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Case Report

Immediate fixed temporization with a natural tooth crown pontic and fiber-reinforced composite following horizontal root fracture: A case report

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ABSTRACT

Anterior tooth loss can significantly affect self-esteem, particularly in young individuals. Traditional treatments like removable prostheses often fail to meet aesthetic and functional standards. Using the patient's natural tooth as a temporary bridge offers a perfect match in size, shape, and color, with psychological benefits. In this case, a 24-year-old male with a fractured maxillary left central incisor underwent tooth extraction. The extracted tooth was cleaned, reshaped with composite resin, and attached to adjacent teeth using fiber-reinforced composite. This technique provided immediate restoration with an aesthetically pleasing ovate pontic design that supported natural gingival health. The patient reported satisfaction with the aesthetic and functional outcome after one month. Utilizing the natural tooth as a pontic is cost-effective, minimally invasive, and preserves future treatment options, making it an ideal temporary solution for anterior tooth loss.

1. Introduction

An anterior tooth loss presents a difficult visual and psychological problem. It is frequently caused by trauma, extensive periodontal disease, resorption of root, or unsuccessful endodontic therapy.The absence of a maxillary anterior tooth, particularly in children or young individuals, can significantly affect an individual's self-perception and social interactions.[1] While various treatment options aim to preserve the tooth after trauma, extraction may become necessary in some instances.[2]

The prompt restoration of a missing anterior tooth is essential to address aesthetic, masticatory, and phonetic challenges, while also preserving the edentate space.[2]Conventional treatment modalities, such as removable acrylic prostheses or prefabricated acrylic pontics, frequently fail to meet the desired standards of comfort, appearance, and functional performance. These solutions can be bulky, uncomfortable, and detrimental to the healing process, often leading to significant loss of hard and soft tissues at the site of extraction.[3]Prefabricated acrylic pontics, despite their initial effectiveness, commonly necessitate extensive modifications to align with the natural appearance of the adjacent teeth.[4]

Utilizing the natural tooth of the patient as a temporary bridge (pontic) provides substantial advantages, including a perfect match in size, shape, and color. Additionally, this approach offers significant psychological benefits for the patient, as retaining their natural tooth, even temporarily, promotes a sense of normalcy and personal connection.[5]When the tooth crown remains intact, light-cured restorative materials can be used to temporarily attach it to neighboring teeth, providing an aesthetically pleasing and functional interim solution.[6]

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The patient's natural crown was used as a successful temporary restoration in this case study, which presents a clinical strategy for the lost anterior tooth replacement. This technique not only addresses aesthetic and functional considerations but also supports the patient's psychological well-being, offering a viable and patient-centric alternative to traditional prosthetic solutions.

2. Case Report

A male patient, 24 years old, came to the Department of Conservative Dentistry and Endodontics primarily complaining of three months' worth of movement in his maxillary left central incisor. The patient disclosed a trauma history from a bicycling accident that left her left central incisor fractured. His past medical history was not noteworthy. Clinical examination and a radiographic image revealed a horizontal root fracture located subgingivally, just below the cementoenamel junction of the maxillary left central incisor. (Figure 1a & b). Pulp sensibility testing of adjacent teeth showed positive responses. The patient was diagnosed with generalized marginal chronic gingivitis, and both supragingival and subgingival scaling were performed using an Ultrasonic Scaler. After discussing various treatment options for the replacement of the left central incisor, including their costs, benefits, and prognosis, the patient provided informed written consent for extraction of the fractured tooth due to a poor prognosis. Given the patient's restricted availability as well as impending travel, it was decided to splint the extracted tooth to the neighboring teeth using composite resin and fiber-reinforced composite as a natural tooth pontic.

Following the extraction of the fractured segment of the maxillary central incisor, the pulp tissue had been removed. The extracted tooth was thoroughly scaled, polished, and debrided using 2.5% sodium hypochlorite, followed by irrigation with normal saline. (Figure 1c &d). To prevent degradation of bond strength, the fractured segment was stored in distilled water at the temp. of 4°C for one week.

