

Full Mouth Rehabilitation- A Prosthodontic Approach To Manage Mutilated Dentition- Case Report

Dr. Shabana Azmin¹, Dr. Prathi Venkat Karthik², Dr. Areeba Zainab Kakroo³
(Department Of Prosthodontics And Crown And Bridges, Institute Of Dental Studies And Technologies, India)

Abstract

Full mouth rehabilitation entails the performance of all the procedures necessary to produce a healthy, esthetic, well-functioning, self-maintaining masticatory mechanism. A single amalgam restoration or a successful periodontal treatment rehabilitates the mouth in one instance while extensive crowns & bridges do so in another. When the restorations and treatment include the entire occlusion, the procedure is referred as occlusal rehabilitation. Full mouth rehabilitation helps to correlate centric occlusion with the unstrained centric relation, to obtain the maximum distribution of occlusal stress in centric relation, to retain the vertical dimension of occlusion, to equalize the steepness of similar tooth inclines to distribute eccentric occlusal stresses evenly, to establish smooth guiding tooth inclines, and to reduce the steepness of inclines of guiding tooth surfaces so that occlusal stresses may be more favorably applied to the supporting tissues

Keyword: Full Mouth Rehabilitation, Zirconia, Broadrick's Occlusal Plane Analysers, Dental attrition

Date of Submission: 25-03-2024

Date of Acceptance: 05-04-2024

I. Introduction

Full mouth rehabilitation entails the performance of all the procedures necessary to produce a healthy, esthetic, well-functioning, self-maintaining masticatory mechanism. Full mouth rehabilitation cases are one of the most difficult cases to manage in dental practice. This is because such cases involve not only replacement of the lost tooth structure but also restoring the lost vertical dimensions. Full mouth reconstruction is basically a set of procedures that are aimed at correcting an improper bite position as well as restoring chipped or worn-out teeth.¹

The aim of FMR is to restore the tooth to its natural form, function and esthetics while maintaining the physiologic integrity in harmonious relationship with the adjacent hard and soft tissues, all of which enhance the oral health and welfare of the patient.³

1. Freedom from disease in all masticatory system structures
2. Maintainable healthy periodontium
3. Stable TMJs
4. Stable occlusion
5. Maintainable healthy teeth
6. Comfortable function
7. Optimum esthetics

Indications for full mouth rehabilitation

1. The restoration of multiple teeth which are missing, worn, broken down or decayed.
2. To replace improperly designed and executed crown and bridge framework.
3. Treatment of temporomandibular disorders is also advised, though caution is advised objectives of preliminary occlusal equilibration.⁴

Various philosophies in FMR

- I. Gnathological concept (McCollum, Stuart, Stallard)
- II. Freedom in centric concept (Schuyler)
- III. Simplified occlusal design (Wiskott and Belser)
- IV. Pankey, Mann and Schuyler philosophy (1960)
- V. Twin Table technique-Hobo (1991)
- VI. Twin stage Procedure- Hobo and Takayama
- VII. Youdelis scheme
- VIII. Nyman and Lindhe Scheme

Alteration of vertical dimension

The VDO refers to the vertical position of the mandible in relation to the maxilla when the upper and lower teeth are inter-cusped at the most closed position.

The gradual wear of the occlusal surfaces of teeth is considered normal due to aging. However, pathological and physiological wear of teeth, if not treated appropriately and at the right time, can lead to decreased occlusal vertical dimension and functional and esthetic problems such as reduced chewing efficiency and disharmonious occlusal plane, respectively.^{5,6,9}

The repetitive contracted length of the elevator muscles determines the vertical dimension of occlusion. Several techniques to determine the VDO are freeway space, Trail appliance, like splints RPDs and orthotics, TENS, Measurements using CEJ and the methods of facial proportion.⁸

Case report

A 65-year-old male patient named Jai-karan dixit reported to the department of prosthodontics and crown and bridges at institute of dental studies and technologies with chief complaint of missing teeth in upper front teeth region since last 2 years. The patient had a medical history of type 2 diabetes mellitus and dental history of uneventful extraction w.r.t 21.

On clinical examination the patient had missing 21, carious 15 and 36, grade II mobile 14, enamel abrasion w.r.t 11,22,23,24,25,26 and 27 due to habit of aggressive tooth brushing, generalised attrition, calculus++, stain++, supra-erupted 31,32,41,44, and generalised gingival inflammation(fig.1)

After initial evaluation, 14 was extracted because of poor prognosis due to localised periodontitis, oral prophylaxis was performed and a full mouth root canal treatment was planned due to severe generalised attrition.

