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Esthetical and Functional Rehabilitation of Severely Worn out Dentition: A Case Report

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Full mouth rehabilitation, Vertical dimension, Metal-ceramic restorations, Worn out Dentition

ABSTRACT:
Restoring occlusion in patients with severely worn dentition presents a significant challenge, as each case is unique and requires a tailored approach. Setting clear and achievable goal is the foundation for any successful full-mouth rehabilitation. Severe tooth wear is commonly observed in patients whose teeth have been subjected to prolonged functional interference and in most of the cases, these patients have faced a complete collapse of their occlusion, leading to the need for restoration of occlusal harmony. As age advances, the occlusal surfaces of teeth inevitably degrade and excessive wear can lead to a range of complications, like pulpal damage, occlusal instability, functional limitations of teeth, and aesthetic concerns. Advancements in dental technology, materials, and equipments have made it easier for clinicians to restore and rehabilitate damaged dentition. With these innovations, Practitioners are now better equipped to diagnose and restore the function of the dentition. Achieving optimal oral health should be the primary goal of all rehabilitation efforts. Maintaining a healthy stomatognathic system is essential for long-term success of the treatment. This case report describes a complete oral rehabilitation of severely worn-out dentition to restore the lost vertical dimension and achieving functional and esthetical harmony with porcelain fused to metal restorations.

Background

Full mouth rehabilitation aims to restore not only the worn dentition but also the overall health of the stomatognathic system. This includes the teeth, periodontal structures, muscles of mastication, and temporomandibular joint (TMJ), all working together in harmony to restore both functional and biological efficiency.[1] A thorough evaluation and accurate diagnosis are crucial, as the causes of severe occlusal tooth wear are multifactorial and can vary greatly from patient to patient. Key factors to consider include the patient's diet, eating habits, gastric conditions, and current occlusal status, which all contribute to effective treatment planning. Various techniques for full mouth rehabilitation have evolved over time, each with its own philosophy of occlusion and approach.[2] These can generally be categorized into three main strategies: (1) simultaneous restoration of dental arches, (2) sequential restoration of individual quadrants, and (3) a combination of the first two approaches. Each technique

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has distinct advantages and disadvantages, depending on the patient's condition and the desired outcome. The procedure outlined in this article presents a method for restoring the vertical dimension of occlusion for a patient with worn-out dentition. Full mouth rehabilitation offers prosthodontists a unique opportunity to improve patients' quality of life, but it also presents challenges. A successful outcome requires not only technical expertise but also an understanding of the patient's concerns, desires, and the full scope of medical and dental implications involved in treatment. Patients with severe dental attrition often present with reduced vertical dimension and occlusal disharmony with surrounding musculature. When this condition is not addressed early, full mouth rehabilitation may be required to restore both form and function. Comprehensive treatment planning, including careful assessment of vertical dimension and occlusion, is vital to ensure long-term success.[3,4] One of the most critical aspects of rehabilitation in these cases is determining whether an increase in vertical dimension is needed to restore proper occlusion. Increasing the vertical dimension of occlusion (VDO) has often been considered a challenging procedure in prosthetics; however, recent concepts suggest that a moderate increase in VDO can be safe and beneficial to achieve occlusal stability.[5] In many cases of severe wear, a slight increase in VDO is essential to provide functionally accepted dentition and restore esthetic requirements.

Case Description

A 62-year old male patient reported to the department of Prosthdontics, with a chief compain of inability to chew food and esthetic concern. His medical history revealed no relevant issues. On extraoral examination, patient had no facial asymmetry and muscle tenderness. The patient's temporomandibular joint was evaluated and examined with no evidence of pain or discomfort. On intra oral examination patient presented with wear facets on occluding surfaces of the posterior teeth, severe generalized attrition, root stump in maxillary right lateral incisor, missing teeth in relation to left maxillary first molar, left mandibular first molar, right mandibular first molar. There was faulty prosthesis in right mandibular posterior quadrant with fractured porcelain and defective margins. Patient presented with anterior deep bite and loss of vertical dimension of occlusion (Figure 1 & 2).

Diagnosis and Treatment Planning

Orthopantomograph was advised and patient was informed about the treatment plan, duration of the treatment, financial aspects, follow up, maintenance and care. Patient accepted the treatment; informed consent was taken from the patient. Patient was evaluated for the vertical dimension and it was observed that vertical dimension at rest was 70 mm and at occlusion was 64 mm. Loss of vertical dimension was found to be 3mm. A treatment plan was constituted to rehabilitate the patient's maxillary and mandibular arches to optimal occlusion with porcelain fused to metal restorations. The treatment planned was done in two phases. Phase one included prosthesis removal in right mandibular premolar, right mandibular first molar, right mandibular second molar. Fabrication of maxillary occlusal splint at increased VDO for muscle adaptation and extraction of the root stump in maxillary right lateral incisor. Phase two included prosthetic rehabilitation of the entire dentition with metal ceramic restorations.

