

COMPLICATED CROWN FRACTURE TREATMENT AND ITS IMPACT ON QUALITY OF LIFE RELATED TO ORAL HEALTH: REPORT OF TWO CASES

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Palavras-chave: Traumatismo. Dentes Permanentes. Fratura Coronária Complicada. Qualidade de Vida.

RESUMO

Objetivo: O objetivo do estudo foi relatar o manejo de duas fraturas complicadas de incisivos permanentes e como o tratamento destas lesões dentárias influencia a qualidade de vida relacionada à saúde bucal (QHRQoL). **Relato de caso:** No primeiro caso, foi realizada pulpectomia devido necrose pulpar e rizogênese completa. No segundo caso, a pulpotomia foi realizada, pois, a polpa apresentava vitalidade e o dente rizogênese incompleta. A colagem dos fragmentos foi realizada em ambos os casos. QHRQoL foi avaliada antes e uma semana após o tratamento. No caso 1, os escores variaram de 32 a 9 no CPQ¹¹⁻¹⁴, de 42 a 12 no P-CPQ e de 24 a 4 no FIS. No caso 2, os escores variaram de 38 a 20 no CPQ⁸⁻¹⁰, de 94 a 28 no P-CPQ e de 39 a 10 no FIS. **Conclusão:** A colagem de fragmentos é uma solução eficiente, assim como a terapia endodôntica. Além disso, o tratamento do traumatismo dentário promoveu uma melhora na qualidade de vida das crianças e suas famílias, e podendo ser observado uma semana após o tratamento.

Keywords: Trauma. Permanent Teeth. Complicated Crown Fracture. Quality of Life.

ABSTRACT

Objective: The purpose of this study was to report on the management of two complicated crown fractures of the permanent incisors and how the treatment of these injuries influences quality of life related to oral health (QHRQoL). **Case report:** In the first case, pulpectomy was performed because of pulp necrosis and complete rhizogenesis. In the second case, pulpotomy was performed, as the pulp had vitality and the tooth had incomplete rhizogenesis. Fragment bonding was carried out in both cases. QHRQoL was assessed before and one week after treatment. In case 1, scores varied from 32 to 9 in the CPQ¹¹⁻¹⁴, from 42 to 12 in the P-CPQ, and from 24 to 4 in the FIS. In case 2, scores varied from 38 to 20 in the CPQ⁸⁻¹⁰, from 94 to 28 in the P-CPQ, and from 39 to 10 in the FIS. **Conclusion:** Fragment bonding is an efficient solution, as well as endodontic therapy. Furthermore, dental trauma treatment improved the quality of life of children and their families and could be observed one week after treatment.

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INTRODUCTION

Traumatic dental injuries (TDI) in children and adolescents are a serious public health problem.¹ Falling down is the most common cause of dental trauma in this population, occurring more frequently in boys than in girls. The upper central incisors are the most affected teeth due to their position in the arch.^{2,3}

Crown fractures involve enamel

and dentin, which can be classified into uncomplicated fractures, when no pulp exposure occurs, and complicated fractures when exposure occurs. The treatment of fractures is mostly restorative, and may or may not require endodontic therapy. Some factors such as rhizogenesis, the duration and extent of pulp exposure, pulp vitality, and fracture extension should be taken into account in therapeutic planning.⁴⁻⁷

TDI lead to several consequences, such as aesthetic alterations, discoloration, pain, and discomfort, which can lead to children not smiling or speaking in a natural way, perhaps affecting self-concept and social relationships. These situations impact on children's quality of life and treatment can improve quality of life related to oral health (QHRQoL) scores.⁸⁻¹¹

The aim of this study was to describe the clinical approach to two paediatric patients after a complicated crown fracture and to evaluate the impact of TDI treatment on the QHRQoL of the children and their families related to oral health.

CASE REPORT

In the first case, a 12-year-old boy who had suffered a dental injury was referred to a public hospital less than 30 min after the accident, but no clinical procedures were performed. The mother was instructed to keep the dental fragment in saline solution and he was prescribed anti-inflammatory medication. After 6 months, the mother brought the boy to the Dental Trauma Surveillance Centre (DTSC) of the Department of Paediatric Dentistry at Federal University of Rio de Janeiro, with complaints regarding aesthetics and a bad odour from the tooth.

