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CASE REPORT

Full Mouth Rehabilitation using Hobo Twin-stage Technique

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ABSTRACT

The present case report discusses the case of full mouth rehabilitation using Hobo twin-stage occlusal philosophy. Diagnostic maxillary and mandibular impressions were made and articulated using HANAU wide-Vue semiadjustable articulator. Diagnostic wax-up was done according to conditions 1 and 2 of Hobo's twin-stage procedure followed by full mouth rehabilitation with porcelain-fused-to–metal (PFM) full-coverage fixed restorations at an acceptably restored vertical dimension of occlusion (VDO). The treatment goal was to achieve functional and esthetic harmony within the stomatognathic system.

Keywords: Disocclusion, Full mouth rehabilitation, Hobo technique, Twin stage.

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INTRODUCTION

Achieving harmony between esthetic and function in full mouth rehabilitation is a challenging procedure. The problem may get worsened if the restorative space is limited as in the case of mutilated dentition. Meticulous treatment planning with a multidisciplinary approach is needed to achieve the successful outcomes. The most critical factor in the success of full mouth rehabilitation is stable occlusion and orthopedically stable temporomandibular joints (TMJs). So, the prosthetic treatment phase should be performed with the extreme care to achieve the desired outcomes.[1,2]

The most widely used classification system for mutilated dentition was given by Turner and Missirlian.[3] They classified the patients requiring full mouth rehabilitation into three categories:

1. Excessive occlusal wear with loss of vertical dimension, but with space available to restore the vertical height.
2. Excessive wear without loss of VDO, but space available.
3. Excessive wear without loss of VDO, but with limited space.

Over the years, various occlusal concepts have been proposed by different authors. All of these concepts have some advantages as well as disadvantages. The two most popular concepts are Pankey Mann Schuyler philosophy and the Hobo twin-stage technique.

This clinical case report describes a case of full mouth rehabilitation of a severely worn out dentition managed by the twin-stage procedure to produce definite esthetic and occlusal schemes favorable for the patient.

CASE REPORT

A 52-year-old male patient reported to the Department of Prosthodontics, Modern Dental College & Research Centre, Indore, India, with a chief complaint of multiple worn-out upper and lower teeth and difficulty in mastication. Patient was also dissatisfied with his unesthetic appearance. Medical history revealed that the patient was apparently healthy without any systemic complications.

The patient's dental history revealed that he was a glass chewer and he claimed this as a reason for his mutilated dentition. The TMJ was free of any sign and symptoms of derangement on clinical examination.

CLINICAL FINDINGS

Extraoral Examination

Patient had bilaterally symmetrical face with no gross facial asymmetry (Fig. 1). The examination of muscles of mastication and TMJ did not reveal any signs of pathology. Mandibular movements were within the range of normal motions.

Fig. 1: Extraoral view of the patient

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Fig. 2: Intraoral view of the patient

Fig. 3: Occlusion of the patient

Intraoral Examination

Clinical examination revealed severe attrition and abrasion involving multiple maxillary and mandibular teeth. The teeth in the maxillary arch prone to pulpal exposure were 11, 12, 13, 14, 15, 21, 22, 24, and 25. The mandibular arch was fully dentate and the root stump with 26 was present (Fig. 2). Soft tissue examination showed no inflammation or any pathology. Drifting of maxillary and mandibular anterior teeth was present due to open contacts. Occlusal examination of the existing condition revealed moderate generalized attrition with loss of intercuspation (Fig. 3). Discrepancy was also noted between centric relation and maximum intercuspal position. Orthopantomogram (OPG) of the patient further confirmed these findings (Fig. 4).

