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Case Report

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A Systematic Approach to Full Mouth Rehabilitation Using Combination of Fixed-Removable Prosthesis with Attachments

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ABSTRACT

Complete oral rehabilitation in patients with severely worn dentition is challenging due to the loss of occlusal vertical dimension, loss of tooth structure, uneven wear of teeth creating an uneven plane of occlusion, and parafunctional habits. The severe wear of anterior teeth facilitated the loss of anterior guidance, which protects the posterior teeth from wear during excursive movement. The collapse of posterior prosthesis teeth also results in the loss of the normal occlusal plane and the reduction of the vertical dimension. This case report described 56-year-old female, who had the loss of anterior guidance, the severe wear of dentition, and the reduction of the vertical dimension. Occlusal overlay splint was used after the decision of increasing vertical dimension by anatomical landmark, facial and physiologic measurement. Once the compatibility of the new vertical dimension had been confirmed, interim fixed restoration and the permanent reconstruction was initiated. This case reports that a satisfactory clinical result was achieved by restoring the vertical dimension with an improvement in aesthetics and function.

Key-words: Fixed Prosthesis, Cast Partial Denture, semi precision attachment, mutually protected occlusion

INTRODUCTION

Clinicians are often faced with the challenge of restoring severely worn dentition. A critical aspect of successful treatment of these patients is to determine the occlusal vertical dimension and the interocclusal rest space. A systematic approach to managing this type of complete oral rehabilitation can lead to a predictable and favorable treatment prognosis [1].

The gradual wear of the occlusal surfaces of teeth is a normal process during the lifetime of a patient whereas extensive tooth wear is considered a potential threat to functional dentition. The management of tooth wear is a subject of increasing interest in the Prosthodontic literature, both from a preventive and from a restorative point of view [2].

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Excessive occlusal wear can result in pulpal pathology, occlusal disharmony, impaired function, and esthetic disfigurement [1]. A thorough evaluation of the cause of destruction should be undertaken. Tooth wear can result from abrasion, attrition, and erosion [3-7]. Many a time, 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 [8,9]. 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 [10].

Management of worn dentition using fixed or removable prostheses is complex and among the most difficult cases to restore. Assessment of the vertical dimension is important for the management and careful comprehensive treatment plan is required for each individual case. Articulated study casts and diagnostic wax-up can provide important information that is helpful

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for the evaluation of treatment options. Tolerance of changes to vertical dimension of occlusion is usually confirmed with the clinical evaluation of the patient having a diagnostic splint or provisional prosthesis [11].
This clinical report described the treatment of a patient, who was clinically monitored to evaluate the adaptation to the combination of fixed and removable treatment regime, she was evaluated during a 1 month trial period with the provisional fixed restorations in the maxillary arch opposed to a temporary fixed partial denture from canine to canine and a conventional removable partial denture in the distal extension region and then followed with final restorations in Porcelain fused to metal [12,13] opposed to cast partial denture in the mandibular region.

CASE REPORT- A 56-year-old female patient reported to the Department of Prosthodontics, D.Y. Patil University, School of Dentistry, Navi Mumbai, India with a complaint of difficulty in eating and poor appearance of existing upper posterior fixed dental restoration. Intraoral examination revealed the presence of faulty maxillary restoration. The maxillary arch had restorations from right lateral incisor to the second molar and left canine to the second molar. The teeth present in the maxillary arch were right and left central incisors and right lateral incisor (Fig. 1). Teeth present in the mandibular arch were from canine to canine (Fig. 2). The upper anterior teeth had sharp enamel edges, dentinal craters and showed attrition probably due to the loss of posterior support. The patient did not have temporomandibular disorder history and soreness of the mastication muscles, but the discrepancy between centric occlusion (CO) and maximum inter cuspal position (MIP) was found when she was guided to CR with bimanual technique [14]. The trans-cranial view was taken to determine whether a temporomandibular problem exists. The left mandibular condyle was flatter than the right condyle, but any specific disorder was not found. The facial type of patient was oval and her lip seemed to be incompetent.

Fig. 1: Maxillary intraoral view

Fig. 2: Mandibular intraoral view

To determine whether VDO had been altered, the following aspects were investigated by Turner and Missirlian [3]; Dawson [10]; Yunus *et al.* [13].

1. **Loss of posterior support:** Mandibular posterior teeth were missing; posterior collapse resulted in excessive wear and fracture of anterior teeth.
2. **History of wear:** Physiologic wear can be compensated by tooth eruption in general, but the accelerated wear may exceed the rate of eruption. The patient liked vegetables and acidic fruits. His favorite food was tough and fibrous.
3. **Phonetic Evaluation:** If the distance between the incisal edge of the mandibular incisors and lingual surface of the maxillary incisors is about 1 mm, it makes normal /s/ sound. The patient's increased space altered /s/ sound to /ʃ/.
4. **Interocclusal rest space:** The patient's interocclusal rest space that was measured between nose tip and chin tip was 5–6 mm that was greater than the normal value, 2–4 mm.
5. **Facial appearance:** Wrinkles and drooping commissars around mouth were observed.

The possible causes of a patient's worn dentition that might include para-function, eating habit and dental ignorance were explained to the patient. On the removal of the faulty restoration, the teeth present in the maxillary arch were right and left central incisor and first molar. The abutment teeth present for conventional fixed partial prosthesis were very few hence; attachments in fixed partial denture were to be considered.

