Acta Scientific Dental Sciences
Volume 2 Issue 5 May 2018
Case Report

Modified Resin Bonded Fixed Partial Denture– A Simplified Approach for Treating Long Span Edentulous Arch

Patel Hardi K[1]*, Patel Ina B[2], Chhabria Hinal M[1] and Patel Dipal A[1]

[1]Post Graduate Student, Department of Prosthodontics and Crown and Bridge, A.M.C. Dental College and Hospital, Ahmedabad Gujarat, India

[2]Post Graduate Guide, Professor and Head, Department of Prosthodontics and Crown and Bridge, A.M.C. Dental College and Hospital, Ahmedabad Gujarat, India

***Corresponding Author:** Patel Hardi K, Post Graduate Student, Department of Prosthodontics and Crown and Bridge, A.M.C. Dental College and Hospital, Ahmedabad Gujarat, India.

Received: March 19, 2018; **Published:** April 26, 2018

Abstract

The use of resin-bonded fixed partial dentures (RBFPDs) is one of the treatment options for replacing missing teeth when abutments are intact, caries free and have significant clinical crown height. Complex inter abutment stresses may lead to clinical decementation especially in long span edentulous arch where more than one teeth are missing in case of RBFPDs with rigid connectors. This disadvantage of RBFPDs with rigid connectors has lead to the development of the RBFPDs with nonrigid connector. The fundamental design principles for long-span RBFPDs with nonrigid connector emphasis on maximizing the resistance form of both the prepared abutments and the retainer as well as incorporation of a non-rigid connector allows free movement between the abutment teeth to minimize inter abutment stresses. This article presents a clinical case that replaces two missing lower posterior teeth using RBFPD with non-rigid connector.

Keywords: Nonrigid Connector; Mandibular Flexure; Resin Bonded Fixed Partial Denture (RBFPD); Fixed Partial Dentures (FPD)

Abbreviations

RBFPD: Resin-Bonded Fixed Partial Dentures; FPD: Fixed Partial Dentures

Introduction

The main aim of prosthetic dentistry is to achieve esthetics and function with preservation of intraoral tissues. Resin-bonded fixed partial dentures (RBFPDs) have become more popular as an alternative to conventional fixed partial dentures (FPDs) when abutments are sound, caries free/exhibit minimal carious lesions and have significant clinical crown height. The main advantage of RBFPDs is minimal loss of tooth structure during tooth preparation [1]. Literature shows that greater the number of units in the RBFPDs, higher will be the debonding rate [2,3]. The failure of RBFPDs with rigid connectors, particularly in long-span edentulous cases (four or more units) may be due to complex inter abutment stresses that occur during function, parafunction and possible mandibular flexure. These stresses may lead to clinical decementation [4]. Splinting of more teeth and use of rigid connection interfere with mandibular flexure, which ultimately transmit forces exceeding the spatial limits of the periodontal apparatus. The use of nonrigid connectors decreases the amount of stress transmitted to the periodontal apparatus by mandibular flexure [5]. This article presents the case report for replacing the mandibular posterior teeth with the help of RBFPD incorporating custom fabricated nonrigid connector.

Materials required for the case

- Putty and light body elastomeric impression material (Speedex, Coltene/Whaledent, Switzerland)
- Type IV dental stone (Pearl Stone, Asian Chemicals, India)
- Pattern wax (Surana Dental Wax, India)
- Nickle Chromium ceramic alloy (4all, IvoclarVivadent, Liechtenstein)
- Fluorapatite leucite glass based veneering ceramic material (IPS d- SIGN, IvoclarVivadent, Liechtenstein)
- Dual cure resin cement (Multilink Speed, IvoclareVivadent, Liechtenstein).

Case Report

A twenty six years old female patient came to our department with the chief complain of difficulty in chewing. There was no relevant medical history. Patient lost her lower right posterior teeth before six months due to caries. Patient wanted a fixed prosthesis.

On intraoral examination 46 and 47 were missing and caries was found in 45 (class II distal surface) and 48 (class I). 45 and 48 were periodontally sound. 44 was caries free and periodontally sound 44, 45 and 48 had sufficient clinical crown height (Figure 1).

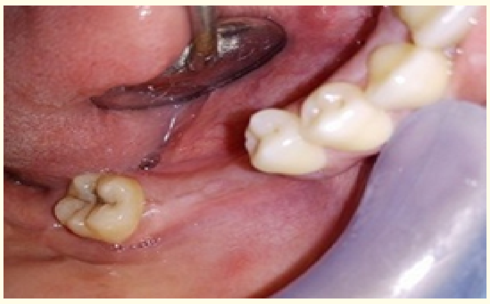

Figure 1: Pre-operative photograph.

As there was a long span partial edentulous arch, RBFPD with custom fabricated nonrigid connector replacing 46 and 47 using 44, 45 and 48 as abutments, with fulfillment of Ante's law was planned which was a conservative option for the patient. Reason for using custom fabricated nonrigid connector is that it is economical.

Clinical and laboratory procedure

1. Tooth preparation (Figure 2)

   Axial surfaces on all three abutments were prepared with supragingival knife edge margin.

   Lingual surface preparation was done in 44. Mesial and distal occlusal rests were prepared in 44.

   Lingual surface preparation was done in 45 which was extended distally with distal proximal box preparation. Mesial and distal occlusal rests were also prepared in 45.

