CASE REPORT

Traumatic intrusion of a primary tooth and its management: a case report

Soha Fuad Alqadi1,*, Rahaf Sulaiman Alsaedi1, Renad Yaser Alahmadi2, Mahir Ahmed Mirah2, Najla Dar-Odeh3

ABSTRACT

Background: Intrusive luxation injuries of primary teeth are characterized by displacement of a tooth in an apical direction with or without alveolar bone fracture. These injuries account for a substantial proportion of luxation injuries in primary teeth. Management is challenging due to the possible presence of other comorbidities such as caries, the potential adverse outcomes affecting the developing permanent successors, and the likely lack of cooperation associated with young age of the patients.

Case presentation: We present a case of complete intrusion of tooth #81 that followed a fall trauma in a 5-year-old girl. The case was conservatively managed with the successful outcome of re-eruption of the primary tooth and subsequent healthy eruption of the permanent successor.

Conclusion: This report highlights the importance of early diagnosis, maintenance of optimum oral hygiene and conservative management in specified cases, which increases the odds of treatment success.

Keywords: Dental trauma, intrusion, luxation, eruption, case report.

Introduction

Traumatic dental injuries are among the most common orofacial injuries in children representing approximately 18% of all injuries seen intra-orally in children ≤6 years of age [1]. Traumatic injuries affecting primary dentition have a remarkably higher incidence than permanent dentition injuries [2]. Although these injuries are a major threat to the health of the pediatric population, they are generally a neglected public health problem.

Common etiological factors of trauma in children are falling, fight, sport, accidents, hitting items, and violence [2]. Anterior teeth are particularly susceptible to trauma due to their vulnerable position in the mouth [3]. Due to their prominent location in the dental arch, upper central incisors are considered the most commonly affected teeth [4,5], followed by the upper lateral incisors and then lower incisors [6]. Once traumatized several adverse outcomes are anticipated such as compromised esthetics, speech defects, and emotional impacts for both parents and child, thereby adversely affecting the patient’s quality of life. Dental traumatic injuries are classified as hard tissue injuries, soft tissue injuries, and periodontal injuries. While soft tissue injury is most commonly seen in young children (≤3 years), dental injuries are mainly seen as enamel fracture which is more commonly encountered than dentinal or pulp tissue injuries [3]. On the other hand, periodontal injuries are considered critical for the patient and challenging for the pediatric dentist. Several types of periodontal injuries have been identified according to degree of displacement, and these are classified into concussion, subluxation, lateral luxation, extrusion, intrusion, and avulsion [3]. Generally, luxation injuries are reported more frequently than dental fracture due to the flexibility and resilience of supporting dental tissues in children [6]. Among periodontal injuries of primary teeth intrusive luxation and avulsion represent the most common types, and both of them are considered the most difficult to manage with the worst prognosis among all types of all dental trauma.

Intrusive luxation injuries can be defined as displacement of a tooth in an apical direction with or without alveolar...
Traumatic intrusion of a primary tooth

Studies reported that 24.2% dental injuries occur in primary teeth, with intrusive trauma accounting for 8% to 22% of all other sub-types of luxation injuries in primary teeth [1].

Traumatic injuries to primary teeth might be compounded with other dental comorbidities such as dental caries in the young child. This might worsen prognosis and compromise the healthy eruption of permanent successors. Therefore, it is important for clinicians to make proper diagnosis, and formulate the appropriate treatment according to the available protocols to increase the odds of favorable outcomes [5].

This study aimed at presenting a case that describes the successful outcome of eruption of tooth number #81 after a complete crown intrusion in a 5-year-old girl. This study supports the evidence behind conservative treatment of an indicated case supplemented by close follow-up for a sufficient period of time.

Case Presentation

A 5-year-old girl presented to the pediatric dental department at Taibah Dental College Hospital complaining of pain in the lower anterior teeth area 2 days after receiving a dental trauma. The mother explained that her daughter was fallen on her face while she was playing outdoor. After obtaining an informed consent from the mother a complete history was taken. Medical history was unremarkable, and there was no sign of head injury such as vomiting or fainting. This was the patient’s first dental visit. She was uncooperative, therefore, “tell-show-do” technique was used to improve her cooperation. Initial examination showed that there was no sign of any trauma to other parts of the body.

