

## A three-unit mandibular resin-bonded fixed partial denture seated after closing anterior open spaces: A clinical report

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This clinical report describes a resin-bonded fixed partial denture (RB-FPD) seated with the aim of replacing a congenitally missing lateral incisor as well as for permanent retention after minor teeth movement. A RB-FPD framework was cast from silver-palladium-copper-gold alloy (Castwell M.C. 12), and the pontic was veneered with indirect composite material. The RB-FPD was treated with a metal priming agent (Alloy Primer), and bonded with a composite luting agent (Panavia Fluoro Cement). After an observation period of seven years and six months, the FPD was functioning satisfactorily without periodontal rebound. The materials and technique reported here are applicable as an option for fixed prosthodontic treatment after closing anterior open spaces in adolescent patients. (*Int Chin J Dent* 2008; 8: 29-32.)

**Key Words:** adhesive, alloy, primer, resin-bonded fixed partial denture, retainer.

### Introduction

Replacement of missing teeth in the anterior region is important for recovering tooth anatomic form, esthetics, mastication, pronunciation and other oral functions. After orthodontic alignment of the dentition, it is necessary for patients to wear retainers for stabilizing their teeth and periodontal tissues. Both removable and fixed retainers are used according to the location and number of teeth to be retained. Among them, resin-bonded fixed partial dentures (RB-FPDs) with minimal tooth reduction are applicable and acceptable as permanent retainers after orthodontic treatment as well as for replacement of missing teeth.

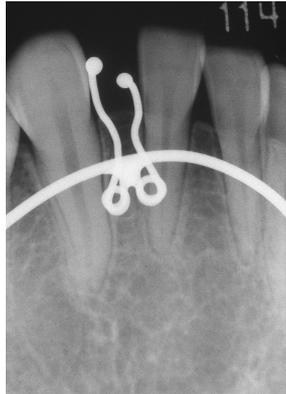
Noble metal alloys are more desirable as FPD frameworks than base metal alloys because of their adaptation to abutments. Moreover, a single liquid primer that contains a thione monomer (Alloy Primer, Kuraray Medical Inc., Tokyo, Japan) has been introduced for bonding dental noble metal alloys.<sup>1</sup> Although a number of prosthodontic applications of the Alloy Primer material and composite luting agents (Panavia systems, Kuraray Medical Inc.) have been reported, only limited information is available about the long-term clinical performance of the Kuraray metal bonding systems.<sup>2-4</sup> This clinical report describes the 7.5-year clinical performance of a RB-FPD seated in the mandibular dentition for recovering esthetics and oral function after closing open spaces.

### Clinical Report

A 16-year-old female patient presented with esthetic and functional disturbances as a result of congenitally missing right mandibular lateral incisor. The patient had undergone orthodontic treatment previously and was wearing a removable retainer (Fig. 1). Several treatment options were therefore proposed: 1) single-tooth implant; 2) RB-FPD without tooth reduction; 3) direct-bonding of an artificial pontic; and 4) a removable partial denture similar to the removable retainer. The patient chose the second of the proposed techniques. The procedure was then explained in detail and consent was obtained from the patient and her mother.

Centric occlusion, lateral mandibular movement, and anterior guidance were examined intraorally with articulating paper and extraorally using a stone cast. After examination of the maxillo-mandibular relation, the areas to be bonded were determined. Reduction of enamel was judged as unnecessary. However, the

prospective bonding area of the retainers was extended as much as possible within the lingual and proximal surfaces of the abutments.



1

**Fig. 1.** A radiograph with the retainer used for retention after orthodontic treatment.



2

**Fig. 2.** Pre-operative facial view.



3

**Fig. 3.** Facial view of the RB-FPD seated with the Alloy Primer and Panavia Fluoro Cement system.



4

**Fig. 4.** Occlusal view of the RB-FPD.



5

**Fig. 5.** Facial view of the RB-FPD two years after cementation.



6

**Fig. 6.** Occlusal view of the RB-FPD two years after cementation.

An impression of the entire mandible was made with addition silicone elastomeric materials (Exafine Putty and Injection, GC Corp., Tokyo, Japan) using a stock tray. Die stone (Fuji Rock, GC Corp.) was poured into the impression, and a working cast was prepared. The stone cast was then mounted in a semi-adjustable articulator with an opposing cast. The pattern of the retainer and pontic was fabricated using an inlay wax material (Inlay

Wax, GC Corp.), and invested with a mold material (Cristobalite Micro, GC Corp.). An FPD framework consisting of two retainers and a pontic, was cast from silver-palladium-copper-gold alloy (Castwell M.C. 12, GC Corp.). The pontic was of sanitary type, the buccal surface of which was veneered with an indirect composite material.

On the second appointment, the completed FPD was tried-in. The inner surfaces of the retainers were air-abraded immediately before bonding, with 50- to 70- $\mu$ m grain sized alumina (Hi-Aluminas, Shofu Inc., Kyoto, Japan) using an airborne particle abrader (Micro Blaster MB102, Comco Inc., Burbank, CA, USA), and treated with a single liquid primer designed for both noble and base metals (Alloy Primer). The lingual enamel surfaces of the abutment were etched with 40% phosphoric acid gel (K-Etchant, Kuraray Medical Inc.), washed with water, and air-dried. The FPD was then seated with Panavia Fluoro Cement adhesive (Kuraray Medical Inc.). The patient entered a maintenance program and was examined twice every year (Figs. 2-6). After an observation period of seven years and six months, the RB-FPD was still functioning satisfactorily.

## Discussion

It is necessary for patients to use retainers after minor tooth movement. The influence of destabilizing factors, i.e., periodontal rebound, subsequent mandibular growth, and resting periodontal tissue pressure can be minimized with either removable or bonded retainers. Probability of detachment of retainers is greater than that of FPDs. This is due to the continuous rebounding force applied to the abutment roots. The composite veneer of the pontic was somewhat extended to the proximal surfaces and incisal edges of the abutment teeth with the intention of stabilizing the mandibular anterior dentition. An ideal cervical contour could also not be provided to the pontic so as to allow cleaning with an interdental brush or Super-floss. As a result, the anatomic form of the pontic was not highly aesthetic. The patient and her mother, however, were satisfied with no-reduction of the abutments rather than other factors.

A noble metal adhesive system (Alloy Primer and Panavia Fluoro Cement) combined with enamel etching using phosphoric acid was applied in the patient to achieve durable bonding between the FPD retainers and abutments. This is a simple and tooth-conservative technique, which is especially useful for adolescent patients because tooth attrition is not apparent, and the clinical crown/root ratio is unpredictable at this age. Although regular check-ups are essential, the techniques and materials described in this clinical report may be useful as a post-orthodontic prosthodontic treatment option in adolescent patients.

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