

Case Report

Direct fragment reattachment of a complicated crown root fracture of
maxillary lateral incisor: A case report

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Abstract:

A 19-year-old woman subjected to a blow by an object on one of her upper front teeth presented with tooth mobility and pain during biting. The tooth was upper left lateral incisor and was diagnosed clinically and radio-graphically as a complicated crown root fracture. Treatment done was crown lengthening root canal treatment and fragment reattachment. In case of anterior complicated crown root fracture of permanent teeth with the fracture line extended below the alveolar bone crest; the treatment option is through root canal treatment, crown lengthening and direct fragment reattachment, hence the result will be immediate restoration of aesthetic and function.

Key words: adhesive dental material, crown lengthening, fractured incisor, traumatic dental injury,

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Introduction

Traumatic dental injuries (TDIs) are considered an important issue due to their high prevalence, mainly in areas of high social privation (1). A crown root fracture (CRF) is a type of dental trauma, usually resulting from a horizontal or vertical impact, which involves enamel, dentin, and cementum, often occurring or extending below the gingival margin. The most commonly affected tooth is maxillary central incisor, while the maxillary lateral incisors are less frequently involved (2).

Several factors influence the management of CRF, including extent of fracture, pattern of fracture and restorability of fractured tooth, secondary trauma injuries and presence/absence of fractured tooth fragment (3). The treatment of traumatic dental injuries should always be initiated as early as possible following the accident (4). Treatment of complicated CRFs is often challenging and complex (2,5) as whether the tooth can be saved is not definite. If the fracture extends so far apically below the level of the alveolar ridge, the appropriate treatment

option is extraction (6). The ability to expose the end of the fracture apically without jeopardizing crown-to-root ratio and with the advancement of adhesive dentistry; (5) treatment of choice for such cases could be fragment reattachment. In order to provide predictable esthetics, function, structure, and biologic health, it is of vital importance that an interdisciplinary treatment approaches by responding (1).

This case report addresses the available treatment alternatives and a step-by step guide to perform proposed treatment planning of reattachment of the available fragment.

Case presentation:

A 19-year-old girl presented with mobile crown of upper front tooth and pain during biting as she received a blow from an object at her home two hours ago. Her medical history was nothing contributory. On examination; severely mobile (third grade mobility) fragment (fig 1) and tooth vitality test revealed painful response, which was released after the removal of the cold stimulus. Gingiva and periodontal tissue of the affected tooth were normal and among



Figure 1: fragment attached by gingiva

examination of others hard and soft tissues; no abnormality was detected. The diagnostic Intra oral periapical radiograph showed a fracture line extending obliquely below the alveolar bone (fig 2).



Figure 2: IOPR view showing fracture line extending below the level of the alveolar bone.

The fragment was removed (Fig 3) after local anesthesia, and was later checked

via repositioning, with an excellent fit without any occlusal interference. The treatment plan through reattachment of the fragment after crown lengthening was set. The whole procedure was explained to the patient. A consensus was made, and the patient signed informed written consents for both the opted treatment and later on publication of the case.



Figure 3:The fractured part of the crown removed

Single visit root canal treatment was carried out for the tooth of concern, with minimal coronal canal preparation to maintain enough tooth structure for additional retention of the fragment. Crown-lengthening procedure (fig 4) was done to expose sufficient sound tooth structure below the fracture line. No. 12 surgical blade (Swann-Morton Limited Sheffield England) was placed into the periodontal ligament space and

manipulated in walking motion to excise 3 mm of the palatal gingiva and 1 mm of labial gingiva, thus exposing the fractured margin of root, while maintaining the biological width. After reflection of the mucoperiosteal flap, adhesive fragment reattachment was done through itching including the interproximal surfaces and facial interproximal areas using a disposable brush and bonding of both parts using the total-etch technique. For this purpose, 36% phosphoric acid gel (De Trey Conditioner 36, Dentsply Sirona GmbH, Bensheim, Germany) and adhesive system (Optibond FL, Kerr GmbH, Biberach, Germany) were used. Adhesive composite resin (Peak, Ultradent) (fig 4) was applied, then finishing and polishing were performed by diamond finishing strip (Gateway Vision strips, Brasseler, Savannah, GA) (fig 5).



Figure 4: Crown lengthening with reattachment of the fragment by adhesive cement



Figure 5: Finishing of reattached fragment using abrasive strip

Simple interrupted sutures were placed for stability and periodontal pack was given. The patient was discharged uneventfully with approval of her aesthetic. Suture removal was done after 7 days. We noticed demarcation of the line of adhesion, as this may be due to the placement of the adhesive material in the inner surface of the internal walls of the pulp chamber. Itching and boning of

the demarcated area on external surface of the crown and flowable composite resin (PermaFlo, Ultradent) was applied and smoothed. The patient was seen six-months later without any clinical complaint (fig 6) or radiographic changes (fig 7). She was satisfied and acknowledged her tooth aesthetic and function, and she was advised to revisit the department every six months for follow up.



Figure 6: post operatively clinical view three months later



Figure 7: Intra oral radiographic periapical view six month later.

Discussion:

Proper dental treatment following a traumatic dental injury is of paramount important to restore aesthetic and function. Trauma along with fracture of a permanent front tooth is a disturbing experience for the young patient and is a problem that management requires experience, judgment, and skill perhaps incomparable to any other segment of the dental practice (7). Diagnosis based on clinical and radiographic examination as in this case is misleading. For this case, the junior and senior staffs who were working in the department of Endodontics, including two consultants referred the patient to surgery department for tooth extraction. We think with advancement of dental adhesion technology and materials; in association with an old concept and continuous practicing of fragment reattachment techniques for original tooth, it represents the first excellent treatment option for anterior fractured teeth (8,9,10). Especially for adolescents and young adults who are mostly injured, which can affect the most endearing quality of a human being, the aesthetic and smile (11,12). So CRFs

require quick functional and esthetic repair (13).

Surgical exploration for confirmation of diagnosis and reattachment treatment should be considered in such circumstances (2). Access cavity for tooth with complicated CRF with minimal coronal root canal preparation can provide better retention for re-bonded fragment. Yogesh *et al.*, 2017, adopted the same concept and technique (14), even though it is not recommended by the International Association of Dental Traumatology ((IADT) (15), it was still used due to its advantages over other treatment modalities. When such emergencies take place every dentist who treats patients must be well prepared to meet these emergencies (4). Although the reattachment procedure was there since many years (Fildeman 1964), its practice is deficient due to lack of awareness or knowledge, (2) as has been noticed in this case. Therefore, we recommend reattachment procedure of CRFs to be introduced in dentistry curriculum during undergraduate course of dental traumatology.

Due to different modalities and controversy in treatment approaches for

CRFs, an evident based practice should be considered. Especially with the availability of internet connections and easy access to previously managed cases by authors using the same technique (16). Similar to others (8, 9) we consider the reattachment as a permanent restoration and we will follow the patient in a regular base of six-month interval. The patient was seen six months later with no complaints and aesthetic acceptance.

Conclusion:

In cases of complicated crown root fractures of maxillary anterior teeth, direct fragment reattachment can successfully manage the case. Knowledge and practice of reattachment should be improved among undergraduate dental students and generalists in order to meet the needs for managing such an emerging dental problem.

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