Dental Traumatology

Dental Traumatology 2008; **24**: 569–573; doi: 10.1111/j.1600-9657.2008.00583.x

Replantation of an avulsed maxillary primary central incisor and management of dilaceration as a sequel on the permanent successor

CASE REPORT

Vivien Thiemy Sakai, Ana Beatriz Silveira Moretti, Thais Marchini Oliveira, Thiago Cruvinel Silva, Ruy Cesar Camargo Abdo, Carlos Ferreira Santos, Maria Aparecida Andrade Moreira Machado

Bauru School of Dentistry, University of São Paulo, Bauru, Brazil

Correspondence to: Carlos Ferreira Santos, Al. Octávio Pinheiro Brisolla, 9-75, Bauru/SP, 17012-901 Brazil
Tel.: 55 14 32358276
Fax: 55 14 32234679
e-mail: cebola@usp.br

Accepted 6 November, 2006

Abstract – This case report outlines the sequel and possible management of a permanent tooth traumatized through the predecessor, a maxillary right primary central incisor that was avulsed and replanted by a dentist 1 h after the trauma in a 3-year-old girl. Three years later, discoloration and fistula were present, so the primary tooth was extracted. The patient did not come to the scheduled follow-ups to perform a clinical and radiographic control of the succeeding permanent incisor, and only returned when she was 10 years old. At that moment, the impaction and dilaceration of the maxillary right permanent central incisor were observed through radiographic examination. The dilacerated permanent tooth was then surgically removed, and an esthetic fixed appliance was constructed with the crown of the extracted tooth. Positive psychological influence of the treatment on this patient was also observed.

The peak incidence of traumatic injury to primary dentition is observed in children aged 1–3 years, as the motor coordination develops and they begin to move on their own (1–3). In children up to 2 years old, intrusion and avulsion are the most severe traumatic dental injuries (4–6). Avulsions make up 7–13% of all injuries to primary teeth (6), and most frequently involve a single tooth, usually an incisor, but multiple avulsions are occasionally encountered (1).

The close proximity of the developing permanent tooth germ to the predecessor root apex renders it vulnerable to traumatic injuries (1, 2, 4, 5, 7). The prevalence of developmental disturbances of the permanent dentition following trauma to the primary predecessor was reported to be 41% (2).

A permanent tooth germ traumatized at the preeruption stage frequently suffers various consequences. Partial or complete malformation or defective maturation may affect a segment or the entire tooth. Developmental disturbances may be manifested as a white or yellowish-brown discoloration of enamel, localized spots or circumferential enamel hypoplasia (1, 2, 5, 7), odontoma-like malformation, crown or root dilacerations (1, 2, 7), root duplication, and partial or complete cessation of root formation (2). The extent of complications encountered is dependent on severity of the trauma, timing, and affected tissues (2).

Treatment of the immediate complications of a traumatic dental injury is often limited to emergency measures, while monitoring latent side effects on the developing permanent dentition is frequently overlooked (2). The purpose of the following case report was to describe a sequel and the possible management of a permanent tooth traumatized through the predecessor, a primary tooth that was avulsed and replanted 1 h after the trauma.

Case report

A 6-year-old girl attended the Clinic of Pediatric Dentistry of our institution with the avulsion of maxillary right primary central incisor because of a fall when she was 3 years old. The parents reported that a dentist replanted the tooth 1 h after its avulsion. The tooth was splinted with surgical cement for 2 days, no antibiotic was prescribed and no further treatment or follow up after the removal of the surgical cement was undertaken. After the general medical, dental and traumatic incident histories were reviewed, clinical and radiographic examinations were conducted. Intra-oral examination revealed the development of a fistula associated with the traumatized tooth, which presented a discoloration (Fig. 1). The periapical and occlusal radiographs showed the absence of endodontic treatment and the presence of a periapical lesion related to maxillary right primary central incisor (Figs 2 and 3). The primary tooth was then extracted under local anesthesia (Fig. 4). Parents were advised about the possibility of some abnormal

Fig. 1. Initial frontal view of the maxillary right primary central incisor after 3 years of replantation, presenting discoloration and fistula in a 6-year-old girl.

