



## MANAGEMENT OF CERVICAL ROOT FRACTURE OF ANTERIOR TEETH WITH OPEN APEX AND CLOSED APEX BY FRAGMENT REATTACHMENT - A REPORT OF TWO CASES

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### ABSTRACT

**Background:** Dental trauma is one of the main causes of loss of teeth in children. Dental trauma is a situation in which the patient is not only affected physically, but socially or psychologically also. Treatment of fractured teeth, particularly in young patients, is further complicated by the often difficult but essential procedure. Advances in adhesive dentistry have enabled dentists to use the patient's own fragment to restore the fractured tooth. Reattachment is such an ultraconservative technique that it provides safe, quick, and aesthetically pleasing results. **Method:** In the first case, the cervical root fracture in I1 with open apex was treated by root canal treatment followed by bio-dentine apical plug and then with the help of fibre post, the tooth fractured fragment were reattached. In the second case, a cervical root fracture in I1 with closed apex was treated by root canal treatment followed by reattachment of the fragment by fibre post. **Results:** The patient was reevaluated in the subsequent follow-up, the patient was asymptomatic with favourable soft tissue healing and good aesthetics. **Conclusion:** This case report includes proper history taking, diagnosis, and treatment of cervical root fracture by fragment reattachment to educate the population that reattachment is an inexpensive treatment option for the patient with a positive emotional and psychosocial response.

### KEYWORDS :

#### DESCRIPTION

Children and adolescents are the majority of patients with a history of dental trauma, and the maxillary central incisors are the most affected teeth due to their position in the dental arch and their large overjet.<sup>[1]</sup> Tooth fractures are frequently reported emergencies in dental practice. They can range in severity from a simple enamel fracture to complete tooth avulsion. Among these injuries, crown root fractures are considered the most common cause of tooth loss.<sup>[2]</sup> These are clinically difficult-to-treat cases because management of these cases requires a multidisciplinary approach for complete rehabilitation. Reattachment of tooth fragments is the most conservative biologic treatment available for crown root fractures when fractured tooth fragments are available and reported early in a clean and hydrated state.<sup>[3]</sup>

With the advancement in adhesive materials, tooth fragment reattachment has become a more predictable technique with several advantages. It is a conservative procedure that preserves the contour, texture and translucency of the original tooth; it is economical and achieves esthetics in a single session.<sup>[4]</sup>

This article presents a series of case reports of cervical root fracture treated by reattachment using a fibre post.

#### Case report 1

A 11-year-old male patient was referred to the department of paediatric and preventive dentistry, Himachal Pradesh Govt. Dental College and Hospital, Shimla, India, with a chief complaint of pain and mobility in the upper front teeth. The patient gave a history of trauma 8 hours back due to an accident with ball during playing cricket. No significant medical history was elicited by the patient. Clinical examination revealed tenderness to percussion in I1 along with Grade II mobility. Preoperative radiograph revealed crown-root fracture extending above the alveolar crest of I1 and open apex (figure 1). As the fracture fragment was in oral cavity partially attached to gingiva without any signs of dehydration, treatment by reattachment was explained to the patient. The procedure was started after taking consent from

the patient's guardian. Single-visit root canal treatment was carried out on I1 followed by placement of bio-dentine plug in order to close the apex. Post space was prepared using Gates-Glidden drills and peeso reamers (figure 2).

A no 2 quartz fibre post (Over Fibers, Italy) was selected as the desired post. As the fracture line was subgingival, isolation of the fracture line during reattachment was not possible. The fractured crown fragment was removed and preserved in normal saline. A mucoperiosteal envelope flap was elevated to fully expose the fracture line. As the fracture line was < 2 mm below the alveolar bone crest, a crown lengthening was performed. In this procedure, 1–2 mm of crestal bone adjacent to the deepest part of the fracture is removed and the normal groove depth of 2 mm is restored. Periodontal and bony recontouring allowed exposure of the fractured margin and sufficient root surface to provide an acceptable final restoration line for placement of the crown fragment very close to the root. This in turn maintains the health of the periodontal tissues by preventing restorative protrusions caused during the bonding procedure. The fractured fragment was prepared on the pulp side to ensure a precise fit on the post.