The fractured tooth was then reconstructed using composite resin (Figure 1e) to closely resemble the natural tooth form. An ovate pontic design was implemented, promoting optimal aesthetics and facilitating effective oral hygiene. The lingual and facial aspects, as well as the proximal surfaces, were acid-etched within 2-3 mm. After that, a bonding agent was added and polymerized.

The adjacent teeth etched and primed lingual surfaces were fitted for an established length of fiber-reinforced composite, which was then fixed in place with a flowable composite. A fine diamond bur was used to remove any extra material after the composite resin was light-cured. To preserve the gingival papilla and provide the best possible gingival health, the interproximal region was carefully shaped. (Figure 1e & f)

Final finishing and polishing were completed, and the occlusal association was evaluated to eliminate any interferences (Figure 1g). Postoperatively, the patient was advised to avoid excessive chewing pressure and habits that could dislodge the replacement of the natural tooth (Figure 1h). It was noted that potential fractures between the bonded pontic and the abutment teeth could be addressed with additional bonding procedures, if necessary.

3. Discussion

When opposed to removable appliances, immediate restoration with fixed acid-etch bridges has various advantages, such as better aesthetics, convenience of use, and the removal of the requirement for patients to get utilize to removable prostheses. With this technique, the patient's natural crown can be used as a pontic right away, eliminating the need for costly laboratory processes. Originally reported more than 30 years ago, instant bonding with a natural tooth is a more affordable option than direct tooth replacement.[6,7]

In this case, an ovate pontic design was selected, which is considered one of the most aesthetically pleasing pontic designs due to its close resemblance to the natural tooth's emergence profile.[8]This design also provides phonetic advantages by preventing the passage of air and saliva, a common issue encountered with more hygienic pontic designs.[8] Furthermore, patients tend to prefer the ovate pontic's lingual contours as they closely mimic the natural tooth morphology.[9,10]

Early composite resin splints incorporating submerged wires along with mesh grids often required increased bulk to prevent breakage, leading to over-contoured restorations. This excessive bulk could contribute to increased food and plaque retention, complicating oral hygiene and potentially compromising long-term oral health.[11]

The development of high-strength polyethylene fiber ribbons has addressed these concerns. These fibers are bondable, biocompatible, aesthetic, and easy to manipulate, providing the necessary strength while allowing for thinner, more streamlined restorations.[12–14]Applications for fiber-reinforced composites in dentistry include periodontal splinting, endodontically treated tooth restoration, and cross-splinting massive composite restorations. This method can be finished in a single appointment, is practical, economical, and involves minimal time in the lab.[15]

The use of the natural tooth as a pontic has several clear benefits. Because it is perfectly sized, shaped, and colored, the extracted tooth may be precisely replaced in the oral cavity in the exact spot it occupies in three dimensions.[16]Additionally, this chairside technique preserves future treatment choices for single-tooth replacement because it is noninvasive, reversible, and does not require laboratory support.[17]

