

# Crown fragment reattachment in anterior-fractured tooth: A five-year follow-up

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## ABSTRACT

Treatment of anterior dental fractures often requires an immediate procedure. Reattachment of the fragment to its original position is an optimal approach to aesthetic and functional rehabilitation. This paper reports the case of a permanent maxillary lateral incisor with crown fracture treated by adhesive fragment reattachment. Follow-up radiographs over 5 years demonstrated the satisfactory resolution of the clinical case.

## Key words

Crown fracture, dental trauma, permanent teeth, treatment

## INTRODUCTION

Coronal fractures are the most frequent traumatic injuries that affect the permanent teeth.<sup>[1,2]</sup> In permanent dentition, the coronal fractures are a common occurrence, particularly in children between 8 and 11 years old.<sup>[3,4]</sup> The high prevalence of fractures in permanent anterior teeth in young patients often represents a challenge for achieving aesthetic dentistry quickly and conservatively. Improvements in adhesive dentistry have enabled a conservative approach by reattachment of the fragment when it is present, or reconstruction with composite resins.<sup>[4,5]</sup>

Fragment bonding is an alternative approach that is becoming more attractive given the technology of new dentin bonding agents.<sup>[3,6,7]</sup> The repositioning of a fractured crown fragment using a bonding fragment technique offers several advantages, including the reestablishment of function, aesthetics, shape, shine and surface texture, in addition to the original contour and alignment of the teeth.

A clinical study demonstrated that fragment retention was considerably higher using a total etch technique

and dentin bonding agents, and that reinforcement of the fracture line did not prolong fragment retention.<sup>[8]</sup> At this point, a new clinical procedure was proposed to enhance fragment retention using a groove in the fragment, which increases the bonding surface and, thus, bonding strength.<sup>[6]</sup>

This paper reports a follow-up case of a permanent maxillary lateral incisor with a crown fracture treated using adhesive fragment reattachment.

## CASE REPORT

A 22-year-old male patient was referred to the UFPel dental clinic, reporting a dental trauma of the maxillary right lateral incisor. Dental history revealed that the trauma was the result of a fall. The patient reported no treatment until that moment and the crown fragment was perfectly intact and stored in water.

The intraoral and radiographic examination showed that the injury caused a non-complicated crown fracture in the middle third of the tooth, with slight pulp exposure [Figures 1 and 2]. Clinical examination evidenced a fracture involving the enamel/dentin aspect with no symptoms. The crown fragment analysis showed a perfect margin adaptation of the fragment to the tooth remnant.

The position and pattern of the fracture, the occlusion (maxilo-mandibular relationship) and a tooth remnant with an intact substrate suggested that pulp protection

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10.4103/2278-9626.103399

followed by reattachment of the fragment to its original position using adhesives procedures was a reliable option for the case. The patient was systemically healthy, presented an overall plaque index and gingival index compatible with good periodontal health, and the operative area was free of visible plaque.

After dental prophylaxis and cleaning the fragment with 2% digluconate chlorhexidine, the operative field was isolated. Briefly, protection of the pulp-dentin complex was performed by applying a thin layer of calcium hydroxide cement (Hydro-C, Dentsply, RJ, Brazil) on the remaining tooth [Figure 3]. Then, the crown fragment and the tooth remnant were acid etched for 30 seconds with 35% phosphoric acid gel, rinsed for 30 seconds and dried with air spray. A conventional two-bottle adhesive system (Scotchbond Multi-Purpose Plus, 3M ESPE, St. Paul, MN, USA) was applied on the enamel. After juxtaposition of the fragment with the tooth, they were light-cured for 40s buccally and 40s lingually using halogen light-curing equipment at an intensity of 1400 mW/cm<sup>2</sup> (Ultralux Curing Light, Dabi-Atlante, SP, Brazil). Excess adhesive was removed and final polishing was performed using a high-lustre polishing paste, goat-hair brushes and cotton buffs on the external enamel surface [Figures 4 and 5].

Two weeks after the adhesive procedure, good aesthetic appearance and function were observed and a frontal smile view showed an imperceptible reattachment [Figure 6]. Radiographic and clinical examination of five years follow-up revealed periodontal health, a normal aspect of the apex and osseous structures and no painful symptomatology [Figures 7 and 8].

## DISCUSSION

Reattachment of the fragment to its original position is considered an excellent approach for the management of a coronal fracture.<sup>[3,6,7]</sup> The application of dental adhesives capable of reattaching a fragment to the remaining tooth structure appears to offer a number of advantages compared with the conventional methods for restoring fractured teeth.<sup>[3]</sup>

A great advantage of the adhesive fragment reattachment technique is to reduce the necessity of restorative procedures used to fill the tooth with composite resin. In the case of unsuccessful treatment, the composite resins restorations as a alternative and can be placed in a region where the structure has been preserved.



Figure 1: Initial clinical aspect of the traumatised lateral incisor



Figure 2: Initial radiographic appearance of the fractured tooth



Figure 3: Protection of the pulp-dentin complex with calcium hydroxide cement



Figure 4: Juxtaposition of fragment with the tooth



Figure 5: Lateral view of reattachment procedures



Figure 6: Frontal view of the reattachment after 2 weeks follow-up



Figure 7: Clinical follow-up 5 years after coronal reattachment



Figure 8: Radiographic follow-up 5 years after reattachment procedures

In the present case, the location and aspect of the fracture (non-complicated crown fracture) and the presence of a balanced occlusion may have favoured the clinical success. Limitations in the bonding fragment technique are attributed to detachment of the remaining dental fragment; the fragment does not recover its original colour or bonding of the remaining fragment at the incorrect position. Fortunately, during the entire follow-up period, none of these adverse conditions occurred in the patient.

The inflammatory process in cases of coronal fractures with minor dentin involvement is transitory, since the vascular supply of the pulp remains intact and bacterial invasion can be prevented. The vascular supply depends fundamentally on the trauma occurred, however, bacterial invasion can be prevented by immediate dentin sealing.<sup>[9]</sup> In the absence of a large pulp exposure, is frequently formed reparative dentin in response to the fracture, so when it is restored with composite resin or with direct adhesive fragment reattachment. These procedures seem to ensure the continuity of function of the pulp.<sup>[9]</sup>

In cases such as the one reported, radiographic follow-up is essential for viewing alterations not perceptible clinically, requiring great caution in this kind of clinical treatment.<sup>[8]</sup> The planning of the present treatment enabled clinical success with direct adhesive fragment reattachment; however, the patient should

perform an extremely careful reattachment for a long period.

## CONCLUSION

The reattachment of the fractured crown fragment using the bonding technique demonstrated the satisfactory resolution of the clinical case.

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**How to cite this article:** Martos J, Koller CD, Silveira LF, Cesar-Neto JB. Crown fragment reattachment in anterior-fractured tooth: A five-year follow-up. *Eur J Gen Dent* 2012;1:112-5.

**Source of Support:** Nil, **Conflict of Interest:** None declared.