

Intrusive Luxation in Primary Teeth: A Case Report

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Background: Intrusive luxation, also called central dislocation, is often the result of an axial impact in the apical direction, moving the tooth within the alveolar bone. This is possibly one of the most traumatic injuries, since the displacement of a tooth within its socket implies extensive and acute involvement of the periodontal ligament, bone damage and rupture of the neurovascular bundle. The close relationship between the apexes of the primary teeth and the developing permanent successor in turn can lead to multiple complications, which are greater when the permanent tooth is affected in the early stages of development. **Methods:** The present paper describes a case of intrusion in primary teeth and its evolution following initial diagnosis as avulsion at the time of trauma. **Results:** The upper right central incisor, initially diagnosed as avulsed, was lodged in the floor of the right nostril, and was surgically extracted through the nose. **Conclusions:** In cases of intrusion of primary teeth, it is essential to diagnose the direction of the displaced tooth to rule out injury to the successor and thus prevent the occurrence of sequelae in the permanent dentition.

Key words: tooth traumatism; primary dentition.

INTRODUCTION

Oral trauma is a major oral and general health problem, and can have medical, esthetic and psychological consequences for children and often also for their parents¹⁻³. In primary teeth, the frequency of intrusive luxation varies according to different authors from 4-10.5%⁴⁻⁷. In terms of age, the highest frequency is between 1-3 years of age, this being a time when the root of the tooth is in training and/or undergoing resorption^{8,9}. This type of traumatism leads to extensive and severe involvement of the periodontal ligament, bone damage and rupture of the neurovascular bundle^{3-5,7}. Furthermore, an impact in an apical direction in the deciduous dentition frequently shifts the tooth apex in the buccal direction, and thus away from the permanent tooth germ. There is a serious risk of damaging the permanent tooth bud, leading to important consequences and disrupting development of the tooth⁹. The extent of the associated complications and their severity depends mainly on the stage of development when permanent teeth

are involved, and on the intensity of trauma¹⁰. Andreasen and Ravn¹ have observed a frequency of abnormalities of the teeth successors of 63% in children under two years of age, 53% in children between 3-4 years of age, and 24% in children between 5-6 years of age. These results, associated with the high prevalence of dental trauma in young children, underscore the importance of this type of trauma¹¹. Similarly, the extent of the associated complications is also dependent upon the magnitude of the impact, which can be classified as grade I (over 50% of the crown is exposed), grade II (less than 50% of the crown is exposed), or grade III (when the crown is fully intruded)^{12,13}.

This implies that in some cases of complete intrusion, the tooth can become lodged in the cortical sheet or in the nasal cavity¹⁴, in which case it is essential to establish a differential diagnosis with avulsion.

The prognosis secondary to intrusion of a tooth is critically dependent upon an early diagnosis of the location of the tooth. In this sense, the routine use of a protocolized form has been described as extremely useful in order not to forget essential aspects of the anamnesis: medical and dental history, a brief neurological examination, classical questions of how?, when?, where? and why?, and treatment. The diagnosis in turn requires an accurate intraoral clinical and radiographic examination.

Additional radiological tests are necessary to determine the location of the intruded tooth, and to monitor and evaluate the possible evolution of the germ of the permanent tooth. This requires an occlusal intraoral radiograph and a lateral X-ray, placing a plaque on the cheek so that the beam impinges perpendicular to the film^{4,5,15}. In this way we can assess the direction of intrusion and whether it is coincident with the axis of the final germ¹⁶.

The present paper describes a case of intrusion in primary teeth and its evolution following initial diagnosis as avulsion at the time of trauma.

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Case description

An uncooperative, four-year-old boy presented after the mother noticed an increase in volume on the floor of his right nostril. She reported that the child had suffered dentoalveolar trauma about two years before the visit. The child was hit with a piece of furniture in the maxilla and mandible, and at the time was taken to an emergency center where he was diagnosed with a transfixing wound of the lip and avulsion of tooth 51, which was never found. Posteriorly, the patient was referred to a secondary care center, since it was not possible to control bleeding of the lower lip. Two years later the patient came to our office, and after compiling a detailed protocolized history and performing a physical examination, he was found to be in the primary dentition phase with a history of avulsion. The tentative diagnosis was ectopic eruption of the permanent germ, caused by its displacement as a result of the traumatism. Nevertheless, after radiographic and clinical examination of the floor of the nostril, an off-white colored foreign body of hard consistency was observed (Fig. 1). A radiographic study was performed, showing the germ of 11 in the panoramic view with a large coronary laceration and root, but located far from the nostril area (Fig. 2). However, the radiopaque image on the occlusal radiograph clearly determined that it corresponded to tooth 51, which two years earlier suffered intrusion and was avulsed and diagnosed at that time (Fig. 3). Tooth 51 was lodged in the floor of the right nostril, and extraction was attempted, but the child was reluctant to cooperate. Surgery was thus programmed for extraction of the tooth nasally but with blockage

of the airway to prevent aspiration under deep sedation. Removal was carried out with pediatric forceps (Fig. 4). Oral antibiotic treatment, together with paracetamol (80 mg/8 hours for three days) was prescribed, and the control after one week confirmed the presence of a healthy nasal mucosa.