Extra-oral examination revealed a 2 cm laceration above the upper lip (Figure 1).

Upon intra-oral examination, soft tissues, oral mucosa, attached, and free gingiva were all within normal limits except the area around tooth #81 where soft tissue laceration was noticed. Further, tooth #81 was completely intruded into the socket. There was also severe caries affecting the upper anterior teeth. Upon palpation there was a bulge on labial gingiva indicating that the tooth was intruded away from the developing permanent tooth bud. There was no sign of alveolar bone fracture. Mobility test revealed grade II mobility affecting teeth number #71 #72 #82 while there was no mobility affecting tooth #81. Radiographic examination was performed while the patient was on the mother’s lap to help control the child movement and to hold the x-ray sensor. The periapical radiograph showed a completely intruded lower right central incisor, however, no abnormality was detected in the neighboring structures including the permanent successor (Figure 2).

Latest International Association of Dental Traumatology (IATD) guidelines were followed which employs conservative treatment and sufficient follow-up period. This involved allowing the tooth to self-reposition itself irrespective of the displacement direction [8]. Further, the patient was prescribed an analgesic and the mother was instructed to help maintain a good oral hygiene by her daughter, use a soft dental brush, and keep her on soft, cold diet for 1 week. Regular follow up visits were scheduled according to current guidelines at 1 week, 6-8 days.

Figure 1. Extra-oral picture showing the soft tissue injury 2 days after the trauma.

Figure 2. (A) intra-oral clinical picture showing severely intruded tooth #81. (B) Periapical radiograph confirms the clinical sign.
weeks, and 6 months [8]. The mother was also instructed to attend when needed.

Clinical photographs taken during the follow-up visits showed the gradually erupting tooth #81 (Figure 3). Further, eruption of the permanent successor was also seen (Figure 4).

Enamel fracture at the incisal tip of the primary tooth was seen after the eruption, however, the tooth was vital and asymptomatic. After the 6-month follow up visit the family moved outside the country and no further follow up was conducted.

Discussion

This report describes the clinical course of an intruded primary tooth following trauma that was successfully managed conservatively with favorable outcomes determined by eruption of a healthy and asymptomatic permanent successor. Intrusion is the most harmful type among other sup-type injuries. It is associated with severe damage to periodontal ligament, root surface, and alterations in enamel development [6]. Some reported sequelae after intrusion are root resorption, pulp necrosis, periapical lesions, ankylosis, and pulp canal obliteration [1], the latter being described as the most frequently reported complication following subluxation and concussion injuries [9].

According to the IADT there are specific factors that should be considered in designing treatment plan for such traumatic injuries in children. These include patient factors such as the child’s ability to cope, and dental factors such as occlusion and time of shedding of the traumatized tooth. Regarding the direction of the intruded tooth it could be either in the labial plate direction or in the lingual direction (towards the permanent tooth germ). The primary incisor is frequently forced in the labial direction through the bone away from the developing permanent germ because the root of the primary incisor has a labial curvature [1]. In both cases, the treatment according to the current guidelines (2020) is observation and regular follow-up [8]. Spontaneous repositioning of the tooth usually takes place within 6 months, except in some severe cases, where it might take up to 1 year [8].

Previous observational studies involving traumatic intrusion injuries of primary teeth showed that approximately 78% of these teeth fully re-erupted after minimally invasive treatment with a proportion of 50% permanent successors that were affected by developmental disturbances as a sequela of intrusion injury [1]. Among these developmental disturbances, enamel hypoplasia, dilacerations, and ectopic eruption were found to be the most frequent sequelae (28.3%, 16.7%, and 6.7%, respectively) [6]. Further, the consequence of trauma occurring in children at a younger age was found to be greater than that at the older children [10].

