

Case Report

Where is the Tooth? Diagnosing and Managing Dentoalveolar Injuries During Infancy

Ann Kennedy¹, Rocio B. Quinonez^{2*}, Lauren Sanzone³ and Edward M. Pickens⁴

¹DDS Class 2015, University of North Carolina at Chapel Hill, USA

²Departments of Pediatric Dentistry and Pediatrics, University of North Carolina at Chapel Hill, USA

³Pediatric Dentist, Private Practice, USA

⁴University of North Carolina Physician Network, USA

***Corresponding author**

Rocio B. Quinonez, Department of Pediatric Dentistry and Pediatrics, University of North Carolina at Chapel Hill, Chapel Hill, NC 27705-7450, USA, Tel: 919-537-3955; Email: rocio_quinonez@unc.edu

Submitted: 25 September 2014

Accepted: 29 September 2014

Published: 29 September 2014

Copyright

© 2014 Quinonez et al.

OPEN ACCESS**Keywords**

- Traumatic dental injuries
- Dental home
- Tooth avulsion
- Foreign bodies
- Collaborative care

Abstract

Pediatric traumatic injuries involving the oral cavity are common, and can have serious functional, esthetic, and developmental sequelae. The peak incidence for primary tooth trauma occurs between the ages of 18 and 30 months – a time when parents have established a medical home for their child, but may have yet to establish a dental home. As a result, such acute injuries commonly present to the pediatrician or family practitioner for initial evaluation. We present the case of a 10-month-old male who sustained avulsion (complete tooth displacement out of the socket) of both maxillary primary central incisors after falling onto a table at day care. Initial assessment was performed by the child's pediatrician, who referred the family to the pediatric dentist for further evaluation. The diagnosis of tooth avulsion was confirmed clinically and radiographically. However, the teeth could not be located at the scene of the fall, raising the question of whether the teeth had been aspirated or ingested. The child's parents and their pediatrician chose to follow a conservative protocol, consisting of monitoring the stool for passage of the avulsed teeth or signs of pulmonary involvement. The teeth were recovered in the stool the following day. This case serves as an example of collaborative care between the pediatrician and pediatric dentist, working together to arrive at an accurate diagnosis, deliver appropriate case management, and provide emotional support to concerned parents.

ABBREVIATIONS

K.C.: Name used for infant reported in this case; CXR: Chest X-Ray; KUB: Kidneys, Ureter, and Bladder x-ray

INTRODUCTION

Managing traumatic dental injuries in infants and toddlers can be challenging for medical and dental professionals to whom these patients present. The American Academy of Pediatric Dentistry (AAPD) and the American Academy of Pediatrics (AAP) guidelines recommend referral to a dental home by a child's first birthday [1,2], with the dental and medical guidelines differing only when limited access to a dentist exists. In addition to the goal of preventing dental disease, early establishment of a dental home has other advantages, including providing a place to help address traumatic dental injuries [2]. With estimates of dental trauma in the primary dentition ranging from 30-40% among preschoolers and peaking between 18-30 months of age [3], a dental home is an important aspect of a child's comprehensive health care network.

Acute encounters associated with dental injuries can occur when children lack a dental home; thus often first presenting to a medical provider. This gap emphasizes the importance of collaborative care between medicine and dentistry, and the significance of primary health care providers having the knowledge to triage dental emergencies. It is known also, that medical providers play a critical role in oral disease prevention in infants and toddlers, as medical visits far outnumber dental visits in this age group [2]. Medical-dental collaboration is equally important in the management of traumatic dental injuries and can promote the best possible outcome in these challenging situations.

The following case report presents an infant who had not yet established a dental home and presented to his pediatrician after sustaining dental trauma to the maxillary anterior segment resulting in loss of primary teeth. We describe a case of coordinated care in the management of this injury and the importance of locating tooth fragments to help guide clinical decision making.



Figure 1 Infant's presentation following fall at daycare with clinically missing teeth.

PATIENT PRESENTATION

K.C. is a healthy 10-month old male who presented to his pediatrician's office with his parents after sustaining orofacial trauma at his daycare center. According to the daycare staff, K.C. was climbing on a chair when he fell onto a table, striking his face. The childcare provider reported being unable to assess the full

extent of his injuries at this time, as he was crying and bleeding profusely from the mouth. No teeth or fragments of teeth were recovered at the scene. No loss of consciousness or alteration in mental status was observed. His parents initially brought K.C. to his pediatrician, who referred them to our university-based pediatric dental clinic.

