CASE REPORT

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Rehabilitation of anterior esthetics using CAD-CAM fabricated zirconia Maryland bridge. A case report.

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Abstract
Introduction: Missing anterior teeth have a great impact on the psychological status of an individual due to the unesthetic appearance. These can be restored using removable prostheses, conventional bridges, resin-bonded prostheses, or implants. A resin-bonded fixed prosthesis is a minimally invasive treatment option in such cases to restore function and esthetics.
Case Presentation: This case report describes the CAD-CAM zirconia Maryland bridge as a treatment modality for effective restoration of the missing maxillary central incisor in a 32-year-old female patient who reported the chief complaint of unesthetic appearance. The patient had a history of extraction due to trauma 6 months ago with normal overjet and overbite.
Discussion: One of the types of resin-bonded prosthesis is a Maryland bridge which involves minimal tooth preparation with supragingival margins, thus maintaining periodontal health. Maryland bridges enhance dental esthetics with minimal loss of tooth structure.
Conclusion: CAD-CAM fabricated all-ceramic resin-bonded prosthesis is an efficacious way of replacing missing anterior teeth, restoring function, providing excellent esthetics, and thus boosting patient's confidence.
Keywords: CAD-CAM zirconia, Maryland bridge, missing anterior tooth, resin-bonded fixed prosthesis, resin-bonded restoration.

Introduction

A missing anterior tooth does not only limit function, but also has a huge psychological impact on an individual, thus affecting his/her social life [1]. Various treatment options are available for restoring the missing anterior teeth including removable partial dentures, conventional fixed partial dentures, and implants. Implants are a better treatment option, but their placement depends on various factors including the amount of bone available, medical conditions, financial factors, and patient acceptance [2]. The long-term use of removable partial leads to bone resorption and conventional fixed partial dentures cause increased loss of tooth structure. In such cases, a resin-bonded fixed prosthesis provides a minimally invasive treatment option with excellent esthetics [3,4]. This case report describes the restoration of a missing maxillary central incisor with an all-ceramic Maryland bridge fabricated using CAD-CAM technology.

Clinical report

A 32-year-old female patient presented to the Department of Prosthodontics with the chief complaint of a missing upper central incisor and an unesthetic appearance due to the missing tooth. The patient gave a history of extraction due to the trauma 6 months ago and wanted replacement of the same. Intraoral examination revealed a missing right maxillary central incisor (figure 1) with normal overjet and overbite. The patient had a Class I molar relation. All the treatment options including implant, conventional fixed dental prosthesis, removable partial denture, and resin-bonded bridges were given to the patient. The patient wanted a minimally invasive fixed treatment option hence, resin bonded prosthesis was planned.

Figure 1. Pre-rehabilitative intra-oral view.

Procedure

Diagnostic impressions of the maxillary and the mandibular arch were made. Diagnostic casts were obtained and the wax-up for the missing tooth was done. The lingual surfaces of the right lateral incisor (12) and left central incisor (21) were prepared with a supragingival chamfer finish line (figure 2a). The incisal end of the tooth preparation was kept 1mm cervical to the incisal edge. Gingiva retraction was done followed by the final impression made using single-step putty wash impression technique using addition silicone impression material (figure 2b). The prosthesis was designed using the Exocad software and milled in zirconia (figure 2c). The prosthesis was finished and polished (figure 2d).

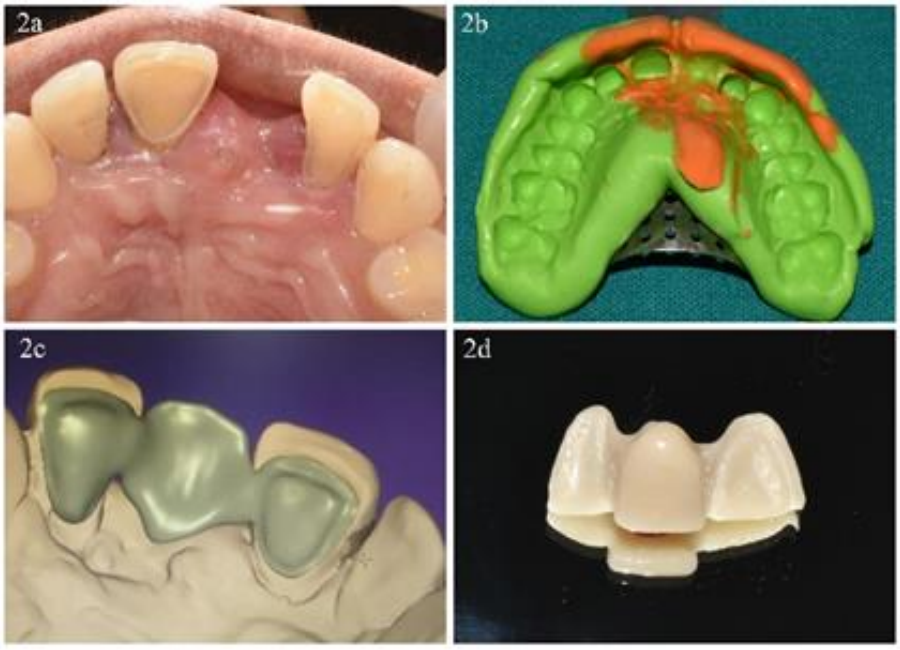

Figure 2. (a) Tooth preparation (12 and 21) (b) impression (c) digital designing of prosthesis (d) finished and polished prosthesis.

