SEVEN
publicações acadêmicas

Dental trauma in childhood: A literature review

https://doi.org/10.56238/sevened2023.007-075

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ABSTRACT
Dental trauma is a frequent incident in early childhood, categorized by the World Health Organization (WHO) as a public health problem, ranging from small cracks in the enamel to permanent tooth loss. The purpose of this study is to review the literature on the aspects of dental trauma in the primary dentition. Trauma to primary teeth occurs in preschool children and is often linked to behavioral characteristics, such as curiosity and restlessness, leading children to explore environments that are conducive to falls, resulting in an increased incidence of injuries. Success in post-traumatic treatment is directly associated with the provision of emergency care at the time of the incident. The delay in care can lead to a series of complications, depending on the type of trauma suffered by the tooth. In view of this perspective, in order to avoid complications resulting from trauma and delay in treatment, there are specific protocols and guidelines that can be employed. Each treatment approach is targeted at a specific type of trauma. In addition, in more severe cases, when there is severe trauma, a multidisciplinary treatment should be considered.

Keywords: Pediatric dentistry, Child, Trauma, Tooth.

1 INTRODUCTION

Dental trauma is a frequent occurrence in early childhood and is categorized by the World Health Organization as a public health issue. This condition ranges from small cracks in the enamel to irreversible tooth loss. In addition to aesthetic impacts, traumatized teeth can cause physical and functional damage, with several repercussions on the health of pediatric patients (PURANIK *et al*., 2023; TEWARI *et al*., 2023).

Trauma-induced damage is varied and can even lead to early loss of elements as well as major occlusal problems if not properly managed (FREITAS *et al*., 2008). Among the places with the highest probability of dental trauma, the school environment was the most prominent, with deciduous teeth and soft tissues adjacent to dental elements being the most affected (TEWARI *et al*., 2023). The best way to prevent dental trauma is to disseminate information to parents and teachers about the best conduct to be adopted in the face of different types of dental trauma (ABREU *et al*., 2020; MARTIOLI *et al*., 2019).

Emergency care, in cases considered acute dental trauma, can ensure a better prognosis, prevent pulp necrosis or premature tooth loss, and the patient should be immediately referred to the dentist so that the necessary conduct can be carried out properly (FERRÉS-AMAT *et al*., 2023).

Thus, the main purpose of this study is to conduct a review of the literature, addressing the various aspects related to dental trauma in the primary dentition.

2 MATERIALS AND METHODS

This study consists of a literature review, using articles from the following databases: Scientific Electronic Library Online (SCIELO), Latin American and Caribbean Health Sciences Literature (LILACS), Brazilian Bibliography of Dentistry (BBO), Google Scholar and National Library of Medicine (PUBMED/Medline). The descriptors used were "Dental Trauma", "Pediatric Dentistry" and "Dentistry".

3 LITERATURE REVIEW

3.1 DETERMINANTS OF DENTAL TRAUMA

Dental trauma impacts both dentitions in a variety of age groups. During early childhood, when children are acquiring fundamental motor skills such as crawling, walking, and running, dental trauma can occur, even in the absence of motor coordination (IDZIK & KRAUSS, 2013). Later, in childhood, falls, collisions with objects such as furniture, and accidents involving falling objects from considerable heights are common events that can result in dental trauma (IDZIK & KRAUSS, 2013; BEECH *et al*., 2015).

In adolescence, sports and recreational activities increase exposure to the risk of dental trauma. Participation in physical activities can result in falls, electric shocks, and bicycle accidents, representing potential threats to physical integrity at this stage of life (Antunes *et al*., 2012; Azami-Aghdash *et al*., 2015).

In addition, several other factors can contribute to dental trauma, such as harmful oral habits, oral perforation, iatrogenic injuries (resulting from medical examinations, such as laryngoscopy or during intubation), and the use of substances such as drugs and alcohol (ALDRIGUI *et al*., 2014; OLIVEIRA FILHO *et al*., 2013; DE OLIVEIRA FILHO *et al*., 2014).

3.2 CATEGORIZATION OF DENTAL TRAUMA

The categorization of dental lesions is of great relevance and can serve as a guiding instrument in the diagnosis of both primary and permanent dentition. This classification not only guides the therapeutic approach, but also provides information about the possible prognosis. The classification of dental trauma according to the Andreasen criteria, currently recognized by the World Health

Organization, is a commonly used approach for this purpose (MARINHO *et al*., 2013; REIS *et al*., 2014).

