Case Report

Restoration of Moderately Resorbed Maxillary Ridge with Fixed-Removable Partial Denture

Dhanasekar Balakrishnan¹, Manawar Ahmad²*, Abdullatif Albiniali³, Ahmed Areashi⁴ and Hina Naim²

¹Department of Prosthodontics, Manipal College of Dental Sciences, Manipal, India
²Department of Prosthodontics, College of Dentistry, Jazan University, Saudi Arabia
³Restorative Dentistry, Saudi Board
⁴College of Dentistry, Jazan University, Saudi Arabia

Abstract

Among the various restorative treatments developed for the patient with an unaesthetic anterior edentulous space, the fixed-removable prosthesis may be considered as one of the treatment choice which can restore the moderate size defects in the anterior region of both maxilla and mandible. Due to constrain of fixed pontic in relation to these residual ridges, an approach to the treatment in such patients has been conceived whereby a removable pontic section is supported directly by adjacent abutment teeth in a manner similar to that of fixed prosthesis. It provides a combination of some of the best attributes of both fixed and removable partial dentures.

This article presents the history, indications, method of fabrication, advantages, disadvantages and limitations of fixed-removable partial denture. It also illustrates a case report for the treatment of maxillary anterior missing teeth with moderately resorbed residual ridge replaced with a fixed – removable prosthesis.

Keywords: Fixed Partial Denture; Removable Partial Denture; Fixed-Removable Partial Denture

Introduction

The fixed-removable partial denture, also known as Andrews's bridge system was introduced by Dr. James Andrews of Amite, Louisiana (Institute of Cosmetic Dentistry, Amite, L. A.). The Andrews's bridge system is constructed from a fixed bridge with removable pontics. The fixed bridge is made of porcelain fixed to metal crowns, fused to a pre-manufactured bar that is permanently cemented to the prepared abutment, while the removable pontics are made of metal sleeve tract embodied within an acrylic removable partial denture. This technique possesses the advantage of flexibility in placing denture teeth as well as the stabilizing qualities of a fixed prosthesis [1].

History Of Fixed-Removable Partial Denture

Bennet blade, developed between 1915-1920, appears to be the first attempt to use a precision or semi precision bar and sleeve assembly that provided for rotational stability gained directly through the substructure bar and abutment teeth. An approach by Fossume using a round bar attached to abutment crowns that supported a supra-structure, appears to be the first attempts to construct a fixed-removable partial denture. Other variations that employed the “bar and clip” concept for retention and extended tissue coverage for rotational stability were presented by Dolder, and more recently by Baker, Hader and Andrews. Development by Andrews consisted of prefabricated arch bar and matching sleeve to which replacement teeth and other supra-structure elements were attached [2].

Indications of Fixed-Removable Partial Denture

Primary indications for this restoration are cases where the abutments are capable of supporting a fixed partial denture but the residual ridge has been partially lost due to trauma, congenital defects or other pathologic processes so that a conventional fixed partial denture would not adequately restore the patient's missing teeth and supporting structures. The other indications are for the patients requiring natural diastemas to be harmonized in the artificial dentition; patients whose residual ridge has a relationship to the opposing dentition that would prohibit the esthetic placement of the pontics of a fixed partial denture [3].

Fabrication of the Andrews Bridge System

The fixed-removable prosthesis consists of a substructure bar designed for the specific contour of the residual ridge being treated and it is attached with the abutment castings. A matching supra-structure to which the replacement teeth are attached is fabricated and fitted accurately to the substructure. It provides exceptional retention and resistance to rotational forces for the supra-structure. The position of substructure bar is determined largely by the position of the replacement teeth. It should be placed immediately

*Corresponding author: Manawar Ahmad, Department of Prosthodontics, College of Dentistry, Jazan University, Saudi Arabia, E-mail: ahmad955mls@gmail.com

Sub Date: May 20, 2016, Acc Date: June 1, 2016, Pub Date: June 3, 2016

Citation: Dhanasekar Balakrishnan, Manawar Ahmad, Abdullatif Albinali, Ahmed Areashi and Hina Naim (2016) Restoration of Moderately Resorbed Maxillary Ridge with Fixed-Removable Partial Denture. BAOJ Dentistry 2: 015.

Copyright: © 2016 Dhanasekar Balakrishnan, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
lingual to these teeth so that excessive bulk in the lingual contour of the superstructure can be avoided or minimized. The path of placement, although essentially vertical in direction, should allow the superstructure to be placed from the labial aspect towards the lingual to minimize the embrasures between the abutment teeth and replacement teeth [4].

Case report

A 46 year old male patient reported with the chief complains of missing anterior teeth in the upper jaw. Intra oral examination showed loss of maxillary left & right central incisors due to trauma four years back (figure 1). There was an adequate amount of alveolar bone loss in both vertical and horizontal direction at the maxillary anterior edentulous site, which was confirmed with Intra oral radiographs. There were no clinically significant findings on the remaining maxillary teeth. The condition of abutment teeth was evaluated and the treatment plan was to fabricate the fixed-removable prosthesis to restore this esthetically challenged maxillary edentulous region. Another treatment option was implant placement after augmentation of the maxillary edentulous ridge however; this approach was not acceptable to the patient for financial reasons.