The prosthesis was etched with hydrofluoric acid (figure 3a) followed by rinsing with water and air drying. The teeth were simultaneously etched with 37% phosphoric acid (figure 3b). A silane coupling agent (figure 3c) was applied to the prosthesis followed by the application of a bonding agent (figure 3d) on both the prosthesis as well as teeth. The prosthesis was looted using resin cement (figures 3e and f), the occlusion was assessed, and post-cementation instructions were given to the patient.

The patient was kept on follow-up at regular intervals and she was satisfied with the result (figures 4a and b).

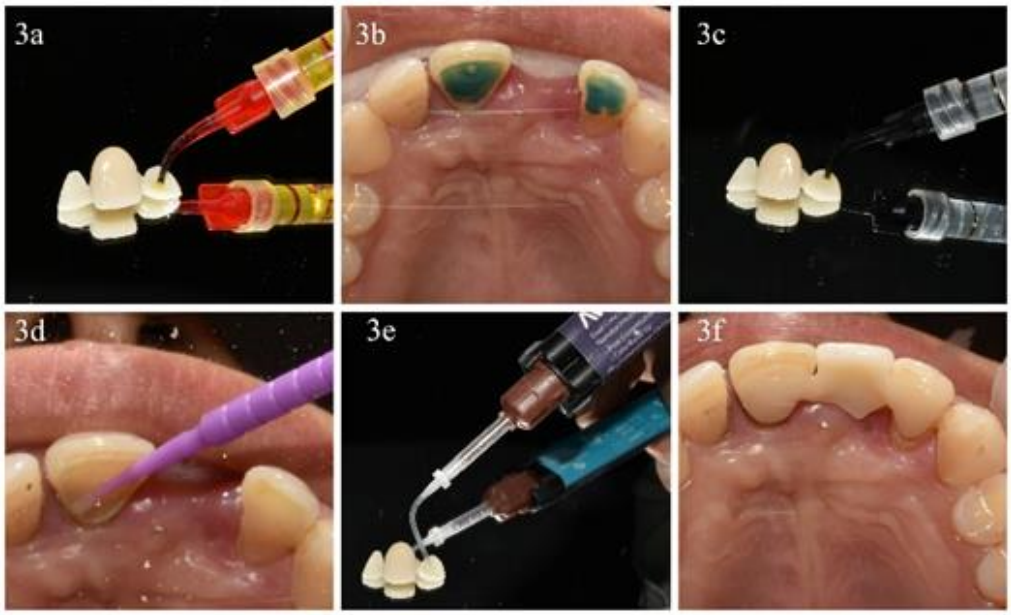

Figure 3. (a) Etching of Maryland bridge with hydrofluoric acid (b) etching of teeth with phosphoric acid (c) application of silane coupling agent (d) application of bonding agent (e) resin cement application (f) final prosthesis in situ.

Figure 4. (a) Pre-rehabilitative view (b) post-rehabilitative view.

Discussion

A number of conservative tooth replacement schemes have been developed to fulfill patients' esthetic needs. Two early prosthetic solutions for replacing missing incisors are the removable partial denture and the three-unit conventional bridge. Although the former can provide adequate esthetics and function, many patients dislike the bulkiness and maintenance of a removable appliance and the discomfort experienced in wearing it. Three-unit bridges avoid these problems. However, they cause increased loss of tooth structure [5].

Resin bonded prosthesis is a minimally invasive treatment modality and a substitute for conventional fixed partial prosthesis requiring minimal tooth preparation used

mainly for missing single anterior teeth [3]. The Maryland bridge is a type of resin-bonded prosthesis developed at the University of Maryland, that requires a minimal amount of tooth preparation restricted to the enamel only and is bonded directly to the tooth structure with the help of resin cement [3]. Maryland bridges have various advantages including minimal tooth preparation conserving the enamel, minimal pulpal trauma, decreased potential for gingival irritation, a single path of insertion preventing displacement, enhanced esthetics, patient satisfaction, and precludes the use of local anesthetic [6,7]. However, it also has certain disadvantages including its technique-sensitive application, debonding, caries, and discoloration [3,8-9]. The factors to be considered while case selection for Maryland bridge include: (a) adequate enamel thickness, (b) no severe rotation or mispositioning of abutment teeth, (c) periodontal conditions, (d) adequate occlusal clearance, and (e) parafunctional habits [1]. The all-ceramic veneer bridge consists of an all-ceramic pontic flanked by two veneer retainers that are attached to the abutment teeth. The all-ceramic bridge provides excellent esthetics, thus boosting the self-confidence of the patient [5].

The indications for Maryland bridge prosthesis include large pulp chambers in the abutments, expected transition in the position of the gingiva, and the age of the patient. However, the Maryland bridge is contraindicated in certain situations including more than one missing tooth in a row, the presence of parafunctional habits, deep bite, cavities in the abutment tooth, and crowded or proclined teeth [3].

Conclusions

CAD-CAM fabricated all-ceramic resin-bonded bridges are an efficacious way of replacing missing anterior teeth, restoring function, providing excellent esthetics, and boosting patient's confidence. Careful case selection, meticulous design planning, precise tooth preparation, and cementation can all lead to the long-term success of Maryland bridges. Hence, the Maryland bridge is an effective treatment modality to restore missing teeth in young patients.

Conflict of interest: None to declare.

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