Objectives of Rehabilitation

- To rehabilitate the entire mutilated dentition in harmony with stomatognathic system
- To establish harmony between esthetic and function
- Canine-guided disocclusion on lateral excursions and mutually protected occlusion anteroposteriorly

TREATMENT PROCEDURE

- Diagnostic maxillary and mandibular impressions were made with irreversible hydrocolloid impression material and casts were retrieved.
- For diagnostic mounting, maxillary cast was articulated on HANAU wide-Vue articulator using an earpiece facebow (Hanau Springbow), and the mandibular cast was articulated in centric relation using Lucia jig and interocclusal records. The discrepancy between VDO and rest position was 7 mm, and no restorative space was present. So, restoration of vertical dimension was needed to achieve the restorative space (Fig. 4).
- Maxillary-based permissive occlusal splint was fabricated at restored vertical dimension. The permissive occlusal splint at centric relation position for 6 weeks was given to determine acceptability of proposed change in occlusal scheme.

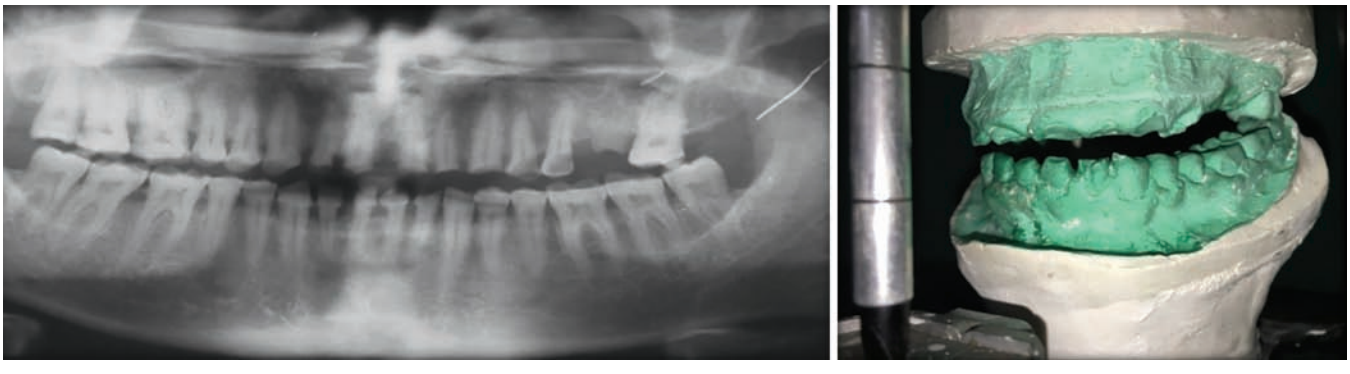

Fig. 4: Orthopantomogram and diagnostic mounting on HANAU wide-Vue articulator

Fig. 5: After root canal, post and core and extraction treatment

Fig. 6: Die sectioning and mounting on HANAU wide-Vue articulator

- Root canal treatment was carried out with 11, 12, 13, 14, 15, 21, 22, 23, 24, and 25 as they were prone to pulpal exposure. Since the patient had moderate loss of tooth structure, post and core treatment was carried out with 11, 12, 21, 22, 23, 24, and 25 (Fig. 5).
- After completion of post and core treatment, occlusal equilibration was done in the patient's mouth by removing the occlusal interferences so that centric relation coincides with maximum intercuspal position before starting the procedure.
- Facebow and centric relation record was once again made and the casts were articulated on HANAU wide-Vue articulator.
- Diagnostic wax-up was done at restored vertical dimension to predict the final outcomes. Mandibular occlusal plane was analyzed using Broadrick occlusal plane analyzer. The articulator was programmed to condition 1 of Hobo's twin-stage procedure (Table 1), wherein the posterior segment wax mockup was done in bilaterally balanced occlusion after removal of the maxillary anterior segment. The settings were changed to condition 2 where the maxillary anterior segment was replaced and the anterior wax-up was completed and checked for proper anterior guidance to achieve disocclusion in eccentric movements. The putty index of this diagnostic wax-up was made to fabricate provisional restorations (Figs 6 and 7).
- The tooth preparation for PFM restorations of maxillary and mandibular arches was carried out simultaneously. A final full-arch impression for maxillary

Table 1: Values of conditions 1 and 2 according to Hobo twin-stage technique (values in degrees)

	Horizontal condylar guidance	*Lateral condylar guidance*	*Anterior guidance*	*Lateral anterior guidance*
Condition 1	25	15	25	10
Condition 2	40	15	45	20

