

## Trauma in permanent central incisor with crown fracture treated by direct composite restoration using one coat 7<sup>th</sup> generation bonding agent: A case report

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### Abstract

Its human tendency that they can cut everything with their incisors, but it's not true sometimes it may lead to an unexpected occurrence of the coronal fracture and requires professional preparation for the urgent approach. A coronal fracture involving non-complicated enamel and dentin might receive different kinds of treatment such as re-attachment of fragments or restoration with composite materials. The aim of this work is to present a clinical case of a teenager with coronal non-complicated fracture of permanent upper central incisor treated by adhesive restoration using one coat 7<sup>th</sup> generation bonding agent material.

**Keywords:** crown fracture, dental trauma, permanent teeth

### Introduction

The traumatic injuries in children and adolescents are a common problem, and some reports have been observed that its prevalence has increased in recent decades [1]. Most dental injuries involve just one tooth, and the majority of the affected teeth are maxillary central incisors. In permanent dentition, the coronal fractures are a common occurrence, particularly in children between 8 and 11 years old [2, 3].

Uncomplicated and complicated crown fracture is the most common traumatic dental injury to permanent teeth. Coronal fractures represent a high proportion of the dental trauma in the permanent dentition ranging between 26-76% of dental injury, and approximately 16% of coronal fractures are complicated presenting pulp exposure [3].

Aesthetic and functional rehabilitation is the primary goal of the treatment of crown-fractured tooth. Actually, an alternative approach, which is becoming more attractive due to the technology of new dentin bonding agents, is fragment bonding [4] however, in cases of absence of the fragment, it becomes essential to preserve the remnant tooth structure with a composite resin restoration [5, 6]. This paper reports a case of a permanent maxillary central incisor with incisal crown fracture treated using composite resin restoration.

### Case Report

A 17-year-old male patient was referred to the department of our institution, reporting a dental trauma of the permanent maxillary left central incisor. Dental history revealed that he had a trauma as the result of a fall while playing at school. The patient reported no treatment until that moment, and the crown fragment had been lost during the accident. The medical history of the child was found to be insignificant. No significant hard or soft tissue injury other than tooth fracture was observed. An intraoral and radiographic examination showed that the injury had caused a non-

complicated crown fracture in the incisal third of the tooth 21, without pulp exposure. On Clinical examination fracture involving only the enamel aspect with no symptoms. The coronal analysis of the adjacent central incisor showed incisal edge fracture which restored with composite resin.



**Fig 1:** Preoperative Fractured central incisor

The patient was systemically healthy, presented an overall plaque index and gingival index of below 20%, and the operative area was free from visible plaque and calculus. The position and pattern of the fracture suggested that a composite resin restoration would be a reliable option for the case.

The operative field was isolated and the central incisor was acid etched for 30 s with a 35% phosphoric acid gel, rinsed for 30 seconds, and dried with air spray. And then adhesive system (One coat 7.0-coltene 7<sup>th</sup> generation bonding agent) was applied (Fig.2) on enamel and light-cured for 40 sec buccally and 40 sec lingually by using a halogen light-curing equipment with an intensity of 1400 mW/cm<sup>2</sup> (LED Curing Light). The restoration was initiated with a small amount of composite (3M ESPE) of 2M2 shade after shade matching.



**Fig 2:** Bonding agent (One Coat) was applied and light cured

The last layer of composite resin A3E corresponding to buccal enamel was applied and smoothed with brushes for an excellent accommodation and surface texturization. The final polishing was performed (Fig.3).



**Fig 3:** Postoperative

### Discussion

The dentist plays an important role in the management of injured cases and so he has to take into consideration every possibility of saving a tooth that has received trauma. The remarkable advancement of adhesive systems and resin composites have made reattachment of tooth fragments a procedure that is no longer a provisional restoration, but rather a restorative treatment offering a favourable prognosis. However, this technique can be used only when the intact tooth fragment is available [7].

The preservation of the fragment is not always possible, because the circumstances in which the fractures occur, sometimes does not allow the patient to find it, which guides the treatment for a reconstruction with composite resin. Composite resin restoration for the restoration of permanent incisors that have minimum or not very extensive crown fractures is an excellent approach due to a conservative, timely and economical treatment option. [8, 9].

The choice of resin composite should be focused on aspects related to the strength and aesthetics. Within this context, the composite layering is the key to obtaining esthetically successful restorations [8]. According Nahsan *et al.* [9] young teeth show a naturally high value and thus require resins with such characteristics; in consequence, the reproduction of enamel should be done with composite resins that presents transparent characteristics.

Resin stratification initiating from the palatal enamel is the

best choice, particularly in fractured anterior teeth, with a transparent composite to create the underlying structure for the subsequent layers [8]. The palatal enamel can be constructed with the use of a polyester matrix, pre-fabricated acetate crowns, or personalized guides like silicone matrix [9]. The silicone matrix option has advantages in restorative procedures by providing reduction of the operating time [8] maintenance of the cervico-incisal and mesiodistal dimensions besides appropriate control of the thickness of the resin increment, and enough support for the build-up of material from the palatal aspect [9].

The variation of some characteristics of the composite materials like translucency and opacity of composite resins requires the professional to know the different esthetic restorative materials and their optical behavior and may thus replace or correct color tones during the restorative procedure [10, 11].

Several variables can affect the longevity of this type of restoration including the extent of the crown fracture, the restoration size, the occlusion of the restored tooth, and the overall prognosis of the injured tooth [9]. The choice of resin should be focused on aspects related to the strength and aesthetics. The present hybrid resins, due to its high percentage of inorganic filler and diversity of colors for enamel and dentine, allow satisfactory clinical results, in terms of longevity of the restoration [12, 13]. In the present case, the location and aspect of the fracture combined with a balanced occlusion may have favored the clinical success. Limitations of the adhesives restoration techniques can be attributed to detachment of the restoration by a new trauma or the restoration does not recover its original color. With regard to the restorative procedure, the applied technique has facilitated the obtaining of dental contours and convexities, which would be more labored and lengthy in a direct restorative technique. If handled properly, prognosis of the tooth, after traumatic crown fracture, is satisfactory.

### Conclusion

The composite resin restoration of permanent incisors with crown fractures is a simple procedure that should be planned and executed with attention to dental contours and convexities, facilitating the re-establishment of function and aesthetics.

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