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Traumatic Dental Injury: A Case Report

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Abstract

Dental injury is considered a public health problem due to its high prevalence, especially in children. It is associated with difficulties regarding treatment cost, psychological and emotional factors, and the fact that the treatment may continue for the rest of the patient's life. The current paper reports the case of an 8-year-old girl who sought the pediatric dentistry clinic at the Catholic University of Brasilia with coronal fracture in tooth 11. During the interview, the patient reported that she had fallen during a leisure activity, fact that caused the fracture. She was firstly assisted in a private practice, where she received emergency care. Clinical and radiographic examination found that the patient had a fracture involving enamel and dentin, but not the pulpal. Class IV composite resin restoration was the proposed treatment. After selecting the colors, the cavity preparation was completed according to parameters in recent conservative guidelines. Rubber dam restoration was used to avoid contamination. The dentin and enamel surfaces were then treated according to the protocol of the chosen adhesive agent. The composite resin was inserted by incremental technique and light curing. The smoothest surfaces were obtained using the complete sequence of Sof-Lex discs. Systematic follow-ups were performed to check the periapical conditions, restoration integrity, as well as the color stability. Thus, the patient aesthetic, phonetic and mastication functions were restored, and she resumed her social activities.

Keywords: Child; Pediatric Dentistry; Esthetics; Dental; Trauma

Introduction

The reduction in the prevalence of dental caries is well documented in the literature. However, a new problem has drawn the attention of health professionals: the dental injury [1]. Dental injury is considered to be a public health problem due to its high prevalence, especially in children. It is associated with difficulties regarding treatment cost, psychological and emotional factors, and the fact that the treatment may be lifelong [2]. According to Traebert [3], there is no national epidemiological survey on dental trauma in Brazil. There are only epidemiological studies conducted in different counties from several regions in the country. These studies pinpoint that the prevalence of traumatic dental injury ranges from 9.4% to 41.6% [3]. Traebert [4] states that the distribution of traumatic dental injuries should be analyzed according to the child's age, gender, type of injury and injury location. Its prevalence in permanent teeth is of 10.5%. As for gender, studies show no significant differences in the prevalence of dental trauma in the permanent dentition between genders, although males show slightly higher prevalence. Crown fractures are prevalent in the permanent dentition. Their highest prevalence is in the upper arch and involves the central and lateral incisors, probably because these teeth are the most prominent in the oral cavity [4].

The presence of increased incisal overjet and anterior open bite are physical features that have been reported as predisposing factors to traumatic dental injuries [4]. Boys run 2.03 times higher risk of crown fracture than girls and children with overjet size >3 mm are 1.78 times more likely to suffer dental injuries. In addition, children with inadequate lip coverage are 2.18 times more likely to present traumatic dental injuries than children with adequate lip coverage [5,6]. Traumatic dental injury may cause irreparable tooth loss in some cases, both at the time of the accident and in the course of the treatment, or even years later. In the case of children, these damages also affect their parents and the professional providing the service, since its adequate and definitive solution is not always simple and fast [7]. Traumatic injury is a distressing experience at physical level, but it may also affect the patient at the emotional and psychological levels [2]. Moreover, traumatic dental injuries may result in pain and loss of function; therefore, it may adversely affect the developing occlusion and aesthetics. These situations may cause negative impact on children's lives [3]. Pain, loss of function and aesthetics, pulp necrosis, obliteration of root canals, root resorption and bone loss are some sequelae from dental injuries [4]. It is of great importance to restore function and aesthetics, since the loss or fracture of the anterior teeth involve aesthetic damage, fact that may lead to further psychological issues and deviant behavior. Dental injury is sudden, unscheduled, and both dentist and staff must be adequately equipped to fast and properly treat the patient in order to assure the best outcome possible [7].

