Conservative Management of Severe Intrusion in a Primary Tooth: A 4-year Follow-up

Denise Belucio Ruviére, DDS
Mariana Machado Teixeira de Moraes Costa, DDS
Robson Frederico Cunha, DDS, MSc, ScD

ABSTRACT

The purpose of this report was to describe the case of an 18-month-old boy who was referred to the pediatric clinic of the School of Dentistry of Araçatuba, São Paulo State University, Araçatuba, São Paulo, Brazil, 3 days after sustaining severe trauma that led to the complete intrusion of the primary maxillary right lateral incisor, a crown fracture of the primary maxillary right central incisor without pulp involvement, and disruption of the superior labial frenum. Four months later, spontaneous re-eruption was observed in the intruded tooth and no endodontic intervention was necessary in either traumatized teeth. Four years after the trauma, a morphological change in the germ of the permanent successor was noted. Clinical follow-up and periodic radiographies are necessary after traumatic intrusion of primary teeth to monitor possible sequelae in the permanent successors.

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Dental traumatic injuries in infants and young children are common and more often related to falls while learning to walk and exploring surroundings.[1-5] Retrospective and prospective studies related that prevalence of these injuries involving the primary dentition ranged from 4% to 33%.[2-4] The consequences of trauma in primary dentition include color change, pulp necrosis, obliteration of the pulp canal, gingival retraction, primary tooth displacement, pathological root resorption, and premature loss of the primary tooth.[1-6]

Sequelae for permanent dentition after trauma in primary dentition are usually related to intrusive injuries.[7-10] These sequelaes are the consequence of impact by a force in an axial direction which results in tooth displacement within the socket and can affect the crown, root, or entire permanent tooth germ.[10] Moreover, intrusive injury in primary dentition often results in anomalous development of the permanent teeth, with a frequency between 18% and 69%.[10,12]

The aim of diagnosis and treatment of traumatic injuries in primary teeth is to manage pain and prevent sequelae for the developing permanent tooth germ.[2-5,7,8,10,12]

There is no agreement in the literature for the ideal treatment for primary intruded teeth after trauma. To date, treatment of these injuries has been based instead on clinical case reports,[13,14] experts' opinions,[15-17] and literature reviews.[12,18, 21]Depending on the direction of displacement suffered, it is suggested to wait for the spontaneous re-eruption or to surgically remove the dental element. Thus, if the apex is displaced toward or through the labial bone plate, the tooth is left for spontaneous re-eruption.[1,5,7,15,18,20,22-24] If the apex is displaced toward the permanent tooth germ, the tooth should be extracted.[1,5,15,18,20,23,24]

The purpose of this paper was to describe the treatment of a primary maxillary right lateral incisor in which

Drs. Ruviére and Costa are post doctoral students, and Dr. Cunha is adjunct professor, all in the Department of Pediatric and Social Dentistry, School of Dentistry of Araçatuba, São Paulo State University (UNESP), Araçatuba, São Paulo, Brazil. Correspond with Dr. Cunha at cunha@foa.unesp.br

spontaneous re-eruption after severe traumatic intrusion occurred and its possible consequences on the developing successive permanent germs.

CASE REPORT

The research protocol was submitted for review to the Ethics in Human Research Committee of the School of Dentistry of Araçatuba, São Paulo State University, Araçatuba, São Paulo, Brazil, and the case report design was approved. An informed consent was obtained from parents. A healthy 18-month-old male was referred to the pediatric dentistry clinic of the School of Dentistry of Araçatuba, São Paulo State University, Araçatuba, São Paulo, Brazil, 3 days after suffering dental trauma caused by a fall. The patient was in good general health, had no neurological problems, and received medical treatment immediately after the incident and prior to dental evaluation. He was medicated with analgesic and amoxicillin.

The extraoral examination revealed a mild edema and several small cuts and lacerations on the maxillary and mandibular lips. The intraoral examination revealed complete intrusion of the primary maxillary right lateral incisor, crown fracture of the primary maxillary right central incisor without pulp involvement, and disruption of the superior labial frenum (Figure 1), with no pain related. Radiographic examination revealed that the primary maxillary right central and lateral incisors' apexes were still open. The primary maxillary right lateral incisor's apex was dislocated into the vestibule, indicating a labial displacement direction. This additional information helped confirm that the tooth apex was in close proximity to the permanent successor's labial surface. No pulpal nor periapical pathosis and no root or bone fractures could be detected (Figure 2).

Dental treatment included antiseptic procedures with 0.12% chlorhexidine gluconate and instructions for home oral hygiene maintenance. The antibiotic therapy already initiated was continued for 7 days longer. Pacifier use was discouraged. Because treatment was sought late (3 days after the injury), it was decided to keep the intruded tooth and wait for spontaneous re-eruption. The crown fracture of the primary maxillary right central incisor was only regularized with a polishing bur when there was no pulp involvement. Clinical and radiographic examinations were performed periodically to monitor tooth development.

After 30 days, although the tooth had not initiated the re-eruption process, clinical examination showed a normal aspect, characterized by no dental crown discoloration, mobility, or pain. The mucosa presented normal characteristics. Radiographic examination also revealed normal aspects, with no signs of a periapical lesion or root resorption. Sixty days following the dental trauma, the beginning of spontaneous re-eruption of the primary maxillary right lateral incisor was observed clinically. After 4 months, the primary maxillary right lateral incisor returned spontaneously to its normal position and radiographic aspects revealed light signs of external cervical root resorption on the distal surface (Figure 3). Twelve months after the trauma, radiograph evaluations showed that the root resorption was stabilized and clinical findings revealed no pain, discoloration, or mobility of the dental crown. The endodontic intervention was not performed.

