



Innovative Oral Rehabilitation with the Double Crown Marburg Denture System: A Case of Severe Maxillary Wear and Partial Mandibular Edentulism

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Abstract

This case report presents the comprehensive oral rehabilitation of a patient with severely worn maxillary dentition and a partially edentulous mandible using the double crown marburg denture system. The patient exhibited significant maxillary tooth attrition and mandibular tooth loss due to caries and periodontal disease. A detailed clinical evaluation guided a treatment plan focused on restoring function, aesthetics, and comfort. The Double Crown Marburg Denture System was selected for its superior stability and ability to preserve remaining teeth. Initial treatment involved periodontal management and oral hygiene optimization. Abutment teeth were prepared for primary crowns, designed with a telescopic fit for optimal retention. Secondary crowns, incorporated into a removable prosthesis, engaged seamlessly with the primary crowns to enhance stability. Multiple trial fittings ensured precise occlusion and comfort. Post-prosthetic care included occlusal adjustments and patient education. This approach resulted in excellent prosthesis retention, improved function, and enhanced patient satisfaction.

Keywords: Fixed partial denture; Marburg denture; Removable partial denture, Prosthodontics, Overdenture

Introduction

The use of removable partial dentures (RPDs) connected to remaining teeth has long been practiced to enhance prosthesis longevity [1]. Factors influencing this approach include the number, alignment, and periodontal health of the remaining teeth, along with the patient's esthetic needs and financial limitations. The Double Crown or Telescopic Crown System effectively retains RPDs by distributing occlusal forces along the long axis of abutment teeth, providing stability, support, and protection against dislodgement. This system preserves the periodontal ligament, reducing occlusal overload and residual ridge resorption, while improving biting force, chewing efficiency, and phonetics compared to traditional dentures [2-5]. Originally introduced by Starr in 1886, the system involves a primary coping luted to the tooth and a secondary coping integrated into the denture framework. Various retention designs exist, including parallel-walled, conical, and hybrid systems [6]. This case report emphasizes the importance of using advanced prosthetic techniques for restoring function, aesthetics, and patient confidence in managing severe tooth wear and partial edentulism.

Case Report

A moderately build, 62 years old male patient reported to the department of prosthodontics with the chief complain of attrited maxillary anterior teeth

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and missing mandibular anterior and partial posteriors. The patient gave history of attrition of teeth due to incorrect brushing techniques he had been administering for 7 years, he also gave history of loosening of teeth in mandible which later was diagnosed to be due to poor periodontal health. No abnormality i.e clicking or popping of TMJ detected, patient showed bilaterally symmetrical facial structures. On assessing patients' condition, it was concluded to rehabilitate both upper and lower dentition whilst restoring the lost vertical dimension. Based on radiographic and clinical examination ruling out loss of structure in most of the present teeth which were attrited (figure 1) patient was advised to go under endodontic treatment for maxillary anterior and posterior teeth and remaining mandibular posterior teeth. After fabricating diagnostic models it was decided to give fixed dental prosthesis in maxillary teeth and double crown Marburg system in mandibular arch with clearance fit to the patient. Mouth preparation of the abutment teeth (figure 2) both maxilla and mandibular teeth was carried out so as to receive PFM crowns in maxilla and telescopic crown in mandibular remaining teeth. After abutment preparation of maxillary teeth, gingival retraction and final impression was taken using a-silicone putty and light body so as to record the abutment as well as adjacent structures. Master cast was obtained & the abutments were then temporized until coping trial of the crowns, in mandible after conventional method of border molding and final impression, master cast was obtained and adequate space was provided with the help of preparation to provide and accommodate both inner and outer crowns. Master cast of the mandible was surveyed and framework was designed along with the design of outer crowns. The denture's structure and outer crowns were accurately cast from complete Co-Cr-Mo alloy. The structure, was cast in one piece, including the outer crowns, without any welding or soldering. To confirm the fit, the cast framework was placed in the patient's mouth (figure 3). There was no friction or wedging when the outer crowns fit precisely onto the inner crown. After metal try-in, acrylic shade selection was done. Acrylic teeth were arranged on the metal framework after the jaw relations were recorded. Prior to fabricating the mandibular denture, final cementation of maxillary PFM crowns were done after coping trail. In mandible one advantage of using acrylic teeth was to make easy occlusal adjustments. During the wax try-in, the occlusion, esthetics and phonetics were satisfactorily evaluated. The dentures were inserted and evaluated after possessing, finishing and polishing. Fit occlusion, esthetics and phonetics were again evaluated (figure 4). Post-insertion instructions were given. The patient was kept on periodic recall. Proper hygiene maintenance was emphasized. Initially, the patient complained of loose upper denture and difficulty in mastication, but over a period of time he was satisfied with the treatment outcome.