Dental injury is one of the most common reasons for people to seek emergency care services. Most traumatic dental injuries happen at school. Nevertheless, some aspects such as late emergency care, misinformation and unprepared professionals and, sometimes, absent clinical management might determine bad prognoses [8]. In most cases, the child is referred to the dentist without any emergency management at the accident site and it may result in irreversible complications and consequences. Therefore, school teachers, especially science teachers, may play a key role in the primary management of traumatic dental injuries and help improving traumatized teeth prognoses [8]. The dentist should investigate the clinical history of the traumatized patient focusing on prior dental injuries and perform physical examination by taking under consideration the child's medical and trauma histories.

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Received May 27, 2015; Accepted July 21, 2015; Published July 28, 2015

Citation: Gravina DBL, Peruchi CMS, Rivera G, Santos ALC, Cruvinel VRN (2015) Traumatic Dental Injury: A Case Report. J Trauma Treat S2: 015. doi:10.4172/2167-1222.S2-015

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Radiographic examination is necessary to determine the extent of the damage and to provide comparison resource in the after trauma follow-ups [9]. Dental injury from traumatic origin is considered to be an emergency in pediatric dentistry, since it not just deals with dental problems themselves but also emotionally affects children. Patients usually come to the office accompanied by their parents, who are afflicted and anxious [10]. Most dental fractures regard coronal lesions, and are not related to pulp injury. In most cases, treatment involves restorations using adhesives or resins to reestablish the function and aesthetics of the tooth [11]. There are several options to treat the fractured such as fragment reattachment, direct composite resin restorations and indirect restorations. These options depend on the remaining and pulp involvement [12]. Thus, the current study aims to report a traumatic dental injury case of an 8-year-old child who suffered a complicated fracture at tooth 11 involving enamel and dentin. The treatment followed a conservative approach and the child's aesthetic and masticatory functions were reestablished due to the reconstructing of the dental element.

Case Report

An 8-year-old female patient with mixed dentition sought the Pediatric Dentistry Clinic of the Catholic University of Brasilia, Brazil, complaining of coronal fracture in tooth 11 (Figure 1). Initially, the patient underwent a detailed medical history investigation, in which she explained the reason of the fracture: she fell during a leisure activity. The patient reported that she went to a private practice where she received emergency care. A temporary glass ionomer cement restoration was performed (Figure 1). The time elapsed between the emergency care and the restorative treatment provided at the university was 45 days. The clinical and orthoradial radiographic examinations found that the patient had fracture involving enamel and dentin without pulp exposure (Figure 2). The clinical examination showed positive response to thermal (cold) pulp vitality tests, no pain in vertical and horizontal percussions and in palpation. The radiographic examination revealed normal periapical tissues and no evidence of pathological changes around the offended tooth. The patient had Angle's class I molar relationship, over jet and normal overbites. The treatment followed a







Figure 4: Class IV resin composite restoration.



conservative approach, and a class IV resin composite restoration was performed. The patient's arches were previously molded in irreversible hydrocolloid. The fractured tooth was reconstructed with wax based on the study model (Figure 3) and its template was made out of silicone, which offered the ideal copy of the palatine structure. After selecting the colors, terminal infiltrative anesthetics was performed and the cavity preparation was completed according to the parameters in recent conservative guidelines. Restoration was done with rubber dam to avoid contamination (Figure 4). Dentin and enamel surfaces were then treated according to the protocol of the chosen adhesive agent. The composite resin was inserted by incremental technique and light curing. The smoothest surfaces were obtained using the complete sequence of Sof-Lex discs. Periodical follow-ups were performed to check possible periapical changes (Figure 5) and to assess the integrity and color stability of the composite restoration (Figures 6 and 7). The child is now back to her daily activities and does not remember the period she spent with the fractured tooth.

