

Preservative Management of Traumatized Anterior Teeth: A Case Series

Mithra Nidarsh Hegde, Nidhi Hegde* and Aswin S

Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences, NITTE (Deemed to be) University, Mangalore, Karnataka, India

***Corresponding Author:** Nidhi Hegde, Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences, NITTE (Deemed to be) University, Mangalore, Karnataka, India.

Received: August 20, 2018; **Published:** October 30, 2018

Abstract

Trauma to anterior teeth is multifactorial phenomenon and may vary in its extent. Though, relatively common, they are difficult to treat, often putting the clinician in a dilemma. Advancements in adhesive systems have led to a shift from conventional invasive procedures to more conservative biologic restorations. In fractures that are of mild to moderate complexity, the fractured fragments can be attached to the tooth providing superior aesthetics when compared to prosthetic procedures. This case series describes the comprehensive management of traumatized maxillary central incisor and a maxillary lateral incisor involving pulp exposure while maintaining the natural integrity of the tooth by additional reinforcement using fibre posts.

Keywords: Anterior Teeth; Aesthetics; Fracture; Fibre Reinforced Posts; Reattachment; Trauma

Introduction

Injury to teeth is usually unexpected and requires emergency attention. Fractured, displaced, or lost teeth can have significant adverse functional, aesthetic, and psychological effects.

Traumatic anterior tooth fracture of the maxillary region is a common dental injury, but most challenging in terms of treatment [1]. Treatment protocols vary with the severity of the fracture. Complicated crown fractures, account for up to 20% of all with the majority being in young permanent teeth [2].

Extraction used to be the treatment of choice for such complicated fractures. The recent years have seen a paradigm shift in the choice of materials and emphasis is now laid on conserving natural tooth structure as much as possible. The use of natural tooth fragments is an excellent biologic approach for restoring fractured anterior teeth when the fractured fragment is available. Reattachment of the fractured fragment is now the treatment of choice in permanent teeth presenting with complicated crown root fractures. This treatment modality depends on the status of the pulp tissue and the stage of root development and the extent of fracture of the coronal segment [3]. An intra-radicular post is recommended when the fracture involves more the two thirds of the crown. Root canal treatment followed by fibre post reinforcement is a feasible option in case of complicated crown fractures [4].

Case Report

Case 1

A male patient aged 23, reported to the department with a complaint of a fractured maxillary right central incisor due to a road traffic accident 2 weeks ago. On examination, 11 was found to be fractured. Fracture line was visible labially, and extended just above the level of the gingiva in the palatal region. The fractured fragment though moderately mobile, remained attached to the tooth. The tooth was tender on percussion. 12 and 13 were found to be fractured at the incisal edges (Figure 1).



Preoperative radiograph



Preoperative photographs

Figure 1

Intraoral periapical radiographs did not show any signs of root fracture. The fracture line was seen extending horizontally along the junction of the middle third and gingival third of the crown (Figure 2). 12, 13 and 21 responded positively to electric pulp testing on the labial surface. This case was diagnosed to be a complicated oblique fracture with respect to 11.





Figure 2: Stabilization of fractured fragment.

The proposed treatment plan was as follows:

- Stabilize the fractured fragment, followed by endodontic therapy through the fractured fragment and placement of a fibre post for additional reinforcement.
- Direct composite restoration of 12 and 13 with resin - based composite.

The treatment plan was explained to the patient and the treatment of the tooth 11 was initiated. After administration of local anaesthesia, the fractured fragment was held in place using digital pressure and the access opening was done through the fractured fragment. Pulp was extirpated and the canal was irrigated and dried. A #20k file was inserted and the working length was measured. The canal was prepared upto #35k file. After thorough irrigation (Chlor Xtra 6%, EDTA 17%) a gutta-percha cone was placed into the canal and the fractured fragment was aligned to the fracture line. This was done to hold the separated fragments in place. The tooth surface around the fracture line was etched with 37% phosphoric acid (Ultra-Etch, Ultradent, South Jordan, UT, USA) for 15 seconds and bonding agent applied (Adper Single Bond 2, 3M ESPE, St Paul, MN, USA) and cured. A flowable composite (Voco Polofil NHT) was syringed along the fracture line and cured (Figure 2). The gutta-percha cone was removed. The canal was irrigated again and an intracanal dressing of calcium hydroxide was placed. The patient was recalled after two days. The canal was prepared upto a size F3 using protaper universal rotary system (Dentsply Maillefer, Ballaigues, Switzerland). Obturation was done using lateral condensation technique and AHplus resin sealer. The post space preparation was done upto peeso reamer size #3 leaving 4 mm of apical gutta-percha (Figure 3). A Fibre post was selected (FRC Postec Plus, Ivoclar-Vivadent) and placed to the into the canal and verified radiographically. The portion of the fibre post extending beyond the fracture line was removed using a diamond bur at high speed. The post was luted in the canal using a self-adhesive luting cement (Multilink N-Ivoclar Vivadent) (Figure 4). The access was restored using composite resin. Routine direct restoration with resin-based composite Filtek Z350 (3M ESPE,. St Paul, USA) of tooth 12 and 13 was conducted during the same appointment (Figure 5).