After completing a full mouth root canal treatment, diagnostic impressions were made with irreversible hydrocolloid impression material (Tropicalgin, Zhermack, Badia Polesine, Italy) and poured in Type III dental stone (Kalstone, Kalabhai Pvt., Ltd., Mumbai, India) followed by facebow record and transfer (fig. 2). The vertical dimension of occlusion was evaluated and the obtained difference between VDO and VDR was 6mm, hence 3mm bite raise was planned leaving a freeway space of 3mm. Centric relation record was done with the help of lucia jig fabricated with tooth colored acrylic and bite registration was recorded with light body material (Zhermack, Occlufast rock) (fig. 4). An occlusion splint at the raised bite of 3mm was fabricated and the splint was worn by the patient for 3 weeks.

With the help of a customised broadrick's occlusal plane analyzer, the occlusal plane was determined followed by mockwax up at the raised vertical dimension (fig. 5 and 6). Firstly, mandibular posteriors (molars) on both sides were prepared and were temporised with PFM single crowns at a raised bite of 3mm using temporary luting cement (Type III, Class I, Dentsply Sirona) to check patients' comfort and adaptation at this increased vertical dimension of occlusion (fig. 7). After one-week mandibular anteriors and premolars were prepared and temporised on the same day using tooth colored self-cure acrylic by fabricating joint temporary crowns (fig. 8). On the next visit, one side of mandibular posterior temporary PFM crowns were removed followed by maxillary posterior teeth preparation on the same side of the arch and then lower posteriors were re-temporised and upper posteriors were temporised (Type III, Class I, Dentsply Sirona) with acrylic temporary crowns based on vertical dimension maintained on the other side. Like-wise the other side mandibular posterior temporary PFM crowns were removed followed by maxillary posterior teeth preparation and temporised (Type III, Class I, Dentsply Sirona) based on the established vertical dimension on the other side (fig. 9). After 10 days maxillary anteriors were prepared and temporised (Type III, Class I, Dentsply Sirona) with joint temporary crowns along with a cantilever w.r.t. 14 (fig. 10 and 11)

The patient was recalled after 2 months for final impressions, for which first the right maxillary and mandibular temporary crowns were removed and final impression was made with silicone-based impression material (WALDENT, FlexiDent, KOREA) (fig.12) and bite registration was done using Alu wax. Later on, left side maxillary and mandibular final impressions were made after luting the temporary crowns on right side with temporary luting agent (Type III, Class I, Dentsply Sirona).

Group function occlusion was planned for this case and metal try in was done separately on both side (fig. 13 and 14) The final posterior PFM joint crowns were cemented with permanent luting agent (GC Fuji I, GC CORPORATION TOKYO, JAPAN) (fig.15 and 16).

Next final impression for the maxillary and mandibular anteriors were made (WALDENT, FlexiDent, KOREA) (fig. 17) and customised occlusal guide table was fabricated on the basis of the provisional restorative cast (fig.18). Joint zirconia crowns for anterior teeth was fabricated with a cantilever on 14 and cemented (GC Fuji I, GC CORPORATION TOKYO, JAPAN) (fig.19 and 20). Occlusal interferences were checked with articulating paper and a group function occlusal scheme was established (fig.21, 22 and 23). The five principles of Pankey Mann Schuyler were followed for this case. The pre-op and post-op pictures of the patient is shown in (fig. 24).