Discussion

The following sources were used as database: Pubmed, Scielo and Bireme, and the search terms were: trauma, permanent teeth, resin restorations and children. Papers written in English and preferably published in the last 05 years were selected. Traumatic dental injury is prevalent in children and adolescents [13]. According to Soriano [14] and Traebert [9], the maxillary central incisor shows the higher injury percentage both in primary and permanent dentitions (78.5% and





76.2%, respectively). The herein presented case involved dental fracture in the permanent central incisor of an 8-year-old child agreement with Soriano [14]. According to data from the National Oral Health Survey -Smiling Brazil [15], the prevalence of at least one incisive tooth affected by trauma is of 20.5%. The most common fracture is that of the enamel alone, with mean of 16.5%. It is followed by fracture involving enamel and dentin (3.7%), fracture with pulp exposure (0.2%) and absence (avulsion) due to trauma (0.1%). The fracture reported in the current case involved enamel and dentin. It compromised the mesial angle, but did not involve the pulp. According to Paiva et al. [16], coronal fracture without pulp exposure often happens among dental trauma in the permanent dentition (23%) - as in the case reported in the current study. Although literature reports high prevalence of trauma in boys (66%) and in the age group of 7-10 years old, the current clinical case reports dental injury in a girl; however, the age group corroborates that presented in the study by Paiva [16]. Sports practicing in childhood and adolescence significantly increase the occurrence of traumatic dental injuries in recent years. In addition, the presence of accentuated overjet is one of the etiologic factors associated with this problem and it justifies the need to use mouthguards [17]. In contrast to the Gomes's findings, the patient in the current clinical case had normal overjet and overbite and Angle's class I molar relationship. She did not practice sports and the injury occurred during her leisure time.

Traumatic dental injuries can become an important public health problem not only because their prevalence is relatively high, but also because they have negative impact on children's daily life [18,19]. This negative impact results from physical and psychological discomfort, pain, and other implications such as the tendency to avoid laughing or smiling: fact that may affect children's social relationships [2]. The current case corroborates Glendor's [2] reports, in which the child's parents immediately sought dental care for pain relief and aesthetics restoration, since the child did not want to go back to school with the fractured tooth. The color change in the dental crown after dentoalveolar trauma is a relatively common sequel [20]. Differently from the Consolaro's et al. account, the herein presented case showed no color change in the remaining tooth structure, fact that positively contributed to aesthetic. According to Kramer [21], aesthetics, which has clear and obvious psychological impact on people, is of great importance to families and to children, since dentition is seen as a key appearance component. Composite resin restoration is the treatment of choice against enamel and dentin fractures in permanent [11,20]. The current case made the option for following a conservative approach protecting the dentin by using glass ionomer cement. After 45 days, the tooth clinical and radiographic conditions were evaluated and the definitive restoration was performed. It was done using composite resin, according to Kramer [21]. According to Opdam [22], bevel is recommended to improve the quality of the restoration margins, as well as to reduce marginal cracks and infiltrations, whereas other researchers consider bevel a solution to improve the bond of some etchand-rise and self-etch adhesive systems [23]. Other authors have stated that the bevel does not improve retention [23]. Although literature is controversial in relation to the use of bevel in class IV restorations, the herein reported case made the option for making it in order to achieve better retention and aesthetics.

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The herein described case was monitored for 03 years and the resin restoration remained intact with no color change. The materials and techniques applied in the current case led to satisfactory results due to the adequate use of the adhesive system and the composite resin, which remain successful after three years of follow-up. It was concluded that by integrating proper technique, basic adhesive principles and high quality materials, the clinician may ensure successful shape, function and esthetics in anterior teeth restorations. Both the child and the parents initially showed great concern with the dental injury, especially in relation to the aesthetic factor, since the child, who was ashamed and sad, no longer wanted to go to school due to the fracture. After the restorative treatment was completed, the child could smile again and resumed her school activities, thus demonstrating the immediate success of the chosen treatment.

Conclusion

Restoring the traumatized tooth is of great importance, especially to children, and it should be considered to be an emergency treatment. First, it is worth eliminating pain and reducing the trauma from the fracture, and second restoring the aesthetics and the function as well as the patient's psychological condition.

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