3.3 TYPES OF INJURIES

Within the lesions in the hard tissues of the tooth, all those resulting from cracks in the enamel, dentin (with or without exposure of the pulp) and even affecting the root are included. These injuries can be categorized as complete and incomplete enamel fractures (BOURGUIGNON *et al*., 2020). Uncomplicated coronary fractures can be divided into: enamel and dentin fractures without pulp involvement, enamel fractures with dentin involvement; On the other hand, coronary fractures considered complex include: coronary fractures without pulp exposure, crown-root fractures with exposed pulp, and root fractures (BASTONE *et al*., 2000; ZHOU et al., 2013; BOURGUIGNON *et al*., 2020).

In fractures involving exposed enamel, dentin, and pulp, there is a low incidence in primary teeth. Therefore, it is crucial to perform a radiographic diagnosis to assess the extent of the fracture and the stage of root development (VIDUSKALNE & CARE, 2010; DONNELLY et al., 2022). In very young children with hypoplastic roots, preserving pulp vitality by means of a partial pulpotomy or pulp overpass becomes critical. Pulpotomy involves the complete removal of the coronary pulp, thereby preserving the root pulp. The same procedure is applicable in cases of fully formed roots. Clinical follow-up can be performed in the first week, while clinical and radiographic control can be done in weeks 6-8 and in the first year (BISSINGER *et al*., 2021; KALLEL *et al*., 2020).

Frequently observed lesions include fractures that compromise enamel and dentin, resulting in the loss of tooth structure, without, however, affecting the pulp, especially in the mesial region of the maxillary incisors, and may present lesions in the supporting tissues. Teeth affected in this way exhibit normal mobility and do not demonstrate sensitivity to percussion (MARINHO *et al.,* 2013). Radiographically, it is possible to identify dentin and enamel loss, and it is crucial to assess the distance between the fracture and the pulp chamber. Thus, the most appropriate therapeutic approach for coronary fractures is to completely seal the affected dentin with a glass ionomer in order to avoid microinfiltrations (ABREU *et al.,* 2020).

3.4 FOLLOW-UP AFTER DENTAL TRAUMA

Patients who have suffered dental trauma should use a pasty diet for a period of 10 to 14 days, in addition to good oral hygiene, including toothbrushing after each meal with a soft-bristled brush (FLORES *et al*., 2006; KEELS *et al*., 2014). External application of 0.12% chlorhexidine, twice a day for one week, is indicated as a crucial measure to prevent plaque buildup. Restricting the use of pacifiers is advisable due to the possible interference with the healing of tissues affected by trauma

and the pulp prognosis of traumatized teeth due to suction force (DIANGELIS *et al*., 2012). Parents should be informed of possible complications such as inflammation, darkening of the crown, increased mobility, or fistula formation. In addition, they should be attentive to signs of gingival inflammation and consider the possibility of complications in the development of successor permanent teeth, especially in cases of intrusion and avulsion in children under 3 years of age (GLENDOR, 2009; BOURGUIGNON *et al*., 2020).

3.5 THERAPEUTIC APPLICATIONS

The reimplantation of the permanent dentition represents a conservative strategy with the objective of repositioning the avulsed tooth in the alveolar bone, being the preferred treatment option. It is crucial to minimize the time the tooth remains outside the socket to optimize results in the first 30 minutes, providing a more favorable prognosis (DE OLIVEIRA FILHO *et al*., 2014; BOURGUIGNON *et al*., 2020). Although there are different suggestions regarding the time intervals for the treatment of avulsed teeth, this study indicates that the minimum period of 15 minutes between trauma and intervention is not considered critical (GLENDOR, 2009; KALLEL *et al*., 2020).

4 CONCLUSION

The results of the study highlight the main treatments for dental trauma, especially in children, with dental replantation being an option. However, the parents' lack of knowledge can compromise the efficacy of the treatment, making it crucial to guide dental professionals on the appropriate conduct. Success in post-traumatic care is linked to emergency care at the time of the event, avoiding complications associated with the type of trauma and the delay in treatment. Specific protocols are recommended for each type of dental trauma. The need for further studies is highlighted to disseminate comprehensive information on the subject, and the implementation of public policies is suggested for prevention, corrective education and reduction of childhood accidents that may result in trauma, as well as to promote appropriate actions in the post-trauma period.

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