

Case Report

Preventive Prosthodontics: Combination of Tooth Supported BPS Overdenture & Flexible Removable Partial Denture

A. Habeeb Bin Mohsin¹, M. Priyanka², Sarah Samee³

¹Assistant Professor, Department of Prosthodontics, Sri Sai College of Dental Surgery, Vikarabad, Hyderabad, India

²Assistant Professor, Department of Periodontics, Sri Sai College of Dental Surgery, Vikarabad, Hyderabad, India

³ Dental Surgeon, BMS Dental Hospital, Hyderabad, India

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ABSTRACT

It is rightly said preservation of what remains is more important, with this in consideration preventive prosthodontics can be appropriately applied highlighting the importance of delaying or eliminating future prosthodontic treatment. In this case study mandibular tooth supported BPS (bio-functional prosthetic system) overdenture and maxillary flexible partial denture was fabricated for the patient. This gives the patient a denture that has more support and retentive principles incorporated, resulting in improved retention. Decrease in rate of resorption of bone hence preservation of alveolar ridge. Overdenture patient possessed preserved sensory function, i.e., discriminating between occlusal forces closer to natural teeth. These factors greatly enhance the patient's physiologic coordination and ability to control the denture.

Introduction

Preventive dentistry is defined as procedures employed in practice of dentistry and community dental health programs, which prevent the occurrence of oral diseases and oral abnormalities¹.

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontic problems².

The overdenture is defined as a removable partial denture or complete denture that covers and rests on one or more remaining natural teeth, the roots of natural teeth and / or dental implants; a prosthesis that covers and is partially supported by natural teeth, natural tooth roots and / or dental implants³ - GPT 7.

The idea of leaving roots of natural teeth to support an overdenture is far from new; even in 1856, ledger had described a prosthesis resembling overdenture⁴.

There are many advantages of overdenture such as preservation of alveolar bone, preserving the teeth retains not only the alveolar bone supporting the teeth but also the alveolar bone adjacent to the teeth. The existence of the periodontal membrane under the overdenture gives the patient a sense of discrimination not possible with conventional dentures. Natural tooth stops of an overdenture provide for a static, stable base unparallel by any conventional denture. The overdenture literally does not move. Retention is usually sufficient merely by overlaying the teeth. It is true that there is a large initial cost, mainly due to periodontal and endodontic treatment and occasionally due to the fabrication of a cast coping or cast retainer device. However, when weighing total service involved, the case of maintenance in years to come, the low percentage of remakes, and the alternative treatment of extensive fixed and removable partial

* Corresponding author. Dr. Abdul Habeeb Bin Mohsin, 23-2-360/3, Moghal Pura, Hyderabad, Telangana, India, 500002. Email: doc.habeeb@gmail.com, Ph +91 9849990569.

prostheses, the cost of an overdenture compares very favorably with different treatment. Patients are most receptive to and appreciative of this treatment because they experience a striking improvement in function and esthetics while still maintaining some of their own teeth. The overdenture concept is designed so that if for some reason overlaid teeth must be extracted, the overdenture can readily be converted to accept the alteration. Even if all the teeth must be lost, the overdenture, because of its basic complete denture design, can be easily relined or rebased into a conventional complete denture⁴.

Selected teeth abutments are reduced to a coronal height of 2 to 3 mm and then contoured to a convex or dome-shaped surface. Most teeth required endodontic therapy receives cast metal coping with a dome-shaped surface and a chamfer finish line at the gingival margin are fabricated and cemented. The impression technique follows the same principles and procedures that are used in constructing a conventional complete denture. The only difference in the construction of the record bases for tooth- supported denture and conventional denture is the incorporation of the space for metal coping in the record base⁴.

A study by **Pacer and Bowman (1975)**⁵ compared occlusal force discrimination between conventional denture and over denture wearers. They found that the overdenture patient possessed more typical sensory function, i.e., closer to natural teeth than a complete denture patient in discriminating between occlusal forces. These factors greatly enhance the patient's denture coordination and ability to control the denture in his or her physiologic environment.

CASE REPORT

A 68 year old female patient reported to the department of prosthodontics with chief complaint of missing teeth in maxillary and mandibular arch. Patient was unable to perform masticatory function due to which she has lost weight. Previous medical history reveals that patient is hypertensive and is on medication for it. Previous dental history reveals that patient has got done extraction of right mandibular posterior teeth one year back. History of shedding of remaining teeth is due to caries and periodontal reasons. There is no mobility in remaining natural teeth.

Presence of healthy Mandibular 1st premolars bilaterally came out as positive finding for taking forward this treatment plan with preventive approach. Which drafted the fabrication of tooth supported mandibular BPS (bio-functional prosthetic system) overdenture. Maxillary arch presented with non-mobile teeth but with multiple undercuts which would have require necessary pre-treatment mouth preparation. For this reason fabrication of maxillary Flexible removable partial denture was planned. Flexible partial denture can make use of multiple undercuts eliminating the need of invasive mouth preparation. With the above treatment plan preventive approach was well established which will definitely preserve the hard & soft tissues and also reducing or eliminating the need of future prosthodontic treatment.

