CASE REPORT

Renovating dental ruins – Hope for the hopeless dentition case report on complete tooth supported rehabilitation

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Abstract

Full mouth rehabilitation poses one of the greatest challenges in restorative dentistry as it involves replacement of the lost tooth structure and also restores the lost vertical dimension. The rehabilitation of occlusion improves the function, which enhances the esthetics and also restores the health of the masticatory system including temporomandibular joint. There are various theories, philosophies, and techniques to restore the occlusion with their specific advantages and limitations. Often the choice of the technique is left to the operator’s decision based on availability of resources and presenting conditions. The ultimate goal can be achieved through a scientifically proven approach with principles of rehabilitation underpinning the approach. Sometimes, various options and approaches leave the clinician bewildered. On the other hand, the non-specialists who attempt to rehabilitate can deteriorate the existing dentition in its form and function. This case report endeavors to propose a simplified functional rehabilitation of form and function without compromising on the science and philosophy of rehabilitation in a patient whose dentition is compromised.

Keywords:
Canine guided occlusion, fixed partial denture, full mouth rehabilitation, metal-ceramic restoration, restoring vertical dimension

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Introduction

The primary concern in full mouth rehabilitation (FMR) is maintaining the health of the supporting structures, along with restoring the function and aesthetics of the individuals. It is important to maintain the health of the stomatognathic system so that the teeth, muscles of mastication, ligaments, and temporomandibular joint (TMJ) all functions in a synchronous manner. A proper clinical examination with meticulous treatment planning will help in proper execution of the treatment. The foremost thing to be done in the examination is assessing the vertical dimension (VD) of the patient. Various classifications were present to categorize the patients requiring FMR based on the VD of occlusion (VDO) and amount of space available for restoration. Among the various classifications, Turner and Missirlian classification was the one which is most widely accepted.

There are various theories and philosophies used in restoring the FMR with specific advantages and limitations. The final approach should be scientifically proven and follow the guidelines for the rehabilitation.

Case Report

A 50-year-old male patient reported to the department of prosthodontics with a primary complaint of difficulty in chewing the food and not happy with the look of the teeth. Extraoral examination revealed loss of VDO with collapsed lower third of face. No symptoms of functional and traumatic limitations observed in TMJ and muscles of mastication. Intraoral examination revealed root canal treatment (RCT) done in relation to 46 and 23 with metal-ceramic crown in 46, restorative fillings in 17 and 48. There was a generalized attrition in relation to maxillary and mandibular teeth. Gingival recession was observed in relation to maxillary and mandibular anterior quadrants with generalized calculus deposits and dark colored stains. A mesially tilted 38 into the edentulous space of 37. Orthopantomogram revealed generalized wear of enamel surface of about 1 mm on maxillary and mandibular posterior quadrants. There was no significant bone loss [Figure 1].

Problems list

1. Collapse of VD
2. Deranged occlusion
3. Wear of enamel structure
4. Sensitivity of tooth during preparation- need for RCT
5. Restoration of the VD during the preparation
6. Mesially tilted 38.

**Diagnosis**
1. Category 1 of turner classification with excessive wear and loss of VDO
2. Generalized gingivitis with melanin pigmentation.

**Treatment objectives**
1. Restoring the form and esthetical appearance
2. Establishing the functional harmony.

**Treatment planning**
A simplified approach of occlusal rehabilitation by raising the VD by 2 mm and giving individual metal ceramic crowns in canine guided occlusion.

