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INNOVATIVE RESTORATION OF A YOUNG SMILE: A PEDIATRIC CASE REPORT ON TOOTH FRAGMENT REATTACHMENT

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Abstract

Anterior tooth coronal fractures frequently occur as dental injuries. Preserving the original fragment after such fractures enables the fragment to be reattached, ensuring sustained aesthetic quality and restoring function effectively. Moreover, this method contributes to a favourable psychological impact on the patient and offers a quicker, less complex treatment alternative. This case study details the intricate treatment of a complex fracture in the maxillary right central incisor, which was first addressed with endodontic therapy and then followed by the reattachment of the original tooth fragment. The reattachment technique serves as a practical restorative option, promptly reinstating the tooth's functionality and aesthetic appearance. This method stands out due to its conservative nature and its economic efficiency, providing clinicians with a swift and effective treatment pathway.

Keywords: endodontic treatment, Dental Preservation, reattachment, Aesthetic Restoration, Ellis Class III Fracture

Introduction

Injuries to the front teeth are quite frequently encountered, with upper central incisors being affected in 37% of cases, as noted in the literature.[1]

Such trauma, especially when it results in a fractured fragment, demands prompt care. This is not solely due to the physical damage to the teeth but also because of the considerable psychological effect on the individual[1]. Depending on the fracture's severity and reach, treatment can range from straightforward to complex restorative procedures. [2,3]

The idea of reattaching tooth fragments took root in 1964 when Chosak and Eidelman pioneered the technique by employing a cast post and traditional cement to reattach a severed crown of an anterior tooth. [4] Advances in restorative materials, application methods, and adhesive processes have since enabled the use of resin-based composites for this purpose. It was Tennery who initially applied the acid-etch technique to reattach broken tooth fragments.[5] This was further echoed in case.

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The reattachment of the original fragment of a tooth is beneficial not just for maintaining the tooth's natural color, resistance to wear, and anatomical shape, but also for its optical properties. Additionally, it yields a positive psychological and social reaction from the patient, as it conserves the natural tooth structure.[6]

Case Report

A 14-year-old boy reported to the Pediatric & Preventive Dentistry Department Rama Dental College, Hospital & Research Centre, Kanpur, reporting a fractured upper front tooth as a result of a recent road traffic accident, which occurred about 8 hours prior. The patient's medical history was unremarkable. Upon clinical and radiographic examination, oblique fracture (Ellis class III) was observed in the gingival third regions of the crown of the maxillary right central incisor with a displaced fragment and Ellis class III in respect to maxillary left central incisor [Figures 1 and 2]. The patient experienced significant pain, and the coronal fragment of the tooth was found to be mobile. However, the remaining structure of the tooth was stable with no mobility, and the surrounding intraoral soft tissues appeared unaffected. The detached fragment was carefully removed, cleansed with water, and kept in sterile saline to prevent dehydration and discolouration [Figure 3]. The young patient expressed a strong preference for retaining and restoring his natural teeth. In response, a treatment plan was formulated to reattach the fractured segment. With the patient's agreement, root canal therapy was initiated without delay. The adjacent teeth that is 21 also required root canal therapy which was performed simultaneously.

After completing the root canal therapy in 2 sitting reattachment of the fragment was planned and executed [Figure 4].

The fractured tooth surface and the corresponding fragment underwent an acid etching process using 37% orthophosphoric acid for 15 seconds. This was followed by a thorough rinse and air drying. An adhesive layer was then applied to the prepared surfaces. Resin cement was mixed as per the manufacturer’s instructions and applied to both the fragment and the tooth surface to facilitate reattachment. The correct positioning of the fragment was verified before initiating the light curing process, which was performed for 20 seconds on both the labial and palatal sides. [Figure 5]

A 1-mm-deep chamfer was created along the fracture line on the buccal surface using a round bur. Following this, the surface was etched and bonded, and a layer of microhybrid composite was added to the chamfer and cured with visible light for 40 seconds for each layer. The restoration was then smoothed and polished using.

A final check for occlusion and aesthetics was conducted. Postoperative instructions were provided to the patient, advising minimal loading on the anterior teeth. The patient was scheduled for follow-up one month later. The postoperative period proceeded smoothly without complications. [Figure 6] with the aesthetic restoration intact. [Figure 7]

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 Journal Volume 11,Iss 12, 2022

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

ISSN PRINT 2319 1775 Online 2320 7876

 Journal Volume 11,Iss 12, 2022

Figure 7

Discussion

Trauma to the anterior teeth is quite common, yet it is often met with a positive emotional and social response from patients when natural tooth structure is preserved. [7]

Studies have shown that the reattachment of fragments involving both enamel and dentin remains satisfactory after one year. Incisal fractures of anterior teeth have been effectively managed through reattachment techniques.[8]Additionally, more complex fractures that involve the pulp have been successfully treated using reattachment combined with post and core placements. [9]

Various techniques have been recommended for the reattachment of tooth fragments, including [10] :-

- Creating a circumferential bevel around the tooth.
- Applying an external chamfer at the fracture line post-bonding.
- Incorporating a V-shaped notch in the enamel.
- Forming an internal groove within the tooth.
- Adding a slight over contour of the restorative material over the fracture line and into the pulp chamber for complex fractures.
- Reis and others have reported that the chamfer technique restores 60% of a tooth's original fracture strength with minimal alteration to the natural fit of the fragment, unlike other methods which may enhance strength but at the expense of increased resin exposure to the oral environment.[10]

In this particular case, the enamel chamfer technique was employed because it offers superior strength recovery compared to simpler techniques.

The significant improvements in adhesive systems and resin composites have transformed the reattachment of tooth fragments from a temporary solution to a viable long-term restorative

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option with a positive prognosis. This method is feasible only when the original tooth fragment is retained.[11]

Conclusion

The reattachment of tooth fragments represents a pivotal advancement in restorative dentistry, particularly for cases involving anterior dental trauma. This technique not only restores the functional integrity and aesthetics of the teeth but also preserves the natural tooth structure, enhancing patient satisfaction and psychological well-being. The use of contemporary adhesive systems and resin composites has elevated this method from a provisional to a definitive treatment option, offering a favorable long-term prognosis.

In this specific case, a conservative approach was employed, utilizing a post for retention to ensure the stability of the reattached fragment. Such an approach aligns with documented successful outcomes in previous studies, reinforcing the viability of this technique. By maintaining the original anatomy of the tooth, the treatment ensures minimal alteration to the patient's oral environment while providing durable results.

Ultimately, the success of tooth fragment reattachment underscores the importance of timely intervention and the benefits of utilizing advanced materials and techniques in dental trauma care. This not only aids in achieving optimal functional and aesthetic outcomes but also supports the emotional and social aspects of dental health recovery.

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