusal and incisal attrition can occur during deglutition and clenching. However, wear becomes more severe during bruxism, as evidenced by the advanced and often rapid wear of the teeth seen in this condition . Clinical signs are matching wear on occluding surfaces, shiny facets on amalgam contacts, enamel and dentin wear and possible fracture of cusps or restorations. Bruxism causes attrition and can be understood as a common parafunctional activity that includes tooth grinding or clenching. It can occur without any signs and symptoms, but may become problematic when contributing to increased tooth wear and pain .

Although some of the individual mechanisms of dental wear may act independently, combined mechanisms occur frequently during the dynamics of interocclusal activity. This process may lead to a loss of vertical dimension. Irrespective of the causes, the effects of tooth wear are multiple and include altering the vertical dimension of occlusion, muscle pain and spasm and temporomandibular joint (TMJ) pain and dysfunction 8. Depending on the degree of tooth wear, restorative treatment can range from placement of bonded composites in a few isolated areas of corrosion, to full mouth reconstruction using cast metal/metal ceramic restorations in case of a devastated dentition.

CASE REPORT

Examination

A 52-year-old man, a police officer by profession posted at crime branch, was referred to the Department of Prosthodontics at Saraswati Dental College & Hospital, Lucknow, for prosthodontic treatment. The patient's chief complaint was poor appearance due to worn out teeth and he wanted restoration of the same. An initial evaluation of the patient indicated a history of occupation related stress leading to parafunctional habits of bruxism and clenching. The patient's occlusion was clinically evaluated and a decreased vertical dimension, secondary to bruxism was diagnosed. Oral hygiene was fair and there were no signs of periodontal affliction. Clinical and radiographic examinations and diagnostic casts revealed severe attrition resulting in reduced clinical crown length specially which was more pronounced in anterior teeth.

TREATMENT STRATEGY

After determining the etiologic factors, a multiphase treatment protocol was planned as follows:

PHASE 1:

- Initial education and motivation of the patient.
- Psychological counseling.
- Comprehensive oral evaluation.
- Pre-treatment photo series.

PHASE 2:

- Periodontal prophylaxis and maintenance.
- Oral hygiene instruction.
- Crown lengthening.

PHASE 3:

- Impressions.
- Jaw relation recording.
- Occlusal splint at 2mm increased vertical dimension.
- Mock wax-up at increased vertical dimension.

PHASE 4:

- Tooth preparations.
- Impressions.
- Jaw relation recording.
- Provisionalization.

PHASE 5:

- Definitive restorations.

FIG 1: Pre-op intraoral

FIG 2: Gingivectomy by electro-cauterization

PHASE 6:

- Post operative follow up.

ACTIVE CLINICAL TREATMENT:

PHASE 1:

After appropriate data were gathered, the initial phase of treatment began with patient education and motivation in which patient was educated about the cause of the defect leading to his present oral condition and treatment plan to correct the same.

Psychological counseling of the patient was arranged with a professional counselor who suggested him to change his job profile from apprehending criminals to a routine administrative desk job. This would help in limiting the occupation related stress which was thought to be the main reason behind bruxism and clenching in the present case.

PHASE 2

Crown lengthening-

On clinical evaluation it was found that the clinical crown height was compromised due to tooth wear. We had two options, either to perform endodontic treatment of vital non-infected worn teeth and fabricate custom cast gold posts and cores, or, to achieve required clinical crown height using crown lengthening procedure. We opted for the latter as it was a more conservative approach as it preserved the vitality of the involved teeth.

After oral prophylaxis, crown lengthening from 14 to 24 and 34 to 44 (FDI nomenclature) of about 3mm was done by gingivectomy using electro-cauterization. Bone was not involved as enough soft tissue was available to achieve the required clinical crown height. Patient was recalled after 21 days for post operative evaluation of clinical crown height thus achieved.

PHASE 3

Occlusal splint

According to Kirveskari, et al.10 (1989), there is an association between occlusal interferences and signs of craniomandibular dysfunction. As prosthetic rehabilitation aims at fulfilling optimal occlusal parameters, this situation cannot be postponed. Additionally, the lack of space in patients with reduced vertical dimension of occlusion makes any rehabilitation therapy impossible to be performed. In these situations, some authors have recommended occlusal splints as an efficient treatment approach 11. A maxillary occlusal splint was fabricated enabling jaw position in centric relation of occlusion (CRO), occlusal stability and anterior guidance , and reestablishing vertical dimension.12 The occlusal splint was fabricated at 2mm increased vertical dimension (VDO) and was adjusted according to the parameters of an organic occlusion: the occlusal forces should be directed to the long axis of the posterior teeth and when posterior teeth occlude there should be no contact among maxillary and mandibular anterior teeth (vice-versa). The occlusal splint was used for 90 days, with monthly clinical review appointments.

Mock Wax-Up

Impressions were taken of maxillary and mandibular arches, the cast thus obtained were mounted on a semi adjustable articulator (J.O. Saurez) using jaw relations records: face bow and centric relation at 2mm increased vertical dimension, the articulator was programmed using protrusive and lateral wax bite records. Mock wax-up was completed on mounted cast at planned increased vertical dimension (2 mm), also the occlusal plane was maintained using custom made Broderick occlusal plane analyser attached to upper member of the articulator.