**Technique**
Oral prophylaxis was done and diagnostic impressions were made with irreversible hydrocolloid (Tropic Algin Zhermack Clinical, Badia polisine, Italy) and casts were poured with type-III stone (Pearlstone, Asian Chemicals, Gujarat, India). Face-bow transfer was done using ear-piece spring bow with impression compound (DPI) and those records were transferred to mount maxillary cast in semi-adjustable Hanau wide – vue articulator [Figure 2]. A customized anterior deprogramming device (Lucia jig) with impression compound (DPI Pinnacle, India) was used to obtain the centric relation and interocclusal records were made by injecting elastomeric bite registration material (3M ESPE Imprint bite, Germany) which was used to mount the mandibular cast in the articulator. Diagnostic wax-up was done with tooth colored wax (Maarc Pattern Wax) and proper occlusal relation was achieved in maximum intercuspation and canine-guided occlusion [Figure 3]. An index was made for the wax-up with addition silicone material (PhotoSil, DPI, Mumbai, India) which was used for fabrication of provisional restorations with autopolymerizing resin and also served as a guide for tooth preparation. A conservative approach of tooth preparation was chosen with chamfer finish line. The tooth preparation was performed on the maxillary and mandibular anterior segment followed by fabrication of provisional restorations using the index in indirect-direct technique [Figure 4]. These provisional restorations were cemented using zinc oxide eugenol. (DPI, India). The right and left maxillary and mandibular posterior segments were prepared and provisional restorations were fabricated by following the similar procedure. After 6 weeks, the provisional restorations were removed and interocclusal records were obtained. All the provisional restorations were removed and final impressions were made with elastomeric impression material. Casts were poured in type-IV stone and maxillary cast was mounted using the facebow transfer in articulator. The bite records were useful to mount mandibular casts and individual die cutting was done on both the casts. Metal copings were fabricated and tried in patient for marginal adaptation. Following that ceramic build-up was checked in patient for any occlusal interferences and verify canine guided occlusion. After glazing, final cementation was done with glass-ionomer cement (GC Corporation, Tokyo, Japan). Follow-up was done after 6 months with satisfactory results [Figures 5 and 6].

**Discussion**
The incremental wear of the tooth’s occlusal surfaces is a continual phenomenon that persists and happens in a patient’s life. Nonetheless, pulpal trauma can result from excessive occlusal
wear, occlusal disharmony, functional disability, and esthetics disfigurement. It is necessary, therefore to identify factors that lead to undue wear reducing the VDO. There are several etiological factors involved in excessive wear such as congenital, parafunctional occlusal habits, and erosion. Careful consideration of patient’s diet, eating habits, and gastric disorders of the patient, along with the latest occlusion state, is necessary for appropriate planning of treatment. The creation of adequate restorative space is one of the most challenging aspects of such cases, while at the same time full filling aesthetical, occlusal, and functional criteria necessary for long-term success.

There are various classifications that have been proposed for the patient requiring FMR, widely adopted was given by Turner and Missirlan. The most important aspect after assessing the VD is the maintenance of centric relation and centric occlusion.

Occlusal approaches and philosophies

There are two kinds of approaches followed for rehabilitation of full mouth, based on their degree of alteration which can either be confirmative approach or reorganized approach. A confirmative approach mainly focuses on maintaining the existing jaw relations. The new restoration should be in harmony by slight amount of alteration of occlusion or varying degree of modification of occlusal interferences, reduction of non-working side contacts. Whereas, reorganized approach intends to establish a new occlusal scheme, if the existing one is unacceptable due to loss of VDO, severe bruxism, trauma from occlusion, inadequate interocclusal space, and repeated fractured restorations.

Many philosophies have been conceptualized focusing on three kinds of occlusal schemes during eccentric movements:

Once the proper occlusal relation was obtained, the treatment of rehabilitation has to be put forth.

Figure 3: Diagnostic waxup

Figure 4: Tooth preparation and temporization

Figure 5: Cementation of individual porcelain-fused-to-metal crowns with posterior disocclusion

Figure 6: Pre-operative and post-operative smile
(a) bilateral balance; (b) group function; and (c) mutually protected occlusion. Bilateral balance concept is mostly applied in complete denture construction. Group function and mutually protected occlusion schemes are applicable for natural dentition [Table 1].

