

The Management of Complicated Crown Fracture of Anterior Primary Teeth

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ABSTRACT

Background: Injury in the primary teeth and their supporting structures is one of the most common dental health problems observed in children. Injuries in children occurred from an external forces which classified in to dental emergency treatment in pediatric growth and development. A child is perceived to be in a dynamic state of growth, both mentally and physically. Curiosity about surrounding environment and urging to explore may lead to dental injuries. A vital pulpectomy and continued selection of an appropriate restoration after a traumatic injury can maintain the primary tooth in its arch until the time of exfoliation. **Objective:** Reported the management of complicated crown fractures in the upper left primary teeth. **Case:** This report presented a 2 years old boy with complicated crown fracture on the upper left primary teeth. The parents gave the history of trauma related to front region of the jaw and they wanted to restore the involved tooth without getting extraction. After an intra oral examinations, it was observed that crown was fracture with vital dental condition. **Case Management:** After removing the fractured fragment, a vital pulpectomy was conducted in three visit periods at the remaining upper left primary teeth with final glass ionomer cement restoration using strip crowns. **Conclusion:** The importance of reconstruction on anterior primary teeth after traumatic injury provides both functional and aesthetic restorations for the child, what reflects on masticatory efficiency, increased self-esteem and also phonetic improvements.

Keywords: Complicated crown fractures, Primary teeth.

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INTRODUCTION

It is very common for children in the age of 0-6 to get injured as a result from traumatic injury.¹ The recent meta-analysis from *traumatic dental injuries* (TDIs) showed that the prevalence of trauma to primary teeth was 22.7%.²

The majority of dental injuries in the primary and permanent dentitions involve the anterior teeth, especially the maxillary central incisors. Concussion, subluxation, and luxation are the most common injuries in the primary dentition.³

The main purposes of dental care in children are to prevent the spread of dental disease and repair damaged teeth so that they can function properly, and the integrity of the dental arch and oral tissue health can be maintained. Conservative endodontic treatment is performed as an alternative to extraction of primary teeth with injuries without or involving the pulp.⁴

Loss of space can cause malocclusion, decreased masticatory function (especially posterior teeth), impaired speech development (especially anterior teeth), and can cause trauma to children as a result of extraction, as the result of unplanned tooth extraction in the primary dentition period. Maintaining anterior teeth can improve aesthetic function, prevent bad habits, help speech function and prevent psychological effects if the tooth has to be extracted long before the eruption of succedaneous tooth.⁵

The aim of this report was to reported the management of complicated crown fractures of 61 dent in a 2 years old child due to traumatic injury.

CASE

A 2 year old boy came with his parents complaining of a fracture maxillary left anterior tooth. According to the patient's mother, this was due to the patient falling while playing on the terrace about three days ago.

On extraoral examination of the patient, no aberration or abnormalities were found. There were no bruises on the patient's face, there were no wounds on the patient's lips as a result of the incident.



Figure 1. Preoperative view of the exposed pulp of 61 dent

The patient had no history of systemic disease, had never been hospitalized, and had no allergies to drugs or food. The patient had received a tetanus vaccination from the mandatory DPT-HB-HiB vaccination.

Intraoral examination showed that 61 dent had a complicated crown fracture with the condition of the teeth still vital, the pulp was exposed with fracture fragments still attached (figure 1). Meanwhile, on teeth 51, 52, 62, there was a lot of plaque due to the patient's refusal to clean his teeth because of the pain he felt for 3 days. The patient's mother said that the patient was very fond of biting his lower lip after the incidence which resulted in fracture of the patient's maxillary left anterior tooth (figure 2).



Figure 2. Patient biting his lower lip.

CASE MANAGEMENT

Infiltration and intrapulp anaesthesia were conducted on 61 dent on the first visit and fragments were then taken and the pulp taken using an endodontic, bearded pulp brooch until the pulp tissue was completely removed, bleeding with sodium hypochloride solution (NaOCl 2.5%) and distilled water was irrigated. Due to the patient's condition, which included crying and wriggling during the treatment, it was not possible to take a radiograph to determine the working length.

