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CASE REPORT

Cantilevered resin bonded bridge: A conservative approach to restore periodontally compromised teeth- a case report.

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ABSTRACT… Multiple treatment options are available for replacement of a missing anterior tooth, each with its own pros and cons. This case report aims to describe the use of a conservative and cost-effective approach for replacing a missing mandibular anterior tooth with periodontally compromised abutment teeth. Here we describe a case in which a single abutment tooth was minimally prepared for a Cantilevered Metal Resin-Bonded Fixed Partial Denture. This report provides a brief literature review regarding the success rates and various designs for resin-bonded fixed prosthesis. It also emphasizes on proper case selection for better long-term prognosis. The results after 1 year follow up of this case demonstrated optimal clinical success of the restoration which encourage the use of this minimally invasive technique for replacing missing teeth.

Key words: Resin Bonded Fixed Partial Denture, Missing Anterior Tooth, Conservative.

INTRODUCTION

One of the greatest challenges in aesthetic dentistry is the restoration of missing anterior teeth. The importance of this challenge is compounded by the significant psychological impact it has on the patient.[1] While exploring the treatment options available, one comes across multiple alternatives, such as Implants, Removable and Fixed Partial Dentures.[2] Depending on the bone availability, an implant is the first treatment of choice, but its high cost and invasive nature demerit its use.[3] The option of Removable Partial Dentures (RPDs) may be utilised for the interim period but it is not suitable in the long run as it can lead to further gingival recession and bone resorption.[4] In addition, patient satisfaction rates with RPDs are relatively lower. Fixed Partial Dentures (FPDs) on the other hand show high patient satisfaction rates and are cost effective as compared to implants.[5] However, the Conventional FPDs require extensive preparation of all surfaces of the neighbouring abutment teeth leading to their hypersensitivity and pulpal trauma, especially in younger patients. Moreover, periodontally compromised abutment teeth preclude their use. In this situation, an alternative option is the Resin Bonded Fixed Partial Denture (RBFPD)/ Resin Bonded Bridge which provides a less invasive and conservative option for the replacement of a missing tooth while conserving the remaining alveolar ridge and gingiva.[6]

Resin Bonded Fixed Partial Dentures (RBFPDs) consist of a pontic with unilateral or bilateral metal wings bonded to the lingual/proximal surface of the adjacent abutment teeth using resin cement. The abutment teeth require minimal tooth preparation restricted to enamel surface hence making it an easy and conservative procedure.[6] The resin bonds to the tooth chemically using the acid-etch technique and to the metal framework by either macromechanical, micromechanical or chemical means. A number of variations of the RBFPDs have been developed over the years based on these different modes of retention. Notable designs include the Rochette Bridge which incorporated macromechanical retention by perforations on the metal wing. Later, the

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Maryland Bridge was introduced which utilised micromechanical retention by electrolytically etching the metal surface.[7] The technique being used most popularly now is the chemical retention to a sandblasted metal surface. Grit blasting with 50 μm aluminum oxide produces an adequately retentive surface that enables chemical retention with the resin cement. The use of cements that chemically bind to both the enamel and the metal alloy (e.g. Panavia 21) have helped increased the success rate of RBFPDs significantly.[8] Additionally, more variations have been developed to further improve retention and esthetics of the prosthesis e.g. all ceramic and fiber reinforced composite bridges.[9]

Designs for RBFPDs can be cantilever (unilateral wing) or fixed-fixed (bilateral wings). Single-abutment cantilever designs have been shown to have a significantly lower risk of failure and greater longevity than resin-bonded bridges with two abutments. One study observed that the average survival of fixed-fixed designs was 7.8 years as opposed to 9.8 years of cantilever designs. The increased incidence of failure rate in the two-abutment design is thought to be due to differential movement of the abutment teeth resulting in debonding of one of the retainers.[9]

This clinical report describes a conservative method for replacement of a missing mandibular incisor using a cantilever type of RBFPD in a patient with periodontally compromised teeth.

