

## Different Approaches to Complicated Crown Root Fractures in Primary Teeth: A Report of Two Cases

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### Abstract

Crown root fractures in primary teeth are rare due to the plasticity of the developing alveolar bone. The proper treatment needs to be addressed in order to secure its developing permanent teeth either by conservative approach or total extraction. This report presents different treatment modalities for two cases of complicated crown root fractures in primary maxillary incisors.

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### Introduction

Crown root fractures in primary teeth are rare and have wide fracture pattern variations. This injury is classified into two categories, complicated and uncomplicated, based on pulp involvement. In most cases, this kind of dental trauma spreads to the subgingival level, which complicates the extent and direction of the fracture lines.<sup>1</sup> A pulp polyp is often found in traumatized primary teeth between the fracture fragments due to the excellent blood supply in the pulp.<sup>2</sup>

The treatment for crown root fractures in primary teeth may be conservative by root canal treatment and coronal restoration, or it may include extraction, depending on the condition of the remaining primary teeth and the succedaneous teeth.<sup>1</sup> This report presents the different treatment options for two cases of complicated crown root fractures in primary teeth.

### Case reports

#### Case 1

A four-year-old boy reported to the Pediatric Dentistry Department of Universitas Indonesia with a history of dental trauma to his upper left front tooth. Two months prior, the boy had fallen then bumped into a car. The tooth was fractured and his gum was bleeding and swollen. The injury healed three days post-trauma. The patient reported pain up to two days after the injury occurred, but he was not given any treatment or medication. The patient did not have any pain during his first visit to the department.

A clinical examination revealed no swelling or extraoral pain. An intra oral examination showed a fracture in the primary maxillary left first incisor. It was broken vertically into two fragments, palatal and labial, which were separated by a pulp polyp (Figure 1a). Both fragments were slightly mobile, but no pain was identified on both the palpation and percussion tests. The surrounding gingival tissue was healthy, and there was no sign of an alveolar bone fracture. The dental and occlusal radiograph revealed a complicated crown root fracture with no signs of a pathological condition in the periapical area (Figure 1b). The patient was very cooperative during the examination.

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A conservative treatment plan was adopted. The treatment began with a local anesthesia and polyp excision (Figure 2a). After excision, extraction of the labial fragment was completed using pediatric extraction forceps. This procedure revealed that half part of labial fragment was cementum to confirm that the fracture was root-involved. The fragment did not include the complete labial surface of tooth, so it could not be used as the restoration (Figure 2b).



Figure 1(a). Intraoral examination  
 (b). Dental radiograph



(b)



(a)

(b)

Figure 2(a). Polyp excision (b). Tooth fragment

After the bleeding was controlled using gentle pressure with a cotton pellet, a root canal was performed to confirm that no further pathologic condition existed. Access preparation was completed, the working length was determined to be 14 mm, and pulp extirpation was continued and filing up to file number 55. Irrigation with NaOCl was done simultaneously until a clean root canal was

clearly visible. Obturation was completed using zinc oxide eugenol (ZnOE), and the tooth was topped with glass ionomer cement to complete the intermediate restoration. A dental radiograph was taken after the procedure, and the patient was instructed to return one week later to proceed with definitive restoration using a compomer crown. The follow-up and dental radiograph was completed a week later and showed no pathologic findings (Figure 3).



Figure 3. Final restoration

### Case 2

A two-year-old boy reported to the Pediatric Dentistry Department of Universitas Indonesia with a broken upper left front tooth. The child's mother stated that the tooth was fractured after he fell from a chair. His gum was bleeding and swollen. The gum was healed two days after the injury occurred. The patient only reported pain when eating, and the parents did not give the child any treatment or medication.

An intraoral clinical examination revealed a vertical primary maxillary right first incisor fracture that left the tooth in two fragments, mesial and distal (Figure 4a).



(a)

Figure 4(a). Intraoral examination

The distal fragment was slightly mobile, while the mesial fragment exhibited no mobility. No pain was identified on either of the palpation and percussion tests. A reddish-colored pulp

polyp was found between the fragments, revealing pulp involvement. The surrounding gingival tissue was slightly hyperemic, but no sign of an alveolar bone fracture was found. A dental radiograph confirmed a complicated crown root fracture with no signs of a pathological condition in the periapical area (Figure 4b).



Figure 4(b). Dental radiograph

The patient's behavior status according to the Frankl scale was negative. After obtaining parental consent for the treatment procedure, physical restraints were used as the child was emotionally immature and did not display cooperative behavior.

Under local anesthesia, the polyp was excised using a scalpel. It was confirmed that the polyp had originated from the pulp. After the polyp excision, the fracture line was explored from the palatal, confirming that the fracture line was extended below the gingival margin (Figure 5a).