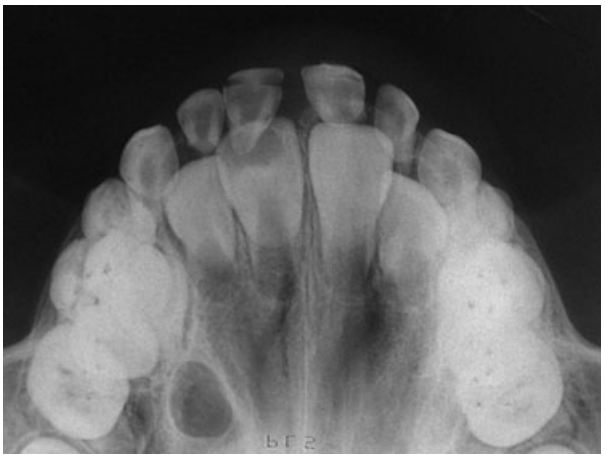

Fig. 3. Occlusal radiograph confirming the presence of a periapical lesion associated with the replanted maxillary right primary central incisor, and the beginning of root formation of permanent teeth.

Fig. 2. Initial periapical radiograph revealing the absence of endodontic treatment, and the presence of a periapical lesion related to maxillary right primary central incisor.

Fig. 4. Clinical aspect 1 week after the extraction of the primary incisor under local anesthesia.

Fig. 5. Missing maxillary right permanent central incisor causing a lack of mesial–distal space, and compromising the oral aesthetics of the 10-year-old girl.

crown root development sequelae occurring in the permanent tooth as a result of the trauma. However, at that moment, the only procedure to be performed would be the clinical and radiographic control. Therefore, periodical follow-up appointments were scheduled to monitor the development and eruption of the succeeding permanent incisor.

Unfortunately, the patient did not come to the planned follow-ups, and only returned to our clinic when she was 10 years old. Her main concern was the unerupted maxillary right permanent central incisor, which caused a lack of mesial–distal space (Fig. 5). A protuberance could be observed through palpation of the alveolar mucosa near the nasal spine. Periapical radio-

Fig. 6. Periapical radiograph showing accentuated dilaceration of the maxillary right permanent central incisor.

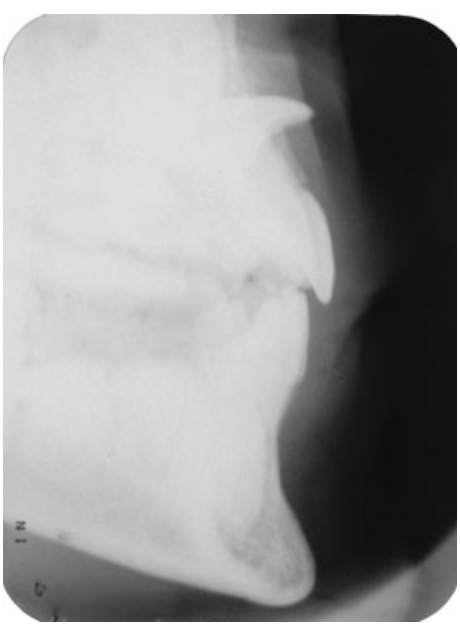

Fig. 7. Lateral radiograph showing that the crown of the maxillary right central incisor had turned toward the vestibular aspect near the nasal spine.

graphic investigation revealed an accentuated dilaceration on the maxillary right permanent central incisor (Fig. 6), confirmed through a lateral radiograph, suggesting that the crown had turned towards the vestibular aspect and; therefore, the coronal portion corresponded to the protuberance observed (Fig. 7). The treatment

