

Avulsion on Deciduous Teeth

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Abstract

The deciduous dentition should be maintained until the normal time of exfoliation, but traumatic lesions in deciduous teeth are common accidents in early childhood. It is defined as dental avulsion the total displacement of the tooth outside its alveolus, and among the treatment options for this problem is the re-implantation, however, the literature is controversial as to the validity or not of this therapy being able to cause sequels that can vary from a change of color in the crown, injuring the crypt of the permanent tooth until the loss of it. The present work describes the advantages and disadvantages of the treatment, as well as indications and contraindications of this technique, besides addressing the known prognoses, through a review of the literature aiming at the maintenance of space and means of storage of the tooth.

It is concluded that re-implantation cannot be considered common practice in the case of avulsions of deciduous teeth, but in ideal conditions it may be a viable treatment.

Keywords: Avulsion; Decay; Pediatric Dentistry; Trauma; Alveolus Re-Implanted

Introduction

Dental avulsion occurs through trauma, where the tooth is completely displaced out of its socket, with a higher incidence in children [1]. As for the etiology, in primary dentition, avulsion occurs mainly in early childhood, because the child is developing motor skills such as walking. The most affected teeth are the deciduous maxillary incisors, due to a greater vestibularization in the dental arch [2].

The consequences of traumatic injuries can accompany the patient for the rest of his life and rehabilitative dental procedures must be carried out in order to minimize the sequelae of these injuries [3].

When trauma occurs and the tooth is avulsed, the treatment plan must be determined through clinical and radiographic observations that must be made in order to determine the type or extension of the trauma.

The radiography is intended to reveal probable alterations of permanent tooth germ position, in cases of avulsion of deciduous teeth, root fracture with permanence of some root fragment or fractures in the alveolar wall [4].

When avulsion occurs, the primary tooth should not be re-implanted due to the damage it can cause to the permanent germ. According to studies, re-implantation is a more conservative treatment, but it is more indicated in permanent teeth, which must have an adequate storage medium, with a neutral pH [5,6].

As the replantation of primary teeth is not so used, those responsible should be informed of the importance of preserving the space of the lost dentition, as early loss of primary teeth can create negative influences from the child's psychological point of view.

The most indicated treatment in primary dentition is the use of space maintainers, as they are economical and easily constructed

devices, as they preserve the normal dimensions of the arch, keeping the neighboring teeth and avoiding anteroposterior disharmony, and the laterality slip in the arch [7].

Purpose of this Study

The purpose of this article is to report the damage that dental avulsion can bring to children, the contraindications of re-implantation and the appropriate treatments.

Basic fundamentals

Dental avulsion is the total displacement of the tooth element out of its socket, causing the rupture of the periodontal ligament and the nervous vascular bundle, and can cause damage to the bone tissue and, frequently, to the permanent tooth germ. This type of dental trauma has been one of the main causes of tooth loss; causing several damages that affect hard tissues and support structures [8].

Dental trauma is one of the biggest occurrences in dental emergencies. The treatment must be planned very carefully, as we must analyze and study the case before performing the procedure, especially in the case of an avulsion of a deciduous tooth, where there is a very close relationship between the apex of the deciduous tooth, affected by a trauma, causing damage to the developing successor tooth, such as hypoplasia and morphological changes in the crowns.

According to Vasconcellos RJH, there is a predominant stage of oral trauma in children, this occurs with greater prevalence when they start to get up, walk and run. This is due to the lack in motor coordination. Regarding the type of trauma in primary dentition, several factors can cause dental-alveolar sequelae, the most common being a fall from standing height, which reaches 80% of the cases [9].

In children between the ages of 1 to 3, either boys or girls, 11% to 30% have some dental trauma. The upper anterior teeth are the most affected, as they are more buccal in the dental arch, thus causing aesthetic, psychological and functional damage to the child [8,9].



