CASE REPORT

CONSERVATIVE MANAGEMENT OF A COMPLICATED CROWN FRACTURE - A CASE REPORT.

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ABSTRACT
Complicated crown fractures involve enamel, dentine and the pulp. The incidence of complicated crown fractures ranges from 2% to 13% of all dental injuries and the most commonly involved tooth is the maxillary central incisor. Over time numerous techniques and materials have evolved for the reconstruction of injured teeth: resin crowns, steel crowns, orthodontic bands, ceramic crowns and resin composite restorations with and without pins. Different treatment modalities for complicated crown fractures are proposed depending on severity of the fracture as well as soft tissue damage. With the advent of adhesive dentistry the process of fragment reattachment has become simplified and more reliable. In this case of complicated crown fracture we have used one such technique where the fractured fragment was repositioned and luted using a glass fiber post (intra-canal anchorage) and flowable composite resins. Gingival complex was accordingly been reshaped.

Key words: Complicated crown fracture, tooth reattachment, glass fiber post reinforcement.

Introduction
The incidence of complicated crown fractures ranges from 2% to 13% of all dental injuries and the most commonly involved tooth is the maxillary central incisor [1]. Dental injuries do cause both physical as well as psychological trauma hampering individual’s daily activity. Traumatized anterior teeth requires quick functional andesthetic repair. Traditionally such injuries have been restored with conventional post-core and crown techniques after endodontic treatment. Several factors influences the management of coronal tooth fractures including extent of fracture, pattern of fracture and the restorability of the tooth, presence or absence of the fractured tooth fragment, occlusion and esthetics [2].

Although composite resin restoration is indicated in the management of fractured anterior teeth, reattachment is an excellent option when the fragment is available [3-8]. Clinical reports have indicated the application of additional preparations, on both the fractured tooth and the fragment, before and after bonding, with the aim of improving bond strength. Researchers have pointed out that when reattaching without making any extra preparation for the broken incisal part and for the remaining tooth in the mouth, lower values than an intact tooth fracture strength were obtained [9,10]. Such preparation methods include internal enamel groove, internal dentinal groove, over contour technique and external enamel groove in the shape of a V on the tooth when reattaching the broken incisal part. Apart from above mentioned procedure in cases of extensive complicated crown fracture intracanal anchorage has been used prior to reattachment [11,12]. Although long term study in this type of procedure is lacking and predictability is still to be determined.

The case report presented here deals with management of a complicated crown fracture by reattachment of the fractured segments by simple preparation on fractured segment and the remaining tooth structure and using intracanal anchorage. Although evidence based literature shows that materials do not play an important role in fracture strength recovery, the advantage of reattachment of fractured fragments include immediate esthetics, more reliable outline form, possibility of maintaining the occlusal function, absence of differential wear, lowered economic burden and excellent time resource management [5].

A newer clinical approach in reattaching the fractured fragment is been reported in this article.

Case Report
A 17-year-old male patient reported 3 days after he met a road traffic accident. After the general medical, dental and traumatic incident histories were reviewed, clinical and radiographic examinations were conducted. Clinically a step defect on the labial aspect of the tooth was observed extending through the crown subgingivally in the palatal aspect in the left maxillary lateral incisor (Fig. 1a). The periapical radiograph revealed a fracture line, an intact periodontal ligament space with complete root formation and no root fracture (Fig. 1 b). The fragment was mobile suggesting that the incisal fragment had separated from the remaining tooth structure and was attached to the soft tissues. Local anesthesia was administered and a root canal access cavity was prepared first to get a straight line access to the canal orifice for biomechanical preparation as well as for post placement into the canal through the fractured crown. The fractured segment was removed giving a crevicular incision palataly (Fig.1 c & d). Since the patient reported three days after the trauma and because of the extensive coronal fracture line, a multi visit root canal treatment followed by reattachment of the fractured segment using a glass fiber post as reinforcement was planned. The procedure was explained to the patient and the informed consent obtained. After the root canal treatment (Fig. 2 a), a 1.5...
A 4.5 mm thick glass fiber post (GLASSIX, NORDIN, Switzerland) was luted in the root canal (Fig. 2b) such that 2 mm of its coronal portion was outside the chamber. The fractured segment was cleaned to remove pulpal remnants. A box like preparation was made in the fractured segment which corresponded to the retentive part of extruding fiber post (Fig. 2b). The remaining tooth structure, fiber post and the fractured segment were etched and two coats of dentine bonding agent (Prime and bond, Dentsply De Trey, USA) were applied. The segment was reattached (Fig. 2c) with flowable composite resin (Tetric-N-Flow, Ivoclar vivadent). A postoperative radiograph (Fig. 2d) is done to verify post placement. All margins were light cured for 40 s. A composite veneer (Fig. 3a) (Ceram X duo, Dentsply) is applied and cured (Fig. 3b) over the labial surface to camouflage the fracture line and were polished using diamond stones and composite polishing kit (Shofu Co., Kyoto, Japan) (Fig. 3c). The post operative evaluation (Fig. 4a & b) at 11 months follow-up, reveals the tooth to be symptom-free and the crown was aesthetically satisfactory.

The patient was recalled to institute supportive periodontal therapy every 6 months at which point the periodontal status was stable and gingiva was free of inflammation. Re-evaluation was done at 19 months and the tooth was symptom-free.

**Discussion**

Development of the adhesive material creates new perspective in reconstruction of fractured teeth, it is now possible to achieve excellent results with reattachment of dislocated tooth fragment provided that the biological factors, materials and techniques are logically assessed and managed. Reattachment should be the first choice of treatment when the fracture fragment is available [8, 9].

The advantage of this alternative treatment includes regaining color and size of the original tooth, being worn away in similar proportion to adjacent tooth and giving positive psychological response to the patient and is also economical [1, 9].

In case of complicated fractures when endodontic therapy is required, the space provided by the pulp chamber can be used as an inner reinforcement thus avoiding further preparation of fractured tooth [1]. The use of post increases retention and distributes the stress along the root, with the help of the glass fiber post the fractured crown can be permanently bonded to the root [10]. Connecting the fiber post with the flowable composite resin increases the retention of segment and provides a monoblock effect [11].

In this case reattachment was possible because the fractured fragment...
was intact and we could achieve a good approximation as the crown and post were inserted. The whole process was less time consuming. Studies have proved that over a period of time chemical or dual cure resin cements change color due to the presence of the amine accelerator [12,13,14]. In this case bonding of the post on to the fracture fragment was preferred with flowable composite resin as they are more color stable and provides teeth with enhanced esthetics over time [13,14].

Conclusion

Even though there are an array of post design options available in this clinical situation success is dictated by remaining tooth structure after endodontic therapy. Reattachment of the fractured fragment is a viable technique that restores function and esthetics with a conservative approach. The case reported here, in addition required the clinician to adopt a multidisciplinary approach as it also needed reshaping of the gingival complex so as to avoid violating the biologic width.

References