

The Use of a Natural Tooth Crown Following Traumatic Injuries in Primary Dentition

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Preschool children are frequently affected by traumatic dental injuries, most of them during the first three years of life. Due to the resiliency of the alveolar bone surrounding the primary teeth, most of these injuries fit into tooth luxations category. In this paper, two different cases of early loss of primary incisors resulting from luxations are described. Removable esthetic space maintainers were placed using the natural crown of the traumatized teeth and the children were evaluated over a 12 month period. The treatment given could be considered an excellent rehabilitation option since it restores the esthetics and masticatory function, allows speech development, benefits oral hygiene and prevents the establishment of tongue habits and malocclusions.

Keywords: *Deciduous tooth, Primary tooth, Space Maintenance, Tooth Avulsion; Tooth Luxation, Dental Crowns.*

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INTRODUCTION

Epidemiological studies show that approximately 30% of all children up to the age of seven present traumatic injuries to one or more primary incisors^{1,2} and those aged 1–3 are the most affected.^{3,4} In regard to the etiology, the factor most frequently observed is falls from heights.⁵

The type of dental trauma is generally related to the age of the patient. In primary dentition, small coronal fractures may be observed, although luxations are more common.¹ When lateral luxation occurs the tooth is displaced, usually in a palatal/lingual direction. The prognosis of lateral luxation is usually favorable, without compromising permanent tooth eruption.⁶ However, the injured primary teeth could be affected by pulp necrosis and, in these cases, follow-up is indispensable.⁷ Avulsions involve 7–13% of all injuries to primary teeth⁷ and the close relationship between the pri-

mary tooth and the developing permanent successor explains the increased risk of developmental disturbances in a permanent tooth after avulsion of the primary predecessor.⁸

In most cases, the treatment of complicated injuries in primary dentition has been limited to extraction of the affected tooth.^{2,9} However, the early loss of maxillary central incisors is a major concern for the parents of an affected child¹⁰ and an anterior esthetic appliance is usually placed at their request.¹¹ In some cases, an anterior appliance may be indicated to maintain space, to reestablish masticatory function, speech development and aesthetic appearance, as well as to prevent the development of tongue habits.¹¹ Follow-up is recommended until the eruption of the permanent succeeding teeth.¹²

The purpose of this paper is to describe two cases of early loss of primary incisors resulting from acute dental trauma. Removable esthetic space maintainers were placed using the natural tooth crown and followed-up over a 12 month period.

CASES REPORTS

Case 1:

A 3-year-old girl attended the Pediatric Dentistry clinic of the Federal University of Rio de Janeiro, Brazil, six months after a dental trauma. Her medical history was noncontributory. Her mother reported that she had fallen and avulsed an anterior primary tooth. The tooth was stored in a dry environment after the injury. The main complaints were related to difficulty with speech and socialization due to its absence. Extraoral examination did not reveal abnormalities. Intraoral examination revealed absence of the primary right maxillary central incisor and the primary left maxillary central incisor presented a slightly deflected inclination suggesting an ini-

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tial space loss (Figure 1). A periapical radiograph revealed no alterations in neighboring teeth (Figure 2). The proposed treatment was to manufacture an esthetics removable space maintainer using the crown of the lost incisor. The tooth was sectioned, the root was discarded and the crown was used in the space maintainer (Figure 3). One month after the placement of the appliance the child presented no speech difficulty and both the patient and her parents were satisfied. The last follow up, 12 months later (Figure 4), showed that this approach was successful.

Case 2:

A 4-year-old boy attended at the Pediatric Dentistry clinic of the Federal University of Rio de Janeiro, Brazil, 24 hours after a dental trauma. His medical history was noncontributory. His mother reported that he had fallen and the maxillary central primary teeth presented mobility. The extraoral examination revealed laceration and hematoma on his upper lip. Intraoral examination revealed a subluxation of the primary right maxillary central incisor and the primary left maxillary central incisor presented a lateral luxation, being displaced in a palatal direction, causing a slight occlusal interference. The neighboring gingiva also presented hematoma and laceration. A periapical radiograph revealed increased periodontal ligament space in both teeth and a

shortening of the primary left maxillary central incisor in comparison with the contra lateral tooth. Because of the occlusal interference, slight tooth reduction was performed on the primary left maxillary central incisor (Figure 5). The patient did not return when recalled. Five months later, an internal and external pathological root resorption was observed in the traumatized teeth (Figure 6). Endodontic treatment was not indicated and both teeth were extracted. Parents accepted the early loss of incisors but demonstrated concern about the child's appearance. The proposed treatment was to manufacture an esthetic removable space maintainer using the extracted incisors (Figure 7) similar to what was done in the first case. One month after the appliance was placed, it was noted that both the patient and parents were satisfied. The child presented good speech. At the last follow up visit, 12 months later, esthetics were maintained (Figure 8).

DISCUSSION

The majority of dental injuries in preschoolers are luxations due to the resiliency of the alveolar bone surrounding the primary teeth.¹³ The consequences of trauma in primary dentition include color change, pulp necrosis, obliteration of the pulp canal, gingival retraction, displacement of the primary tooth, pathological root resorption, alterations in the



Figure 1. Initial aspect of a 3 years old child with avulsed tooth



Figure 2. Radiographic exam at the first appointment six months after dental avulsion