PHASE 4

Planning tooth preparations

Preparation of anterior teeth was planned first following which provisionalization was done using putty index of mock wax-up using additional silicone (Aquasil, Dentsply Caulk). The occlusal splint was modified by removing its anterior portion from canine to canine thus making space for newly cemented anterior provisional crowns. The modified splint was used to maintain vertical dimension (VDO) by providing positive posterior occlusal stop. Post cementation, anterior provisional restorations were evaluated for 1 week. After confirming that the anterior guidance thus established is comfortable to patient and in harmony with functional movements, preparations and provisionalizations of posterior teeth were completed segment wise. Occlusion was equilibrated according to organic occlusion using the Dawson method. Patient's occlusion and comfort was evaluated every week for next 3 weeks. When provisional restorations given to the patient at planned increased vertical dimension were accepted as comfortable both esthetically and functionally by the patient, impressions of maxillary and mandibular arch with cemented provisional crowns were taken. Casts thus obtained were used for developing the custom incisal guide table. Also the putty indexes of casts were taken which will guide in developing form and contour of definitive metal ceramic restorations (crowns).

PHASE 5

Definitive restorations

Mandibular Anterior Teeth:

Impression of prepared mandibular anterior teeth was taken using additional silicone impression material

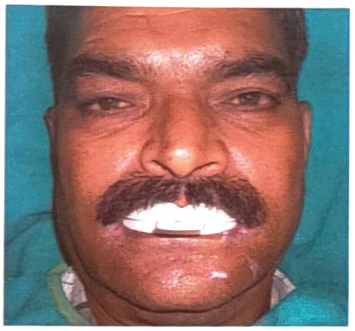
(Aquasil,Dentsply Caulk) by dual stage impression technique. The cast thus obtained was articulated on semiadjustable articulator (J.O. Saurez) against the positive replica of cemented maxillary provisional restoration using face bow record and other jaw relation records: CR, protrusive & lateral records. Putty indexes of mandibular anterior provisionals were used for establishing same contours as given in provisional restoration. The mandibular anterior crowns thus fabricated were temporarily cemented using IRM (Dentsply Caulk) and evaluated for functional harmony, esthetics and comfort following which they were permanently cemented using GIC luting cement(GC Corp. Tokyo, Japan).

Maxillary Anterior Teeth:

Impression of prepared maxillary anterior teeth was taken using additional silicone impression material (Aquasil, Dentsply Caulk) by dual stage impression technique. Impression of mandibular teeth with cemented permanent anterior crowns was taken using additional silicone impression material (Aquasil, Dentsply Caulk). Cast thus obtained were articulated on semiadjustable articulator (J.O. Saurez) using face bow record and other jaw relation records : CR, Protrusive & Lateral records. Putty index of maxillary anterior provisional restoration was used as a guide to give contours to the metal ceramic crowns. Palatal inclines which dictate the incisal guidance was achieved using customized incisal guide table and putty index of cemented provisionals . The maxillary anterior crowns thus fabricated were temporarily cemented using IRM (Dentsply Caulk) and evaluated for esthetics, functional harmony and comfort following which they were permanently cemented using GIC luting cements (GC Corp.Tokyo Japan).

DEFINITIVE PROSTHESIS FOR POSTERIOR TEETH:

To reduce chances of failure due to increased occlusal load as the patient was a known bruxer, cast metal crowns



Jaw relation records and programming of articulators

FIG 3: Provisionals completed

FIG 13: Definitive anterior prosthesis

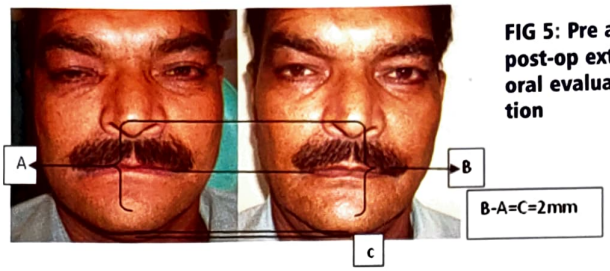


FIG 5: Pre and post-op extra-oral evaluation

FIG 6: Post-op extraoral

with buccal veneer in ceramic were planned for all posterior teeth except for first premolars, on which full ceramic coverage of metal was planned (as they came in the zone of esthetics). The posterior teeth were restored segment wise, first completing one side and then the other. Impression of prepared posterior teeth was taken using additional silicone impression material (Aquasil,Dentsply Caulk) by dual stage impression technique. Face bow record was taken to aid mounting of maxillary cast on semi adjustable articulator. The counter cast was mounted by the help of centric relation record taken using poly bite tray (DENTAMERICA) and poly ether impression material (3M ESPE). Articulator was programmed using protrusive and lateral records taken by wax bite method. Putty indexes of provisional restorations were used to give contours to the definitive prosthesis. The crowns thus fabricated were first cemented using temporary cement using IRM (Dentsply Caulk) and evaluated. Occlusal equilibration was done using Dawson technique . Also features of organic occlusion were confirmed following which the crowns were permanently cemented using GIC luting cement (GC Corp.Tokyo Japan). A maxillary occlusal splint was fabricated for protecting the restorations from patient's parafunction.

PHASE 6

EVALUATION & PATIENT FOLLOW-UP

We were successful in counseling the patient to change his job profile. The patient was asked to attend a scheduled post treatment follow-up to assess the effects of the parafunctional habit by evaluating the restorations for signs like de-cementation of restoration and fracture of ceramic. Also, it was assured that the occlusal parameters are maintained in correct form and function and whether the severity of bruxism had reduced or not.

CONCLUSION

In the treatment of severely worn teeth, equal-intensity centric occlusal contacts on all teeth should be accomplished. An anterior guidance should also be established in harmony with normal functional jaw movements and all posterior teeth discluded immediately during any eccentric jaw movement. Taking the guidance into account during provisionalization ensures minimal adjustment in the definitive restorations and a greater long term predictability of the case. If there is habitual bruxism, an occlusal splint should be delivered to the patient. Also, psychological counseling is of cardinal value in ensuring positive treatment prognosis.

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