The post and tooth fragment were luted with dual cure resin luting cement (coltene, United States). The flap was sutured with 000 silk sutures. The patient was recalled after 1 week for suture removal (figure 3). On subsequent follow up the patient was asymptomatic with favourable soft tissue healing and good aesthetics. 12 months Follow up Radiograph revealed accuracy of fit of fractured segments without any tenderness (figure 4). Patients are advised regarding the care of teeth that underwent trauma and follow-up at intervals of 6–8 weeks, 4 months, 6 months, 1 year. Patient was advised to maintain oral hygiene, brush gently followed by rinses with 0.1% chlorhexidine in order to reduce plaque accumulation and not to bite hard items from anterior teeth.

#### Case report 2

A 15-year-old male patient was referred to Department of Paediatric and Preventive Dentistry, Himachal Pradesh Govt. Dental College and Hospital Shimla, India, with a chief complaint of pain and mobility in upper front teeth. The patient

gave a history of trauma 16 hours back due to an accident while playing contact sport. No significant medical history was elicited by the patient. Clinical examination revealed tenderness to percussion in 11 along with Grade I mobility. Preoperative radiograph revealed crown-root fracture extending above the alveolar crest of 11 and closed apex (figure 5). As the fracture fragment was in oral cavity partially attached to gingiva without any signs of dehydration, treatment by reattachment was explained to the patient. The procedure was started after taking consent from the patient's guardian. Single-visit root canal treatment was carried out on 11.

Post space was prepared using Gates-Glidden drills and peeso reamers (figure 6). A no 2 quartz fibre post (Over Fibers, Italy) was selected as the desired post. As the fracture line was subgingival, isolation of the fracture line during reattachment was not possible. The fractured crown fragment was removed and preserved in normal saline. Periodontal and bony recontouring allowed exposure of the fractured margin and sufficient root surface to provide an acceptable final restoration line for placement of the crown fragment very close to the root. This in turn maintains the health of the periodontal tissues by preventing restorative protrusions caused during the bonding procedure. The fractured fragment was prepared on the pulp side to ensure a precise fit on the post. The post and tooth fragment were luted with dual cure resin luting cement (Coltene, United States). Post treatment photograph and radiograph was taken (figure 7) and Post treatment instructions were given similar to first case. On the subsequent follow up the patient was asymptomatic with favourable soft tissue healing and good aesthetics. 12 months follow up Radiograph revealed accuracy of fit of the fractured segments without any tenderness (figure 8).

## DISCUSSION

Selecting an appropriate treatment option depends on several factors: the type of fracture and its relationship to the alveolar ridge; degree of pulp involvement; eruption height and occlusal characteristics; cresting; prognosis, as well as the patient's needs and attitude towards treatment. The first published case of replacing a fractured tooth fragment was described by Chosack and Eidelman in 1964 and the procedure was described as a "temporary restorative modality".<sup>[5]</sup> Before Due to the use of adhesive technology in dentistry, chip reattachment was viewed as a "transitional treatment option" to delay definitive treatment until an age when the contours of the gingival margins were relatively stable.

