

# Direct composite build-up on traumatized central incisors. A case report

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## Abstract

*The complicated crown-root fractures with pulp exposure appear to be one of the hardest tasks the dentists face nowadays. To provide the best treatment for traumatized teeth they must do an adequate treatment plan, to put a correct diagnose and to perform an proper follow-up. In such cases the dentist must preserve as much root dentin as possible to provide reliable endodontic treatment and restoration. Around 22% of the children between age of 8 to 10 experienced traumatic injuries in permanent dentition that affect especially maxillary central incisors. Because of the present periodontal trauma a significant importance for the good prognosis and high quality treatment is the medical intervention on time.*

**Keywords:** traumatic injuries, fractured central incisors, complicated crown fractures, endodontic treatment.

## Background

A large group of the clinical cases in primary, mixed and permanent dentition is represented by traumatic injuries which pediatric dentists affront in their everyday practice (1,2). As etiology factors for traumatic

injuries on primary and permanent children's teeth are reported fall during playing outside, sport accidents, car crashes, cycling (3) and rarely child abuse (usually the history of the trauma from parents is not the same as the child's one) (4,5). In permanent dentition the frequency of the traumatic injuries is around 22% (1) as they happen before age of 14 and the peak is in children from 8 to 10 years of age. The male to female ratio is respectively 2:1 (2). Overjet and its severity is one of the main predisposing factors for crown fractures. The medical intervention on time has a crucial impact on the treatment quality and the prognosis of the tooth, as well as the correct diagnose of the periodontal trauma which always supports crown fractures (2,6). Usually crown fractures affect one or two frontal teeth, especially the maxillary incisors (2,7).

### Case description

A 14-year-old child came in the office forwarded by other dentist with a complicated fracture on tooth 21 and uncomplicated fracture on tooth 11 (Fig. 1).



**Fig. 1 Crown fracture of maxillary central incisors**

History anamnesis from the parents reported that the trauma was happened due to a fall accident. The both incisors were with completed root development. An initial x-ray was taken for trauma severity assessment (Fig 2) as well as EOD on tooth 11 with uncomplicated crown fracture. The child's behavior was assessed as slightly negative with the Frankel scale. After a child's behavior management in advance an infiltrative local anesthesia was applied and vital extirpation of the pulp of tooth 21 was performed. The child did not allow the usage of rubber-dam isolation and it was necessary a cotton rolls to be used combined with OptraGate and suction system. The small fractured fragment of tooth 21 must be removed after the endodontic treatment (Fig. 3).



**Fig 2. Initial X-ray**



**Fig. 3 Situation in oral cavity before treatment**

After the pulp extirpation and 5,25% hypochlorite irrigation the working length of the root canal was set. A mechanical treatment of root canal with ProTaper Next – X1, X2 and X3 was performed supported by hypochlorite and Metronidazole 500mg/100ml irrigation. The root canal was obturated with central gutta-percha pin and AH+ sealer (Fig. 4). A control x-ray was made for root canal filling assessment (Fig. 5).



**Fig 4. Root canal filling after endodontic treatment**



**Fig. 5 Control X-ray**

The crown fractured fragment, which also included part of the root, was removed. After 24 hours, the root canal was prepared for a fiber post placement at the level of 2/3rds of its total length (Fig. 6).



**Fig 6. Root canal preparation**



**Fig 7. Cemented fiber post**

A fiber post TokuPost 15R/0,75 was cemented. After a treatment of the root canal walls and the remaining hard tooth tissues with 39% orthophosphoric acid an adhesive bonding system Tokuyama Universal Bond was applied and Estecem II – dual-polymerizing cement was used for the cementation (Fig. 7).

With the support of silicone index a direct composite build-up was performed with highly aesthetic composite Tokuyama Estelite Asteria-A2B – layer by layer until total restoration of the missing hard tooth tissues (Fig. 8).



**Fig 8. Final direct composite build-up**

## Discussion

The complicated crown-root fractures of the teeth are a great challenge for the dentists as they deliver two difficult tasks – endodontic treatment and the following restoration because the defect includes part of

the root and it is subgingivally located (8). In certain cases the dentists are able to restore the tooth with reattachment of the fractured fragment using the contemporary adhesive systems and composite materials (9). In cases where the crown fragment was not found by the child or the parents it is necessary a restoration with resin composites to be performed to achieve high quality aesthetic and functional outcome. For a long lasting restoration of fractured teeth it is necessary for the remaining hard tooth tissues to be preserved (10,11), supported by base of RMGIC for optimal sealing and decreasing the risk of contamination. The restorations of vital teeth have high durability for many years (12,13). Endodontically treated teeth can be restored with the contemporary adhesive systems and composite materials. Endodontic treatment usually includes the additional removing of root dentin from the already mechanically compromised tooth. A correct clinical approach is needed to preserve the remaining dentin for the composite restoration not being compromised (14,15). When the root part of the fractured tooth was treated, the relatively large pulp chamber can be used to improve the retention of the filling material (16). The aesthetics is with extreme importance for the teeth in the frontal area as they can get discoloration after inadequate endodontic treatment or traumatic injuries. The direct fiber pin build-ups are used when there is a deficiency of coronal hard tooth tissues. It is necessary enamel translucency to be taken into account while choosing a color of restoration material for maximal representation of the aesthetical appearance of the adjacent teeth (17).

### Conclusion

Traumas are relatively often during childhood age. The complicated fractures sometimes require endodontic treatment of the teeth which is slightly different compared to those in adults. General practitioners and specialists should rely more on the chemical disinfection of the root canals instead of mechanical removal of hard tooth tissues. Due to widely opened root canals the clinical approach must be as conservative as possible to achieve high durability of the root and provide high longevity of the direct build-up. The contemporary adhesive systems, filling materials and cements are perfectly suitable for this purpose.

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