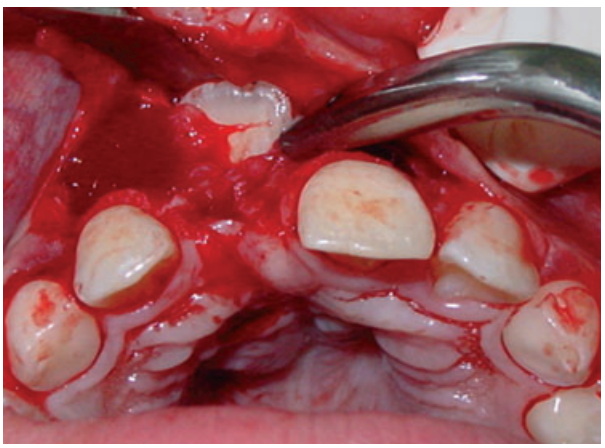

Fig. 8. Crown exposure after flap reflection and bone removal to extract the dilacerated maxillary permanent central incisor under local anesthesia.

Fig. 9. Extracted maxillary right permanent central incisor presenting accentuated dilaceration.

plan considered for this case included the surgical removal of that permanent incisor and the restoration with a bridge, which should be replaced by an implant later when her growth had ceased.

In the next appointment, tissue incision, flap reflection, bone removal (Fig. 8), tooth extraction, and cleaning of the operated site and suture were then performed under local anesthesia. The extracted tooth was cleaned (Fig. 9) and kept in saline solution at 4°C, as its crown would be used in the construction of the esthetic fixed appliance in a further appointment. Three weeks later, the crown was separated from the root, and its mesial and distal faces were slightly abraded to fit in the space of the missing incisor at the maxillary alveolar ridge. Resin composite was used to fill the coronal pulp

Fig. 10. Palatal view of the esthetic appliance fixed to the adjacent teeth with an orthodontic wire and resin composite. The crown of the extracted tooth (Fig. 9) was used. Periodic recall visits were advised to monitor the oral hygiene and to replace the appliance during the period of growth and development as needed.

Fig. 11. Immediate frontal view of the final aspect after the fixation of the esthetic appliance.

chamber and to fix the crown to the adjacent teeth with the aid of an orthodontic wire (Fig. 10).

The result was an esthetic biofunctional restoration that presented total integration with the surrounding natural teeth and gingiva (Fig. 11). As a consequence of the oral rehabilitation, the patient presented a positive feedback regarding psychosocial living, thus improving her quality of life. The girl has been followed-up for 13 months, and esthetic outcome is still observed.

Discussion

The main objectives of diagnosis and treatment of traumatic injuries affecting children with primary dentition are pain management and prevention of possible damage to the developing tooth germ (5). The degree of germ malformation is directly related to the stage of development at the time of the trauma and direction of the traumatic forces (7). The lower the age at the time of injury, the greater the risk of developmental disturbances in the permanent successors (6). Moreover, the guardian and the patient should be informed of the potential prognosis and possible shortcomings of the management sequence (2), and they should be psychologically prepared for treatment that may last for years (7).

The preservation of avulsed primary teeth is undoubtedly a challenge to the dentist, particularly when considering that there are very few reports on the replantation of avulsed primary teeth or their prognosis after replantation (4, 8–12). Although this procedure has been carried out in this case and in other studies (4, 8–12), the criteria adopted appear to be based on the protocol related to replantation of permanent incisors (8, 12). In addition, the benefits to justify replantation, such as prevention of articulation problems, impaired mastication, space maintenance, and prevention of tongue thrust are weakly supported by clinical investigations and are largely anecdotal (11).