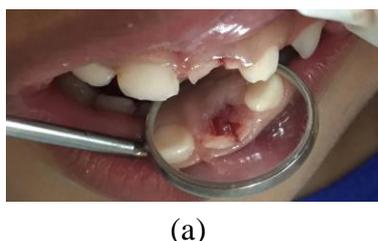


Figure 5(a). Polyp excision

The treatment plan included total extraction as no coronal restoration attempt would be adequate. The first step of the extraction process was the removal of the distal mobile fragment using forceps. The next step was the luxation of the tooth fragment using a luxator. The luxation was completed carefully to prevent trauma to the succedaneous tooth. After the extraction was complete, the tooth socket was

irrigated using a betadine solution and postoperative instructions were given to the child and his parents (Figure 5b).

Three months later, the patient returned for a follow-up evaluation, which result no pathological findings. In addition, no space loss was found between teeth 51 and 62 (Figure 6).

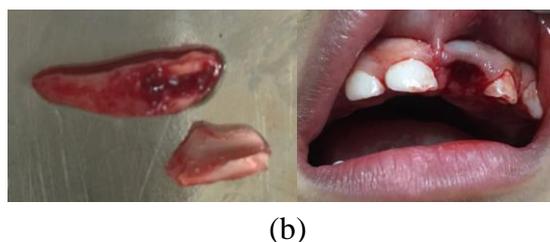


Figure 5(b). Tooth fragments and post extraction condition



Figure 6. Oral condition during three-month follow up

## Discussion

The high prevalence of dental trauma involving the anterior primary teeth in young children is the result of their developing motor skills.<sup>3</sup> Due to the high prevalence of these injuries and to achieve a good treatment prognosis, parent's knowledge about the emergency management of dental trauma is necessary. In the first case, the parent's concern for taking the child to the dentist was to save the primary tooth. In the second case, the parents brought their child in for an examination after they noticed a reddish appearance in the tooth and the child experienced an uncomfortable sensation while eating. Parents may believe that the appearance of a pulp polyp means the child may require medical attention.<sup>2</sup> If parents had a better understanding of the importance of speedy an examination after a dental injury, the patient would experience a more optimal outcome.<sup>4</sup>

In both cases, a pulp polyp was in between the two tooth fracture fragments. A pulp polyp is an open, chronic, irreversible pulp inflammation that causes the hyperplastic growth of pulp with a reddish mucosa-like structure. It usually occurs in children and young adults due to significant pulp exposure. This condition is associated with the pulp's resistance and reactivity to bacterial infection.<sup>5</sup> In most cases, a pulp polyp does not induce pain, except in direct mastication,<sup>6</sup> because the pulp polyp contains fewer nerves. Therefore, pulp polyps are relatively asymptomatic. The polyp lesion may or may not bleed readily, depending on the degree of vascularity and the epithelialization of the tissue.<sup>7</sup>

For fractures in primary teeth that involve pulp, the treatment plan was based on pulp vitality and how long the affected tooth will stay in the mouth. The treatment options vary from pulpotomy, pulpectomy, to extraction.<sup>4</sup> In the first case, a pulpectomy was chosen because root resorption of the upper left front tooth had not occurred, thus the exfoliation still took a long time. This condition was confirmed by its contralateral teeth, which was in the same stage of root resorption. Long-term evaluation is necessary to identify any pathological conditions or ankylosis. Fracture fragments that result from dental trauma can sometimes be used for tooth restoration, but in the first case, the labial fragment was not used because it did not have a complete labial surface. The long-term result of the restoration should be considered as, in most cases, color changes were found around the area where the composite bonded to the tooth fragment.<sup>8</sup> Therefore, in this case, a compomer crown was chosen as the final restoration.

In the second case, the pulp polyp condition was supposed to be an indication to conserve the tooth as it suggested the absence of pulp necrosis.<sup>2</sup> Total extraction was the chosen treatment because the fracture line extended subgingivally. This type of fracture can complicate the endodontic or restorative treatments of the tooth and future adequate coronal restoration cannot be achieved. Long-term evaluation is required to monitor any space loss between the adjacent teeth. Premature loss of maxillary primary incisors does not generally result in space loss if the incisor loss occurs after the primary canines

have erupted. A space maintainer was not applied in this patient as the main purpose for the maintenance of this case was aesthetics. Practical issues, including patient cooperation and the ability to place a reasonably, esthetic, stable, and hygienic appliance, generally play a greater role in determining the need for space maintainer in the primary anterior teeth.<sup>9,10</sup>

## Conclusion

The clinical management of complicated central primary incisor crown-root fractures may include a conservative treatment and total extraction. The objective of traumatic dental injuries management in primary teeth should consider the patients' succedaneous teeth. The public, particularly parents and teachers, should be informed about dental trauma first aid as children experience a high prevalence of dental injury at homes and schools most of the time. Prompt management and an immediate visit to a pediatric dentist after dental trauma may result in a better prognosis.

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