Figure 1, Intraoral view

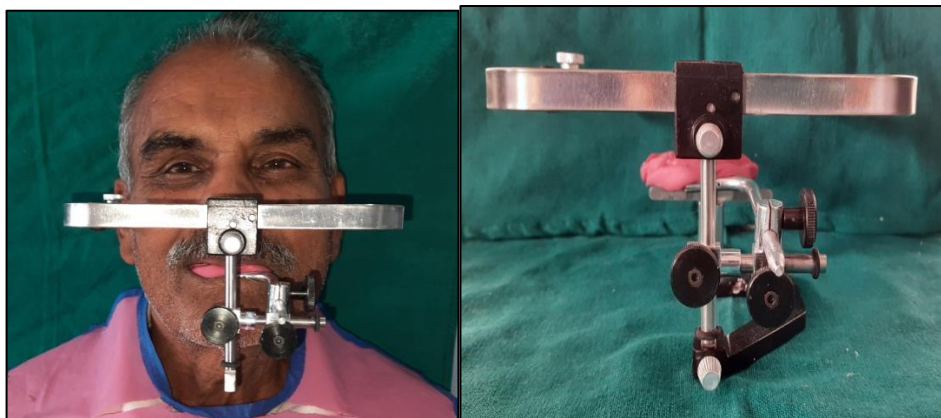
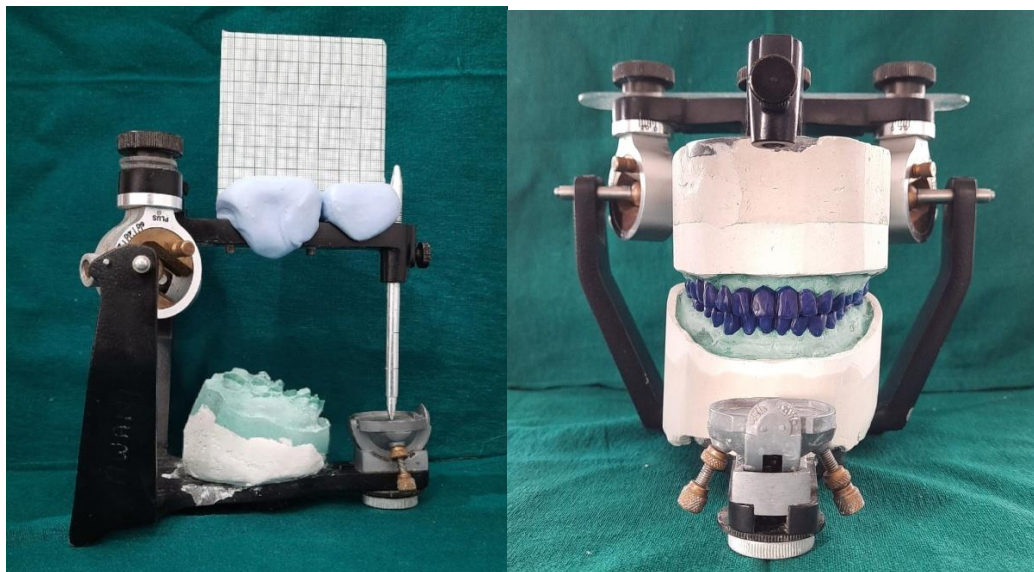


Figure 2, Facebow record

Figure 3, Facebow transfer clamp assembly



Figure 4, Centric relation record with customized lucia jig



**Figure 5, Occlusal Plane Determination Broadrick's Occlusal Plane Analysis
Figure 6, Mock Up At Increased Vertical Dimension**