During anamnesis, the mother reported that the boy had been playing soccer at school. After TDI, the patient had a history of psychological violence within the last 6 months at school, due to bullying from the other children about his smile and broken tooth. Even though he suffered bullying, he said that he was not ashamed of smiling, but he wanted to reattach the dental fragment.

The intraoral exam revealed good oral hygiene and the overjet was not increased. The permanent maxillary left central incisor presented a complicated crown fracture in the enamel and dentin (Figure 1A). The tooth did not respond to thermal sensitivity or percussion tests.

Periapical radiographic examination showed complete canal root development, closed apices, no periapical pathology, and the absence of root or alveolar bone fractures (Figure 1B).

Endodontic treatment was performed before the reattachment of the fractured fragment (Figure 1C), which was kept for 6 months in saline solution. Etching and bonding to the tooth with flow resin was performed (Figure 1D).

In the second case, an 8-year-old girl suffered a dental trauma while taking a shower. She fell down on the floor in the presence of her grandmother, who called by phone to her private dentist to ask for advice. In order to stop the bleeding around the TDI, she was instructed to drink ice water, put ice cubes in her mouth and take anti-inflammatory medication. She was requested to keep the dental fragment in saline solution. A couple of hours later, the mother was able to take the girl to her private dentist, who suggested extraction and an implant. The mother found it better to ask for a second opinion.

The mother searched for treatment at the DTSC, less than 24 h after the occurrence of the TDI, due to aesthetic complaints. The girl was very embarrassed about her smile and very afraid to lose her tooth.

During anamnesis, the mother said how worried they both were due to the possibility of losing the tooth and she looked very upset.

Increased overjet was observed in the extraoral exam and in the intraoral exam, the permanent right maxillary central incisor was clearly damaged (Figure 2A). A sensitivity test was not performed in order to not provoke pain, but it was evident that the pulp was vital (Figure 2B). The dental fragment was kept in water (Figure 2C). Clinical and radiographic examinations were performed and showed incomplete root development and no alterations around the periapical region (Figure 2D).

Pulpotomy with MTA followed by sealing with glass ionomer cement and the restorative procedures to bond the fragment were performed (Figure 2E and 2F). Recommendations regarding oral habits to avoid, eating, and oral hygiene were emphasised.

In order to evaluate the impact of TDI treatment on children's and families' lives, QHRQoL questionnaires (FIS - Familiar Impact Scale, P-CPQ - Parental/Caregiver Perceptions and CPQ - Child Perception Questionnaire)¹¹⁻¹⁶

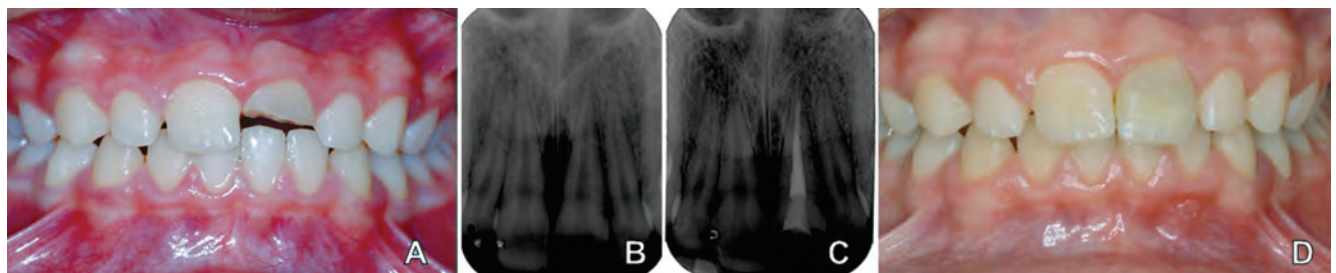


Figure 1: (A) Intra oral aspect of the first case; (B) Radiographic aspect before treatment; (C) Radiographic aspect after the endodontic treatment and before the reattachment of the dental fragment; (D) Final intra oral aspect of the first case.

