

## **Full Mouth Reconstruction of a Bruxer with Severely Worn Dentition: A Clinical Report**

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**Abstract:** Management of occlusal wear and attrition is a complex and intriguing aspect of Preventive and Restorative dentistry. The most critical steps for a successful full mouth rehabilitation are correct assessment of occlusal vertical dimension, interocclusal rest space, and centric relation records. A systematic approach is required in order to achieve a predictable and desirable result in these types of cases. This paper describes the full mouth rehabilitation of a 36-year-old bruxer with severely worn dentition and loss of vertical dimension. A hard-occlusal splint was given to the patient at raised vertical dimension for a period of 4 weeks, diagnostic mock-up was performed on mounted cast on a semiadjustable articulator at raised vertical dimension and provisional restorations were fabricated. The provisionals were then evaluated clinically and adjustments were made based on the criteria dictating aesthetics, phonetics, and vertical dimension. After a period of 2 months the final impression were made, occlusion and vertical dimension was maintained with the help of temporaries. Stable contacts on all teeth with equal intensity in centric relation and disocclusion of posterior teeth with anterior guidance in accord with functional jaw movements was ensured and achieved.

### **Introduction:**

Tooth wear is becoming more and more prevalent especially with the changing lifestyles and increasing stresses in our daily life. In fact tooth wear and its severity is on an increase even in younger individuals. Attrition is defined as a loss of tooth structure caused by tooth-to-tooth friction without any intervening substance. Occlusal and incisal attrition may occur normally during deglutition (physiological wear) and may be severe if parafunctional activities such as bruxism and clenching habits exist (pathologic wear). Shiny dental surface and well-defined facets are considered reliable signs of attrition that usually match facets of teeth in the opposing arch in eccentric occlusion. In attrition the wear rate in the upper and lower jaw are equal because intimate contact of opposing surfaces can result in matching wear facets. Attrition is caused due to various factors many of which often remain undiagnosed. Pulpal hyperaemia, generalized sensitivity, disorganised occlusion, and aesthetic problems are the sequelae of excessive occlusal and incisal wear.

Management of occlusal wear and attrition is a complex and intriguing aspect of Preventive and Restorative dentistry. After arriving at a definitive diagnosis, full mouth reconstruction with modern restorative materials such as zirconia, metal ceramic restorations along with eliminating the causative factors will be one of the treatment options. The occlusion vertical dimension (OVD), the interocclusal rest space (IRS), and centric relation (CR) records are critical for successful treatment. Management of severe teeth wear is challenging and complex treatment to accomplish both for the dentist and the patient. This case report discusses the phases of prosthodontic rehabilitation of a 36-year-old bruxer with severely worn dentition.

## **Procedure:**

A 36-year-old man with severe bruxism was referred for the treatment of his severely worn dentition. His chief complaint was that she could not eat anything because her teeth were worn too much. Intraoral examination revealed a generalized loss of dental substance, Severe attrition was seen on the occlusal surface of all teeth. The first and second molars showed more than 40% attrition on the occlusal surfaces and there was no intercuspation of any sort. The upper right lateral incisor and canine were attrited to the gingival level. The mandibular teeth from the right first premolar to left canine were totally razed to gingival level. The patient was unable to reproduce any stable centric occlusion. Lateral and protrusive excursions were not guided correctly by any group of teeth. Partial fixed prosthesis was seen in lower arch. The patient did not have temporomandibular disorder history and soreness of the mastication muscles. The orthopantomogram view was taken to determine whether a temporomandibular problem exists.

To determine whether VDO had been altered, the following aspects were investigated:

- 1) History of wear: The patient had a habit of eating raw vegetables and acidic fruits which were tough and fibrous. In addition, mandibular posterior zirconia prostheses might had accelerated the wear of maxillary teeth and resulted in unbalanced wear rate.
- 2) Phonetic evaluation: the patient had disturbed phonetics since the distance between the incisal edge of the mandibular incisors and lingual surface of the maxillary incisors was increased and, it altered /s/ sound to /ʃ/.
- 3) Interocclusal rest space: The patient's interocclusal rest space that was measured between nose tip and chin tip was 7–8 mm that was greater than the normal value, 2 - 4 mm.
- 4) Facial appearance: patient was not happy with the sunken appearance of his lips and cheeks, giving a feeling of edentulousness. Also, during speaking maxillary teeth were not visible which decreased his confidence during social interactions.