All the occlusal theories have a fair bit of advantages and also some limitations in regard to clinical aspects. The foremost purpose of all the philosophies is to functionally restore the occlusion and establishes an acceptable occlusal plane. In the gnathological concept, McCollum focused on the bilateral balanced occlusion for restoring the natural dentition. This concept was opposed by many authors, as they have observed defective contacts or interferences due to inappropriate wear of cusps (buccal and lingual). There was a significant amount of reduction of masticatory freedom and also lead to development of cheek bite.11

For Pankey Mann Schuyler philosophy, there were certain limitations regarding the usage of instruments. The Broadricks flag which is used to achieve the center of curve of spee by maintaining a 4-inch radius, cannot be considered as fixed value in all the individuals. In a retrognathic mandible, a 4-inch curve will create a flat posterior occlusal plane, which causes posterior protrusive interferences resulting in a low posterior plane. Hence, a lesser radius curve should be used in such conditions. Similarly, usage of 4-inch curve leads to a steep occlusal plane in patients with Class-III malocclusion. Among the philosophies, hobo twin stage technique is more advantageous due to minimal production of errors. The obstacle for this technique is about the usage of articulator which has to be programmed into two conditions. The creation of twin tables is generally not accepted by all the articulators. Hence, a specially designed articulator is needful. The most important aspects in FMR such as esthetics,

| Table 1: Summary of important philosophies in FMR |
| Philosophy | Key points |
|-------------|------------|
| Gnathological concept: McCollum, Stuart | 1. Balanced occlusion  
2. Anterior guidance is independent of condylar path  
3. Need for fully adjustable articulator |
| Stuart and Stallard | 1. Canine guided/organic occlusion/ mutually protected occlusion  
2. Point centric occlusion |
| Concept of “Freedom in Centric” – Schuyler | 1. Long centric relation  
2. Relies on cusp to surface mechanics  
3. Measurable amount of long centric needed is 0.5 mm (between centric relation closure and postural closure) |
| Wiskott and Belser | 1. Maintenance of VD and allows chewing due to cusp-fossa relation  
2. Number of occlusal contacts reduced  
3. Used for small and extensive restorations  
4. Occlusal stability and aesthetic demands |
| PMS (Pankey-Mann Schuyler Philosophy) | 1. Based on - spherical theory of occlusion, “Wax chew- in” technique by Meyer and Brenner and importance of cuspid teeth  
2. Presence of Group function on working side  
3. Absence of contacts on balancing side (Non-Working side)  
4. Posterior teeth disclusion on protrusive excursion  
5. Curve of Monson was used for obtaining optimal occlusal plane  
6. Broadrick’s occlusal plane analyzer was used for establishing the functional occlusal plane on mandibular teeth  
7. Long centric relation  
8. Advocated on non-arcon articulator, which do not accept interocclusal records |
| Twin-Table technique: Hobo and Takayama | 1. Anterior guidance and working condylar path are dependent factors  
2. Mutually protected occlusion  
3. Concept of posterior disclusion depended on angle of hinge rotation, inclination and shape of posterior cusp  
4. Use of twin tables  
1. Incisal table without disclusion – Fabricate Posterior teeth  
2. Incisal table with disclusion – To achieve incisal guidance with posterior disclusion |
| Twin-stage technique: Hobo and Takayama | 1. Cuspal angle was considered as the most reliable determinant  
2. Standard cuspal angles are used to establish good amount of disclusion  
3. Fixed values are used on articulator and conditioned as: Condition 1 and Condition 2  
4. Mutually protected occlusion |
| Nyman and Lindhe Scheme | 1. Indicated in extremely advanced periodontitis  
2. In long tooth borne cantilevered restoration, balanced occlusion has to be provided  
3. In distal support cases, posterior teeth disclusion on protrusive movements has to be achieved |
function, and patient satisfaction should be achieved whenever a FMR is planned.[12] In this case, a simplified approach of occlusal rehabilitation was done without affecting the concepts involved in the rehabilitation.

**Conclusion**

The goal of FMR is to restore the esthetics and function by maintaining the periodontal structures, muscles of mastication, and TMJ in harmony. It improves the oral health of the individual. The simplified approach which was followed in this case gave satisfactory results with less chair side appointments and superior esthetics. Individual metal ceramic crowns were given for proper maintenance and improving the longevity of the prosthesis.

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