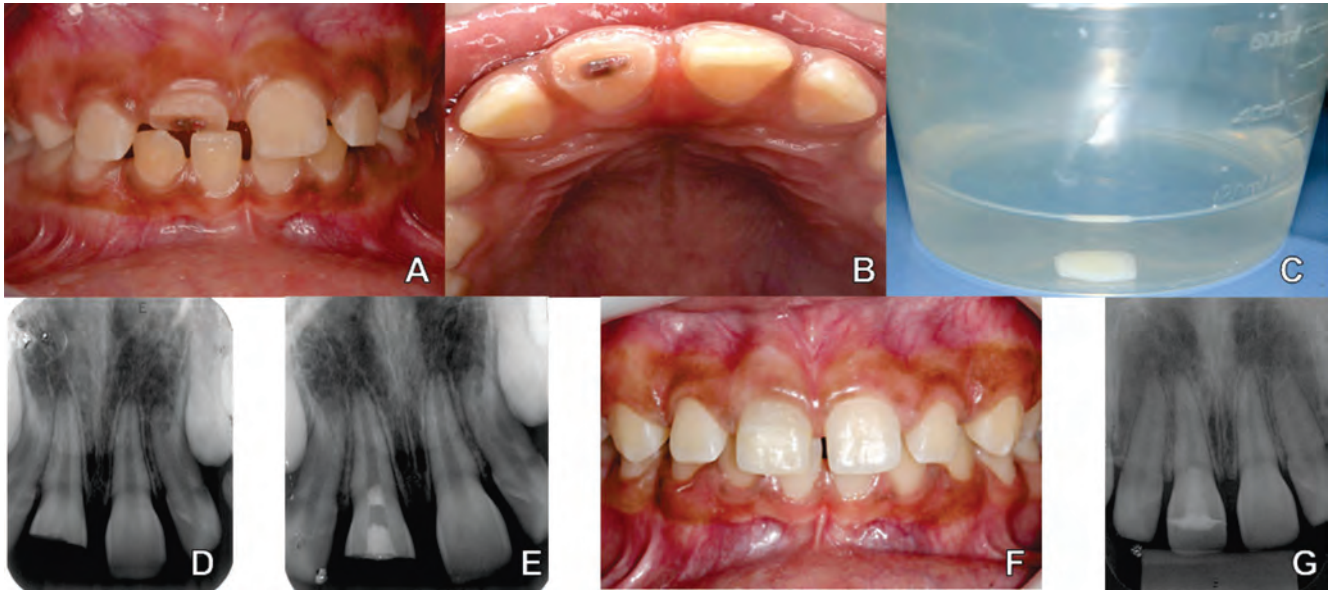


Figure 2: (A) Intra oral aspect of the second case; (B) Aspect of the pulp before treatment; (C) Dental fragment; (D) Initial radiographic aspect; (E) Radiographic aspect after endodontic therapy; (F) Final aspect after the reattachment of the fragment. (G) Radiographic aspect after 1-year follow-up.

Table 1: Gender Differences on assessing Quality of Life before and after the treatment according to each Questionnaire issue.

CPQ	BOY		GIRL	
	BEFORE TREATMENT	AFTER TREATMENT	BEFORE TREATMENT	AFTER TREATMENT
ORAL SYMPTOMS	14(87.5%)	4(25%)	6(30%)	0(0)
FUNCTION LIMITATIONS	12(75%)	5(31.2%)	7(35%)	8(40%)
EMOTIONAL WELNESS	4(25%)	0(0)	12(75%)	4(25%)
SOCIAL WELLNESS	2(12.5%)	0(0)	13(29.5%)	8(18.2%)
TOTAL32(50%)	9(14%)	38(38%)	20(20%)	
P-CPQ	BEFORE TREATMENT	AFTER TREATMENT	BEFORE TREATMENT	AFTER TREATMENT
ORAL SYMPTOMS	12(50%)	0(0)	12(50%)	0(0)
FUNCTION LIMITATIONS	14(43.7%)	8(25%)	20(62.5%)	10(31.2%)
EMOTIONAL WELNESS	10(35.7%)	4(14.3%)	28(100%)	7(25%)
SOCIAL WELLNESS	6(15%)	0(0)	34(85%)	11(27.5%)
TOTAL42(33.9%)	12(9.7%)	94(75.8%)	28(22.6%)	
FIS	BEFORE TREATMENT	AFTER TREATMENT	BEFORE TREATMENT	AFTER TREATMENT
PARENTAL EMOTIONS	12(42.8%)	0(0)	24(85.7%)	0(0)
FAMILIAR CONFLICTS	0(0)	0(0)	0(0)	0(0)
PARENTAL/ FAMILIAR ACTIVITIES	12(100%)	4(33.3%)	15(93.7%)	10(83.3%)
TOTAL	24(42.8%)	4(7.1%)	39(69.6)	10(17.8%)

Note: % relative to total scores for each questionnaire

were administered through interviews conducted by the researcher in charge. The CPQ questionnaire was used according to the patient's age, for the first case the CPQ¹¹⁻¹⁴ and for the second case the CPQ.⁸⁻¹⁰ A reduction of the impact on QHRQoL was clearly seen only one week after treatment

(Table 1). The self-esteem of both subjects was recovered and social interactions were improved.