Figure 3: Obturation and post space preparation.



Figure 4: Fiber post cementation.



Figure 5: Post-operative photograph.

Case 2

A male patient aged 38, reported to the department with a complaint of a fractured maxillary right central incisor and the lateral incisor due to a fall 1 week ago. On examination, tooth 12 had a horizontal fracture at the junction of cervical and middle third. The fracture line was visible labially, and extended just above the level of the gingiva in the palatal region. The fractured fragment remained attached to the tooth. The tooth was tender on percussion. Tooth 21 had an Ellis class 3 fracture (Figure 1).

Intraoral periapical radiographs did not show any signs of root fracture. The fracture line was seen extending horizontally along the junction of the middle third and gingival third of the crown (Figure 2). 12 and 11 were evaluated using electric pulp testing on the labial surface. Tooth 12 responded negatively, tooth 11 showed a delayed response. This case was diagnosed to be a complicated oblique fracture with respect to 12.



Figure 1: Preoperative photograph.



Figure 2: Preoperative radiograph

The proposed treatment plan was as follows:

- Stabilize the fractured fragment, followed by endodontic therapy through the fractured fragment and placement of a fibre post for additional reinforcement with respect to 12.
- Pulp space therapy followed by direct composite restoration with respect to 11.

The treatment plan was explained to the patient and the treatment of the tooth 11 and 12 was initiated. After administration of local anaesthesia, tooth 12 was attend to first. The fractured fragment was held in place using digital pressure and the access opening was done through the fractured fragment. Pulp was extirpated and the canals were irrigated and dried. Access was gained into the tooth 11 and pulp extirpation was done. A #15k file was inserted into the canals and the working lengths were measured. The canals were prepared upto #30k file. After thorough irrigation (Chlor Xtra 6%, EDTA 17%) a guttapercha cone was placed into the canal of tooth 12 and the fractured fragment was aligned to the fracture line. This was done to hold the separated fragments in place. The tooth surface around the fracture line was etched with 37% phosphoric acid (Ultra-Etch, Ultradent, South Jordan, UT, USA)for 15 seconds and bonding agent applied (Adper Single Bond 2, 3M ESPE, St Paul, MN, USA) and cured for 20 seconds. A flowable composite (Voco Polofil NHT) was syringed along the fracture line and cured (Figure 3). The guttapercha cone was removed. The canals were irrigated again and an intracanal dressing of calcium hydroxide was placed. The patient was recalled after 24 hours. The canals were prepared upto a size F3 using protaper universal rotary system (Dentsply Maillefer, Ballaigues, Switzerland). Obturation was done using lateral condensation technique and AHplus resin sealer. The post space preparation for the tooth 12 was done upto peeso reamer size #2 leaving 4 mm of apical gutta-percha. A Fibre post was selected (FRC Postec Plus, Ivoclar-Vivadent) and verified radiographically. The portion of the fibre post extending beyond the fracture line was removed using a diamond bur at high speed. The post was luted in the canal using a self-adhesive luting cement (Multilink N-Ivoclar Vivadent) (Figure 4). The access was restored using composite resin (Figure 5).



Figure 3: Stabilization of fractured fragment.



Figure 4: Fiber post cementation.



Figure 5: Postoperative photograph.

Discussion

Rehabilitation of traumatic dental injuries involves restoration of form, function and aesthetics. Reattachment of fractured fragment forms a very conservative treatment providing good and long lasting results as the normal anatomic form, colour and surface textures are maintained. Advances in adhesive dentistry and availability of different types of aesthetic materials have made fragment reattachment procedures more achievable.