CASE REPORT

History and Examination

A 38 years old female presented to the dental OPD with the chief complaint of a missing lower anterior tooth. She wanted replacement of her tooth with a fixed prosthesis and her main concern was esthetics. She gave a history of extraction of the said tooth 6 months ago due to increased mobility and pain. Intra oral examination revealed a missing left mandibular incisor (FDI 31). Calculus deposits and 2-4mm gingival recession was seen in the rest of the dentition. The teeth neighboring the missing left central incisor (31) were assessed as possible abutment options. The right central incisor (41) exhibited Grade 2 mobility and the left lateral incisor (32) exhibited Grade 1 mobility.

Diagnosis & Treatment Planning

A diagnosis of Moderate Periodontitis was made, confirmed by the bone loss in the Periapical Xray. The patient was counselled that in order to have a successful prosthesis, she needed to improve her periodontal health. Therefore, Ultrasonic scaling and curettage was performed. The patient was then medicated and oral hygiene instructions were reinforced. The patient was recalled after 1 month.

Diagnostic Impressions were taken using Cavex Cream Alginate to obtain study casts. The models were studied to determine the final treatment plan. The possible treatment options included an implant supported prosthesis, a conventional fixed bridge, a minimal preparation resin bonded bridge and a removable partial denture. The patient could not afford an implant and did not want a removable prosthesis hence these options were excluded. As the possible abutments (Teeth 32 and 41) were mobile (Grade 1 and 2 respectively) preparing them for a conventional bridge would have been counterproductive. Hence a minimal preparation cantilever RBFPD was planned for the patient using the left lateral incisor (32) as the abutment for the metal wing. A cantilever was preferred over a 2-wing design as the differential mobility of the abutments in the 2-wing design would have increased the chance of failure of the FPD.

Clinical Technique

The Mandibular Left Lateral Incisor (32) was minimally prepared lingually to receive the metal wing. Care was taken not to extend the preparation beyond the linguo-proximal line angles. A chamfer margin was prepared 1mm supragingivally and incisally the preparation was kept 2mm below the incisal edge. A small pit was made in the center of the preparation to aid in adhesion.

The Mandibular Impression was taken using Zhermack Elite HD Addition Silicone Impression Material by employing a single stage, two phase

(light body and putty) impression technique. The opposing maxillary Impression was taken using Cavex Cream Alginate in a plastic stock tray. The shade for the porcelain was also matched at this stage using Vita Tooth Guide Shade Master.

The Impression was sent to the lab for fabrication of a RBFPD. The design was a porcelain fused to metal pontic with a metal wing. The fitting surface of the wing was sandblasted using alumina 250 microns to create micromechanical retentive surfaces for the cement.

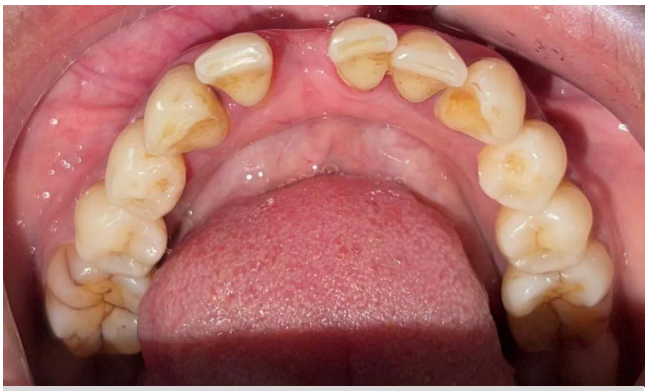
The bridge was tried in the oral cavity and assessed for fit and aesthetics. The metal surface was then cleaned with alcohol, sandblasted on the chairside and set aside. The area was isolated using cotton rolls and the abutment (32) was etched using 37% Phosphoric acid for 30 sec after which the tooth was washed and thoroughly air dried. Bonding agent was applied, excess of which was removed by the air syringe and then cured. ITENA'S TOTELCEM Self-adhesive permanent cement was then uniformly dispensed on the metal wing. The RBFPD was then properly seated in the oral cavity and the cement was light cured for 5 sec to achieve initial set. The excess cement in its gel state was removed at this stage using a probe. The cement was then light cured for a further 60 sec. Afterwards the cement was allowed to self-cure. Any high spots were removed carefully and the prosthesis was ensured to be out of occlusion in all centric and eccentric mandibular movements. Post Cementation instructions were given and the patient was called for follow up at regular intervals.