The possible causes of patient's worn dentition that might include posterior interferences, parafunction, eating habit, and dental ignorance were explained to the patient. And the options of treatment plan were full mouth rehabilitation with metal ceramic restoration or zirconia with or without crown lengthening procedure. The patient had financial issues, so the option of zirconia crowns was excluded. As there was clinical evaluation of reduced vertical dimension, full mouth rehabilitation with increased vertical dimension was planned. severely worn teeth were subjected to crown lengthening procedures to obtain a sufficient clinical crown length and ferrule effect.

## **Treatment planning:**

The patient's casts were mounted on a semi-adjustable articulator arcon type (Hanau<sup>TM</sup> Modular Articulator; Whip Mix Corp., Louisville, USA) using a face-bow record and an interocclusal record that was made with the aid of a Lucia jig and polyvinylsiloxane occlusal registration material (EXABITE II; GC Corp., Tokyo, Japan).

Niswonger's technique was utilized to measure the vertical dimension. Vertical dimension at rest was found to be 59 mm by which was reconfirmed by facial measurements after swallowing and relaxing and using phonetics. Vertical dimension at occlusion was found to be 51 mm, from which we inferred that the loss of vertical dimension was 6 mm after taking into consideration the Freeway space of 2-3 mm.

The existing vertical dimension on the mounted articulator was increased by 6 mm using the incisal guidance pin of the articulator to a new dimension of 56 mm. a hard-occlusal splint was designed on this raised bite with uniform bilateral contacts on all posterior teeth in centric relation and also guiding the anterior teeth in protrusive and lateral movements. The anterior guidance resulted in loss of contact of all the posterior teeth in all eccentric jaw positions except CR.

The patient's adaptation to the increased vertical dimension was observed and evaluated during a 1-month period using the splint. Patient adjusted to the splint after an initial discomfort with no muscle tenderness or discomfort in the temporomandibular joint. Increasing the vertical dimension with the splint was essential to allow the condyles to adjust with the new vertical dimension and assume their most anterosuperior position in intimate contact with the thinnest part of biconcavity of articular disc. It also allowed the entire temporomandibular joint (TMJ) complex to attain an improved functional health and allowed to eliminate any muscle engrams due to posterior occlusal interferences and lead to establishment of a new vertical dimension. The method of increasing vertical dimension with the splint was used to determine desirable vertical dimension of the fixed interim prostheses.

### **Diagnostic Provisionalization:**

After taking CR record using Lucia jig and wax-rim, diagnostic wax-up was performed. Heat cure acrylic resin (ALIKETM; GC America, ALSIP, USA) provisional crowns were fabricated from lost wax technique by investing the diagnostic wax-up. The provisional fixed restorations were cemented with temporary cement (FREEGENOL TEMPORARY PACK; GC Corp., Tokyo, Japan), and the patient's adaptation was monitored. The provisional restorations were adjusted for a period of 12 weeks, the patient's adaptation to temporary crowns was also monitored by observing any signs of discomfort in temporomandibular joint, soreness or tenderness in muscle of mastication, any restriction in mandibular movement or any problem in swallowing or speech. The anterior guidance and posterior disocclusion on excursive movement were also established. These provisional restorations will be acting as a guide for fabrication of final prosthesis. When patient was comfortable in the new mandibular position with restored vertical dimension, which was confirmed by observing improvement in speech, facial esthetics and mastication of food, further procedures were performed. The final adjusted occlusion of the temporary restorations was transferred to customized anterior guide table, which was made with acrylic resin (PATTERN RESIN; GC Corp, Tokyo, Japan).

### **Tooth preparation:**

The simultaneous arch technique was employed for rehabilitation. All existing teeth were prepared to accept full veneer metal ceramic restorations with equigingival chamfer margins

### **Final provisionalization:**

The final provisional restorations were fabricated from autopolymerizing acrylic resin (Alike™; GC America, Alsip, USA) using the direct-indirect technique. The provisional restorations were cemented with temporary cement (Freegenol Temporary Pack; GC Corp., Tokyo, Japan) and the

patient's adaptation was monitored.

