

Fracture tooth fragment reattachment - case report

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How to citation this article: Jasleen Virk, Sunil Malhan, Arvind Arora, Gursandeep Sandhu, Himanshu Sood, Chahat Bansal, “Fracture tooth fragment reattachment - case report”, IJMACR- July – August - 2022, Vol – 5, Issue - 4, P. No. 01 - 06.

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Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

The development of adhesive dentistry has allowed dentists to use the patient's own fragment to restore the fractured tooth, which is considered to be the most conservative method of treatment of crown fracture allowing restoration of original dental anatomy, and rehabilitating function and esthetics in a short time by preserving dental tissues. Coronal fractures of the anterior teeth are a common form of dental trauma and its sequelae may impair the establishment and

accomplishment of an adequate treatment plan. Among the various treatment options, reattachment of a crown fragment is a conservative treatment that should be considered for crown fractures of anterior teeth. The tooth fragment reattachment is preferred over full coverage crowns or composite resin restoration because it conserves sound tooth structure, and is more esthetic, maintaining the original anatomy and translucency, and the rate of incisal wear also matches that of original

tooth structure. Presented here is a report of a case of crown fracture managed by reattachment procedures.

Keywords: Periodontal, reattachment, epidemiological

Introduction

Coronal fractures of the anterior teeth are a common form of dental trauma that affect the primary and permanent teeth. It has a severe impact on the social and psychological well-being of a patient.¹

Anterior crown fractures are a common form of injury that mainly affects children and adolescents. The position of maxillary incisors and their eruptive pattern carries a significant risk for trauma. Andreasen has classified crown fractures as enamel infractions, enamel fractures with little or no dentin involvement, enamel-dentin fractures with no pulp involvement (uncomplicated crown fractures), and enamel-dentin fractures with pulpal involvement (complicated crown fractures).²⁻³

The incidence of trauma to anterior teeth in children is on a rise. In the 6-12-year-old children, it has been reported to range from 2.1 to 4%.²⁻³ Divakar and Nayak (2007) reported that crown fractures have been documented to account for up to 92% of all traumatic injuries to the permanent dentition. Coronal fractures of permanent incisors represent 18–22% of all trauma to dental hard tissues, 28–44% being simple (enamel and dentin) and 11–15% complex (enamel, dentin and pulp).⁴ Various epidemiological studies have shown that approximately one in six adolescents and one in four adults suffer a traumatic dental injury in their lifetime and that most dental injuries involve just one tooth. Following maxillary incisors, traumatic injuries occur most frequently in upper and lower lateral incisors and the upper canines.⁵⁻⁶

In the pre-adhesive era, fractured teeth needed to be restored either with pin-retained inlays or cast restorations followed by full-coverage crowns that sacrificed healthy tooth structure and were a challenge for the clinicians to match in esthetics with the adjacent teeth.⁷

Clinical assessment

Periodontal assessment

Gentle probing around the periodontal tissues of the fractured tooth under local anaesthesia will help determine the level of the tooth fracture as well as the presence of vertical root fracture.

If the fracture line is supragingival, the procedure for reattachment will be straight forward. However, when the fracture site is subgingival or intraosseous, surgical or orthodontic extrusion of the apical portion for restoration with a post retained crown, instead of reattachment, may be necessary.

Endodontic assessment

In addition to clinical examination for pulpal exposure, the vitality of the pulp is tested with various pulp vitality tests and status of apex maturation should be analysed by vitality tests and periapical radiographs.

Coronal assessment

If multiple fragments are present, it may be necessary to assemble the pieces with resin composite prior to trial in the mouth.

Occlusal assessment

Check whether the occlusion is traumatic or atraumatic. In case of traumatic occlusion, disoccluding the teeth is advised.

The objective of this case report is to present a conservative approach for the treatment of coronal tooth fractures using glass-fibre-reinforced composite post and

original tooth fragment to give a functional, aesthetically pleasing result.⁸

Case report

Presented here is a report cases of crown fracture, maxillary right central incisor was fractured at the middle third of the clinical crown, exposing the pulp (complicated crown fracture - Ellis class III fracture.