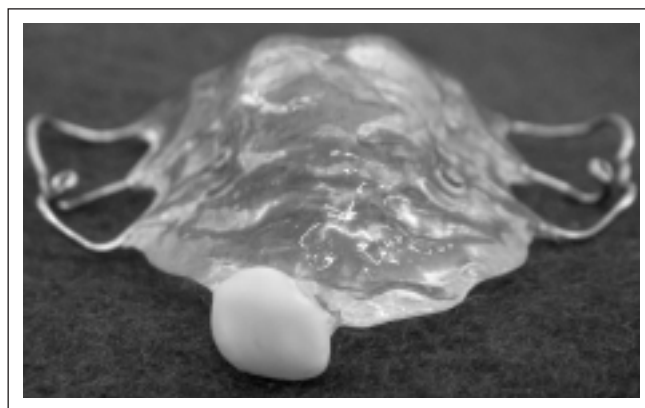


Figure 3. Esthetic removable space maintainer



Figure 4. Final aspect at 12 month follow-up

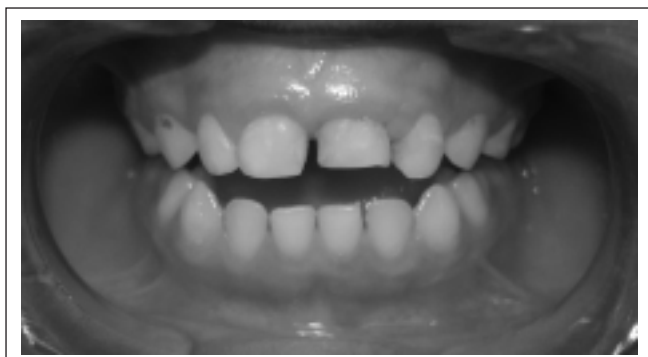


Figure 5. Aspect of subluxation of the right maxillary central incisor and of lateral luxation of left maxillary central incisor after slight grinding

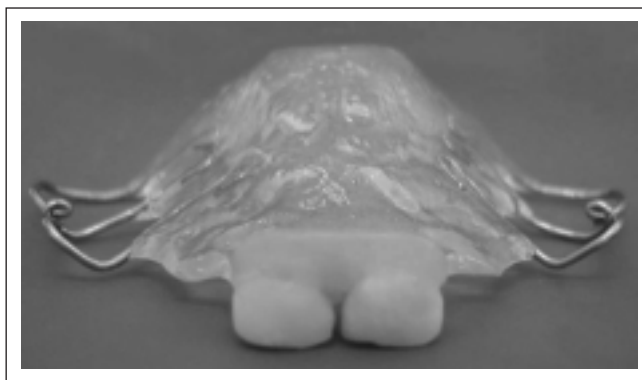


Figure 7. Esthetic removable space maintainer



Figure 6. Radiographic exam five months after trauma, showing internal and external pathological root resorption



Figure 8. Final aspect at 12 month follow-up

physiological root resorption process or premature dental loss.²

The parents' concern about the early loss of primary teeth is the reason for seeking treatment, not only because of esthetics, but also due to loss of masticatory function,¹⁰ interference in speech development, establishment of tongue habits, as well as concern about space maintenance.¹¹ Many different sounds are made with the tongue touching the lingual side of the maxillary incisors and inappropriate speech compensations can develop if the teeth are missing.¹⁴ According to Kupietzky,¹⁵ appliances for children under 3 years of age that have not yet developed their speech skills should be considered very important. In our cases, the placement of a space maintainer improved the speech development since without the tooth the pronunciation of certain sounds was affected.

Another concern is related to esthetic problems, which becomes an important issue at preschool age, when children become aware of the esthetic standards and need to be like their peers.¹⁶ The patient's self esteem and image were an important factor in the decision to manufacture the esthetic maintainer in both cases. In the first report, the girl was bullied by her school friends, while in the second case, the

mother showed concern about the child's appearance after the extraction.

An important factor is that a removable space maintainer is easy to manufacture and place; also it facilitates hygiene care since the appliance can be removed during tooth brushing. According to Orsi *et al.*¹⁷ when there is a loss of one or more primary teeth, a removable space maintainer is the first option — causing no interference to tooth and arch development processes. Furthermore, fixed appliances need to be inserted with precontoured stainless-steel or orthodontic bands,¹⁸ extending the treatment time and causing difficulties with uncooperative children. Kupietzky¹⁵ described in a case report that a fixed appliance, similar to a Nance holding arch, was attached to the primary molars with prefabricated stainless steel bands. However, as a red hypertrophic gingival inflammation appeared following the placement of the fixed appliance, it was removed and replaced with a removable one, after a few months.

Many advantages are related to the use of natural teeth for oral rehabilitation and restoring function, such as better esthetics, physiological wear and superficial smoothness¹⁹ which contributes to the reduction of biofilm retention and facilitates oral hygiene. One major advantage of retaining the patient's natural crown is that the patient can tolerate the effects of a tooth loss more easily.²⁰ Moreover, it provides the optimal choice in terms of shape, color, size and alignment.²¹

The above-mentioned advantages of esthetic removable space maintainers with natural teeth contributed to the success of the treatment and satisfaction of both patients and their families.

Care must be taken in cases where teeth remain for long periods of time outside the oral environment as they dehydrate. In these cases they can be submerged as in the first case in saline for 24 hours and the clinical crown sectioned with a slow speed handpiece.

The early loss of primary incisors does not cause loss of space in most cases. However, it is sometimes associated with malposition of their permanent successors. A lack of eruption guidance or the direct effect of the injury on the position of the developing bud could be considered as contributory etiologic factors.²² For this reason, the child should be referred to a pediatric dentist for follow-up control in such cases. It is important to explain to the parents that long-term consequences in the permanent dentition may happen, which will only be seen many years later, at the time of the permanent incisors eruption.²³

CONCLUSION

An esthetic removable space maintainer using natural tooth crown can be an excellent option to rehabilitate anterior primary tooth loss and presents many advantages. In addition to being easily manufactured and placed, it restores the esthetics and masticatory function, allowing speech development, benefiting oral hygiene and preventing the establishment of tongue habits and malocclusions.

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