### **Final restorations:**

Final impression was made with polyvinyl siloxane material, of the opposing posterior quadrants of maxilla and mandible, bite registration was done using bite registration paste. During bite registration the contralateral provisional restoration were left in place. After 1 week, metal trial was done and porcelain fused to metal restorations were fabricated using a customized anterior guide table, utilizing the duplicated provisional restoration casts and cemented with resin modified glass ionomer cement (FujiCEM; GC America, Alsip, USA) and an orthopantomogram was obtained. Because the patient's anterior guidance table was used in the production of definitive restoration, the amount of occlusal adjustment on the lingual surface of maxillary anterior teeth was minimal. The prostheses were designed using mutually protected occlusion. The anterior teeth protected the posterior teeth from excessive force and wear and the posterior teeth supported the bite force in CO. Oral hygiene instruction were given and regular reviews were scheduled. Three reviews were completed in a period of 6 months

### **Discussion:**

Natural dentition over a period of time can undergo changes in terms of loss of tooth structure because of attrition, abrasion or erosion which may be generalized involving the full maxillary and mandibular arches or localized limited to incisors and canines. Tooth wear has a multifactorial aetiology which may be age, dietary habits, occupational, parafunctional habits, gastric problems, stress etc. The number of clinical controlled trials on restorative and prosthodontic approaches in this respect to rehabilitation of worn out dentition is limited in the literature. Insufficient evidence regarding the long-term clinical outcome of treatment can complicate clinical decision making. The sequence and amount of wear is usually uneven in natural dentition, which is evidenced by the difference in the anatomy and the amount of tooth structure with respect to anterior and posterior teeth. The presence of occlusal prematurity in the posterior region may result in increased use of anterior teeth, which may result in increased tooth wear. The major area of concern when we are performing full mouth rehabilitation of an individual with restoration of the vertical dimension to its original state is the transfer of the condylar movement onto an articulator. This is accomplished by doing facebow transfer and transferring the records on a semi or fully adjustable articulator. Clinical experience and judgement play an important role in the establishment of occlusal vertical dimension in full mouth rehabilitation, the methods employed clinically for assessing the vertical dimension are phonetics, interocclusal distance, swallowing and patient preference. Initially fixed provisional prostheses is given to the patient for a period of 2-6 months at raised vertical dimension and the patient is observed for any type of discomfort in relation to TMJ and muscle of mastication. In the present case report the provisional were given to the patient for a period of 2 months.

There are various techniques documented in the literature to achieve a stable occlusion in full mouth rehabilitation cases, the primary aim of all the techniques is to achieve equal-intensity centric occlusal contact on all teeth. Furthermore, an anterior guidance occlusion must be

established in accordance with the condylar guidance of the patient and the normal functional jaw movements with all the posterior teeth disocclusion during the protrusive and lateral jaw movements. Establishment of this type of occlusal scheme is more significant in case of bruxers for prevention of further damage to the orofacial structures. Finally, the most important factor in long-term success of full mouth rehabilitation cases is periodic monitoring of aetiologies including bruxism and any changes in the anterior guidance which may restrict the envelope of function and may cause recurrent wear on anterior teeth or damage of anterior restorations. Any sign of recurrent wear should be identified and controlled as soon as possible to prevent further complications.

### **Conclusion:**

Full mouth reconstruction in severely worn out dentition is one of the most common treatment options. Excellent prognosis can be achieved only if the patient maintains the oral hygiene and come for regular visits for routine check-ups.

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# Legends:

Figure1- Preoperative

Extra Oral Figure 1a-

Preoperative Intraoral

Figure 1b- Preoperative

Maxilla Figure 1c-

Preoperative Mandible

Figure 2- Facebow

Figure 3a- Tooth

Preparation Figure 3b-

Tooth Preparation

Figure 4-

Temporization Figure

5- Postoperative Front

Figure 6- Lateral

Postoperative Figure 7-



Extra Oral Postoperative

Figure1- Preoperative Extra Oral



Figure 1a- Preoperative Intraoral

Figure 1b- Preoperative Maxilla



Figure 1c- Preoperative Mandible



Figure 2- Facebow  
Tooth Preparation

Figure 3a-



Figure 3b- Tooth Preparation  
Postoperative Front



Figure 4- Temporization



Figure 5-



Figure 6- Lateral Postoperative



Figure 7- Extra Oral Postoperative

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