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Resin-Bonded Overcasting to Salvage a Long-Span Fixed Prosthesis: A Clinical Report

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Abstract

To salvage a failing long-span fixed partial denture (FPD), a resin-bonded overcasting made of a silver-palladium-copper-gold alloy was fabricated and cemented using an adhesive metal conditioner and adhesive resin luting agent to an existing multiple-abutment FPD.

Dentists are occasionally faced with a situation in which one of the retainers of a long-span fixed prosthesis that includes multiple restorations is difficult to remove. When this situation occurs, the prosthesis must be entirely removed and a new one fabricated. This treatment requires many appointments, a long treatment period, and high cost, although the procedure is ideal and reliable.

The overcasting technique[1-6] is a practical option offering a solution to such a situation. The fabrication of an overcasting incorporated with the existing adjacent metal-ceramic fixed partial denture (FPD) has been reported.[6] The present article describes the fabrication and 10-year clinical follow-up of a resin-bonded overcasting used to salvage a long-span prosthesis consisting of multiple restorations using a metal conditioner and an adhesive resin luting cement.

Clinical report

A 68-year-old man presented with the chief complaint of spontaneous pain in the right maxillary posterior region. Examination led to a diagnosis of acute pulpitis associated with a deep carious lesion of the right maxillary first molar. The molar was restored with a full veneer crown, which served as one of the retainers of a long-span FPD. This FPD, which included full veneer crowns from the right first molar to the left second premolar, replaced the missing right canine and the two first premolars. The connector area of the retainers between the second premolar and the first molar was sectioned, and the full veneer crown of the first molar was removed. All caries was removed, and the tooth was endodontically treated. The remaining prosthesis was esthetic, and the occlusion was stable, although there was a slight problem with the marginal fit of the removed crown. In addition, the patient strongly preferred conservative repair instead of the replacement of the entire large prosthesis, mainly due to his general poor health. Therefore, the addition of a resin-bonded overcasting with a partial veneer restoration of the second premolar and a full veneer crown of the first molar was proposed as an alternative treatment plan with associated risks outlined. The patient accepted the plan.

A cast post and core made of a silver–indium alloy (Miro Bright, GC Corp., Tokyo, Japan) was seated on the first molar. The right maxillary first molar was prepared in the standard manner for a full veneer all metal crown. A partial veneer preparation[7] was limited to the buccolinguodistal metal surface of the second premolar, and vertical grooves for mechanical retention were made using a diamond point (Fig 1). Although the distal surface of the dentin of the second premolar was partially exposed, it was not a concern, because it would be completely covered by the overcasting and sealed by an adhesive luting cement. An impression was made with a silicone elastomeric material (Dent Silicone-V Putty and Injection, Shofu, Inc., Kyoto, Japan), and a master cast was prepared (Fig 2). A wax pattern for the splinted full veneer first molar and premolar overcasting was fabricated, sprued, and invested. A silver-palladium-copper-gold alloy (Castwell M.C. 12, GC Corp.) was cast and polished (Fig 3). The overcasting was tried-in, adjusted, and polished, and the inner surface was air-abraded

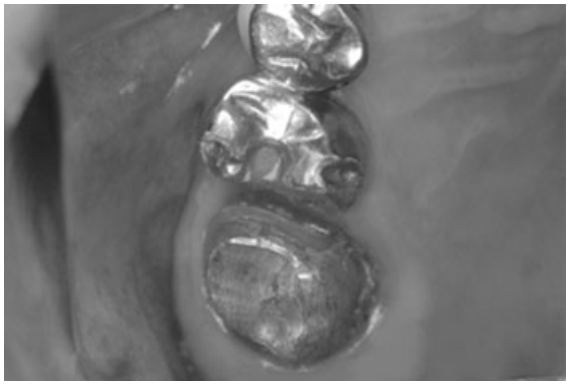

Figure 1 Preparations of the second premolar and first molar.

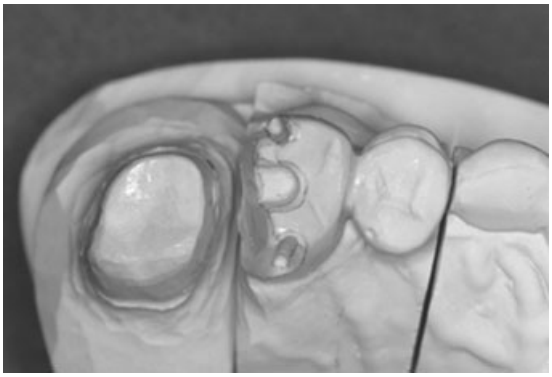

Figure 2 Master cast.