Intentional root canal therapy of the right and left maxillary lateral incisors was carried out. The abutment teeth were prepared for ceramo-metal preparations with more reduction on the axial walls of abutments approximating the pontic to allow space for joining the supra-structure bar and metal retainer (figure 2). It reduces the chances of breakage of the bar and retainer at this junction. Double mix single step impression technique was used to make the final impression using light and medium body elastomeric impression material. Provisional bridge was cemented and oral hygiene instructions were given to the patient (figure 3). Master casts were poured and mounted in the articulator. Inlay wax patterns for the retainers were made on the prepared dies. Supra-structure bar was made with inlay wax and attached to the wax pattern (figure 4). The bar, which is positioned for the least restrictive path of insertion, should provide at least 1.5mm of occlusal clearance and should be positioned in the same horizontal position as the center of the pontic teeth. The entire wax assembly was then cast. Finishing and polishing of the metal framework was done in the conventional manner. Metal frame work was inserted in the mouth to verify the proximal, marginal and occlusal relationships and the shade selection was done (figure 5). Adequate space for the substructure to replace the missing teeth was verified. A 0.5mm deep groove was made on the facial and palatal side of the super-structure. This groove helps in the retention of substructure. Wax pattern was fabricated over the super-structure and casted, finished & polished. The substructure was verified to check the fit over the super-structure. Self-cure acrylic base plate was adapted over the substructure and bite registration was done. Teeth arrangement was carried out and patient was called for try-in appointment. The porcelain was finally contoured and stained at this point before it is glazed. The flange was festooned and removable pontic was processed in heat cure acrylic. At the final insertion appointment,
the restoration was adjusted before cementation. The framework was cemented first without the pontic on the bar to assure that the abutments were fully seated (figure 6). The framework should not impinge on the tissue. The tissue surface of the bar was grounded and polished to relieve contact with the interdental papilla. Home care instructions were given to the patient and recalled after 2 weeks for evaluation (figure 7 & 8).

Discussion

The concept of fixed-removable partial denture presents a combination of some of the best attributes of both fixed and removable partial denture. It minimizes many of the short comings of each modality. Compared to the conventional removable partial denture, the fixed-removable partial denture is more stable because it is totally tooth borne and the occlusal forces are directed more along the long axes of the abutment teeth. The framework is constructed of ceramometal retainers which can be contoured and stained at the framework try-in appointment. The use of conventional removable partial denture of necessity incorporates coverage of soft tissue by major connectors and other necessary elements of the prosthesis & involves several of the teeth as suitable abutments for stabilization [5, 6].

Compared to the conventional fixed partial denture, the pontic teeth are arranged during the esthetic try-in appointment. The flange of the pontic assembly is contoured to improve the comfort, esthetics and phonetics and to resist the possible torque during function. Moreover, in contrast to conventional fixed partial dentures, the pontic assembly is removed to facilitate hygiene procedures and may be relined as the ridge resorbs. In this way a replacement or pontic section could be used that (1) would cover a minimum of soft tissue, (2) could afford a means of replacement of teeth with optimum esthetic arrangement, (3) could compensate for soft tissue defects and (4) could be removed by the patient for easy day-to-day hygiene [7-9].

Advantages of Fixed-Removable Partial Denture

Flexibility of Design: Being custom made to the contour and alignment of each individual mouth, the substructure affords opportunity for wide variety in design, placement, contour and retentive capability.

Oral Hygiene: The removal of supra-structure permits easy cleaning of the underlying tissues which usual problems associated with conventional fixed partial denture.
Minimum Tissue Coverage: It extends only to the areas where loss of residual ridge has occurred, does not cover the unnecessary palatal or lingual tissue like a conventional removable partial denture which affords greater acceptance by patient.

Durability: It is more durable and has very less maintenance problems. Breakage and major repair have been found to be infrequent.

Esthetic Results: The wide selection of replacement teeth and restorative materials allows optimum esthetic results even in patients where considerable deformity occurs.

Ease of Adjustment: The broad frictional areas of the substructure enable inherently stable prosthesis. The wear of frictional surfaces that occurs with time has very little effect on retentive character of supra-structure. The wear and fracture incidence seen in pontic assemblies are similar to those found in conventional removable partial dentures and can be easily repaired. During this time, only a few adjustments with three-prong pliers are needed.

Disadvantages of Fixed-Removable Partial Denture

Gingival Response to Fixed Substructure: When a fixed part of prosthesis is in continuous contact with soft tissue, hygiene maintenance of the region becomes a potential problem. However being of narrow dimension (1.5-2mm in width) and rounded labio-lingually where tissue contact is made, the fixed substructure presents a minimum contact area that can be easily cleaned by patient.

Precise Technical Procedure: Although the technique is not extremely difficult, a certain degree of fine craftsmanship is required. The technique is more time consuming than either a removable partial denture or conventional fixed partial denture.

Limitations of Fixed-Removable Partial Denture

Abutment Requirements: The abutment requirements for the fixed-removable partial denture are identical to those of the fixed partial denture. Both derive their entire support from the abutment teeth, not from the ridge.

Common Path of Placement: The path of placement and removal of the retentive elements of the abutment preparations must be in directional harmony with each other. Long axis of abutment teeth must sufficiently harmonious so that preparation of teeth may present the required degree of parallelism and occluso-gingival length to provide adequate retention and stability.

Crown-Root Ratio: The bony support of the abutment teeth, amount and character of supporting bone and ration of root length coronal to the alveolar crest is vital to the success and longevity of the prosthesis.

Span Length: If excessively long spans are encountered, use multiple abutments may be required. It may be contraindicated for patients with excessively long span and inadequate abutment support.

Rotational Forces: The more actuate the pontic in its configuration, the greater is rotational moment that is reflected to the abutment teeth. The length of span and curvature of pontic from axial alignment of the abutment are the limiting factor to use of this modality.

Inter-Occlusal Space Requirement: A minimum occluso-gingival height of 3-4mm is necessary for proper function of the prosthesis. However, usually there is more than adequate space available due to damaged ridges and lost alveolar process.

Conclusion

The technique and rational has been presented for the fixed-removable partial dentures. This type of dentures has qualities of both the fixed partial denture and removable partial denture. It is indicated where the abutments would support a fixed partial denture but a sever defect is present in edentulous space.

References