Follow-up

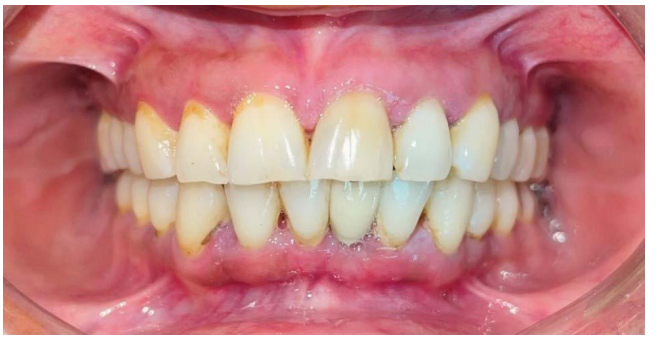
Follow ups at 3,6 and 12 month intervals showed no signs of debonding of the prosthesis. The patient was fully satisfied with the performance of the bridge.

DISCUSSION

Indications for RBFPDs include short edentulous spans and vital abutment teeth with minimum dynamic occlusal contacts. They have a better prognosis in anterior region, more specifically the mandibular incisor region, because of lower occlusal loads. According to latest studies, the 15-year survival rate of RBFPD was found to be of 95.1% in the anterior region and 66.5% in posterior region.[10,11] The patient in this case report had a missing mandibular incisor and minimal overbite with no history of parafunction (meaning decreased occlusal loading) hence making her the ideal candidate to receive the RBFPD.



Figures-1 & 2. Pre-Op Intra oral views with missing mandibular central incisor



Figures-3 & 4. Post Op Intra oral views with cemented RBFPD

RBFPDs, when used appropriately, offer a number of advantages over conventional FPDs. Firstly, they involve minimum preparation of the tooth surface that is confined to the enamel only, resulting in conservation of the remaining tooth structure and decreased potential for pulpal trauma. Anesthesia is not needed in such preparations which further enhances patient's comfort. Easy impression making along with no need of traditional interim restorations minimizes chair side time and hence further promotes its use. As the prosthesis is entirely supragingival, it causes minimal periodontal irritation and is an effective way of restoring teeth with a history of periodontal disease. In a periodontal evaluation done over a period of 10 years, it was found that the periodontal response of teeth resorted with RBFPDs was minimal and comparable to those restored using other types of restorations.[12]

The most common complications associated with the RBFPDs include: debonding (21%), tooth discoloration (18%) and caries (7%).[13] As mentioned earlier, studies have shown that the differential mobility of the two abutment teeth in fixed-fixed designs results in a greater incidence of debonding. Another study reported that the cantilever design is more resistant to debonding especially in cases where the abutment teeth are periodontally involved.[14] Thus, in order to minimize the risk of debonding in this case, a cantilever design was chosen.

The results after 1 year follow up of this case created much optimism regarding it survival. On average, the RBFPD is reported to have an overall survival rate of 77% after 10 years of service. This is a particularly good survival rate in view of its many advantages and a very easy rebonding procedure even if it debonds, A Research conducted on 358 patients documented that the patient satisfaction rate with RBFPDs was high and was not influenced by the occurrence of failure.[12]

Therefore, careful case selection, appropriate design and attention to operative detail are key factors that can ensure the long-term success of RBFPDs, making them ideal candidates for replacement of single anterior missing teeth.

CONCLUSION

RBFPDs have shown to be effective in replacement of missing teeth, restoration of oral function and aesthetics, along with having high levels of patient satisfaction. With detailed patient evaluation and the use of meticulous clinical techniques, the RBFPD should be considered more frequently as the restoration of choice for short spans.

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