Root canal preparation was carried out using K-file size 15 to 30. In primary teeth the preparation was done only to clean the pulp tissue, not to expand the root canal. The root canals were then irrigated using a 2.5% NaOCl solution and distilled water and then sterilized using $\text{Ca}(\text{OH})_2$ paste which was applied using lentulo. Then using a temporary filling the cavity was closed (figure 3).



Figure 3. The cavity of 61 dent had been closed with a temporary filling, the patient was seen biting his lower lip

One week later at the second visit, a subjective examination of the patient was performed and there were no complaints. The results of the objective examination were negative percussion, negative palpation and dry root canal after sterilization, then obturation could be performed.

Working area was isolated first, then the root canal was irrigated using 2.5% NaOCl solution and rinsed with distilled water, then dried using paper points. Furthermore,

obturation of the root canal using a paste containing Calcium Hydroxide and iodoform, then using a cotton pellet, pressure was applied so that the root canal can be filled properly and temporarily filled. To ensure that the obturation of the root canal was hermetic, a radiograph was performed.

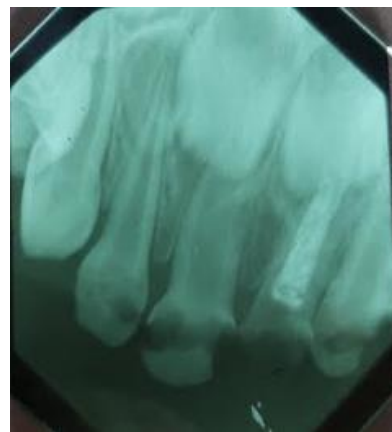


Figure 4. Post-obturation periapical radiographic.

Root canal filling was hermetic as seen from the evaluation of radiographic examination. The cavity was lined with GIC base and lining and temporary filled. The patient was instructed to come back after 1 week.

One week later at the third visit, a subjective examination of the patient was performed and there were no complaints, the objective examination showed negative percussion and negative palpation. Post-obturation radiograph was hermetic without any periapical lesions (Figure 4). The final restoration was carried out using glass ionomer cement fillings with the aid of strip crowns (Figure 5 and 6).



Figure 5. Strip crowns.



Figure 6. The final restoration was carried out using glass ionomer cement fillings

DISCUSSION

In this case, a vital pulpectomy was performed on 61 dent because the patient was brought to the clinic three days after the injury and the pulp tissue appeared to be out of the cavity so devitalization was not possible. Pulpectomy treatment on 61 dent was to prevent further infection, then the tooth can be maintain until the exfoliation time. Maintain masticatory function, maintain space for permanent teeth, prevent impaired speech, prevent bad habits.⁴ In this case, patient's starting to show, the bad habit of biting the lower lip.

Because the child is at early age and uncooperative, the mechanical procedures for root canals of Primary teeth are not optimal, so the treatment of 61 dent a vital pulpectomy depends on the use of irrigation and root canal sterilization and the use of antimicrobial root canal obturation materials. Root canal irrigation procedure is one of the important factors in sterilization. Because it has anti-bacterial effects, it can neutralize toxins and remove the remaining pulp tissue. 2.5% NaOCl solution and distilled water are used as irrigants in this case.^{6,7}

Ca(OH)₂ material was used for sterilization because it has a high pH ranging from 12.5 to 12.8 and OH⁻ ions can inactivate membrane enzymes from the bacterial cytoplasm, so that it can interfere the growth process, cell division and metabolic activity of bacteria (bactericidal).⁸

Calcium Hydroxide material with iodoform paste with syringe packaging is used for obturation, it allows the material to enter deep into the root canal and then condense with cotton pellets. For pulpectomy in primary teeth, the ideal root canal obturation material should have antibacterial effects, harmless to permanent tooth germs, reabsorbed as well as primary tooth root resorption, not irritate periapical tissues, and easy to use.^{10,11}

The mixture of Calcium Hydroxide and iodoform paste, has the analgesic effect was produced due to the reaction of Calcium Hydroxide with CO₂ as a pain inhibitor. Furthermore, Calcium Hydroxide with a mixture of iodoform has the effect of inhibiting macrophage phagosity so that it can reduce inflammatory reactions, has the ability to dissolve necrotic tissue, both in aerobic and anaerobic environments.⁹