A 23-year-old female patient presented with severe pain and a broken front tooth (figure 1) after an accident 2 days before.



(A)

(B)

Figure 1: Pre-Operative view of fractured tooth fragment (a) Labial aspect (b) Palatal aspect

The patient presented the fragment of the detached tooth that had broken due to trauma.

Clinical examination revealed a class III fracture in 12 with the fracture line running obliquely from the middle third of the tooth on the labial aspect of crown.

In Intraoral examination no soft tissue laceration and no alveolar bone fracture seen.

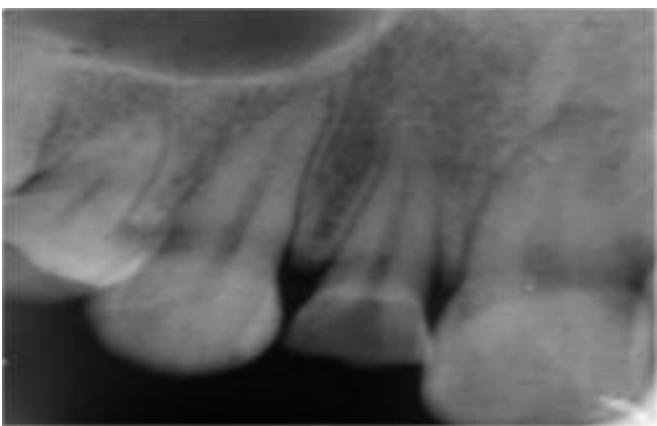


Figure 2: Pre-operative radiograph

A radiograph indicated complete root formation and a closed apex with no periapical radiolucency and did not show any other fracture or injury on the adjacent teeth (figure 2).

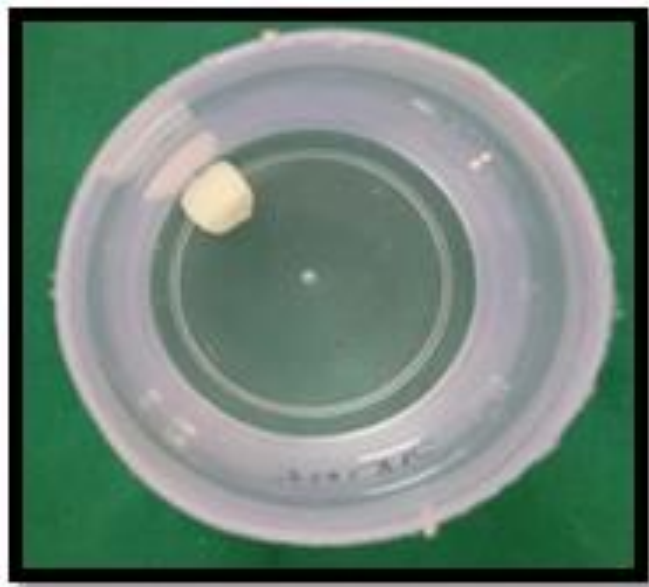


Figure 3: Broken tooth fragment

Treatment

Access opening was done with endo access bur and working length was determined. After cleaning and shaping, the root canal was obturated with gutta-percha and sealer using the lateral compaction technique. The post space was prepared after removing the partial gutta-percha with the help of peso reamers, leaving the apical 4 mm of the filling to maintain apical seal. (Figure 4)