DISCUSSION

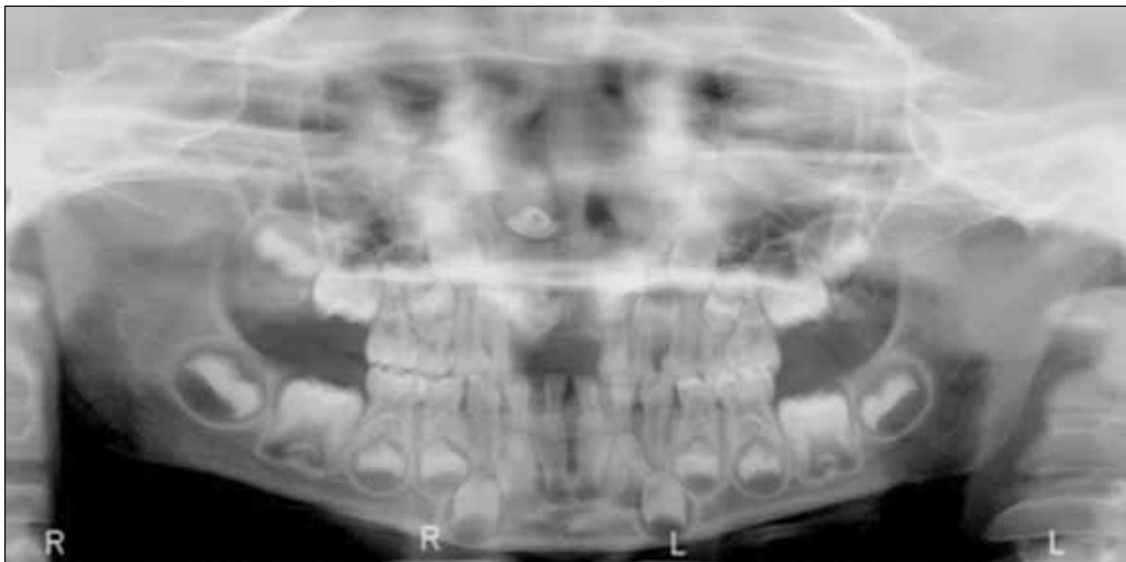
Traumatism of the primary incisors are common. The highest incidence of intrusive injuries of the primary teeth is in the first three years of life. This may be attributed to large bone marrow spaces in such patients, as an inherent characteristic of developing bone, and which results in increased tissue flexibility. Another factor that makes these patients more vulnerable to primary incisor intrusion is the smaller root length in the context of the physiological resorption process^{8,9,12}.

The consequences of trauma in primary dentition include discoloration of the crown, pulp necrosis, pulp canal obliteration, gingival recession, tooth displacement, pathological primary root resorption (internal or external), abscesses or cellulitis, alterations in the physiological root resorption process, or premature loss of primary teeth^{9,17-19}. In contrast, in the permanent dentition, the consequences are changes in the crown: discoloration and particularly hypoplasia^{1,3}; alterations of the crown / root: laceration; alterations of the root: duplication, angulation, laceration, training interruptions; changes in the entire tooth successor: lumps kidnapping^{20,21}; or alterations in eruption. These consequences result from the close

Figure 1. Extraoral and intraoral clinical records. A,B) Extraoral pictures, where the tooth fragment can be clearly seen in the right nostril. C) Intraoral view showing mucosal integrity during the clinical exploration.



Figure 2. Panoramic radiograph where the development of eruption and the intruded primary tooth can be observed.



relationship between the apexes of the primary teeth and the developing permanent successor. The problems are increased when the permanent tooth bud is affected in the early stages of development, with a prevalence ranging from 12-69%². Other influencing factors besides the type of injury are the severity of trauma, the treatment provided, and the presence or absence of complications.

Clinical examination should be thorough, including the assessment of vomiting, nausea, drowsiness and unconsciousness. If concussion is suspected, the patient should be referred to a medical center for further evaluation. After the clinical examination, radiographs and photographs must be taken to assess the degree of intrusion and decide the best treatment strategy. Furthermore, radiographs and / or photographic documentation may be required in the event legal protection is needed³.

