

UTILIZING RESIN CEMENT TO CONSERVE NATURAL TOOTH STRUCTURE IN PARTIAL VENEER RETAINERS

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Abstract

Partial veneer retainers for use in fixed partial denture have infrequently been used because of disadvantages associated with it one of them being incorporation of technically sensitive preparation features like proximal grooves. The proximal grooves besides being difficult to make are also hard to be duplicated in the final restoration. With advances in resin cements especially with the advent of monomer based cements, these retentive grooves can be waived off with promising results. This article presents a case where a partial veneer crown was used as a retainer in a fixed partial denture to restore maxillary right central incisor. Indication of such treatment is also discussed.

Key words: retention groove, abutment, lateral incisor, dental cements

Introduction

Use of partial veneer crowns as partial retainers in fixed partial dentures has existed for more than 90 years¹ but has been a less explored subject because of failures that are associated with such heroics. They are commonly used because they conserve the facial surface of the tooth where the exact contour and appearance of natural tooth enamel cannot be reproduced.^{2, 3} For any restoration, preparation must be based on fundamental principles from which criteria can be developed to help in predicting the success of prosthodontic treatment.⁴⁻⁶ Partial veneers that have been used in fixed partial dentures comprise a key principal feature used to aid retention and resistance form that is lost by leaving the facial surface of the

tooth intact. This key feature is incorporation of a proximal groove that requires tooth preparation in the appropriate location with correct shape, size, extent and parallelism to each other along with long axis of the tooth.⁷⁻⁹

However, there are many teeth who do not allow for such incorporation of accurate grooves, especially in patients who have long teeth. The excessive length of the natural tooth is accompanied by narrow bucco lingual size. Placement of a retentive groove in such cases undermines enamel on the labial surface of the teeth, thereby weakening the tooth structure.⁷ Advances in dental resins over the last two decades have seen a surge of many resin cements in the field of dental materials. One such cement is

4-META (4-methacryloyloxyethyl trimellitate anhydride) (Super-Bond) that was invented in Japan in January 1979.¹⁰⁻¹²

This article is intended to report a successfully rehabilitated young female patient with a partial veneer retainer for an anterior fixed partial denture without incorporation of proximal grooves, thus stressing the significance of such high strength cements on conservation of tooth structure.

Clinical Case Report

A female patient aged 25 years reported to the department of Prosthodontics with a chief complaint of unaesthetic smile due to missing right central incisor, extracted three years back due to trauma. Medical history was non-contributory. Social history revealed that the patient had received a job offer for which she needed a life like restoration. Dental history revealed the use of adequate oral hygiene measures, low caries index, good patient attitude towards dental and personal care. Extra oral examination disclosed inhibition in expression, shying away while laughing or smiling and a broad smile with cervical anterior thirds exposure. Intra oral examination presented a Kennedy class three partial edentulous situations (missing maxillary right central incisor) with well-formed edentulous ridge and clinically sound anterior and posterior abutment. Treatment plan presented to the patient included prosthetic option of an implant supported single crown, a removable partial denture or a conservative fixed partial denture. The patient opted for a fixed partial denture with a conservative approach. After obtaining the informed consent from the patient, the treatment was started by making preliminary impressions using irreversible hydrocolloid (CA 37; Cavex, Haarlem, Holland) from which diagnostic casts were made and mounted on a semi adjustable articulator (Hanau) (Waterpik, Ft Collins, CO, USA) with the help of a face bow (Spring Bow, Waterpik, Ft Collins, CO,

USA). After thorough evaluation of the abutment teeth on the diagnostic casts along with radiographic evaluation, the design of the fixed partial denture was made. Design included use of a partial veneer retainer in relation to maxillary right lateral incisor and full ceramic retainer on maxillary left central incisor. It was also decided that the partial veneer retainer would not have any retentive grooves due to lack of its participation in anterior guidance.

