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# Case Report

# Resin bonded fixed partial denture as an interim restoration

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#### ABSTRACT:

Prosthodontic treatment options for fixed restorations are many. Some of them are conservative and some are non-conservative. Resin bonded fixed partial denture derives its mechanical retention from the existing enamel of the tooth while the bridge itself bonds with the help of a resin cement. Its use has been limited to cases that are influenced by existing occlusion especially anterior guidance. We present a case of a young adult male patient who had lost his maxillary right central incisor in an accident and was studying in a college. The patient had esthetic emergency and did not opt for long duration orthodontic or implant correction. Two treatment plans included interim using a resin bonded FPD and a definitive treatment using a conventional fixed partial denture after correction of labially flared anterior tooth through cast post core. This case describes the interim treatment prosthesis in the form of the resin bonded prosthesis and discusses the advantages and drawbacks of the same. **Keywords:** abutment, cantilever bridge, fixed partial denture, resin cement, acid etching Introduction

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### **INTRODUCTION**

Multiple treatment options for different clinical Prosthodontics situations need to be presented to a patient seeking such treatment. Different options allow a patient to select which one is suitable for him at that time. This depends on a multitude of factors that are governed by economic suitability to time consumption. In present times, everyone is rather busy being it a student or a doctor or an old person sitting at home. With other factors being constant, the two most influential criteria in Prosthodontics are time restraints and economic affordability. Fixed partial denture supported by a natural tooth is one of the most desired treatment of young and elderly. If the condition is allowed, then all patients will prefer to have a fixed prosthesis rather than a removable one. This is obvious due to the advantages that fixed restoration has. Among many fixed prosthodontic treatment options, resin bonded (RB) and partial veneer (PV) supported FPD are least desired by both patient as well as a dentist. For a patient, the chances of developing secondary caries around the restoration and for a dentist the reduced retention and support such prosthesis offer. Still, such RBFPD designs are done and studies have shown that they are successful when evaluated in relation to time.<sup>1,2</sup> The term given to resin bonded prosthesis is mainly derived from its lack of retention which is overcome by cementation of the prosthesis with a resin cement. <sup>3</sup> The retention of RBFPD is primarily due to the resin cement tags that are developed as a result of etching on enamel.<sup>4</sup> Since its inception when perforations of the wings were done, RBFPD has developed many conservative techniques to increase the micro or micromechanical retention forms like etching and bonding.<sup>4</sup> Because of the chances of either retentive or aesthetic failures associated with RBFPD, their use has been limited to conservative or temporary restorations in the past.<sup>5</sup> Concepts that involve additional means of retention like grooves have increased their clinical survival supported well by development of stronger resin cements. <sup>6</sup> There was a time when small edentulous spaces were restored with cantilever prosthesis with the basis of conservation in mind. Sacrificing two teeth for the sake of one was considered illogical till studies showed that cantilever prosthesis was detrimental to periodontal health of abutment it was supported by. These cantilever restorations were used extensively despite having little biologic regard to the periodontium.<sup>7</sup> With advances in understanding of occlusal concepts and occlusal designs in natural teeth, such prosthetic options were limited to be used only in certain clinical conditions if and when occlusion would permit. Modified forms of cantilever designs like spring fixed partial denture were first thought to solve the problem, but they too have been limited to be used only in certain conditions. Lack of dental insurance in certain countries still allows patients to choose such treatment options and have been considered a durable treatment option in prosthetic dentistry.<sup>8</sup> With such limitations on other fixed prosthodontic treatment options, the focus shifted to RBFPD which has a better clinical performance record as reported in several studies. <sup>2,3,9</sup> This article presents a case of one such unique instance where a RBFPD was planned as an interim

treatment alternative that was influenced by the patient's demand and the clinical condition. The RBFPD was fabricated as a temporary restoration because of the age limit, clinical situation and economic/ time affordability.

## CASE REPORT

A male patient aged 24 years was referred to the prosthodontic department with chief complaint of impaired esthetics due to loss of maxillary and mandibular anterior tooth. The patient had lost both his teeth as a consequence of an accident. The patient was a student studying in a college, unmarried and living with his parents. Medical, social and drug related history was irrelevant to existing treatment. Dental history included regular aid like tooth brush and paste daily once with no use of other aids. The patient never had undergone oral prophylaxis in previous dental appointments. Extra oral examination showed normal parameters. Intra oral examination showed missing maxillary central and mandibular lateral incisors on the right side (Fig 1A, B). Maxillary and mandibular anterior teeth were flared, and presence of diastema in between the teeth was generalized. Patients concern was the maxillary central incisor since it was evidently absent to the viewer in normal speech. Since patients age was 24 years a treatment plan that was transitional was devised. This included orthodontic correction of maxillary and mandibular teeth followed by replacement of missing teeth with implant supported as first choice and fixed partial denture as the second choice. Patient refused orthodontic treatment due to economic reasons and also refused implant treatment for the same reasons. Both treatment options had a pretty long time before getting results and the patient needs immediate