Figure 7, Temporisation Of Molar Teeth With Pfm Crowns At 3mm Rised Bite



Figure8, Mandibular Anterior Teeth Preparation And Temporisation



Figure 9, Maxillary Posterior Teeth Preparation And Temporisation



Figure 10, Maxillary Anterior Teeth Preparation And Temporisation



Figure 11, Complete Temporisation



Figure 12, Posterior Final Impressions

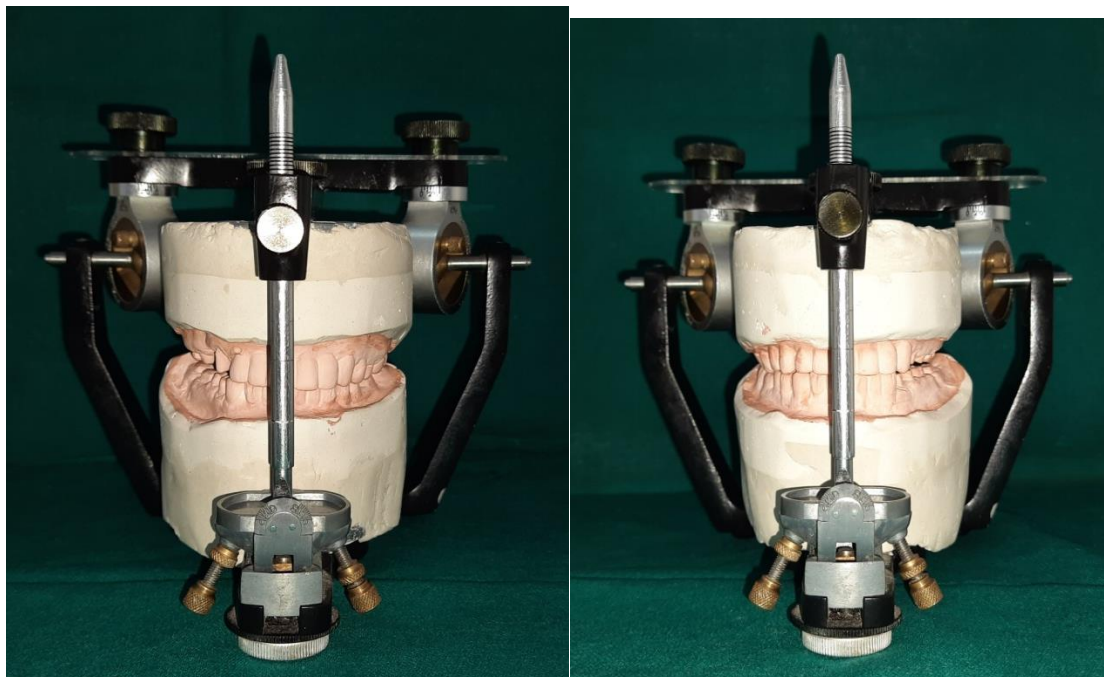


Figure 13, Mountings Of Master Casts For Posterior Crowns At Increased Vertical Dimension



Figure 14, Metal Try Infor Left And Right Posterior Crowns



**Figure 15, Maxillary Posterior Pfm Bridges Cemented (Left And Right)
Figure 16, Mandibular Posterior Pfm Bridges Cemented (Left And Right)**

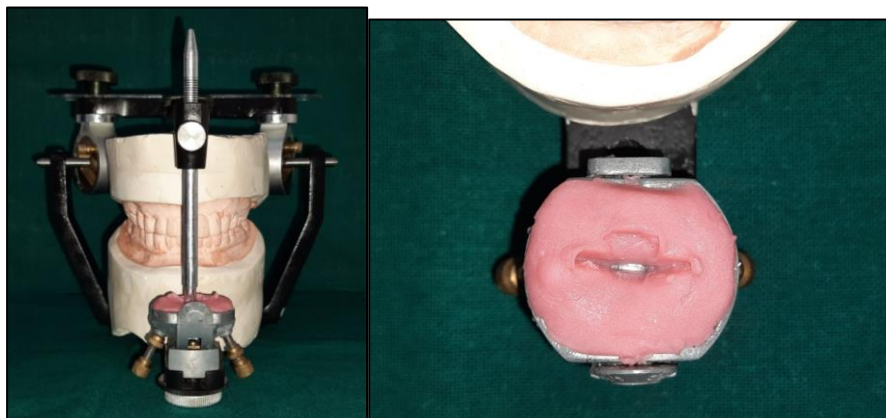


Figure 18, Customised Anterior Guide Table Based On Provisionals



Figure 19, Maxillary Anterior Zirconia Bridge Cemented
Figure 20, Mandibular Anterior Zirconia Bridge Cemented



Figure 21, Post Op View (In Protrusion)



Figure 22, Post Op View (Right & Left Laterotrusion)



Figure 23, Post Op View (In Centric Relation)