Respective preparation for two retainers was done at the same appointment (**Fig.1**), following which gingival retraction (Traco; VOCO GmbH, Cuxhaven, Germany) and final impressions were made using addition silicone elastomer (Reprosil, Dentsply/Caulk; Milford, DE, USA). Temporary fixed partial denture was cemented with non eugenol zinc oxide cement (PreVision Cem; Heraeus Kulzer). The preparation for a partial veneer in relation to maxillary right central incisor was kept conservative without incorporating retentive grooves on the proximal surfaces. The labial surface of the right lateral incisor was kept intact with removal of all overhanging enamel (**Fig.1**). The metal framework was first tried following which a porcelain trial was done (**Fig.2**). After thorough evaluation of the casting and the restoration, the final fixed partial denture was cemented using resin cement (Super Bond, C&B-Metabond, Parkell, Inc. U.S.A) in relation to the partial veneer retainer and zinc phosphate cement in relation to the maxillary left central incisor (**Fig.3 a and b**). The patient was followed up at 1 week, 1 month, 3 months, 6 months and then yearly for a period of 7 years. The patient continues to be under follow up. No problems have been reported till date and the patient is highly satisfied with the outcome of the prosthesis.

Discussion

The 4-META resin was selected in this study, in preference to other adhesive resin cements, because of its relatively high

surface energy characteristics¹³ and also because of its strong bonds to dentine and metal.^{14,15} Compared to other resin cements, 4-META resin cement consist of linear polymers of methyl methacrylate without inorganic fillers. This unique structure allows it to have micro hardness and flexural modulus substantially lower than other resin cements. To improve the longevity of the cement water sorption and solubility values is also compatible for its long term use.

Use of strong cement in itself does not allow one to eliminate the use of proximal retentive grooves. More important than properties of particular cement, are clinical factors like occlusion especially the lateral forces exerted on a critical abutment like lateral incisor. Before making final judgement it is important to weigh all the factors together and decide accordingly. In this case, lateral forces exerted on the weak abutment like lateral incisor were non-existent during protrusive and lateral movements. A possible complication of use of resin cement is the eventual removal of the restoration. In this case, supra gingival margins were placed to allow removal of the bridge in the future. Young age, being a predictor for anticipation of failure in the future.

Conclusion

Conservation of tooth structure is basic to all preparations. With advanced cements having high retentive ability, use of interproximal retentive grooves need not to be practiced in patients with favorable occlusion.

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FIGURES



Figure 1: INTRA ORAL VIEW OF PREPARED TEETH



Figure 2: PREPARED MAXILLARY LEFT CENTRAL INCISOR

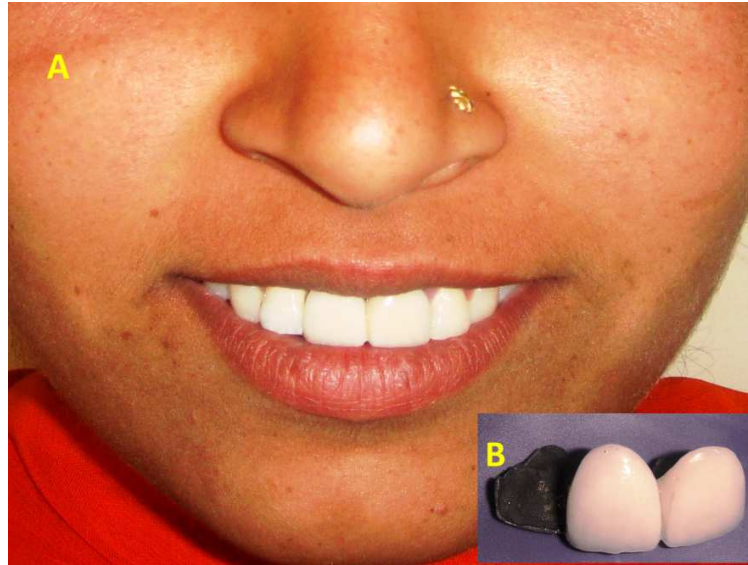


Figure 3: Post cementation view (A) and the final restoration (B) cemented with a resin cement