As viewed in biological properties of the material, Calcium Hydroxide is alkaline because it contains hydroxyl ions, as is well known, when inflammation occurs, the inflamed tissue will be in an acidic environment due to the activity of the components that cause inflammation. As an inflammation is treated with Calcium Hydroxide, the hydroxyl ions from Calcium Hydroxide will neutralize the acidic atmosphere of inflammation so that the healing process can take place more quickly.^{12,14}

Glass ionomer cement restoration materials tend to be more brittle than composites but have the advantage of adherence to tooth substance, both enamel and dentine, without etching. The coefficient of expansion of glass ionomer is very close to dentine, and once set these materials remain dimensionally stable even in the mouth where the moisture and temperature levels are constantly changing.

Added with the aid of strip crowns as a mold to form the missing part of the crown so that could made it easier for the operator to form a good aesthetic restoration.^{13,16}

CONCLUSION

The reconstruction of primary anterior teeth after traumatic injury provides both functional and aesthetic restorations for the child, what reflects on masticatory efficiency, increased self-esteem and also phonetic improvements. The consequences of delayed treatment due to traumatic injury could cause complications that interfere with the growth and development of permanent teeth stage in the future, that will received much attention, concern and cost later.

Nevertheless, it becomes essentially important a clinical and radiographic follow up of the child until the appropriate exfoliation of the primary teeth and eruption of the permanent teeth. Post-obturation evaluation showed that pulpectomy of 61 dent was successful. The patient's subjective examination had no complaints, the objective examination of percussion was negative and palpation was negative, and the radiographic examination showed hermetic obturation and there were no periapical abnormalities. Glass ionomer cement restoration was still in place and had a good shaped when the patient comes for control and could prevent the patient's bad habits that had begun to appear.

REFERENCES

1. Sleet DA. The global challenge of child injury prevention. *Int J Environ Res Public Health*. 2018; 15(9):1921.
2. Petti S, Glendor U, Andersson L. World traumatic dental injury prevalence and incidence, a meta analysis one billion living people have had traumatic dental injuries. *Dent Traumatol*. 2018; 34(2): 71-86.
3. Jane A. S. *Handbook of Clinical Techniques in Pediatric Dentistry*-Wiley-Blackwell; 2017; 143-6.
4. Welbury R. *Paediatric Dentistry* 4th Edition. Oxford University Press; 2012; 219-23.
5. Cameron AC, Widmar RP. *Handbook of Pediatric Dentistry* 4th Edition. Elsevier; 2009; 207-18.
6. Marwah N. *Text book of pediatric dentistry*. 3rd Edition. Jaypee Brothers Medical Publishers; 2016. p. 156-69.
7. Cassamasimo P. *Pediatric dentistry infancy through adolescence*. 5th Edition. Elsevier; 2012 ; 213-25.
8. Day PF, Flores MT, O'Connell AC, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: Injuries in the primary dentition. *Dent Traumatol*. 2020; 36(4). 343-59.
9. Wright GZ. *Behavior management in dentistry for children*. 2nd Edition. Wiley blackwell; 2014; 197-210.
10. Mc Donald and Avery's. *Dentistry for the child and adolescent*. 11 th Edition. Elsevier; 2021; 85-103.
11. Andreasen FM. *Textbook and color atlas of traumatic injuries to the teeth*, 5th Edition. Wiley Blackwell; 2019; 165-70.
12. Nowak AJ. *Paediatric Dentistry*. 6th Edition. Elsevier; 2019; 599-604.
13. Welbury R. *Paediatric Dentistry* 4th Edition. Oxford University Press; 2012; 219-52.
14. Cairns AM, Mok JY, Welbury RR. Injuries to the head, face, mouth and neck in physically abused children in a community setting. *Int J Paediatr Dent*. 2017; 15(5):310-8.
15. Holan G. Long-term effect of different modalities for traumatized primary incisors presenting dark discoloration with no other signs of injury. *Dent Traumatol*. 2016; 22(1):14-7.
16. Gideon H, Elizabeth Y. Radiographic evidence of traumatic injuries to primary incisors without accompanying clinical signs, *Dental Traumatology*. 2017; 33(2):133-6.

