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A successful outcome using a minimal invasive approach to manage a severe trauma to the primary maxillary incisor in a toddler

CASE REPORT

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Pediatric Dentistry, Department of Pediatric Dentistry and Orthodontics, School of Dentistry, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil Abstract – Intrusive and lateral luxation are common traumatic injuries in children. The aim of this work is to report the successful conservative management of severe intrusion and lateral luxations of the primary maxillary central incisors in a 27-month-old patient.

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The incidence of traumatic injuries to primary teeth is high and according to previous reports, this prevalence varies from 11% to 30% of all children (1), whereas luxation injuries represent 21% of such injuries (2). Intrusion is the most frequent injury among luxation and is generally the result of an axial impact which dislocates the tooth into the interior of the alveolar bone. This action damages the periodontal ligament and fibers of the neurovascular bundle (3).

Frequently, intrusive luxation may be accompanied by a fragmentation or fracture of the alveolar socket (4–6). This type of trauma is the most common during primary dentition, when the patient is between 1- and 3-years old, because of the high resilience of alveolar bone (3, 7–9). Depending on the magnitude of the impact, the injury can be divided into three types: type I, >50% of the crown is exposed; type II, <50% of the crown is exposed; type III, the entire crown is intruded (3, 10).

When teeth are damaged by intrusive luxation during childhood, the treatment plan can be complex and will depend on the magnitude of the trauma and on the displacement position (11). Extraction of the traumatized tooth is often recommended (8). However, the loss of a primary tooth can interfere with dentofacial and speech development (8). Therefore, the purpose of this report is to describe the successful conservative management of an intrusive dislocation accompanied by a fracture of the alveolar socket in a girl toddler.

Case report

A 27-month-old girl with no health problems was referred to the Dento Traumatology Clinic of the Federal University of Rio de Janeiro, Brazil. The mother reported that the girl had sustained a dental injury from a fall while playing at home. After a complete cleaning of the oral cavity with 0.12% solution of chlorhexidine, clinical and radiographic examinations (periapical X-ray, occlusal X-ray, lateral extraoral X-ray) were carried out. The extraoral soft tissue had been injured and feeding was difficult, although she was not feeling any pain. The girl was cooperative throughout the examinations.

The right primary incisor had a palatal luxation and the left primary incisor had a type II intrusive luxation (Fig. 1). The palpation in the maxillary incisors area showed partial dislocation of the labial bone. The lateral and occlusal radiographs showed a labial displacement of both incisors. The apexes of the teeth were not in close contact with the permanent tooth germs and the lateral X-ray radiographic image suggested a fracture of the alveolar socket (Fig. 2).

The treatment adopted was conservative management, which involved observation without invasive treatment. The parents were instructed about oral hygiene, the nonuse of a pacifier and dissuasion of thumb sucking as well as instructions for a soft diet during the first 2 weeks. The use of topic 0.12% solution of chlorhexidine was prescribed twice a day, for 7 days.



Fig. 1. Clinical aspects of lateral luxation of teeth 51 and intrusive luxation type II of teeth 61.

Spontaneous re-eruption was observed at the patient's first follow-up visit 1 week later (Fig. 3). The next appointments were 3 and 5 weeks later and after that monthly. After 3 months, the left primary incisor presented complete spontaneous re-eruption. After 6 months both central incisors presented re-alignment (Fig. 4) and the radiographic examinations showed the primary incisor without any internal or external root resorption, the permanent tooth germs undergoing normal developmental, and the bone formation showed a favorable prognosis (Fig. 5). The patient now attends regular check-ups twice a year.

Discussion

Tooth intrusion is the most common dental trauma in early childhood (i.e. 18 months–4 years) (1–3, 8, 11). For this reason, the dentist should consider the details concerning the incident as well as a complete meticulous examination of the hard and soft tissues (10, 12).

A clinical evaluation in addition to radiographic examinations is essential to identify the type and position of the injury along with the displacement, diagnosis of bone fractures, degree of root formation and root resorption as well as the relationship between the deciduous teeth and permanent successors (11, 12). The lateral extraoral and periapical radiographs should be taken with central angulation to determine the direction of the intrusion (labial or palatine) (3, 7, 8, 11, 12). These exams can also indicate a possible perforation of the cortical bone as well as the deciduous tooth root apex proximity to the follicle of the permanent tooth germ (4–6). In agreement with others studies (3, 8, 13), when the risks to the follicle of the developing permanent tooth germ are taking into account, the clinical exam and the occlusal radiographic image are of particular interest. In this case report, the favorable relationship between the intruded incisor and the permanent incisor germ suggests a reduced risk of damage to permanent tooth. However, the exact consequence to the development dentition could not be determined yet.

When defining the treatment plan of intruded primary incisors some variables must be considered: the direction and severity of the intrusion; if there is alveolar bone fracture (3, 5, 6, 8); the developmental stage of the permanent tooth germ (3, 6, 14); the time lapse to seek care after the trauma; the anxiety of the family in maintaining the primary teeth and the patient's age (8, 11). The treatments for intruded primary incisor range from extraction of the affected teeth to observation until spontaneous re-eruption. Severe intrusion with displacement and alveolar bone fracture presents an unfavorable prognosis. According to the literatures (1, 14) 54.5% of the intrusive luxation injuries of primary incisors are associated with bone fractures and two alternative treatments are suggested, the first is the reduction of the fractured bone using digital pressure and the use of a splint for 3-4 weeks and the second is extraction of the injured tooth (8, 12). However, the premature loss of primary teeth may lead to an unfavorable orofacial development (3, 8, 15-17). In our case, the favorable relationship between the intruded incisor and the permanent incisor germ, the patient's age and the emotional status of the child led to a successful outcome. The mother's anxiety was also taken into account and influenced our conservative therapy that required a close follow up to monitor the re-eruption of the tooth, neither without nor reduction splint.

Intrusion is responsible for a large number of pulp necrosis cases. The ratio of pulp vitality and pulp necrosis is almost 50% in patients aged 0–3 years (8). Given that 90% of intruded primary teeth have severe pulpal (necrosis, dystrophic calcification) and periodontal complications (inflammatory root resorption, ankylosis) (6) extraction becomes the preferred method of management. In our case, pulp vitality was positive up to the latest follow up.



Fig. 2. Radiograph aspects of teeth 51 and 61 (a). Note radiograph aspect suggested fracture of alveolar socket (b).



Fig. 3. Clinical and radiograph aspects 1 week later.



Fig. 4. Spontaneous re-alignment of both central incisors after 6 months.

It is important to emphasize that the parental cooperation is fundamental for this type of treatment. Guardians must sign a free and informed consent about the possible risks resulting from traumatic injuries such as: resorption, ankylosis, and damage to the developing tooth germ (8, 11). They must receive clear instructions about the necessary home care to promote normal healing (3). Careful monitoring for spontaneous re-eruption of the intruded primary incisors is the most conservative treatment. In the case of non-re-eruption of the primary incisor, extraction would probably have to be performed. However, the premature loss of a primary incisor in a young child leads to orthodontic problems, speech problems and can have an impact on the physiology, esthetics, and behavior of the child.

The importance of this case report is to highlight the successful outcome of the conservative management approach. It is indeed a surprising outcome, given that the root apex of tooth 61 seems to have clearly perforated the labial cortical plate.

Conclusion

This present case suggests that intruded and lateral luxation primary incisors have a high potential of spontaneous re-alignment when conservative management is adopted. In addition, the surprisingly successful outcome in this case report is unique in the literature and could stimulate other non-invasive (conservative management) approaches.

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Fig. 5. Radiographic aspects after 6 months.

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