Upon arrival to the dental clinic, the medical and dental histories were reviewed. A knee-to-knee clinical examination was performed, revealing a small abrasion on the chin and minor bruising at the nasal bridge. Intraorally, the primary maxillary central incisors (teeth #E & F) were clinically absent, with coagulum noted in the sockets (Figure 1). There was bleeding along the gingival margin of the primary mandibular central incisors (teeth #O & P), though these teeth did not appear to be displaced. Ecchymosis was evident in the facial vestibule adjacent to these teeth. To assist in the clinical diagnosis of tooth avulsion, intrusion, or crown fractures, we proceeded to obtain a radiographic image of the maxillary segment and considered the decision tree in (Figure 2) to guide our diagnosis and management. With the patient sitting in his father's lap and using a lead apron, we obtained an occlusal radiograph confirming the absence of the maxillary primary central incisors (Figure 3).

With a diagnosis of tooth avulsion, there were three possibilities: the tooth was lost outside of the patient's body,

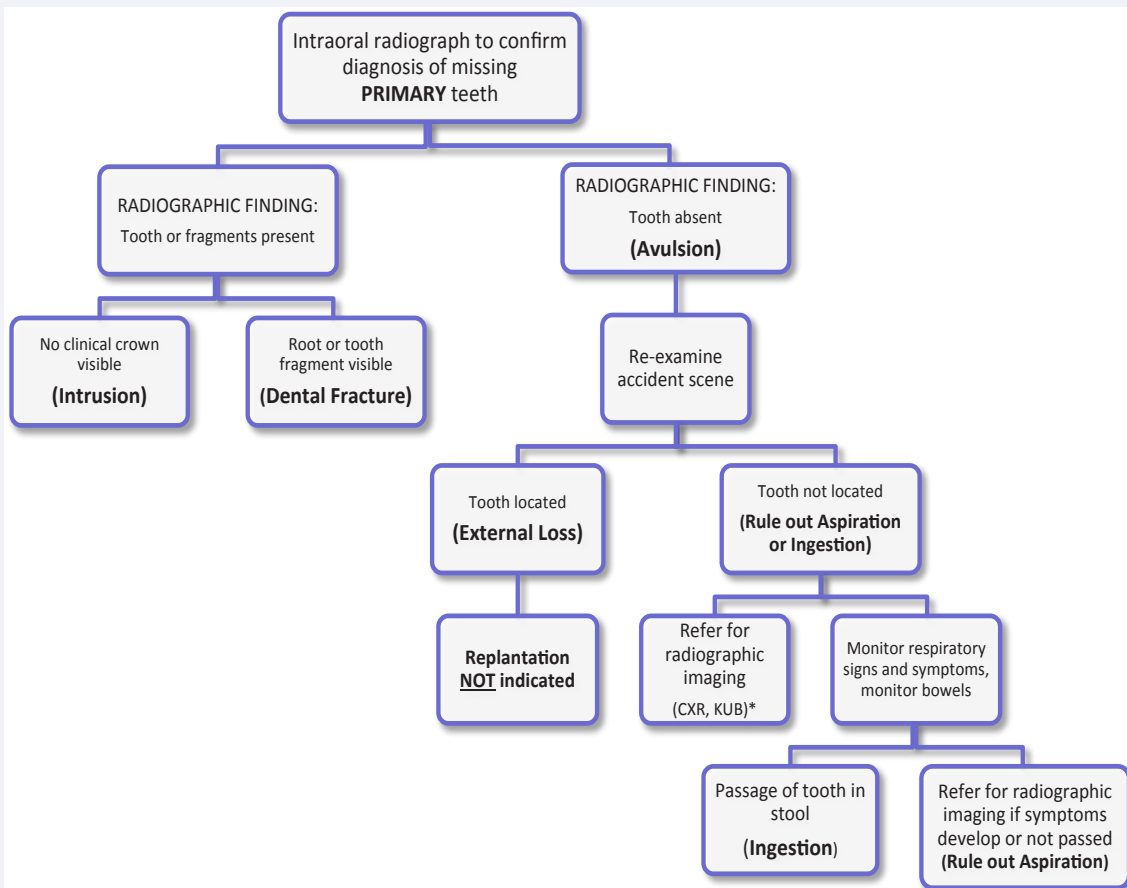


Figure 2 Algorithm guiding clinical decision making for dental trauma in the primary dentition with clinically missing tooth or teeth using intraoral imaging to confirm diagnosis. *CXR- chest x-ray; *KUB- kidneys, ureter, and bladder x-ray

ingested, or aspirated. Since the daycare staff were unable to locate the teeth at the scene, it was necessary to determine whether the teeth were in the airway or the gastrointestinal tract. In this case, diagnosis was complicated by the fact that K.C. had an upper respiratory infection at the time of his injury, with a several day history of cough and rhinorrhea. We explained these possible outcomes, their attendant risks to the parents, and discussed two primary management options: (1) immediate referral for imaging of the lungs and GI tract; or (2) monitoring for signs of respiratory distress, and checking the stools for elimination of the teeth. The child's parents opted for the latter, and the teeth were recovered from the stool a day later during the parents visit back at the pediatrician's office (Figure 4).