Most of the replanted primary teeth mentioned in literature were extracted 2–24 months later because of complications, such as abscess, mobility, and advanced root resorption (5). In our case, the primary incisor lasted 3 years in function after its replantation, and perhaps it could have had a longer period of survival if endodontic treatment and long-term follow up had been performed (11, 12). Despite this, it is not recommended to replant a primary tooth because of the risk of ankylosis, infection and subsequent iatrogenic damage to the permanent successor during insertion of the avulsed primary tooth back to its socket (1, 4, 5, 11–14). Thus, one could state that the tooth dilaceration documented here might be attributed to the replantation procedure rather than the initial insult.

Irrespective of the cause of the dilaceration, the girl presented an impacted anterior tooth, which required a treatment to improve her esthetic, functional, and psychological conditions. Although impacted incisors can be properly positioned with the aid of direct orthodontic traction instead of surgical extraction (7, 15), an impacted incisor with dilaceration still poses a clinical dilemma because of its difficult position (15). In our case, orthodontic traction was not tried because likelihood of failure ankylosis, external root resorption, and mainly apex exposure.

Therefore, our option was to remove the impacted and dilacerated incisor and to construct an esthetic fixed appliance using the crown of the extracted tooth. One of the most important and valid reasons for replacing a missing incisor is to restore a natural and pleasing appearance and thus provide an opportunity for normal psychological development (1). Furthermore, a confidential relationship among the patient, parents, and treating professional team is mandatory. Periodic recall visits were advised to monitor the oral hygiene and to replace the appliance during the period of growth and development as needed.

Taking into account that the replantation of primary incisors is based largely on the descriptions and options contained in the sporadic case reports rather than any scientific evaluation, this procedure should be discouraged because of the possibility of damage to permanent

successors. This case report clearly shows the influence of a variety of factors that should be considered when assessing traumatic dental injuries for the establishment of prognosis and successful treatment.

References

1. Kupietzky A. The treatment and long-term management of severe multiple avulsions of primary teeth in a 19-month-old child. Pediatr Dent 2001;23:517–21.
2. Bassiouny MA, Giannini P, Deem L. Permanent incisors traumatized through predecessors: sequelae and possible management. J Clin Pediatr Dent 2003;27:223–8.
3. Kramer PF, Zembruski C, Ferreira SH, Feldens CA. Traumatic dental injuries in Brazilian preschool children. Dent Traumatol 2003;19:299–303.
4. Weiger R, Heuchert T. Management of an avulsed primary incisor. Endod Dent Traumatol 1999;15:138–43.
5. Flores MT. Traumatic injuries in the primary dentition. Dent Traumatol 2002;18:287–98.
6. Christophersen P, Freund M, Harild L. Avulsion of primary teeth and sequelae on permanent successors. Dent Traumatol 2005;21:320–3.
7. Pomarico L, Souza IPR, Primo LG. Multidisciplinary therapy for treating sequelae of trauma in primary teeth: 11 years of follow-up and maintenance. Quintessence Int 2005;36:71–5.
8. Ravn JJ. Sequelae of acute mechanical trauma in the primary dentition: a clinical study. J Dent Child 1968;35:281–9.
9. Filippi A, Pohl Y, Kirschner H. Replantation of avulsed primary anterior teeth: treatment and limitations. ASDC J Dent Child 1997;64:272–5.
10. Kinoshita S, Mitomi T, Taguchi Y, Noda T. Prognosis of replanted primary incisors alter injuries. Endod Dent Traumatol 2000;16:175–83.
11. Zamon EL, Kenny DJ. Replantation of avulsed primary incisor: a risk-benefit assessment. J Can Dent Assoc 2001;67:386.
12. Al-Khayatt AS, Davidson LE. Complications following replantation of a primary incisor: a cautionary tale. Br Dent J 2005;198:687–8.
13. Straffon LH, Pink TC. Trauma to the primary and young permanent dentitions. J Mich Dent Assoc 2000;82:40–5.
14. Holan G. Disturbing conclusions. Br Dent J 2006;200:123.
15. Lin YTJ. Treatment of an impacted dilacerated maxillary central incisor. Am J Orthod Dentofacial Orthop 1999;115:406–9.