

Clinical evaluation of resin-bonded bridges

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ABSTRACT

This study evaluated resin-bonded fixed partial dentures (FPDs) clinically. Forty patients received 40 resin-bonded FPDs. Two types of luting materials were used, Super Bond Crown and Bridge Material and Degufill SC composite.

The metal frame works for Super Bond Crown and Bridge Material were sandblasted only, and for Degufill SC composite were electrolytically etched. Clinical evaluation were performed at 3, 6, 12 and 24 months after cementation. None of the prostheses bonded by Super Bond Crown and Bridge Material lost retention, whereas two of the acid etched retainers required replacement after one year. Resin bonded prostheses appear to be favorable alternative to other types of fixed partial dentures.

Key words: Resin bonded bridge, acid etching, retainers.

الخلاصة

الدراسة عبارة عن تقييم سريري للجسور اللاصقة (Resin-Bonded Bridge)، اربعون مريض ثبتت لهم جسور لاصقة باستخدام نوعين من المواد اللاصقة (سوبر بوند كراون بريج مع ديكوفيل أس سي كومبوزت) مع طريقتين للتخريش الأولى باستخدام التخريش الكهربائي والمادة اللاصقة هي ديكوفيل أس سي كومبوزت والثانية باستخدام (Sand blasting) والمادة اللاصقة هي (سوبر بوند كراون بريج). التقييم السريري جرى بعد 3، 6، 12، 24 شهر من تثبيت الجسور فأظهرت النتائج بأن كافة الجسور المثبتة بمادة سوبر بوند كراون بريج ثابتة خلال فترة التقييم ولكن اثنين من الجسور المثبتة بمادة ديكوفيل أس سي كومبوزت فقدت الالتصاق بعد سنة من التثبيت وقد أعيد لصقها ثانية.

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INTRODUCTION

Resin-bonded fixed partial dentures (FPDs) have become popular alternative to conventional fixed partial dentures when abutments are intact or exhibit only minimal carious lesions. Since the introduction of resin bonded FPDs by Rochette⁽¹⁾ in the early 70s numerous improvement in technique and designs for tooth preparation to resist dislodgment have been described⁽²⁻⁷⁾. The advantages of these prostheses include minimal tooth reduction without dentinal or pulp involvement, avoidance of anesthesia or gingival displacement cords, use of relatively reversible procedures, use of thin, highly polished supragingival retainers, potential for improved esthetics and reduced fees. Despite acceptance there are limitations to use of resin-bonded restorations, they are not indicated for long span cases or when abutments have large restorations, extensive caries, short clinical crowns or extensive abrasion erosion or wear. The restoration cannot be temporarily cemented therefore no trial period to evaluate occlusion, contour or esthetics, despite these limitation this method of treatment has become popular.⁽⁸⁾ The long term success of resin bonded restorations depend on how well retainers remain adapted to tooth structure. Short term debonds within the first few months are usually the result of inadequate retention, poor retainer design or bonding to contaminated enamel or metal surfaces.⁽⁸⁻¹²⁾ The purpose of this study was to evaluate resin-bonded bridges fabricated using two different methods for preparing the metal frame works and two types of luting materials.

MATERIALS AND METHODS

Patients were selected from dental clinic of College of Dentistry, Mosul University and from private clinics with the following criteria (1) caries free abutments, teeth with out existing restorations or with small restoration on uninvolved surfaces (2) limited occlusal contacts (3) acceptable alignment of abutment teeth (4) teeth with out mobility, and (5) suitable enamel surfaces for etching. Forty patients receiving 40 resin-bonded fixed partial dentures (29) females and (11) males the average age of the patients was 31 years the study was conducted between 1997 and 1999. Patients having missing tooth which is either central, lateral, canine, first premolar and second premolar. The cases were evaluated for periods of two years. Tooth preparation followed the established principles, maximum enamel for bonding were used and preparations did not penetrate dentin, margins remained at one mm supragingivally and are one mm from adjacent teeth. At least one occlusal or cingulum rest was placed on each abutment, adjacent to edentulous area for anterior bridge. Guide planes prepared on proximolingual tooth surfaces, creating a definite path of insertion. To prevent lingual displacement of a prosthesis, a guide planes extended slightly facial to line angle adjacent to edentulous areas forming a proximal wraparound. When esthetic was critical, proximal grooves were placed in line of proximal extensions to avoid metal display. Laboratory procedures were performed by the same dental technician using CB Blando72 (Hatakegama Dental MFG. Co. Ltd. Japan) for fabrication of the metal frame works, the frameworks were 0.4-0.5 mm thick. The metal framework for 18 cases were etched electrolytically and bonded Degufill Sc composite. The remaining cases were sandblasted and bonded by Super Bond Crown and Bridge material as shown in Table (1).