Some clinical studies have shown that these restorations last more than 7 years.<sup>[6]</sup> Andreasen et al. reported retention rates of 50% and 25% for 2.5 and 7 years in a multi-centre clinical study with 330 reattachment cases. 0 years.<sup>[7]</sup> Cavalleri and Zerman compared fragment reattachment to direct adhesive restorations for the treatment of crown fractures. The best result after 5 years was the tooth fragment reattachment technique, especially in terms of esthetic results.<sup>[8]</sup>

In the present case of a complicated crown fracture requiring endodontic treatment, the fractured fragment was discarded and the fragment reinserted with a fibre post. The use of natural tooth structure offers a conservative, esthetic and economical option that offers good and long-lasting esthetics, restores function, results in a positive psychological response, and is undoubtedly a straightforward procedure. Adhesive posts are used because they have the potential to increase retention, are more flexible, and have a modulus of elasticity approximately equal to that of dentin, and when bonded with resin cement they distribute forces evenly across the root.<sup>[9]</sup>

## CONCLUSION

Due to the higher incidence of injury to dental tissue and its

supporting structures, it is important to have a working knowledge of the available techniques and their indications, as well as the risk-benefit balance. Reattachment is an inexpensive treatment option for the patient with a positive emotional and psychosocial response. The main concern is to educate the population, get the fractured fragment, and get immediate dental treatment.

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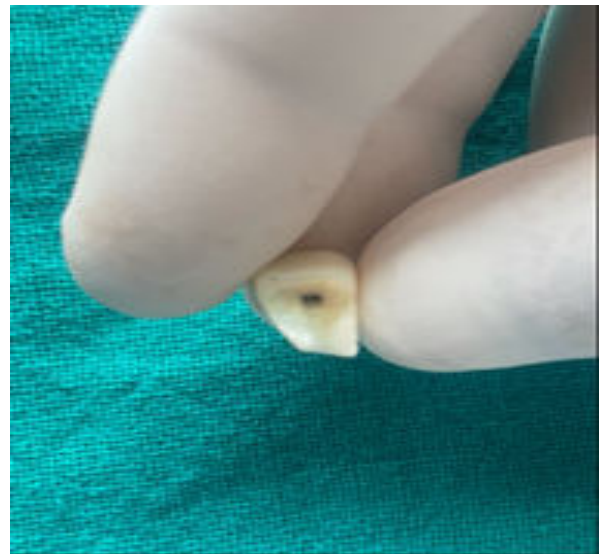
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**Informed consent:-** Written informed consent was obtained from the patient's guardian to publish this report in accordance with the journal's patient consent policy.



**Figure 1 ( Preoperative photographs and radiograph showing cervical root fracture w.r.t 11)**



**Figure 2 (Prepared pulpal aspect of fractured fragment)**



**Figure 3 (One-week postoperative photograph and radiograph)**

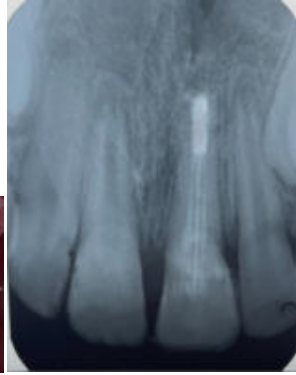


Figure 4 (One-month postoperative photograph and radiograph)



Figure 8 (One-month postoperative photograph and radiograph)

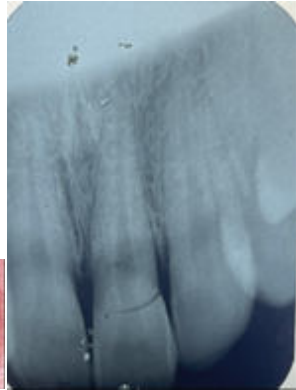


Figure 5 ( Preoperative photographs and radiograph showing cervical root fracture w.r.t 11)



Figure 6 (Prepared pulpal aspect of fractured fragment)

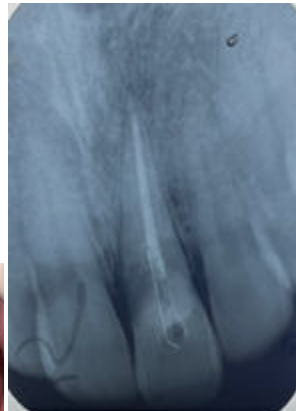


Figure 7 (One-week postoperative photograph and radiograph)

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