The girl returned for a one-year follow up; the radiographic exam showed complete root formation, confirming pulp vitality (Figure 2G). The boy did not return for evaluation.

DISCUSSION

The management of two cases of complicated crown fractures was described. The first case reports on a boy who was not able to admit that he was feeling embarrassed to smile, laugh, and show his teeth in public, but it was clear by his behaviour as related by his mother that he was having difficulty at school; in other words, the TDI impacted negatively on his QHRQoL. The girl from the second case was clearly very ashamed and refused to go to school and wanted her tooth reattached as soon as possible, showing that TDI affected her emotional state and impacted on her QHRQoL. In both cases, the restorative and endodontic treatment provided an improvement in the quality of life, observed in just one week.

These findings corroborate those of other studies, which found that TDI and its treatment highly influenced the QHRQoL of children and their families.^{8,10} In contrast, other authors found that the presence of TDI in children did not have an impact on QHRQoL of children or their families.^{17,18} The type of trauma evaluated in the studies, since fractures can cause more aesthetic damage than luxations, the time since the trauma occurred, the type of sequelae, and delayed care are factors that could affect these results.

In the first case, the tooth already had complete root development and remained with exposed dentinal tubules for 6 months; pulp necrosis was diagnosed and endodontic treatment was performed. These factors led us to believe that the extent of the fracture, the period of dentinal tubule exposure to the oral cavity, and root development may influence the presence of complications and determine the clinical management of dental trauma. Pulp necrosis is the most common healing complication and diagnosis is difficult in cases of trauma.^{4,5} Late diagnosis of pulp necrosis after trauma can result in additional complications, such as apical periodontitis and inflammatory root resorption.

Partial pulpotomy is a good strategy for the preservation of tooth vitality; such a procedure offers superb outcomes for the treatment of complicated traumatic crown fractures.¹⁹ This corroborates our second case, in which we performed more conservative treatment, i.e. pulpotomy, due to factors such as the young age of the patient, short duration of pulp exposure, incomplete root development, and the presence of pulp vitality. Immediate treatment involving reattachment of the fragment recovers aesthetics and is rapid and inexpensive. An improvement in QoL and its social aspect was observed by both of our patients after the reattachment of the fragments and pulp therapy. These results agree with those of Fakhruddin et al.,²⁰ who showed that the restoration of injured teeth improved aesthetics and social interactions,

but functional deficiencies can persist as a result of periodontal or pulpal pain.

In case 1, the family took a long time to search for a definitive treatment, but in case 2, treatment was sought very quickly. Previous assistance may have influenced the search for care at DTSC, since the person in charge reported concerns regarding the radical care proposed in the second case. This difference in the length of time patients remained untreated may have influenced the impact of QoL outcomes. Because of the delay in care, the patient in the first case had pulp sequelae, which resulted in greater complaints regarding functional limitations and oral symptoms when compared to the second case.

The girl was obviously more concerned about aesthetics than the boy. We believe that girls tend to be concerned about their appearance, as the QHRQoL scores related to emotional and social wellness were very different between the boy and the girl. The aspect of reattaching the fragment to the fractured crown played an important role from the moment we started treatment with the girl, showing that she was worried about aesthetics, while the boy was afraid of the procedure itself. He turned out to be more aggressive over time when bullying played a role at school, but he claimed to not be ashamed of his smile or of showing his teeth in public. This was reflected in the results of the QHRQoL administered before treatment (oral symptoms and functional limitations), on which the boy scored higher than the girl, and also after treatment (social and emotional wellness), when the boy scored much lower than the girl.

Aesthetic recovery through reattachment of the fragment to the fractured tooth is a rapid and practical solution, particularly for permanent teeth. Endodontic treatment minimises the risk of complications in the pulp and periapical tissues, bringing greater safety to the restorative treatment. The impact on the QoL of school-aged children who have suffered dental injuries is high, but it is possible to offer these children better QoL after recovering their oral health status.

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