Figure 3. Radiographic series performed during diagnostic evaluation. A) Occlusal projection showing the position of 51. B-D) Periapical radiographic series performed in the central incisor region. Note the position and full root integrity of the intruded primary tooth.

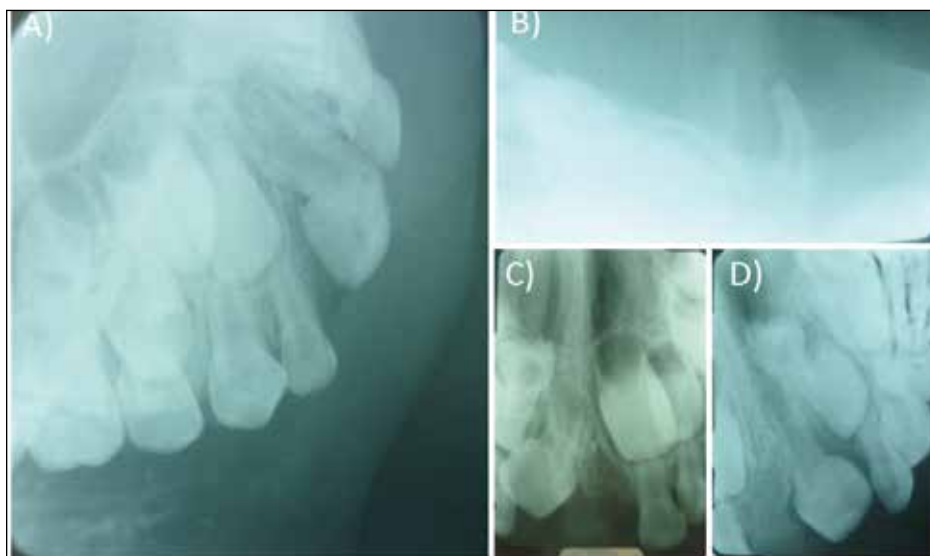


Figure 4. Tooth extraction was successfully performed through the nasal cavity with forceps and with the patient under deep sedation.



Clinically, we find the intruded tooth to be submerged in the alveolar bone, located above the occlusion line, with no mobility upon palpation, a dull sound in response to percussion, and a bleeding periodontal ligament and gingival sulcus³. In a retrospective study, Holan and Ram²² studied 172 intruded primary incisors, showing that the root tips were displaced towards the labial bone plate in more than 80% of the cases. This suggests that clinical examination should include palpation of the buccal vestibule. Furthermore, it is essential to diagnose the direction of the displaced tooth, if possible, to rule out injury to the successor and thus prevent the occurrence of sequelae in the permanent dentition.

Accordingly, in addition to clinical evaluation, radiographic examination is essential, because it allows us to identify the degree of injury, the direction of displacement, alveolar bone fractures, the degree of root formation, root resorption and the relationship between the tooth and its permanent successor, and to evaluate the presence of foreign bodies in soft tissue^{2,3}. According to the International Association of Dental Traumatology⁵, an extraoral lateral radiograph and angulated periapical center X-ray should be obtained. The images help determine the direction of intrusion (labial or palatal), and may also establish possible perforation of cortical bone, and the proximity of the apexes of deciduous teeth and the height of the permanent tooth bud. The radiographic image is elongated in the case of lingual displacement, indicating that the follicle germ of the permanent tooth is at risk^{12,13,16,23}.

At any age, upon loss of a primary tooth, the parents should be encouraged to find the tooth, to ensure that it has not been swallowed or aspirated. If the tooth cannot be found, the child should be referred to a pediatrician. Cough, tachypnea and fever are common symptoms of foreign body aspiration. It is therefore recommended that in the case of an avulsion, if the tooth cannot be found, the parents should observe the child carefully for several days. If the patient develops cough, shortness of breath or fever, aspiration of the tooth should be suspected, and a chest X-ray study should be made for confirmation purposes.

Accordingly, in cases of intrusion of primary teeth, it is essential to diagnose the direction of the displaced tooth to rule out injury to the successor and thus prevent the occurrence of sequelae in the permanent dentition. To prevent this effect, comprehensive assessment of the region, both clinically and radiographically, is essential.

At radiographic inspection, the priority concern is to establish a differential diagnosis between full intrusion and type III avulsion. It is the responsibility of the dentist to inquire about the location of the tooth, and in doubtful cases the possibility of aspiration should be considered (discarded by obtaining a chest X-ray), warning the parents about the possible consequences.

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