In the present case series, we have discussed two cases of fractured anterior teeth that were successfully reattached using fibre post. In both cases the fragments were not separated from the tooth and hence were preserved in the oral environment. Our data adds to the growing number of case reports on fragment reattachment, validating that it is an effective method for treatment of coronal fracture of anterior teeth [3-7]. This was a case of complicated crown fracture which involves the enamel dentine and pulp. The fracture line extended above the gingival level in both the cases. Therefore, it was decided to stabilize the fragment in its place and to provide additional reinforcement using fibre posts. Since endodontic treatment was required in both the cases the space of the pulp chamber contributed to being a reinforcement factor [8]. Riccardo tonini reported a case of fragment reattachment with a 4 year follow up, wherein the post was inserted into the crown rather than the root [7]. This method could have been applied to our cases as well, but since the fracture was incomplete and the fragments could be approximated, a straight forward approach was preferred.

Badami and colleagues reported a case of successful reattachment of fractured segments of fractured anterior teeth with a 12 month follow up period. They also concluded that fragment reattachment of a tooth with additional reinforcement using fiber posts form a definitive treatment for traumatized teeth [5]. Zorba and colleagues reported a case of re-attachment of the left maxillary incisor with a horizontal fracture in the cervical region. The root canal was prepared and reinforced with a fiber post. The separated crown fragment was prepared along the line of fracture while the margins were kept intact. The fractured fragment was luted to the post using adhesive resin cement. A clinical success of 1 year was reported. The patient reported with slight marginal discolouration, but no gingival findings were recorded [9]. The procedure for fragment attachment may be altered in many ways depending on the complexity of the fracture and on the remaining tooth structure. A single straight forward approach may not be applicable to all the cases. Therefore, fragment reattachment is a conservative option that restores function and aesthetics, and clinicians should consider it when treating patients with coronal fractures of the anterior teeth [5]. Since the anterior teeth are subjected to shear and tensile forces insertion of flexible fibre post reinforces the tooth against functional forces thereby providing longevity to the restoration [5]. None of the cases required an additional full coverage restoration as the coronal tooth structure was intact [10,11].

Conclusion

Our results and similar cases reported in the literature provide further confirmatory evidence of the long-term efficacy of the reattachment procedure using fiber posts and provide dental health professionals with an effective and viable alternative treatment method.

Source of Support

Nil.

Conflict of Interest

None declared.

Bibliography

1. Bastone Elisa B., *et al.* "Epidemiology of dental trauma: a review of the literature". *Australian Dental Journal* 45.1 (2000): 2-9.
2. Ojeda-Gutierrez Francisco., *et al.* "Management and followup of complicated crown fractures in young patients treated with partial pulpotomy". *Case Reports in Dentistry* (2013): 23864963.
3. Jagannath-Torvi Sourabh and Munniswamy Kala. "Restore the natural-A review and case series report on reattachment". *Journal of Clinical and Experimental Dentistry* 6.5 (2014): e595-e598.
4. Sapna CM., *et al.* "Reattachment of fractured tooth fragment with fiber post: a case series with 1-year followup". *Case Reports in Dentistry* (2014): 376267.
5. Badami Vijetha and S Kranthikumar Reddy. "Treatment of complicated crown-root fracture in a single visit by means of rebonding". *The Journal of the American Dental Association* 142.6 (2011): 646-650.
6. Surapaneni Sai Kalyan and Rita Chandki. "Preservative management of traumatized maxillary central incisor using fiber reinforced composite and mineral trioxide aggregate: Report of a case". *Journal of Natural Science, Biology, and Medicine* 6.1 (2015): S156.
7. Tonini Riccardo. "An innovative method for fragment reattachment after complicated crown fracture". *Journal of Esthetic and Restorative Dentistry* 29.3 (2017): 172-177.
8. DiAngelis Anthony J and Monica Jungbluth. "Reattaching fractured tooth segments: an esthetic alternative". *The Journal of the American Dental Association* 123.8 (1992): 58-63.
9. Zorba Yahya Orcun and Erdal Özcan. "Reattachment of coronal fragment using fiber-reinforced post: a case report". *European Journal of Dentistry* 1.3 (2007): 174-178.
10. Reis A., *et al.* "Reattachment of fractured teeth: a review of literature regarding techniques and materials". *Operative Dentistry* 29.2 (2004): 226-233.
11. Dean Jeffrey A., *et al.* "Attachment of anterior tooth fragments". *Pediatric Dentistry* 8.3 (1986): 139-143.

Volume 17 Issue 11 November 2018

© All rights reserved by Nidhi Hegde., *et al.*