Eighteen months after trauma, the primary maxillary right lateral incisor revealed a brown coronary discoloration, but no pain, fistula, or mobility was observed (Figure 4).

After 4 years, an alteration was observed on the germs of the permanent maxillary right lateral and central incisors (Figure 5) and an external distal-cervical root resorption of the primary maxillary right lateral incisor could be seen clinically (Figure 6). The parents were informed of the sequelae of the primary intruded tooth's condition and morphological alterations in the permanents teeth. The same professional examined and treated the patient initially and at follow-up visits. The patient's dentist and family decided to continue conservative management and periodic follow-ups.

Figure 1. Disruption of the superior labial frenum, intrusion of the primary maxillary right lateral incisor, and uncomplicated crown fracture of the primary maxillary right central incisor in an 18-month-old male, 3 days after suffering dental trauma.

Figure 2. Radiographic examination 3 days after suffering dental trauma.

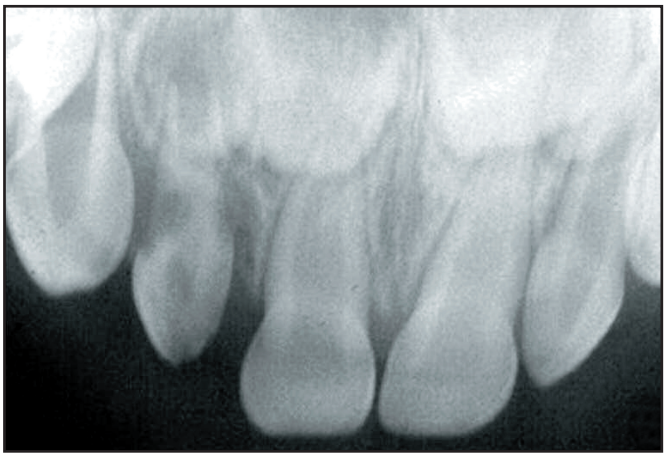

Figure 3. Radiographic aspects revealed light signs of external cervical root resorption at the distal surface, 4 months after dental trauma.

Figure 4. Clinical exam 18 months after dental trauma showing coronary discoloration in the intruded tooth, absence of pain and fistula, and no mobility.

Figure 5. Radiographic exam after 4 years, showing a sign of alteration of the permanent maxillary right lateral and central incisors' germs.

Figure 6. Clinical exam, after 4 years, showing an external cervical root resorption of the primary maxillary right lateral incisor.

DISCUSSION

In the present case report, a complete intrusion of the primary maxillary right lateral incisor was observed, which compares with the results observed in the literature.[3,4,7,9,25] The preference for intrusion into the permanent maxillary central and lateral incisor appears to be related to the common fall direction in which these teeth are generally the first to make contact with extraoral objects.[26] These situations could be explained by the pliability of the facial skeleton and of the periodontal ligament, the large volume of teeth in relation to the bone in primary and mixed dentition, and the shorter roots of primary teeth.[1,7,23,26]

Depending on the vestibular curvature of the primary teeth's root and the impact's direction, the apexes of these teeth are usually dislocated into the vestibular. This diagnosis is important to determine whether the germ of the successor has been affected and may be checked using radiographs.[25] The most common initial treatment for traumatically intruded primary teeth is to wait for spontaneous re-eruption.[1,10,25]

In the present case, several factors influenced the decision to keep the traumatized teeth, including the timing of seeking care (considering that the trauma had happened 3 days before the patient sought treatment), the family's eagerness to maintain the teeth, and the patient's age. Therefore, a conservative approach with periodic follow-ups was established. After 4 months, the tooth returned spontaneously to its normal position. This finding agrees with Gondim et al, who evaluated 22 intruded teeth and showed a total re-eruption in 43% of cases, partial re-eruption in 47% of cases, and no re-eruption in 11% of cases.[25] In a follow-up study of 123 intruded primary incisors, total re-eruption occurred in 84% of the completely intruded teeth and in 92% of those who had suffered partial intrusion.[27] In addition, in a clinical study of 123 intruded teeth available for follow-up evaluation, 88% re-erupted fully, 10% did not return to the occlusal plane, and 2% failed to re-erupt due to ankylosis.[22] Failure to re-erupt to the occlusal plane was often associated with pacifier use, thumb-sucking, or

tongue-thrusting.[21,23,25] The endodontic intervention was not performed due to the clinical findings, which showed absence of pain and fistula, no mobility, and a mucosa with normal characteristics.[28] In spite of this initial decision, it is important to emphasize that this patient received regular follow-ups and that endodontic treatment could be indicated in cases of clinical or radiographic alterations.[28]

Regarding malformation of the germ reported in this article, prior studies[7,8,12,22,24,26,29] support the present case report's findings that intrusion injuries are the most frequent cause of developmental disturbance. Of this form, the permanent tooth germ's malformation may be the result of severe intrusion by the primary tooth and invasion of the developing germ during the earliest phases of odontogenesis, when the child is between 1 and 3 years old.[1,12]

In this case report, secondary damage on the permanent maxillary right central and lateral incisors' germs was observed radiographically. The extent and type of actual damage, however, cannot be definitively established.

In conclusion, the type of traumatic primary tooth injury combined with the child's age at the time of the injury can indicate the probability of subsequent damages to the primary tooth or permanent tooth germ involved. Therefore, the importance of regular follow-ups should be emphasized to evaluate healing, oral hygiene, infection control, and evolution of the case. In particular, radiographic examinations are recommended to achieve early detection of possible developmental disturbances in the permanent germ.

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