

Immediate fixed temporization with a natural tooth crown pontic following failure of replantation

SMRITI BHARGAVA, RITU NAMDEV, SAMIR DUTTA, RAJKUMAR TIWARI¹

Abstract

Extracted teeth can be bonded directly to adjacent teeth utilizing a prefabricated composite resin framework reinforced with polyethylene fiber as a noninvasive long-term provisional tooth replacement. This immediate provisional restoration allow for exact repositioning of the coronal part of the extracted tooth in its original intraoral three-dimensional position and thus relieves the apprehension of the patient caused by the sudden loss of an anterior tooth.

Keywords: Composite, fiber, interlig, pontic

Introduction

Dentists face the difficult esthetic situation to remove an anterior tooth because of trauma, advanced periodontal disease, root resorption, or failed endodontic therapy.^[1] The missing anterior tooth has implications in how one presents themselves to others and the psychological effects of how we feel about ourselves. The loss of a solitary permanent maxillary anterior tooth in a child or young adolescent is usually because of either trauma or its sequelae. Despite a wide range of treatment options that can be provided to conserve the tooth after the traumatic episode, there are occasions where loss of the traumatized tooth is inevitable. With special regards to avulsion injuries, replantation of teeth has a doubtful long-term prognosis because of resorption and more than half of the teeth are eventually lost because of ankylosis or inflammatory resorption.^[2] Following traumatic loss of the anterior tooth, it is important that an immediate replacement is provided in order to avoid esthetic, masticatory, and phonetic difficulties, and to maintain the edentulous space.^[3] Cosmetic demands, functional needs, treatment sequencing, timeliness, and affordability are some primary concerns that must be addressed on an individual basis. Conventionally, the solution to this clinical problem has

been the provision of a single tooth, removable temporary acrylic prosthesis, or prefabricated acrylic tooth used as a pontic. Acrylic removable partial dentures placed immediately after the tooth is extracted are bulky, may be uncomfortable for the patient, and may impede healing. They exhibit esthetic and functional disadvantages and inadequately preserve the extraction socket. As a result, an objectionable loss of soft and hard tissues in the extraction area normally occurs. Prefabricated acrylic teeth used as a pontic bonded to the adjacent teeth can present challenges with regard to matching color, size, and shape, and often require substantial modification to achieve an acceptable appearance. Using the natural tooth as a pontic offers the benefits of being the right size, shape, and color. Moreover, the positive psychological value to the patient in using his or her natural tooth is an added benefit. When the crown of the tooth is in good condition, it can be temporarily bonded easily to the adjacent teeth with light cured restorative material.^[4] This interim restoration can also be useful, especially in pediatric patients as the child does not accept the acrylic denture and fixed dentures cannot be given at young age. Here, a clinical technique for immediate interim tooth replacement is being presented, utilizing the clinical crown to assist the clinician in providing an esthetically acceptable treatment option.

Department of Pedodontics, Government Dental College, Rohtak

¹Department of Pedodontics, Maulana Azad Institute of Dental Sciences and Research, New Delhi, India

Correspondence: Dr. Ritu Namdev, 7/11 J, Medical Campus, Rohtak, India. E-mail: ritunamdev@rediffmail.com

Case Report

A patient aged ten years reported to the Department of Pedodontics and Preventive Dentistry, Govt Dental College, Rohtak, with chief complaint of mobility of left central incisor since six months. His medical history was noncontributory. He had experienced a bicycle accident that resulted in the avulsion of his left central incisor two years ago. The patient's parents reported to the local dentist with the avulsed tooth and it was replanted within one hour of its avulsion. Following replantation, the patient was symptom-free for one and half year, after which the child noticed mobility of the replanted tooth. Clinical findings associated with left central incisor

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confirmed patient's chief complaint. The tooth was mobile in lateral directions. An intraoral periapical radiograph revealed root resorption in relation to maxillary left central incisor and apical third of root had resorbed completely [Figures 1 and 2]. The age of the patient was not favorable for fixed prosthesis. On visual examination, the crown presented the same color, shape, and translucency of the adjacent central incisor. The patient's oral hygiene status was assessed to be fair. It was decided to extract the right central incisor and use it as a natural tooth pontic and splint it to the adjacent teeth using composites. The patient's parents were informed the final restoration when the patient's growth is complete, and can vary between removable prosthesis, tooth-supported prosthesis, and implant-supported prosthesis. The tooth was extracted under infiltration anesthesia without much manipulation of the alveolar bone [Figure 3]. Following extraction and root resection of the maxillary central incisor, the pulp tissue was removed (to avoid later discoloration through decomposition of organic tissue) and light cure composite resin was cured within the canal [Figure 4]. A modified ridge lap design was given to the natural tooth pontic which satisfied both oral