Fig. 7: Diagnostic wax-up used according to values of conditions 1 and 2

Fig. 8: Tooth preparations for PFM restorations

Fig. 9: Provisional restorations

Fig. 10: Mounted final casts at established vertical dimension

Fig. 11: Fabrication of posterior restorations

and mandibular teeth was made using polyvinyl siloxane impression material with double-mix two-stage putty wash impression technique, and casts were poured in die stone. Individual die preparation of all the prepared teeth was carried out. Tooth-colored acrylic temporary restorations were fabricated with the help of putty index, which was made from the diagnostic wax-up. The provisional restorations were cemented using noneugenol zinc oxide cement and the necessary occlusal adjustments were carried out in the provisional restorations to achieve the desired occlusion in antero-posterior and lateral excursions (Figs 8 and 9).

- Final casts were mounted on HANAU articulator using centric interocclusal record at previously determined restored vertical dimension (Fig. 10).
- Articulator was programmed to condition 1 without anterior segment for fabrication of PFM final restorations of bilateral posterior segments. Bisque trial followed by metal trial were done for posterior teeth and necessary corrections were carried out (Fig. 11).
- After completing fabrication of posterior restorations, the articulator was programmed to condition 2 with anterior segment, and final anterior restorations were fabricated in a similar way as posteriors. The anterior teeth were fabricated in such a way that they produce canine-guided disocclusion in lateral excursions and the standard amount of disocclusion of posteriors was also produced during protrusion (Fig. 12).

Fig. 12: Fabrication of anterior restorations

- Occlusal adjustments and equilibration were carried out intraorally. Permanent restorations were cemented with glass ionomer type I luting cement and oral hygiene instructions were given to the patient. Night guard was given to the patient as a preventive treatment modality (Fig. 13).

DISCUSSION

Rehabilitation of occlusal form and function is the primary goal of full mouth rehabilitation. Thorough examination,

Fig. 13: Cementation of final restorations

diagnosis, and choice of appropriate occlusal scheme are the key to successful prosthodontic rehabilitation.[4]

The vertical dimension can never be changed as the lost vertical dimension is compensated by continuous eruption of teeth and alveolar bone expansion.[5] The rationale behind altering the vertical dimension in this case was to gain restorative space.

The incorporation of posterior disocclusion avoids harmful lateral forces as suggested by Hobo. In the twin-stage procedure, as cusp angle was the main determinant of occlusion; the need to record condylar path was not necessary. Therefore, complicated instruments, such as the pantograph and fully adjustable articulators are not required. This procedure is much simpler than the standard gnathological procedure, yet it follows gnathological principles.[6]

Hobo and Takayama[7] studied the influence of condylar path, incisal path, and the cusp angle on the amount of disocclusion and concluded that cusp angle was the most reliable determinant of occlusion. The twin-stage procedure helps in achieving a standard disocclusion of 1.1 mm on protrusion, 1 mm on nonworking side, and 0.5 mm on working side in eccentric movements at 3-mm protrusion from centric relation.

However, if the sagittal condylar path of the patient is steeper than the articulator adjustment values (40°), disocclusion increases. If the path is less than 40°, then the amount of disocclusion decreases. If the patient has less than 16° sagittal condylar inclination (only about an 8% occurrence rate), cuspal interferences will occur. If the incisal path is more than 5° steeper than the condylar path, patients complain of discomfort.[8,9]

Abnormal curve of Spee and Wilson, abnormally rotated teeth, and inclined teeth are contraindications of this technique.[7]

CONCLUSION

The restoration of form, function, and esthetics in mutilated dentition is a demanding procedure and should be carried out only when absolutely indicated. Proper diagnosis and multidisciplinary treatment planning with adequate knowledge and judgement are paramount for success. The treatment should aim at restoring the occlusion to enhance mastication and improve the esthetic appearance. The present case report discussed the full mouth rehabilitation of worn out dentition with Hobo twin-stage philosophy of occlusal rehabilitation. The technique is relatively simpler and does not need any sophisticated armamentarium. This technique can be easily adopted by clinicians to achieve more predictable outcomes.

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