Figure 1

The main disadvantages of re-implanted teeth are the damage that can occur to permanent teeth, developing successors, such as hypoplasia and morphological changes in the crowns [10]; it can also occur the appearance of cysts related to re-implanted primary teeth and delay in the eruption of the permanent tooth [11]. In addition, there is the possibility that the patient may present a tooth abscess, external root resorption, ankylosis, pulp necrosis, and periapical lesion associated with a fistula, leading to extraction of the element following treatment.

One of the harms of re-implanted teeth is the need for additional treatments, such as retaining the tooth that will be re-implanted, endodontic treatment and numerous radiographs that will be taken to monitor the element that has been avulsed [12].

Based on the literature review described by the authors, the assessment will depend on the teeth involved, the child's age, alveolar damage, radiographic examination, and clinical follow-up.

As it is not indicated for the replacement of deciduous teeth, the early loss of teeth can cause changes in word pronunciation, inclinations of neighboring teeth, interference with masticatory function, loss of space, antagonist extrusion, tooth-maxillary disharmonies [13-18].

The consequences will depend on the age at which the loss occurs, and the location of the missing tooth. In the case of early loss, when the permanent tooth has a third or less of the root, there is a delay in eruption, as there is bone deposition in the region of the lost unit. However, if the permanent tooth has three to two-thirds of the root, the loss of the primary tooth promotes acceleration in the eruption of the permanent tooth.

In addition, other articles report that the child can develop harmful habits of tongue posture, which can lead to speech problems [14].

For some, the treatment used is space maintainers, which will be divided into fixed or removable, and it should be chosen and based on the age, if the child will cooperate, oral hygiene and the help of their guardians [13,15,16,18,20,21].

Removable space maintainers are not recommended for children under three years of age, as there is no cooperation, and good oral hygiene.

The literature also reports that fixed anterior prosthesis is a space maintainer that guides the eruption of permanent successors and prevents the extrusion of antagonists [17,18,21,22].



Figure 2

Functional fixed prosthesis is an excellent replacement option for children under five years, as they do not have the skill to use a removable space maintainer device. Fixed prostheses for children must be well planned, as the child's growth and development must be taken into consideration [23,24].

For this reason, the fixed prosthesis most used today is the one with a cursor known as the Denari prosthesis, because even though it is fixed, it does not alter the growth of the child's dental arch.

Discussion

Due to the high frequency of avulsion in primary teeth, the dentist has to act quickly, know how to proceed in these cases, as the child is afraid due to the avulsed element caused by the trauma.



Figure 3

The avulsions of primary incisors cause great controversy among health professionals, as some authors report that the re-implantation of deciduous teeth is not suitable, due to the sequelae they can cause on the permanent developing tooth germ, but also on the other hand, the dentist faces the dilemma of re-implantation of avulsed primary teeth, especially incisors, when parents encourage them to save the tooth.

Some authors say that re-implanting the primary tooth is to restore normal function and esthetics, which as a consequence will improve the patient's self-esteem. When re-implanted, the primary tooth maintains the space in the arch again, avoiding the delayed eruption of the permanent successor and its bad position after erupting, aiding facial growth. Parents also feel guilty, which is why they ask to go to the pediatric dentist to have the tooth re-implanted. Some authors have suggested that failure to re-implant the incisors can lead to speech, chewing, and develop bad habits.

The re-implantation of deciduous teeth can be effective depending on the way it was re-implanted, however some caution is recommended in the procedures to be performed, since the root formation stage is one of the first factors to be considered and if there is any sign of resorption should not be re-implanted as it has no strategic value.

In case of re-implantation, the teeth must be immobilized and it has to be semi-rigid to allow the physiological movement of the teeth, allowing the re- insertion of the periodontal ligament.

Rocha and Cardoso [19] in 2008, specify some aspects that must be analyzed and evaluated to determine an adequate treatment plan and whether or not the therapy is effectively recommended, the strategic value of the primary tooth in the oral cavity must be analyzed; the integrity of the alveolar bone; how long the tooth was kept outside the socket and how it was stored; the level of contamination where the tooth fell; the presence of adjacent teeth to make a retainer; and nutritional or non- nutritive habits in the child's routine, which can affect the stability of the re-implanted tooth. The avulsed primary tooth requires subsequent endodontic treatment to avoid the apical consequences of pulp necrosis [24].

