

Crown Dilaceration with Discoloration and Hypoplasia of Maxillary Permanent Central Incisors After Trauma to the Primary Dentition: Case Report

Primer Dentisyonda Geçirilmiş Travma Sonucu Maksiller Daimi Santral Dişlerde Renklenme ve Hipoplazi ile Birlikte Görülen Kron Dilaserasyonu

Aydan AÇIKGÖZ,^a
Alp Erdin KOYUTÜRK,^b
Kaan GÜNDÜZ,^a
Hakan AVSEVER^c

Departments of

^aOral Diagnosis and Radiology,

^bPedodontics,

Ondokuz Mayıs University

Faculty of Medicine, Samsun

^cDepartment of

Oral Diagnosis and Radiology,

Gülhane Military Medical Academy,

Ankara

Geliş Tarihi/Received: 08.11.2010

Kabul Tarihi/Accepted: 11.02.2011

Yazışma Adresi/Correspondence:

Hakan AVSEVER

Department of

Oral Diagnosis and Radiology,

Gülhane Military Medical Academy,

Ankara,

TÜRKİYE/TURKEY

hakanavsever@gmail.com

ABSTRACT Traumatic dental injuries are very frequent cases during childhood and adolescence. In primary dentition if the injury occurs then its effects will be seen on the developing permanent tooth germ by delayed eruption, impacted or enamel hypoplasias. In this case report it is presented the trauma to the primary teeth and its effects to the permanent dentition. A 13-year-old boy was referred to the department of Oral Diagnosis and Radiology for a routine examination. It was detected crown dilaceration with discoloration of the enamel and hypoplasia of the upper right and left permanent central incisors by a result of the intrusion of the primary maxillary anterior teeth at the age of 1.5 years due to fall. After clinical examination and radiographic evaluation of the patient who complained about the appearance of his anterior teeth, it was seen the both dilacerated teeth had fully erupted and responded positively to electric pulp testing. The dilacerated teeth were improved with esthetic composite restoration and the palatal inclination was vertically corrected according to normal anatomical forms.

Key Words: Injuries; dental enamel hypoplasia; tooth deciduous

ÖZET Travmatik dental yaralanmalar özellikle çocukluk ve adolesan dönemde sıklıkla karşımıza çıkan bir durumdur. Süt dişlenme döneminde meydana gelen yaralanmanın daimi dişler üzerinde diş sürmesinde gecikme, gömülü kalma ve mine hipoplazileri gibi etkileri vardır. Bu olgu raporunda süt dişinin maruz kaldığı travma ile bu travmanın daimi dişlenme üzerindeki etkisi bildirilmiştir. Rutin ağız, diş, çene muayenesi için Oral Diagnoz ve Radyoloji Anabilim dalına başvuran 13 yaşındaki erkek hastada, 1,5 yaşında düşme sonucu maksiller süt anterior dişlerde intrüzyon sebebiyle ortaya çıkan mine renklenmesi ve hipoplazisi ile birlikte üst sağ ve sol daimi santral dişlerde kron dilaserasyonu tespit edildi. Ön dişlerinin görünümünden şikayetçi olan hastanın klinik muayenesi ve radyografik değerlendirmesi sonrası her iki dilasere dişinin tamamen sürmüştüğü ve elektrikli pulpa testine pozitif yanıt verdiği görüldü. Dilasere dişler estetik kompozit restorasyon ile tamir edildi ve palatal eğimi normal anatomik forma uyumlu bir şekilde düzeltildi.

Anahtar Kelimeler: Yaralanmalar; dental mine hipoplazisi; geçici diş

Türkiye Klinikleri J Dental Sci 2013;19(3):220-4

Traumatic dental injuries occur frequently during childhood, and epidemiological studies show that the prevalence of injuries to primary teeth range from 6.5% to 71.4%.¹⁻⁶ Trauma to primary teeth can potentially damage their permanent successors. The type and the severity of anomaly depend on the developmental stage of the permanent teeth and the intensity and type of trauma.