   Since there was occlusal caries in relation to 48, inlay preparation was done in 48 with lingual cusps and lingual surface preparation. Proximal box on distal surface and mesial surface preparation with groove at mesiobuccal line angle were also prepared on 48.

2. Putty wash impression was taken (Speedex, Coltene/Whaledent, Switzerland).
3. Impression was poured using Type IV dental stone (Pearl Stone, Asian Chemicals, India).
4. Patrix portion of nonrigid connector was carved (Surana Dental Wax, India) on distal surface of the wax pattern of 45 retainer (Figure 3).
5. Casting of the wax pattern with patrix portion was done using Nickle Chromium ceramic alloy (4all, IvoclarVivadent, Liechtenstein which was finished and polished.
6. Metal framework with patrix portion was tried intraorally.
7. Metal framework with patrix portion was placed on the cast and wax pattern was fabricated for pontic 46, 47 and for retainer 48 (Figure 4).
8. Casting of the wax pattern with matrix portion was done, which was finished and polished.
9. Metal try in of anterior and posterior segments of RBFPD was done intraorally.
10. Ceramic buildup was done (IPS d- SIGN, IvoclarVivadent, Liechtenstein) on pontic 46 and 47.
11. Cementation of prosthesis

    The bonding surface of the retainers were airborne particle abraded using 50-μm aluminium oxide before cementation.

Figure 2: Photograph after tooth preparation for RBFPD.

Figure 3: Wax pattern of anterior segment of RBFPD.

Figure 4: Metal framework with patrixportion and wax pattern for posterior segment on the cast.

Firstly, the anterior segment with patrix portion was cemented and then the posterior segment with matrix portion was cemented intraorally with resin cement (Multilink Speed, IvoclareVivadent, Liechtenstein) (Figure 5-7).

Follow up was taken after fifteen days, three months, six months and one year which manifested excellent clinical success.

Figure 5: Cementation of anterior segment of RBFPD with patrix portion: Occlusal view.

Figure 6: Cementation of posterior segment of RBFPD with matrix portion – Occlusal view.

Figure 7: Cementation of five unit RBFPD– Buccal view.

Discussion and Conclusion

The annual debonding rate for RBFPDs placed on posterior teeth (5.03%) tended to be higher than that for anterior-placed RBFPDs (3.05%) [6]. Creugers., *et al.* noted that the mandibular posterior resin bonded bridges showed the lowest retention ratio [7]. Use of nonrigid connectors in FPDs with etched metal bonded retainers allow a high degree of independent abutment tooth mobility, which decreases dislodging forces on the abutment retainers. The pontics are supported during function but separate in the unseating directions [8]. Increasing framework resistance form was achieved by maximizing the surface area for bonding, which can be done by maximum axial encirclement of the abutment and additional occlusal coverage. Additional resistance features such as grooves, slots, or pin holes can also be used when required [9]. Improvement in bonding techniques and materials in RBFPDs have failed to completely solve decementation. A stress breaking modification in framework design has proved effective in preventing debonding of the prosthesis during function [10].

In this case report, long span mandibular RBFPD has been designed considering the following facts, which include:

- Selection of abutments without caries/minimal caries, with sufficient clinical crown height with sound periodontium
- Appropriate tooth preparation to increase resistance form of prepared abutments as well as retainers
- Incorporation of a custom fabricated nonrigid connector to allow independant movements between the abutments to reduce inter abutment stresses which ultimately prevents debonding of the RBFPD.

Bibliography

1. Boening KW. "Clinical performance of resin-bonded fixed partial dentures". *Journal of Prosthetic Dentistry* 76.1 (1996): 39-44.
2. CP Marinello., *et al.* "First Experiences with resin-bonded bridges and splints - a cross-sectional retrospective study, Part II". *Journal of Oral Rehabilitation* 15.3 (1988): 223-235.
3. Olin PS., *et al.* "Clinical evaluation of resin-bonded bridges: a retrospective study". *Quintessence International* 22.11 (1991): 873-877.
4. Botelho MG and Lam WY. "A fixed movable resin-bonded fixed dental prosthesis--A 16 years clinical report". *Journal of Prosthodontic Research* 60.1 (2016): 63-67.
5. Fischman BM. "The influence of fixed splints on mandibular flexure". *Journal of Prosthetic Dentistry* 35.6 (1976): 643-647.
6. Pjetursson BE., *et al.* "A systematic review of the survival and complication rates of resin-bonded bridges after an observation period of at least 5 years". *Clinical Oral Implants Research* 19.2 (2008): 131-141.
7. NHJ Creugers., *et al.* "Clinical Performance Of Resin-Bonded Bridges: A 5-Year Prospective Study. Ii. The Influence Of Patient-Dependent Variables". *Journal Of Oral Rehabilitation* 16.6 (1989): 521-527.
8. Crispin BJ. "Success of etched-metal bonded retainers with nonrigid connections: A clinical study". *Journal of Prosthetic Dentistry* 62.3 (1989): 269-272.
9. Botelho MG and Dyson JE. "Long-span, fixed-movable, resin-bonded fixed partial dentures: A retrospective, preliminary clinical investigation". *International Journal of Prosthodontics* 18.5 (2005): 371-376.
10. Plainfield S., *et al.* "A stress-relieved resin-bonded fixed partial denture". *Journal of Prosthetic Dentistry* 61.3 (1989): 291-293.

Volume 2 Issue 5 May 2018