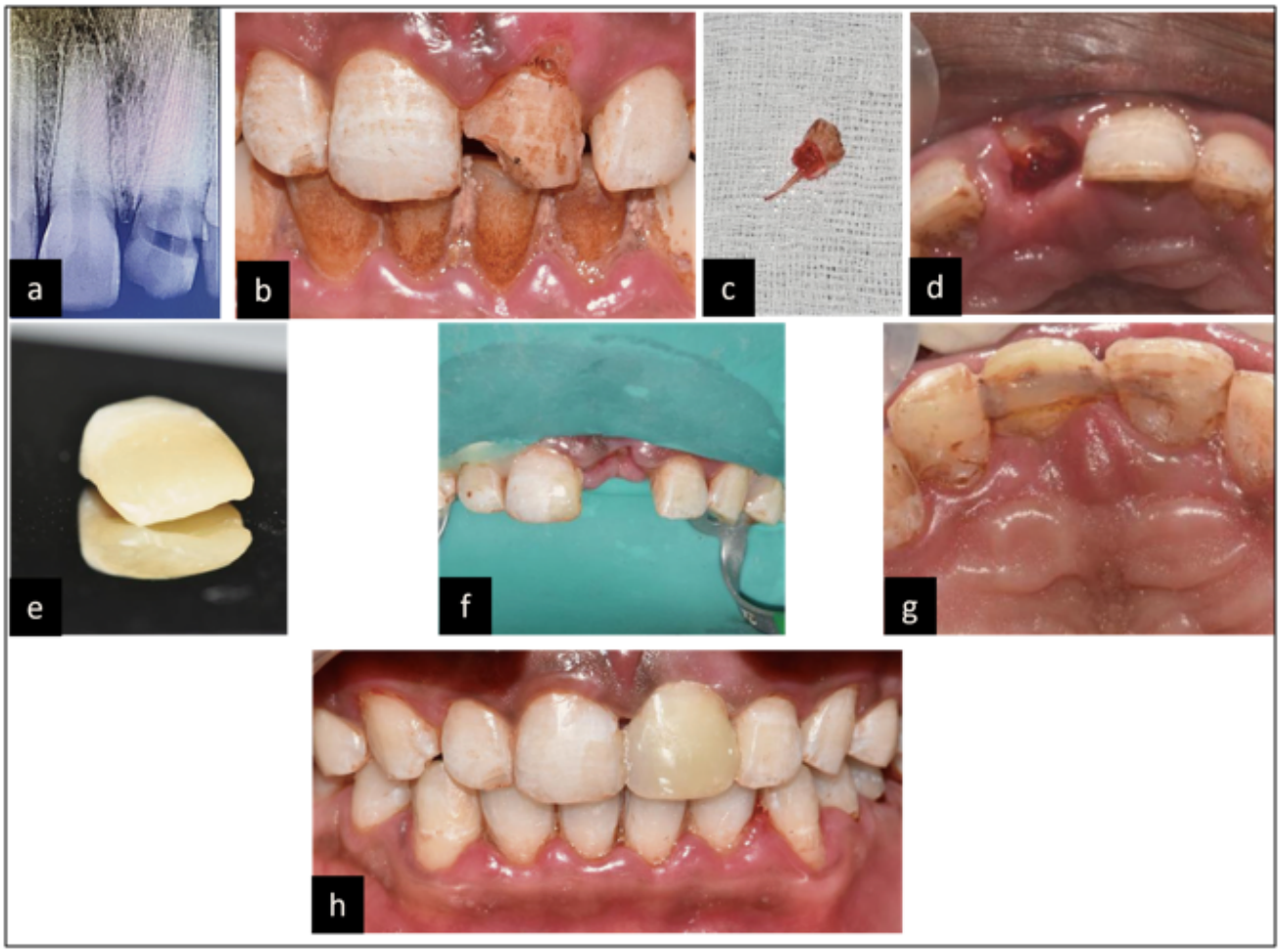

Figure 1: (**a**): Preoperative radiograph; (**b**): Preoperative image before extraction; (**c**): Extraction of the fractured segment of the maxillary central incisor; (**d**): Intra-Oral image of the affected site; (**e**): The fractured tooth was remodeled with composite resin to resemble the natural tooth form; (**f**): Rubber dam isolation using the split dam technique; (**g**): Fiber-reinforced composite adaptation to the lingual surfaces of adjacent teeth and secured with flowable
composite, and (**h**): Postoperative functional and esthetic results at the 1-month follow-up

4. Conclusion

The patient was satisfied with the esthetic outcome and functioning of this treatment modality, reinforcing its utility as a routine viable option for cases, indicated for extraction of anterior tooth. Natural tooth pontic (NTP) can be placed as interim restoration until an extraction site heals which later if the patient so desires can be replaced by a conventional bridge or an implant. However, appropriate patient selection, their motivation levels, plaque control, and precision during the placement of NTP are imperative for its success.

5. Conflict of Interest

None.

6. Source of Funding

None.

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