Treatment Procedure

Phase One

Orthopantomograph was evaluated for the poor prognostic teeth and endodontic evaluation was done. Faulty prosthesis was removed in relation to right mandibular premolar, right mandibular first molar, right mandibular second molar and extraction of the root stump in maxillary right lateral incisor was done. After healing of the socket the patient was recalled. Diagnostic impressions of maxillary and mandibular arches were recorded using irreversible hydrocolloid material with the stock trays and diagnostic casts were obtained. Facebow records were secured, and the casts were mounted on a semi-adjustable articulator based on the facebow and centric record. Protrusive records were made using polyvinyl siloxane material and condylar guidance was set on the articulator. Once the casts were mounted the incisal pin was raised to 3mmto establish a new vertical dimension and diagnostic wax up was done on the diagnostic casts and plane of occlusion was determined (Figure 3). Base plate wax was used to fabricate the wax pattern for the occlusal splint of 3 mm thickness and canine guidance was incorporated in the

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splint by providing a convex guidance ramp in the canine regions to ensure uniform tooth contact in centric relation and facilitated posterior tooth disocclusion during eccentric movements. After removing all the interferences on the articulator, it was finished and polished. Occlusal splint was inserted and patient was monitored biweekly for one and a half months to assess the adaptation of the muscles and temporomandibular joints.

Fig 1: Pre-operative Intraoral view

Fig 2: Pre-operative mandibular arch

Fig 3: Diagnostic wax up at 3 mm raised VDO

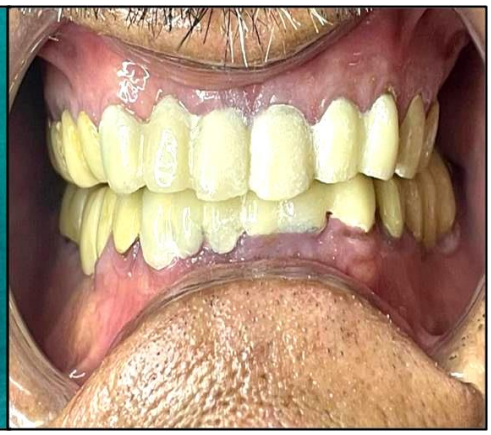

Fig 4: Temporaization

Phase Two

Crown lengthening was done for the mandibular central and lateral incisors followed by subgingival tooth preparation for metal-ceramic restorations posteriorly followed by the anteriors. 3M ESPE Protemp, USA material was used to fabricate temporary restoration with the help of putty index made on the diagnostic wax up. Temporary restorations were finally adjusted intraorally and cemented with non- eugenol temporary cement (Rely X Temp NE, 3M ESPE, USA). (Figure 4) After 4 days, impressions were recorded with irreversible hydrocolloid along with the temporary restorations placed intraorally and the casts were mounted using facebow and centric record. Final facebow transfer done accordingly (Figure 5). Articulator was programmed to adjust incisal and condylar guidance. Temporary restorations were then removed from oral cavity and final impressions were recorded with addition silicone impression material. Impressions were then poured with type IV die stone. Die cutting and die ditching was done on the cast and the casts were mounted on the articulator using centric and facebow records. The wax pattern was made and the casting was done for the metal ceramic restoration and the metal coping were tried intra-orally to verify marginal fit and inter-occlusion clearance (Figure 6). Shade was taken using the classical Vita shade guide. Interferences were removed from the metal ceramic

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restorations on the articulator and they were finished and polished. Final restorations were verified intraorally for the precise marginal fit, inter-occlusal interference and esthetic. Interferences were removed from the metal ceramic restorations and they were finished and polished. Once they were evaluated they were cemented using Glass Ionomer cement and the excess cement was removed (Figure 7). Instructions were given to the patient for the maintenance and the patient was scheduled for the follow up visits.

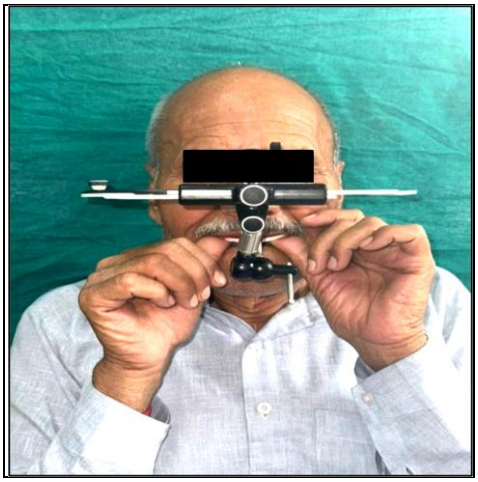

Fig 5: Facebow Transfer

Fig 6: Metal Try-in

Fig 7: Final Restoration

Discussion

Reconstructing occlusion in severely compromised dentitions is one of the most challenging tasks in restorative dentistry. Full-mouth rehabilitation is a comprehensive treatment often required for managing severely worn dentitions, developmental anomalies, acquired defects, or poorly fitting, long-span fixed partial dentures. The process involves simultaneous consideration of various factors, such as vertical dimension of occlusion (VDO), centric relation, occlusal contact patterns, aesthetics, and phonetics, ensuring harmony between anterior and posterior teeth. Full-mouth rehabilitation begins with evaluating aesthetics, including incisal edge positioning, tooth shapes and sizes, and the occlusal plane, alongside establishing an ideal occlusal vertical dimension.. Restoration of the VDO is achieved through establishment of proper anterior guidance. Generalized attrition, particularly among older adults, presents significant challenges, including functional impairments, diminished aesthetics, and compromised occlusal health, adversely impacting quality of life. Attrition is often counterbalanced by alveolar bone remodeling, which compensates for the gradual loss of tooth structure. However, in cases where wear surpasses the compensatory process, excessive loss of VDO may occur, resulting in reduced aesthetics, chewing difficulties, and discomfort. Identifying the underlying cause of wear is critical to formulating an effective treatment plan. Techniques like phonetic evaluation,

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aesthetic assessment, and measurement of inter-occlusal distance are used to confirm VDO loss.

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