Intrusion and avulsion are the most seen injuries that affect the developing tooth crown in early aged children. Developmental anomalies may be manifested as white or yellowish-brown discolorations of the enamel, localized enamel hypoplasia, and crown dilacerations.⁷⁻¹³ In addition to crown disturbances, trauma to the primary dentition may also affect the root region or the entire permanent tooth germ, and many sequelae can result from this, such as root dilaceration, root duplication, partial or complete arrest of root formation, odontoma-like malformations, and eruption disturbances.^{7,8,11-15}

Rates of developmental anomalies of permanent teeth due to primary tooth trauma between 12% and 53.6% have been reported.^{7,10,16,17}

The aim of this article is to report a crown dilaceration with discoloration and hypoplasia of the enamel of the permanent right and left maxillary central incisors in a 13-year-old boy with a history of trauma at an early age, in which the primary teeth were extracted immediately after the accident.

CASE REPORT

A 13-year-old boy was referred to the department of Oral Diagnosis and Radiology for a routine dental examination. He complained about the appearance of his right and left maxillary central incisors. His medical history was not contributory. His mother provided a history of trauma at the age of 1.5 years due to fall, which resulted in partial intrusion of his deciduous maxillary central incisors. The intruded teeth were extracted. Intraoral examination revealed horizontal enamel hypoplasia in the middle of third on the both central incisors with a localized brownish discoloration on the left central incisor and a white discoloration on the right central incisor. Moreover, there was crown dilaceration that was much clearer in the left central incisor, and both teeth were bent palatally at the mid-linear level of the crowns (Figure 1). Caries were detected on the palatal surface of the left maxillary central incisor; however, both teeth were vital (positive responses to electric pulp testing). Localized gin-



FIGURE 1: Intraoral view showing totally erupted maxillary right and left central incisors. Note: Horizontal enamel hypoplasia in the middle third of both central incisors with a localized brownish discoloration on the left central incisor and a white discoloration on the right central incisor.

(See color figure at <http://dishekimligi.turkiyeklinikleri.com/>)

gival overgrowth and bleeding upon probing were noted on the labial gingiva in the maxillary anterior region. Intraoral periapical radiographs of the maxillary central incisors showed crown dilacerations of the right and left maxillary incisors. Both central incisors with fully formed root apices had no periapical pathology or root fractures that were visible radiographically (Figure 2).

Under local anesthesia, the dilacerated crowns of the incisors were prepared and restored with acid etching, bonding agent (Prime&Bond NT, Dentsply, De Trey, Konstanz, Germany), and a resin composite (Clearfil Majesty Esthetic, Kuraray Co., Ltd, Osaka, Japan) according to the anatomic form (Figure 3). Periodic follow-up appointments were scheduled for periodontal treatment and to monitor the restored teeth.

DISCUSSION

Developmental anomalies of the permanent teeth involving the crown are reported to occur more frequently than developmental root anomalies, and the most serious crown malformations occur in children between the ages of 0 and 3 years at the time of injury.^{7-9,12-18} This is the developmental stage of the permanent crown, and there is a close relationship between the primary tooth root and the permanent tooth crown.^{7,9,10,16-18} Because



FIGURE 2: Radiographic appearance of the teeth.



FIGURE 3: Intraoral view of the patient after the restoration of the central incisors with a resin composite.

(See color figure at <http://dishekimligi.turkiyeklinikleri.com/>)

maxillary primary incisors are more prone to injury, the permanent maxillary central incisors are the most commonly affected teeth.^{6,7,9,10,15-20} In the present case with a history of trauma at an early age, developmental anomalies were observed in the crowns of the permanent central incisors only.