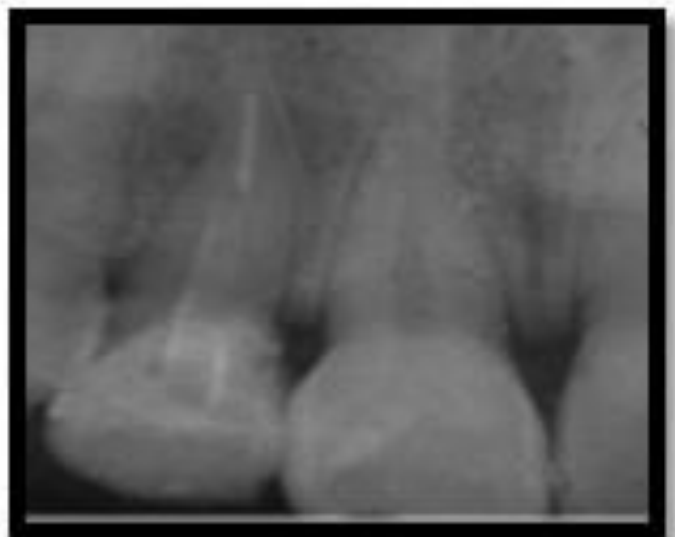


Figure 4: Post space preparation wrt 12

A glass-fibre-reinforced composite root canal post was placed in the canal. A dual-cure luting system and a glass-fibre-reinforced composite root canal post were placed according to the manufacturer's instructions. (Figure 5)



Figure 5

A groove was created in the centre of the original crown fragment. (Figure 6)

The intact coronal portion of the tooth and the original crown fragment were etched with 37% phosphoric acid gel for 20 seconds, rinsed for 20 seconds and dried.



Figure 6: Placement of groove in fractured tooth fragment.

Flowable composite resin was applied at the intact coronal portion of the tooth and the fractured crown fragment. After this, the fractured fragment was accurately placed and polymerised for 30 seconds.



(A)

(B)

Figure 7: Post operative clinical view (a) Labial aspect (b) Palatal aspect

The patient was recalled after a week for follow up and regular checkup was done.

Patient was advised to take some of the precautionary measures like soft brushing should be done and patient is advised to not to chew from this side as de-attachment of fragment can occur.

Discussion

The present case described the reattachment of tooth fragment as an alternative to the composite build up for regaining the esthetics and function of fractured teeth. The development of adhesive material creates new perspective in the reconstruction of fractured teeth. it is

now possible to achieve excellent results with the 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. The advantage of this alternative treatment includes regaining colour 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.⁹⁻¹¹ Reattachment of fractured fragments has been reported in the literature since 1960s, with the first study published in 1964,¹² where the authors had reattached the fractured fragment using post and core. The fragments have also been attached with dentinal pins.¹³

The site of fracture, extent of fracture, periodontal status, endodontic involvement, maturity of root formation, biological width, occlusion, time, and resource of the patient predict the feasibility of such repairs.¹⁴

Proper bonding of posts reduces the wedging effect within the root canal, needs less dentin removal to accommodate a shorter and thinner post, and minimizes susceptibility to tooth fracture.¹⁵

The friction bond of postplacement in addition to bonding provides retention to the coronal portion and assists in preventing dislodgement by nonaxial forces.¹⁶

A number of treatment options have been proposed for coronal tooth fractures depending upon the circumstances like immediate reattachment¹⁷, surgical exposure, crown and root re-contouring and fragment reattachment.¹⁸

When the tooth is completely unrestorable, extraction is the only option available, leading to the loss of bone in the area compromising future treatment with implants.¹⁹

Pros and cons of reattachment are shown below.^{20,21}

Pros of reattachment

- Conservatism and Preservation of 'identical' occlusal contacts.
- Preservation of incisal translucency/good aesthetics.
- Colour match to the remaining crown portion and Colour stability of the enamel.
- Maintenance of original tooth contours.
- More durable restoration than a Class IV resin restoration alone.
- Wear similar to adjacent/opposed teeth.
- Positive emotional and social response from patients.

Cons of reattachment

- Less than ideal aesthetics if the tooth fragment is allowed to dehydrate.
- Colour changes of the bonded fragment.
- Necessity for continuous monitoring.
- Unknown longevity.
- 'Predicted' eventual separation of the repair due to progressive breakdown of the bonded junction.

Conclusion

It can be concluded from the case report that fracture reattachment is a conservative and esthetic alternative for treatment of the complicated crown fracture. The long-term prognosis is still obscure, but it is an immediate technique of esthetic rehabilitation in the management of traumatized tooth.

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