DISCUSSION

This case report aims to provide insight into the acute management of dental trauma in an infant whereby locating the missing teeth, in partnership with the medical and dental providers, was a critical component to determining an accurate diagnosis and treatment. Upon K.C.'s initial presentation, the primary differential diagnoses for the missing teeth included intrusion, (teeth in the sockets) or avulsion (teeth out of the

mouth). Crown fractures were a possible diagnosis, but given the greater bone malleability in early childhood, tooth displacement is a far more common injury than crown fractures in this age group. Radiographic imaging obtained upon referral to the dental office was essential; confirming the diagnosis of avulsion and begging the question of the location of the maxillary primary central incisors.

In circumstances when teeth cannot be found, caregivers should be directed to look for the teeth at the scene of the injury. If the teeth remain missing, caregivers must be advised of the risk of aspiration or ingestion, and counseled regarding management options. In the case of aspiration, parents should seek medical attention if the child develops difficulty breathing, cough, or fever [4]. Risk of foreign body aspiration is reported to be high in infants and toddlers, with approximately 3% of children not showing the immediate signs of aspiration such as choking, wheezing, and vomiting [5].

In cases of ingested foreign bodies in children, large case series reports indicate symptoms such as choking, retrosternal pain, and vomiting to be present in approximately 50-75% of cases [6,7]. Arana et al., found more severe symptoms such as cyanosis and dysphagia in only 9% of cases [6]. Most ingested foreign bodies were already in the stomach at the time of evaluation, and a minority required medical intervention for removal [6]. Guidelines on post-ingestion patient monitoring vary widely—some recommend radiographic studies in all ingestion cases, while others propose waiting to allow the object to pass before imaging [6,8]. The recommendations for management also depend upon the ingested object, with immediate removal often recommended for sharp objects, batteries, and magnets that could cause gastrointestinal injury [9,10]. Radiation exposure, cost, and the anticipated level of parent compliance with follow-up should all be additional considerations in deciding to perform imaging to rule out aspiration or ingestion of foreign bodies.

The importance of properly diagnosing aspiration *versus* ingestion is critical and cannot be overstated. When the avulsed tooth or teeth cannot be located, it is prudent to suspect aspiration and seek to rule it out [4]. In a case presented by Holan and Ram, respiratory symptoms in a 7-year-old female following avulsion of a primary incisor was misdiagnosed as an upper respiratory infection, and was treated with a course of antibiotics [4]. Only after the patient developed a fever was a radiographic examination performed, revealing an aspirated tooth in the right bronchus and resulting atelectasis [4]. At the extreme, there have been reported cases of death from missed foreign body aspiration diagnoses in developing countries where medical systems may be inadequate and families may fail to seek care [11].

Whether to replant the teeth when present at the time of injury is an important point of discussion. The current standard of care is to *not* replant primary teeth as one would replant permanent teeth. The rationale for *not* replanting primary teeth is mainly to prevent further damage to the permanent tooth germ that lies apically to the root tip of the primary tooth [12,13], as well as the many practical obstacles to performing these procedures in a very young child. Multiple studies, however, have established that parents, teachers, and other caregivers often lack knowledge of appropriate management of traumatic dental injuries in the

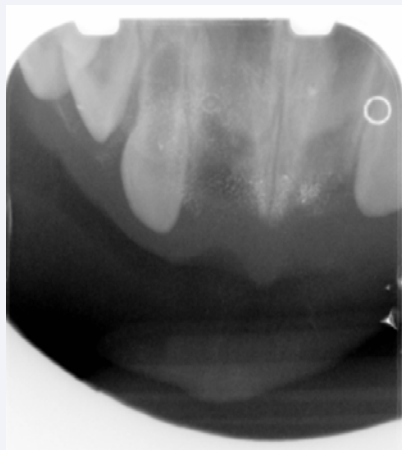


Figure 3 Intraoral radiograph revealing intact bone and missing maxillary primary central incisors.



Figure 4 Recovered maxillary primary central incisors in infant's diaper (red arrows) the day following the dental injury.

primary and permanent dentition [14,15]. Up to one third of parents and primary school teachers in these studies believed that primary teeth should be replanted after avulsion [14,15]. While there has been a recent resurgence in interest in replanting avulsed primary teeth, the consensus still remains that a primary tooth should not be replanted [12,13,16,17], and only considered under very unique circumstances.