Intrusive or extrusive luxation of the primary teeth results in the highest risk of crown dilaceration and discoloration of the enamel and/or enamel hypoplasia of the permanent dentition.^{7,12,13,15,17,21} Jacoma and Campos, Christophersen et al., Altun et al., and Assunção et al. reported that the most frequent sequelae after traumatic injury to the primary teeth were discoloration of the enamel and/or enamel hypoplasia in the permanent teeth.^{7,10,16,17} The traumatic displacement of the roots of primary teeth may alter the secretory phase of ameloblasts and cause hypoplasia of the enamel. Turgut et al., Christophersen et al., and Altun et al. reported that if breakdown products from bleeding spread into an area where enamel formation is still taking place, the result will be a yellow-brown discoloration.^{9,10,19}

Crown dilacerations occur due to traumatic non-axial displacement of the already formed hard tissue portion of the tooth in relationship with the developing soft tissue portion.^{18,20}

Assunção et al. reported that 9% and Andreasen and Ravn reported that 3% of the injuries to the primary teeth result in this type of malformation.^{17,22} However, Christophersen et al. did not report any crown dilacerations in their study, although this may be attributed to the older age of the children at the time of injury in this study.¹⁰

In the present case, the intrusive-type injury to the deciduous incisors at the age of 1,5 years was a possible etiological factor, which caused crown dilaceration with discoloration of the enamel and enamel hypoplasia of the upper permanent central incisors. In cases similar to the one presented here, crown dilaceration alone was not seen, but rather was accompanied by discoloration and hypoplasia of the enamel.^{9,13,15,18,19,23} Since the developmental formation of the permanent incisors is still ongoing at the ages of 0-3 years, the displacement of a primary tooth root occurring as the result of intrusion affects both the secretory phase of the ameloblasts, which cause hypoplasia, and the deviation in the mineralized tissue, which results in dilacerations as a consequence.

Çalışkan and Tekin reported that a crown dilacerated tooth is at risk of developing pulp necrosis accompanied by periapical inflammation with no caries evident.¹³ Altun et al. also reported that trauma to the primary teeth can lead to calcified tissue that resembles pulp stones in the permanent successor teeth.¹⁹ However, in our case, clinical and radiographic examinations did not show any pulp stones or periapical pathology in either of the crown-dilacerated central incisors, except for dental caries in the left central incisor.

The dilacerated right and left maxillary central incisors reported here had fully erupted. Treatment options for crown dilacerations associated with an erupted tooth include preparation and restoration of the crown with resin composite, improving the esthetics with a permanent porcelain

jacket crown, or using a prosthesis or orthodontic space closure after an extraction.^{9,11,13-15,18,19,23} In this case, the caries section of the dilacerated tooth was removed. The dilacerated teeth were improved with an esthetic composite restoration, and the palatal inclination was vertically corrected according to normal anatomical forms.

In conclusion, intrusive luxation of the primary teeth in patients between the ages of 1 and 3 years results in the highest risk of crown dilaceration and discoloration of the enamel and/or enamel hypoplasia of the permanent dentition. Permanent maxillary central incisors are the most commonly affected teeth, and this type of developmental disturbance leads to esthetic problems during adult life. To avoid the unwilling prognosis after treatment such as pulp necrosis, periodic follow-up appointments must be scheduled.