The options of treatment plan comprising of restoring mandibular partially edentulous arch with implants or removable cast partial denture, along with a combination of fixed restorations in the anterior region and for the Maxillary arch rehabilitation with fixed partial denture using attachments was suggested to the patient as the first line of treatment. Replacement of the missing teeth with implants provided us with the solution of not utilizing healthy natural teeth as abutments for a fixed prosthesis [15]. The fixed component in the maxillary and the mandibular arch would be fabricated with metal ceramic restoration with or without crown lengthening procedure and intentional root canal procedures. Patients did not consent to implant surgeries hence rehabilitation using implants was omitted.

Hence the final treatment plan for the patient was to fabricate a combination of a fixed and removable prosthesis in the mandibular arch and the fabrication of a fixed partial prosthesis in combination with the attachment for the maxillary arch. Also, the patient was advised intentional root canals in the maxillary central and lateral incisors on both sides and maxillary first molars. As there was a clinical evaluation of reduced VDO, full mouth rehabilitation with increasing VDO was planned.

The patient's casts were mounted on a semi-adjustable articulator (Adler CE) using a face-bow record and an interocclusal record that was made with the aid of a polyvinylsiloxane occlusal registration material (Alu wax). The new VDO was set by 4 mm increase in the incisal guidance pin of the articulator (Fig. 3). Because the patient's interocclusal rest space was 2–3 mm larger on the premolar area than normal distance, the increase was determined 4 mm in the anterior teeth and 1–2 mm in the posterior teeth. The splint was incorporated in the removable partial denture for the mandibular arch designed so to offer bilateral contacts of all posterior teeth in centric relation and guides of the anterior teeth in excursive movement (Fig. 4). The anterior guidance dis-occluded the posterior teeth in all jaw position except centric relation. Occlusal overlay splint in the form of lower RPD having monoplane occlusion opposing a temporary fixed partial denture in the maxillary was delivered and monitored for 1 month to evaluate patient's adaptation to the new VDO.

Fig. 3: Increased VDO

The adaptation of patient to the increased VDO was evaluated during the 1-month trial period. No muscle tenderness and temporomandibular discomfort were found. The method of increasing VDO with the splint in a removable partial denture was used to determine desirable VDO of the fixed interim prostheses for the mandibular arch. After taking the CR record using wax-rim, diagnostic wax-up was performed. Auto polymerizing acrylic resin (PROTEMP) provisional crowns were fabricated for the maxillary arch using a putty matrix (Aquasil, Dentsply) that was produced from the diagnostic wax-up and mandibular anterior fixed prosthesis with provisional RPD at increased vertical was fabricated. The provisional fixed restorations were cemented with temporary cement (Template) and the patient's adaptation was monitored.

For three months, interim restorations were adjusted and used as a guide for the definitive oral rehabilitation. During this period, the patient's condition and functions, such as muscle tenderness, discomfort of TMJ, mastication, range of the mandibular movements, swallowing, and speech, were evaluated. Improvement in mastication, speech, and facial esthetics confirmed the patient's tolerance to the new mandibular position with the restored VDO.

The final preparation was performed, and definitive

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impressions were made with additional siloxane impression material (Aquasil, Dentsply) (Fig. 5). Bite registration was taken using a provisional crown with registration material (Alu wax). Porcelain fused to metal restorations for the maxillary arch and mandibular anterior region were fabricated. In the maxillary arch, as the abutments were very few, semi-precision attachment was incorporated in the right second premolar and the left first premolar regions. The prostheses were designed using mutually protected occlusion (Fig. 7 & Fig. 8). The anterior teeth protected the posterior teeth from the excursive force and wear, and posterior teeth supported the bite force. The restorations were cemented with resin-modified glass ionomer cement (Fuji CEM; GC America, Alsip, USA).

During the mandibular anterior teeth, preparation mouth preparation for the posterior Cast Partial Denture was incorporated, which presented them in the casted anterior restoration. The impression for the mandibular posterior CPD was made with additional siloxane impression material (Aquasil, Dentsply). The casted metal framework was tried to fit in the mouth. As in case of distal extension partial dentures, a functional impression was recorded for the mandibular cast followed by altered cast technique. Jaw relation was recorded, trial was taken and the final cast partial denture was delivered and hygiene instruction and regular check-up were administered.

Fig. 5: Attachments in maxillary fixed prosthesis

Fig. 6: Metal coping trial

Fig. 7: Maxillary final prosthesis

Fig. 8: Mandibular final prosthesis

CONCLUSIONS

The combination of fixed restorations and a cast partial denture for the mandibular arch along with rehabilitation of the maxillary arch with fixed partial denture using attachments was the treatment rendered to the patient. The management of the presented case reflects the importance of judicious use of prosthodontic principles and strategic planning in addition to multidisciplinary teamwork. Despite the significant disfigurement of the occlusal plane, optimal and

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esthetically pleasant occlusion was achievable by restoring the lost VDO in conjunction with intentional root canal therapy. The multiple provisional prostheses enhanced the predictability and patient adaptation to the definitive prosthesis. Although recent advances in dentistry suggested for fixed treatment options and implants for fixed restorations would be an ideal option.

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CONTRIBUTION OF AUTHORS

Dr. Pooja Agrawat- Data collection, analysis, interpretation and drafting of the article.

Dr. Rubina Tabassum- Drafting of the article and revision of the article.

Dr. Gaurang Mistry and Dr. Omkar Shetty- Revision and final approval of the article.

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