Figure 1: Intra oral image of maxilla showing teeth affected by attrition.

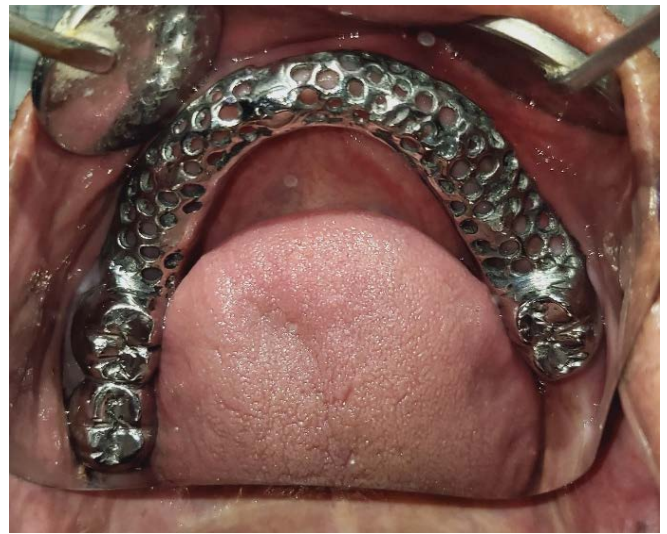


Figure 2: Trial of metal framework



Figure 3: Prepared maxillary abutments.



Figure 4: Final prosthesis outcome

Discussion

The successful rehabilitation of this patient using the double crown marburg denture system highlights the effectiveness of telescopic overdentures in managing complex cases of severe tooth wear and partial edentulism [7,8]. This system offers superior retention, stability, and support compared to conventional removable dentures by utilizing a primary and secondary crown mechanism [8]. The telescopic design efficiently distributes occlusal forces along the long axis of the abutment teeth, reducing stress on the supporting structures and minimizing residual ridge resorption. Additionally, the preservation of the periodontal ligament enhances proprioception, improving the patient's control over mandibular movements, chewing efficiency, and phonetics.

The combination of maxillary porcelain-fused-to-metal (PFM) crowns and mandibular telescopic overdentures addressed both functional and aesthetic concerns, restoring the patient's vertical dimension and improving mastication. The use of acrylic teeth in the mandibular prosthesis allowed for easy occlusal adjustments, further enhancing patient comfort. Initial challenges, such as minor denture looseness and masticatory difficulty, were effectively managed through patient education and follow-up care [9].

Overall, this case demonstrates that telescopic overdentures are a reliable and durable prosthetic option for patients with significant tooth wear and partial edentulism, providing long-term functional stability, aesthetic satisfaction, and improved quality of life.

Conclusion

Tooth-supported, removable overdentures with telescopic metal-ceramic crowns represent a viable and superior alternative to conventional removable dentures. These overdentures not only enhance the aesthetic appeal but also provide significant functional advantages [1]. By preserving bone structure and transferring compressive forces into tensile forces via the periodontal ligament, they effectively reduce the rate of residual ridge resorption. Additionally, the incorporation of telescopic crowns ensures better retention, stability, and support, along with a more stable occlusion. The reduction in forward sliding of the prosthesis and

improved control over mandibular movements, attributed to proprioceptive feedback, enhances chewing efficiency and phonetics. Overall, these features make tooth-supported, removable overdentures with telescopic crowns a more advantageous option for patients compared to conventional complete dentures [10].

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