correction. Conventional three unit fixed partial denture utilizing maxillary left central incisor and right lateral incisor was decided as definitive treatment. For maxillary left central incisor, the correction of labial proclination was decided to be corrected by the use of cast core (different inclination) from the root as mentioned in the literature. <sup>10,11</sup> Since the case was considered as an esthetic emergency therefore a tentative treatment plan was to fabricate a three-unit resin bonded FPD and later use the same abutment to correct axial inclination using cast post core followed by a threeunit conventional metal, ceramic FPD. The patient consented to the same treatment plan. Routine clinical and laboratory steps that included diagnostic impressions, mounted diagnostic casts on a programmed articulator, occlusal evaluation and centric occlusal correction were done. This was followed by diagnostic wax up and a resin index to check alignment of the missing tooth (Fig 1C). Clinical step involved preparation of maxillary left central incisor and right lateral incisor for a resin bonded prosthesis that was partially modified in terms of having retaining the ability (Fig 1D). Definitive impression was made using elastomeric impression material with a putty reline technique (Fig 1E). In the laboratory the metal framework was cast using the lost wax technique and the casting was evaluated for fit on the cast (Fig 2A). The metal framework was tried in the patient's mouth followed by bonding porcelain to the metal. The metal, ceramic framework was tried in the patient's mouth (Fig 2B, C). Since the metal framework was still exposed in the connector area, it was decided to fill the area with composite (Fig 2D). On the day of cementation, the prepared area was etched followed by application of bonding agent and then the prosthesis was bonded after application of a resin cement. The patient was given instructions for maintenance of the prosthesis as mentioned in the text book. <sup>12</sup> All centric and eccentric contacts were evaluated and corrected. The patient was followed up regularly and was scheduled for final treatment whenever he desired.



Figure 1: (a) Extra oral view shows missing maxillary right central incisor with flared maxillary left central incisor (b) Intraoral view shows mandibular right lateral incisor missing

with flared anterior teeth (c) Resin index with temporary tooth placed in position (d) prepared teeth for resin bonded bridge (e) putty reline impression for the prepared teeth



Figure 2: (a) Cast metal framework on working cast (b) Cast framework with bonded porcelain tried in the patient (c) Final restoration showing exposed connectors (d) Final resin bonded prosthesis with masked connectors using composite resin

## DISCUSSION

A Kennedy class 1 partial edentulous situation was successfully restored with the use of RBFPD of this clinical case report. Among various reasons for choosing such treatment option, were the patients affordability in terms of economics and time, patients age with a pulp chamber being large and local clinical condition (abutment flared or proclaimed). Irrespective of patient related conditions, any occlusal abnormality should be first corrected using the most conservative treatment option. Orthodontic correction is conservative option, but it has two major drawbacks that patients do not like. Economics and duration of treatment time. <sup>10</sup> Because the patient was a student, the treatment option of orthodontics was not desirable since it would have taken the time to complete and the situation for the student was an aesthetic emergency. In Prosthodontics, any tooth that is flared, rotated or malpositioned to a certain degree can be corrected using a combination of endodontic and restorative procedure. This correction of tooth can be achieved using a custom made cast post and core, in which the core is aligned to the desired axial inclination. Comparatively such treatment can be finished with a space of a few weeks as compared to orthodontic which may take more than a year to complete. The design of RBFPD is simple and is considered to be one of the most conservative designing in FPD. The preparation has to be done within enamel which was present in the patients since he was young. Because the abutment teeth were flared, there was no evidence of enamel wear or abrasion. The enamel thickness was sufficient to hold a RBFPD in place. <sup>13</sup> Many teeth which are long, do not allow placement of axial retentive grooves accurately which should be assessed beforehand. 14

Since the patient's teeth were slightly flared therefore the axial inclination of both abutments did not create any difficulty in placing these retentive grooves. Use of retentive grooves may not be desired if the prosthesis is made of zirconia framework as mentioned in the literature. <sup>15</sup> In such cases a guide or a resin template has been shown to be useful to whether groove placement determine will compromise the bridge design or not. <sup>16</sup> Stress distribution of an FPD in relation to an abutment will vary according to the type and position of the abutment.<sup>17</sup> If the tooth is central incisor or a canine, the stress distribution through the bridge is different when compared to a molar or a premolar. Likewise, in case the tooth is aligned parallel to the long axis then the stress distribution will have less horizontal components while a tooth whose axial inclination is not parallel, there will be more horizontal forces. In this case both abutments were flared and any occlusal contact on the bridge would have exaggerated the horizontal forces applied on the abutment teeth. Occlusal evaluation therefore plays an important role in deciding the type of prosthesis as reiterated by various authors.  ${}^{3,6,8,13}$  The significance of anterior guidance in the selection of such cases has also been discussed. <sup>18</sup> Flaring of teeth in this case reduces the steepness of anterior guidance which creates problems in the posterior artificial occlusal forms especially in prosthesis where posterior tooth forms are replaced (removable partial or complete denture). <sup>19</sup> The anterior guidance cannot be effective in such case unless orthodontic or prosthodontic correction of flared teeth was done. Therefore, this aspect of occlusal correction was decided to be done in definitive prosthesis after correction of axial inclination of the teeth. The results of this case are also comparable to other cases that have attempted use of RBFPD in the maxillary anterior region.<sup>20</sup>

#### CONCLUSION

A resin bonded fixed partial denture made of metal ceramic can be a useful alternative as an interim fixed prosthesis in cases similar to those described in this case. Young patients, patients with esthetic emergencies, conducive existing occlusal arrangement and economy and time feasibility are some of the clinical situations where one can recommend their use.

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#### CONFLICT OF INTEREST None

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