Table (1) : The type of frame work preparation.

Prostheses	Electrolytically etched and fixed with SC Degufill composite	Sand blasted fixed with Super Bond Crown and Bridge Material
Maxillary	8	14
Mandibular	10	8
Total	18	22

Luting Procedure :

The bridges were checked to know the proper path of insertion by seating the appliance several times. The teeth are cleaned thoroughly and dried, and the exposed enamel on the bonding surface etched using a 35% phosphoric acid for one minute followed by thorough rinsing with water spray for 30 seconds, and the electrolytically etched cases (18 cases) were bonded to the tooth surface using Degufill SC self curing composite (Degussa Dent Inc. Germany) the composite was mixed according to the manufacturer directions and placed on the metal side only. The fixed prosthesis carried to the mouth and seated with even force applied to the abutment teeth until setting of the resin while the prosthesis being held in place a dental assistant removed excess resin with an explorer before polymerization. Any remaining resin was removed with finishing bur, used with water coolant. The occlusion was evaluated, if necessary adjusted. The remaining cases (22 cases) were bonded to the tooth structure using Super Bond Crown and Bridge Material (Sun Medical Company Ltd., Kyoto, Japan) following the same procedure prostheses were checked, the abutment teeth cleaned dried and etched with 35 % phosphoric acid the bonding material mixed according to manufacturer directions and applied to both the metal framework and the abutment teeth the prosthesis seated, excess removed and occlusion checked, in a similar manner of the etched frameworks. All cases were evaluated at 3, 6, 12 and 24 months.

RESULTS

The type of missing teeth for resin bonded fixed partial dentures is shown in Table (2). The first and second recall were after 3 and 6 months, all the prostheses were in function. After 12 months two of the electrolytically etched and bonded by Degufill SC self curing Composite were debonded. The debonded prostheses were fabricated for missing first premolar and second premolar. The prostheses were cleaned and replaced again. The forth recall was after 24 months. All prostheses were in function. Marginal periodontitis was not observed in any of the patients in the observation period. An occlusal gap with dental caries were observed in one of the

electrolytically etched prosthesis, this was repaired using resin composite and the prosthesis remain in function .

Table (2) :Missing Teeth for which a resin bonded Prosthesis was fabricated

Teeth	Central Incisors		Lateral Incisors		Canine		First Premolar		Second Premolar		Total
	*M	**F	M	F	M	F	M	F	M	F	
Maxillary	2	4	3	5	-	1	-	3	1	3	22
Mandibular	4	4	1	6	-	-	-	1	0	2	18

*M : Male **F :Female

DISCUSSION

The major problem with the acid etched fixed partial denture seems to be retention, poor retention was the cause of debonding for the two prosthesis etched electrolytically and bonded by Degufill SC composite since there is break down of the resin and separation from the metal framework, this may be due to contamination during bonding. While Super Bond Crown and bridge material showed good retention since there is a chemical bond between the metal and the luting agent. In most of the studies of resin bonded posterior fixed partial dentures a less favorable prognosis was found because many were debonded,⁽⁸⁻¹⁴⁾ some other studies have shown posterior resin bonded prostheses with^(8,11,15) or few^(16,17) debonding. In some studies the survival of resin bounded fixed partial denture was better for prostheses in maxilla than in the mandible^(8,9) . A similar observation was not made in the present study where the two lost prostheses were placed in the maxilla.

CONCLUSIONS

- After two years of observation the following conclusions may be made :
- Sufficient retention could be obtained with resin bonded fixed partial dentures.
 - None of the prostheses luted by Super Bond Crown and Bridge material were lost retention up to two years observation.
 - Two of the electrolytically etched and bonded by Degufill SC self curing composite prostheses failed at 12 months observation.

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