Even so, re-implantation is considered a modality, in which conditions should be recommended, such as the dental development stage, ideally with 2/3 of the root; minimal contamination of the avulsed tooth; however it must be stored properly. The storage medium also plays an important role in maintaining the vitality of the cells in the root, recommends storing the avulsed element in Saline Solution, milk, or the child's own saliva [25].

Some authors recommend storage preferably in milk due to its physiological properties to maintain the vitality of the periodontal ligament for up to 6 hours, in addition to its easy access at the time of the accident, providing an adequate means to seek a dentist [26-29].

It is important to emphasize that water is the most unfavorable medium due to its osmotic and hypotonic characteristics, causing cell lysis and increasing the inflammation in re-implantations. Another important factor is also the period of re- implantation, as periods longer than two hours, with the tooth outside the alveolus, can occur extensive root resorption [30].

According to the literature, the prognosis varies. In some cases, the re- implanted primary teeth remained in the arch without major problems until the physiological exfoliation of the teeth. The lack of conduct for the re-implantation of avulsed primary teeth results in decisions based on the needs of each patient. However,

the treatment protocol for avulsed primary teeth can be modified and adapted to fit the specific needs of permanent teeth [31].

There is a controversy in the literature, with some agreeing with the practice of re-implanting a tooth in the socket, while others are against the practice. This generates controversy because deciduous teeth are genetically programmed to exfoliate, and their exfoliation begins in the periapical region through osteoclasts, cells aimed at resorption. In addition, there is a very close relationship between the primary tooth and its permanent successor, which puts its formation at risk when the tooth is repositioned in its alveoli, since in this period the processes of development and mineralization of permanent teeth occur, which can be significantly altered by external factors, causing hypo- mineralization, this is because ameloblasts, which are cells responsible for mineral deposition, are highly sensitive and capable of altering the environment during their period of activity [32,33].

Re-implantation of a primary tooth can act as additional trauma, triggering malformations during the period of enamel deposition.

Some authors report that the best way to restore esthetics, and at the same time function, without losing the space of the tooth that was avulsed, are the maintainers, whether fixed or removable [34-39].

According to some authors, the dental surgeon must perform technical maneuvers to try to keep the tooth in the dental arch, as it is still the best space maintainer. But if this does not occur, space maintainers should be used, either fixed or removable, as they are currently the most used.

According to Almeida-Pedrin 2003, the types of maintainers should be classified into removable and fixed, functional and non-functional. Functional removable are indicated for collaborating children with loss of one or more teeth, whereas fixed space maintainers, functional and non-functional, are indicated for children who are not collaborators, and who have lost one or more elements. According to the authors, the maintainers are not intended to preserve the space of the avulsed tooth [41].

The space maintainers have the function of maintaining the child's esthetics, preventing phonetic changes and installation of habits, maintaining the space for the permanent tooth, and especially not causing an interposition of the tongue [38,40-43].

As for the loss of space, Almeida and Almeida-Pedrin believe that there is no need to maintain space in anterior teeth, as this early loss will not influence occlusion, as long as the posterior teeth have a satisfactory occlusion [33].

On the other hand, Schnider and Rontani (2004) Faheemuddin, Yazdsnie and Naws (2012), state that space loss can occur, only when there is early loss of deciduous teeth before the eruption of deciduous canines [40].

Conclusion

After reviewing the literature, it can be concluded that dental avulsions in primary teeth are one of the main challenges for dentists, especially for pediatric dentists, due to the contraindication of re-implantation of primary teeth, as they cause damage to permanent teeth. Although the non re-implantation can cause migration of neighboring teeth to occur, chewing and speech problems, it can also compromise aesthetics and affect the child's psychological condition.

So, in conclusion the maintenance of these spaces are made necessary through the use of maintainers, since the re-implantation is not so indicated due to the risk it can cause to the successor tooth.

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