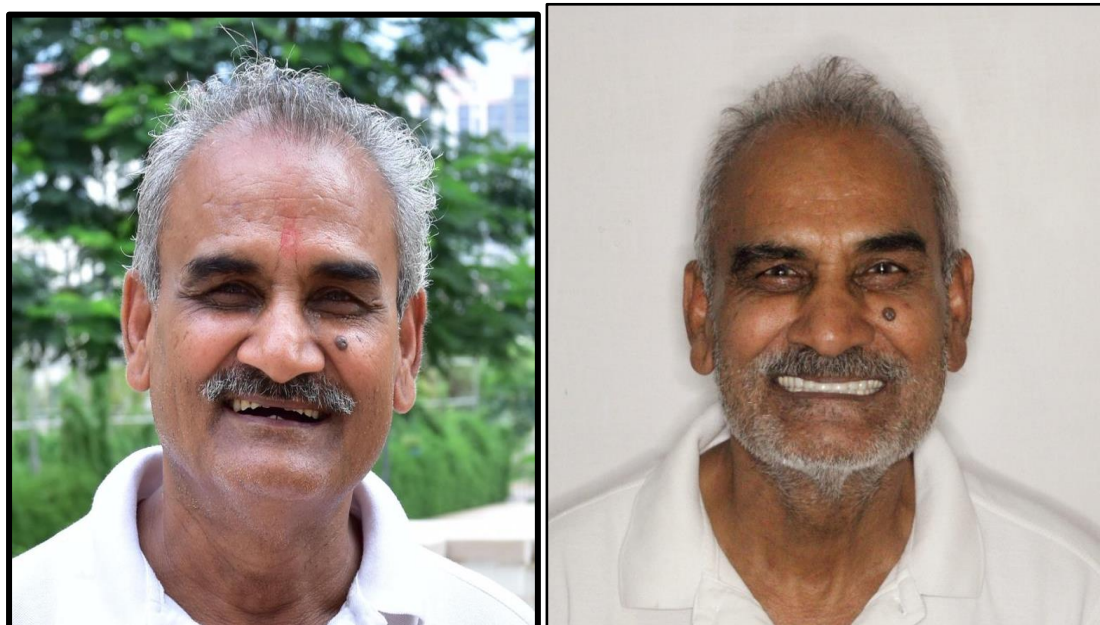


Figure 24, Pre-Op And Post Op Extra Oral View

II. Discussion

The patient in this report had a multitude of intraoral factors causing occlusal disharmony, such as carious teeth, enamel abrasion in several teeth, generalised attrition, calculus++, stain++, supra-erupted lower anterior teeth, generalised gingival inflammation, decreased overjet and overbite, edentulous area, and

insufficient OVD for dental prostheses. If uncorrected, these factors could magnify the stress, resulting in mechanical failure of prostheses or temporomandibular disorders (TMD). In 1984, Turner classified the treatment of a severely worn dentition by the amount of the loss of VDO and available space to restore. His classification and conventional treatment, which includes raising VDO with multiple crown-lengthening procedures, have been widely used up to present. However, the aetiology of tooth wear is multifactorial, and clinical controlled trials of restorative and prosthodontic approaches are limited in quantity and quality.^{1,2,3}

The trial period of occlusal splint was for a period of 3 week to evaluate the adaptation to the removable occlusal splint. Most occlusal splints have one primary function: to alter an occlusion so it doesn't interfere with complete seating of the condyles in centric relation. Occlusal splints are predictably effective if properly designed and accurately fabricated for certain specific problems that are related to occlusal factors. The splint should allow uniform, equal-intensity contacts of all teeth against a smooth splint surface when the joints are completely seated in centric relation. The splint should have an anterior guidance ramp angled as shallow as possible for horizontal freedom of mandibular movement. The splint should provide immediate disocclusion of all posterior teeth in all excursive jaw movements from centric relation. The splint should fit the arch comfortably and have good stable retention.^{5,6} Also the patient's adaptation to the provisional restoration was monitored for 2 months. The trial period is relatively shorter than the other case report, but discomfort, wear, and muscle fatigue were not observed during that period. Depending on the patient's situation and adaptation ability, the interim period can be modified, and the careful evaluation and monitoring may shorten the overall treatment duration.

In many cases, the vertical dimension of occlusion (VDO) is maintained by tooth eruption and alveolar bone growth. As teeth are worn, the alveolar bone undergoes an adaptive process and compensates for the loss of tooth structure to maintain the VDO. Therefore, VDO should be conservative and should not be changed without careful approach. Especially, increasing the VDO in bruxers puts a severe overload on the teeth and often results in the destruction of the restorations or teeth themselves. However, the rehabilitation of the severely worn dentition is challenging when the space for restoration is not sufficient. In this case, the vertical dimension of occlusion was evaluated and the difference between VDO and VDR was 6mm, hence 3mm bite raise was planned leaving a freeway space of 3mm. Group function occlusion was planned and PFM crowns were fabricated for maxillary and mandibular posteriors and joint zirconia crowns were designed for anterior teeth with a cantilever on 14 for maxillary anterior. Restoring a patient by quadrants has enormous practical advantages for both patient and clinician, since fewer appointments are necessary. Neither multiple aesthetic injections nor difficult full mouth impressions are required. Since the contra lateral part of the mouth guarantees a stable occlusion, patients feel comfortable throughout the whole active treatment phase up to the delivery of the final restorations. The patient was recalled for follow up after 3 weeks and then after 6 months. Patient had no complaints on the follow up visits and was satisfied with the treatment.

III. Conclusion

This case report describes the full mouth rehabilitation of a patient with severe attrition and abrasion rehabilitated with PFM crowns and monolithic zirconia crowns. The patient was satisfied with the prosthesis esthetically and functionally. Management of worn dentition using fixed or removable prostheses is complex and among the most difficult cases to restore. However, further studies and technological developments are required for validating occlusal treatment theories and modalities.

Conflict of interest: none

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