Unfortunately, treatment success is often compromised by several confounding factors. It is often difficult to examine and treat a young child due to dental phobia and lack of cooperation. This is a stressful situation for both the child and parents. Accurate history should be obtained on timing, location and nature of injury. Thorough medical history and medication history should be discussed with the child’s parents [1], and the need for prophylactic antibiotic coverage to prevent infective endocarditis in susceptible patients should be determined. Tetanus booster dose is indicated if the patient contacted with soil after the traumatic injury and did not receive any immunization in the last 5 years [7,10]. Past dental injuries or child dental experience should be identified when taking dental history, which helps in assessing the degree of child cooperation during treatment [1]. In this case, the patient did not require prophylactic antibiotics or tetanus booster, however, she was anxious and initially uncooperative. Therefore, certain cognitive methods were used as described earlier to mitigate anxiety and increase cooperation.
Accurate radiographic and clinical examination is important to minimize traumatic dental complications [11]. Treatment can be provided in two phases for all different injured tissues. The initial phase focuses on symptomatic relief and restoring both aesthetics and function. The second phase is the follow up phase which includes monitoring the healing of traumatized tissues and assessing the best treatment options to avoid any more complications [6].

Most of intruded primary anterior teeth take 1-6 months to re-erupt with no pathological consequence [12]. In the presented case, the latest protocol of the IADT (2020) were followed with a conservative approach by following the patient regularly to minimize and prevent the consequences of dental trauma [9]. On radiographic examination, an initial periapical radiograph was taken for diagnostic purposes. Further radiographic examination is not warranted unless a clinical pathological sign was detected [8]. On clinical examination, the child was followed up according to IADT at 1 week, 6-8-weeks, and 6 months [8]. At the 6-month follow up appointment the patient presented with erupted healthy lower permanent central incisors. However, it is recommended that in severe cases more follow up visits at the age of 6 are conducted to observe the eruption of the permanent successor [8].

The close proximity of the root of primary tooth to the germ of permanent tooth might cause a long-term complication, such as damage of the developing successor tooth as a result of infection of the primary tooth. Therefore, it is important to establish the prognosis of the injured primary tooth and assess the chance of any complications in the future before deciding whether to extract or preserve the injured tooth. Traumatic dental injuries might lead to necrosis of the pulp as result of damaged neurovascular apical bundle, which could cause clinical signs and radiographic changes such as periapical rarefaction [6].

The patient was compliant in attending appointments up to the 6-month follow-up period, after which she stopped attending due to travelling abroad. Lack of dental attendance in general was found to be an adverse oral healthcare behavior among populations in this geographic area particularly among vulnerable populations of children and pregnant women [13]. The multiple carious teeth seen in this patient might also represent an expected outcome of neglected oral hygiene and lack of dental attendance as this was the first dental visit the patient ever made. However, cooperation from both parent and child was achieved by following a carefully designed patient education method that reinforced patient cooperation. Successful treatment outcomes were fortunately obtained and the healthy eruption of the permanent successor was encountered.

**Conclusion**

Treatment of traumatic dental injuries in the pediatric patient should be carried out as early as possible. Treatment success is enhanced by regular follow-up visits and careful examination and radiographic assessment. Conservative treatment is indicated for selected cases of intruded primary teeth, which usually take 4-6 month to re-erupt with no adverse effects on permanent successors.

**List of Abbreviations**

IADT International Association of Dental Traumatology

**Conflict of interest**

The author declared that there is no conflict of interest regarding the publication of this case report.

**Funding**

None.

**Consent of publication**

Informed consent was obtained from the participant.

**Ethical Approval**

Ethical approval was granted by Ethics Committee via reference/letter number TUCDREC/051022/AAlgadi. Dated: 18/10/2022.

**Author details**

Soha Fuad Alqaedi, Rafah Sulaiman Alsaedi2, Renad Yaser Alahmadi, Mahir Ahmed Mirah, Najla Dar-Odeh

1. Department of Pediatric Dentistry and Orthodontics, College of Dentistry, Taibah University, Medinah, Saudi Arabia

2. College of Dentistry, Taibah University, Al Madinah Al Munawara, Saudi Arabia

3. School of Dentistry, University of Jordan, Amman, Jordan

**References**