Aside from the acute management of dental trauma in early childhood, parents should be made aware of the long-term sequelae of early loss of primary teeth, including misalignment, space loss, and delay in eruption of the permanent successor [12,18]. Although the exact reason for delayed eruption is not fully understood, it is theorized that following the primary tooth injury, the permanent tooth must transcend through denser fibrotic scar tissue, thus slowing down the emergence of the adult tooth. It is also noteworthy to advise parents that primary tooth injuries may affect the developing permanent tooth, with the damage occurring at the time of primary tooth injury. Disturbances to the permanent teeth are more likely to occur with severe luxation injuries (i.e. avulsion or intrusion) and particularly when injuries occur prior to the second year of life [19]. While there is no way to predict the effect an isolated primary tooth injury will have on the underlying permanent teeth, the parents should be counseled on the possibilities, including tooth discoloration and developmental defects of enamel [17,19].

Finally, the importance of good communication and rapport with the parents of the injured child cannot be emphasized enough. Parents are often distressed in the aftermath of an orofacial injury to their child, which can be attributed to both the practical challenges of dealing with a child who may be crying and bleeding, as well as the parents' concern for the health and safety of the child after sustaining an injury. In K.C.'s case, he was calm by the time he and his parents arrived in our office, but his parents were quite concerned. The mutual support of the dental and medical professionals in this case was essential in mitigating the parents' anxiety. Together, the pediatrician and the pediatric dentist were able to address the parents' concerns and provide a systematic approach to diagnosis and management of the child's injuries, ensuring a positive outcome.

REFERENCES

1. American Academy of Pediatric Dentistry Clinical Affairs Committee-- Infant Oral Health Subcommittee. Guideline on infant oral health care. *Pediatr Dent*. 2012; 34: 148-152.
2. Section on Pediatric Dentistry and Oral Health. Preventive oral health intervention for pediatricians. *Pediatrics*. 2008; 122: 1387-1394.
3. McTigue DJ. Managing injuries to the primary dentition. *Dent Clin North Am*. 2009; 53: 627-638.
4. Holan G, Ram D. Aspiration of an avulsed primary incisor. A case report. *Int J Paediatr Dent*. 2000; 10: 150-152.
5. Steelman R, Millman E, Steiner M, Gustafson R. Aspiration of a primary tooth in a patient with a tracheostomy. *Spec Care Dentist*. 1997; 17: 97-99.
6. Arana A, Hauser B, Hachimi-Idrissi S, Vandenplas Y. Management of ingested foreign bodies in childhood and review of the literature. *Eur J Pediatr*. 2001; 160: 468-472.
7. Panieri E, Bass DH. The management of ingested foreign bodies in children--a review of 663 cases. *Eur J Emerg Med*. 1995; 2: 83-87.
8. Hodge D 3rd, Tecklenburg F, Fleisher G. Coin ingestion: does every child need a radiograph? *Ann Emerg Med*. 1985; 14: 443-446.
9. Jayachandra S, Eslick GD. A systematic review of paediatric foreign body ingestion: presentation, complications, and management. *Int J Pediatr Otorhinolaryngol*. 2013; 77: 311-317.
10. Kay M, Wyllie R. Pediatric foreign bodies and their management. *Curr Gastroenterol Rep*. 2005; 7: 212-218.
11. Oviawe O, Abhulimhen-Iyoha BI, Obaseki DE. Migrating foreign body in the tracheobronchial tree of children: report of two cases. *Niger Postgrad Med J*. 2011; 18: 154-157.
12. Keels MA; Section on Oral Health, American Academy of Pediatrics. Management of dental trauma in a primary care setting. *Pediatrics*. 2014; 133: e466-476.
13. McTigue DJ. Overview of trauma management for primary and young permanent teeth. *Dent Clin North Am*. 2013; 57: 39-57.
14. Raphael SL, Gregory PJ. Parental awareness of the emergency management of avulsed teeth in children. *Aust Dent J*. 1990; 35: 130-133.
15. Blakytyn C, Surbutts C, Thomas A, Hunter ML. Avulsed permanent incisors: knowledge and attitudes of primary school teachers with regard to emergency management. *Int J Paediatr Dent*. 2001; 11: 327-332.
16. Holan G. Replantation of avulsed primary incisors: a critical review of a controversial treatment. *Dent Traumatol*. 2013; 29: 178-184.
17. Malmgren B, Andreasen JO, Flores MT, Robertson A, DiAngelis AJ, Andersson L, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. *Dent Traumatol*. 2012; 28: 174-182.
18. Holan G, Needleman HL. Premature loss of primary anterior teeth due to trauma--potential short- and long-term sequelae. *Dent Traumatol*. 2014; 30: 100-106.
19. Flores MT. Traumatic injuries in the primary dentition. *Dent Traumatol*. 2002; 18: 287-298.

Cite this article

Kennedy A, Quinonez RB, Sanzone L, Pickens EM (2014) Where is the Tooth? Diagnosing and Managing Dentoalveolar Injuries During Infancy. *Ann Pediatr Child Health* 2(3): 1022.