Treatment involved endodontic therapy for the mandibular right and left first premolar. Followed by tooth preparation [Fig 1] of both the premolars to receive cast metal dome shaped copings with chamfer finish line. Cementation of copings was done [Fig 2] using glass ionomer cement. Patient recalled after one week, primary impressions were made using edentulous perforated metal stock trays with alginate impression material



Fig. 1: Abutment Preparation



Fig. 2: Cast metal copings



Fig. 3: Finished prosthesis



Fig. 4: Tissue side of finished prosthesis

Border molding was performed using addition silicone putty and secondary impression made using addition silicone light body to get the fine details. Functional impression technique was used for border molding. Facebow record taken and vertical dimensions evaluated. Centric jaw relation recorded using indentations of the maxillary teeth as imprint for reorientation for mounting and then sealed with the help of sticky wax. Both the casts with occlusal rims were mounted on hanau articulator. Denture teeth used are Ivoclar vivadent teeth and teeth arrangement was done according to opposing remaining maxillary teeth minimizing the lateral

interferences. Tryin was done to check for occlusion, esthetics, speech and reduced possible interferences intraorally in lateral excursions.

Maxillary removable partial denture was fabricated using Bredent denture material (Bre-Flex) [Fig 3,4] with thermopress injection molding technique. Bre-Flex is flexible, comfortable, unbreakable & highly biocompatible. Mandibular overdenture fabricated using Ivoclar BPS technique [Fig 3,4,5]. The best part of BPS Dentures is the use of the SR Ivocap processing system. This unique system uses continuous heat and injection molding to produce dentures that are comfortable and



Fig. 5: Mandibular tooth supported BPS overdenture



Fig. 6: Post operative view

functional. The acrylic is injected under pressure and during the curing process which produces a denture without shrinkage and warping which can occur under regular processing. Insertion of prosthesis done, [Fig 6] carefully explained post insertion instructions. Follow up check up done on regular intervals. Patient's feedback was positive.

DISCUSSION

When it has been decided by diagnostic procedure that the remaining natural teeth are suitable for supporting complete or partial denture, then this form of treatment must be considered the primary plan of treatment. Periodontally the teeth should present minimum mobility, have acceptable bone support. Treating abutment teeth endodontically is advantageous as the crown-root ratio can be made more favorable, and the reduction of the clinical crown provides an interocclusal distance more favorable by placing the artificial tooth in an esthetically acceptable position. The use of two teeth bilaterally in mandibular arch has met with satisfactory results when the patient has been educated in what to expect from the treatment.

A study by **Crum and Rooney (1978)**⁶ compares bone loss between patient with conventional dentures and patients with overdentures. By retaining teeth for an overdenture, the resorption of the alveolar bone surrounding these teeth was reduced by eight times. In addition, the alveolar bone between the abutment teeth and the alveolar bone posterior to the abutment were also preserved in both height and width. This type of study clearly shows that the use of the overdenture preserves alveolar bone.

FRPD (Flexible removable partial dentures) are practically indicated in every partial edentulous condition provided the patients are ready to keep a removable appliance in his/her mouth. Flexible partial dentures utilizes the undercuts in the ridge for retention so it is indicated in ridges where bilateral undercuts are present. It is indicated in patients who are allergic to acrylic monomers as there is almost no free monomers in this material; cases where clasps have to be given in esthetic zone like on maxillary canine, cases where economical conditions limit the use of implant and patient does not want FPDs. In patients who are allergic to nickel, flexible partial dentures can solve the problem faced with cast partial dentures⁷.

The occlusal interference may be present during latero-trusive movements and protrusive movements⁸. If the occlusal interference cross the threshold of adaptive capacity of the Temporo-mandibular joint, muscles of mastication and neuromuscular system, it leads to muscle hypertrophy, muscle fatigue, spasm, headaches, cranio-mandibular dysfunction syndrome, wear facets, fractured cusps, tooth mobility. Parafunctional habits like bruxism. So correction of occlusal interference is recommended in the early stages^{1,9}.

Treatment with combination of tooth supported Overdenture and FRPD fulfills the criteria of preventive prosthodontics that prevents the migration of remaining natural teeth, prevent the supra eruption and prevent the contact between the teeth, alveolar ridge, restore the function, esthetics, restore the muscular tonicity, restore the vertical height, jaw health (alveolar bone preservation) and avoids the abnormal jaw habits¹⁰.

CONCLUSION

Even though prosthodontics is a specialized field in replacement of missing teeth and hard & soft tissues, the preventive aspect of prosthodontics cannot be ignored. There are certain conditions which may disturb patient's orofacial region and their well being, but prosthodontics plays a valuable role with high therapeutic and preventive character. Though implants are popular now a days but tooth supported overdenture remains efficient treatment modality for its periodontal proprioception and minimized residual ridge resorption. Positive feedback received from patients for FRPDs due to its comfort of use and least invasive mouth preparation needed. Different problems can be solved and prevented by systematically executing a preventive prosthodontic practice.

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