with 50-μm grain-sized aluminum oxide (Aluminous Powder WA 360, Pana Heraeus Dental, Inc., Osaka, Japan) using a grit blaster (Micro Blaster MB102, Comco, Inc., Burbank, CA). Immediately before insertion, a thiol derivative metal conditioner (V-Primer, Sun Medical Co., Ltd., Moriyama, Japan) was applied to the inner surfaces of the overcasting. The prepared surfaces of the first molar and the second premolar were cleaned with pumice and etched with 37% phosphoric acid, and the same metal conditioner was applied to the metal surfaces of the abutments. The overcasting was then seated with adhesive luting cement (Super-Bond C&B Ivory, Sun Medical Co., Ltd.) (Fig 4). The patient was then placed on a maintenance program.

Two years after seating, the left maxillary first and second molars were extracted because of severe caries. The right second premolar and first molar, including the overcasting, were reduced (Fig 5) for a double Akers clasp as an indirect retainer of the removable partial denture (RPD). The resin-bonded overcasting has been functioning without any problems for more than 10 years after seating, including 8 years up to the present, as the clasped teeth of an RPD (Fig 6).

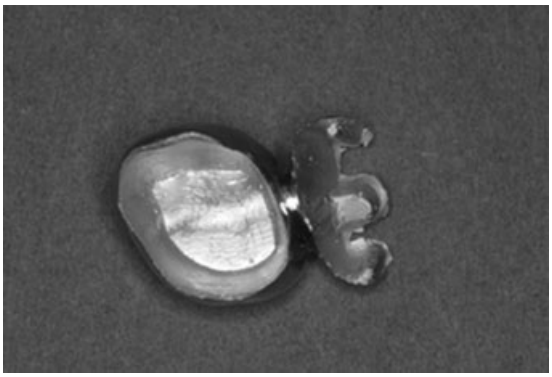

Figure 3 Intaglio of the overcasting.

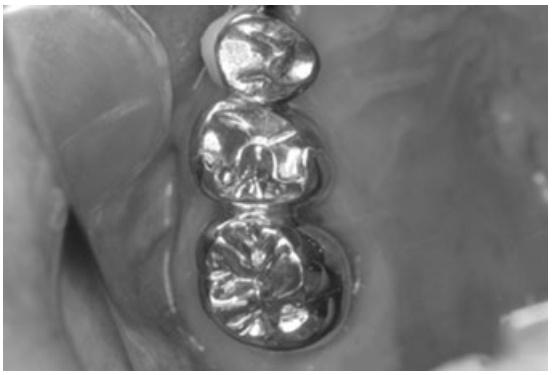

Figure 4 Seated overcasting.

Figure 5 Preparations for a double Akers clasp.

Figure 6 Clasp blends well.

Discussion

This report describes the satisfactory 10-year follow-up of a resin-bonded overcasting, which was applied using a metal conditioner and an adhesive resin luting cement to avoid removing and remaking a long-span FPD consisting of multiple restorations. The second premolar and first molar, including the overcasting, have been functioning as the clasped teeth of the RPD for more than 8 years. The long period of repetitive insertion/removal cycles is undoubtedly one of the crucial negative factors affecting the bonding durability of the overcasting. Nevertheless, the resin-bonded overcasting has been functioning without any problems for an extended period.

V-Primer is a triazine dithione primer, which is a thione primer used to enhance the strength of the bond to the silver-palladium-copper-gold alloy.[8,9] Super-Bond C&B is a tri-n-butylborane-initiated resin that has been shown to be efficient for bonding to the same alloy.[9] The present situation suggested that their combined use was clinically effective for this type of case. The success of this prosthesis can be attributed to the mechanical retention preparation design, fine accuracy of casting, and short overall design of the prosthesis. This technique could also be used for a pier abutment of a long-span fixed prosthesis.[2,5,6]

The conclusions with regard to anterior to posterior location factor and the survival rates from longitudinal follow-up studies of resin-bonded FPDs are sometimes conflicting. Some researchers reported that the anterior to posterior location had significant influence on the survival rates,[10,11] whereas other studies indicated that the intraoral location did not influence the survival time.[12-15] In contrast to some reports, the present situation indicates that there is a possibility that a posterior location without complicated occlusion and immobile abutments[12] could be advantageous for resin-bonded overcastings. Further clinical follow-up is required.

Summary

The use of a resin-bonded overcasting with an adhesive metal conditioner (V-Primer) and an adhesive resin luting cement (Super-Bond C&B Ivory) to salvage a large cast splint device consisting of multiple restorations is presented.

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