hygiene locals and esthetics. Recess grooves were placed into the pontic and the adjacent abutment teeth. The extracted tooth pontic and abutment teeth were cleaned with pumice, washed, and air-dried. The proximal areas (adjacent to the extraction site) and approximately 2 to 3 mm of the facial and lingual surfaces were acid-etched (Etch, D-Tech™). The bonding agent (Adper™ Single Bond 2 Adhesive, 3M ESPE) was applied to the acid-conditioned surfaces and polymerized. An appropriate length of the fiber reinforced with the composite (Interlig, Angelus[®]) was cut and adapted to the lingual surface which was etched and primed. The length can be predetermined using a dental floss. Then, it was light cured. Flowable composite (Synergy, Coltene Whaledent[®]) was added in the proximal surface and polymerized using light cure. Excess composite resin material was removed with a fine diamond instrument. The composite resin was contoured in the interproximal area, to protect the gingival papilla and allow optimal maintenance [Figures 5-8]. Following final finishing and polishing, occlusal relationship was checked and inspected for any interference to be eliminated. The patient was instructed to avoid excessive chewing



Figure 1: Preoperative photograph



Figure 2: Preoperative intraoral periapical radiograph



Figure 3: Tooth extracted



Figure 4: Root trimmed and pulp space obturated with light cure composite



Figure 5: Interlig (Fiber reinforced with composite)



Figure 6: Postoperative view showing splint in place



Figure 7: Postoperative photograph



Figure 8: Postoperative intraoral periapical radiograph

pressure or habits that could dislodge the natural tooth replacement. Fractures may occur between the bonded pontic and the abutment teeth, but repair can be made by an additional bonding procedure. The patient is complaint free since 14 months of treatment and is recalled every three months to examine the restoration.

Discussion

At present, there is no standard treatment procedure for the replacement of permanent anterior teeth that are lost because of trauma, especially in cases that occur before cessation of growth. Although removable appliances or prosthesis seem to be one suitable option, patient compliance is generally a major problem, besides compromised esthetics because of canine clasps that are commonly used to provide stability and to enhance retention. Moreover, partial removable dentures are frequently subjected to fracture. In addition, its long time use often produces irritation of palatal mucosa. In this regard, fixed acid etch bridging may offer several advantages over removable appliances including enhanced esthetics,

ease of use, and avoidance of becoming accustomed to a removable prosthesis. This approach would also permit utilization of a patient's natural crown as a pontic for an immediate bridge with little or need to perform complicated laboratory procedure.^[3] The immediate bonding of a natural tooth or a denture tooth presents a low-cost alternative for direct tooth replacement and was already described 30 years ago. After its extraction, the immediately bonded natural tooth pontic protects the extraction and forms an ovate pontic contact surface.^[5] One major advantage of retaining the patient's natural crown is that the patient can better tolerate the effect of tooth loss. Moreover, it provides the optimal pontic in terms of shape, color, size, and alignment.^[3] In a dental clinical office, there may be a limited selection of plastic denture teeth available to satisfy esthetic, size, and form requirements. In the past, there have been a number of different techniques described in the restorative dentistry literature for splinting teeth and adding a natural tooth pontic, denture tooth, or composite resin tooth pontic. These pontics were connected to the adjacent teeth with adhesive composite resins, wire, metal mesh, nylon, mesh,

and cast metal frameworks bonded to the adjacent teeth. The inherent problems with these materials when placing a tooth pontic fixed to the adjacent teeth when replacing a missing tooth were their inability to be chemically incorporated into the dental resin. Clinical failures of these bridges were prevalent because these materials could not support the repeated loading stresses placed on the bridge during normal and para-function. The problem associated with the placement of composite resin splints with submerged wires and mesh grids was that in order to protect against breakage, more bulk and thickness of composite resin was necessary.^[6,7] This overbulking of the restoration led to an increase in food and plaque retention resulting in making it more difficult to clean around the restoration and maintain good oral health. The challenge to place a thin but strong, bonded composite resin-based single visit bridge was met with the introduction of a high-strength polyethylene, bondable, biocompatible, esthetic, easily manipulated, fiber ribbons that could be embedded into a resin structure.^[8] Other clinically successful uses for fiber reinforcement ribbon have been described in the dental literature including periodontal splinting,^[9,10] restoration of the endodontically treated tooth,^[11,12] and for cross splinting teeth with large composite restorations.^[13] The technique is practical, economically feasible, requires limited laboratory support and materials, and can be accomplished in a single appointment. Using the natural tooth as a pontic offers the benefits of being the right size, shape, and color. This particular design allows for exact repositioning of the coronal part of the extracted tooth in its original intraoral three-dimensional position. This chairside technique does not require laboratory involvement, is noninvasive and reversible, so that all traditional treatment options for single tooth replacement remain open.^[5] This paper's objective is to describe a simple, economical, and fast method to replace a single tooth utilizing a prefabricated composite resin framework reinforced with polyethylene fiber and the existing tooth as pontic.

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