REFERENCES

1. Ferreira JM, Fernandes de Andrade EM, Katz CR, Rosenblatt A. Prevalence of dental trauma in deciduous teeth of Brazilian children. *Dent Traumatol* 2009;25(2):219-23.
2. Avşar A, Topaloglu B. Traumatic tooth injuries to primary teeth of children aged 0-3 years. *Dent Traumatol* 2009;25(3):323-7.
3. Cardoso M, de Carvalho Rocha MJ. Traumatized primary teeth in children assisted at the Federal University of Santa Catarina, Brazil. *Dent Traumatol* 2002;18(3):129-33.
4. Gulinelli JL, Saito CT, Garcia-Júnior IR, Panzarini SR, Poi WR, Sonoda CK, et al. Occurrence of tooth injuries in patients treated in hospital environment in the region of Araçatuba, Brazil during a 6-year period. *Dent Traumatol* 2008;24(6):640-4.
5. Kirzioğlu Z, Karayılmaz H, Ertürk MS, Kösele Sentut T. Epidemiology of traumatised primary teeth in the west-Mediterranean region of Turkey. *Int Dent J* 2005;55(5):329-33.
6. Jorge KO, Moysés SJ, Ferreira e Ferreira E, Ramos-Jorge ML, de Araújo Zarzar PM. Prevalence and factors associated to dental trauma in infants 1-3 years of age. *Dent Traumatol* 2009;25(2):185-9.
7. do Espírito Santo Jácomo DR, Campos V. Prevalence of sequelae in the permanent anterior teeth after trauma in their predecessors: a longitudinal study of 8 years. *Dent Traumatol* 2009;25(3):300-4.
8. Tozoglu S, Yolcu U, Tozoglu U. Developmental disturbance of maxillary lateral incisor after trauma. *Dent Traumatol* 2007;23(2):85-6.
9. Turgut MD, Tekçiçek M, Canoglu H. An unusual developmental disturbance of an unerupted permanent incisor due to trauma to its predecessor - a case report. *Dent Traumatol* 2006;22(5):283-6.
10. Christophersen P, Freund M, Harild L. Avulsion of primary teeth and sequelae on the permanent successors. *Dent Traumatol* 2005;21(6):320-3.
11. Agnihotri A, Marwah N, Dutta S. Dilacerated unerupted central incisor: A case report. *J Indian Soc Pedod Prev Dent* 2006;24(3):152-4.
12. Udoye CI, Jafarzadeh H. Dilaceration among Nigerians: prevalence, distribution, and its relationship with trauma. *Dent Traumatol* 2009;25(4):439-41.
13. Çalışkan MK, Tekin U. Surgical extrusion of a partially erupted and crown dilacerated incisor. *Dent Traumatol* 2008;24(2):228-30.
14. Sakai VT, Moretti AB, Oliveira TM, Silva TC, Abdo RC, Santos CF, et al. Replantation of an avulsed maxillary primary central incisor and management of dilaceration as a sequel on the permanent successor. *Dent Traumatol* 2008;24(5):569-73.
15. Arenas M, Barbería E, Lucavechi T, Maroto M. Severe trauma in the primary dentition--diagnosis and treatment of sequelae in permanent dentition. *Dent Traumatol* 2006;22(4):226-30.
16. Altun C, Cehreli ZC, Güven G, Acikel C. Traumatic intrusion of primary teeth and its effects on the permanent successors: a clinical follow-up study. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009;107(4):493-8.
17. Da Silva Assunção LR, Ferelle A, Iwakura ML, Cunha RF. Effects on permanent teeth after luxation injuries to the primary predecessors: a study in children assisted at an emergency service. *Dent Traumatol* 2009;25(2):165-70.
18. Asokan S, Rayen R, Muthu MS, Sivakumar N. Crown dilaceration of maxillary right permanent central incisor - A case report. *J Indian Soc Pedod Prev Dent* 2004;22(4):197-200.

19. Altun C, Esenlik E, Tözüm TF. Hypoplasia of a permanent incisor produced by primary incisor intrusion: a case report. *J Can Dent Assoc* 2009;75(3):215-8.
20. Andrade MG, Weissman R, Oliveira MG, Heitz C. Tooth displacement and root dilaceration after trauma to primary predecessor: an evaluation by computed tomography. *Dent Traumatol* 2007;23(6):364-7.
21. Tüloğlu N, Özer S, Tunç EŞ. [Extrusive luxation: case report]. *Türkiye Klinikleri J Dental Sci* 2010;16(1):83-7.
22. Andreasen JO, Ravn JJ. Epidemiology of traumatic dental injuries to primary and permanent teeth in a Danish population sample. *Int J Oral Surg* 1972;1(5):235-9.
23. Ak AT, Eden E, Tasdemir OO. Treatment of sequelae in permanent dentition after severe trauma in primary dentition. *Dent Traumatol* 2008;24(5):e31-3.