Dental Traumatology

Dental Traumatology 2010; **26**: 434–437; doi: 10.1111/j.1600-9657.2010.00908.x

Bonding of fractured permanent central incisor crown following radiographic localization of the tooth fragment in the lower lip: a case report

CASE REPORT

Gabriela Ferrari da Silva Schwengber, Mariane Cardoso, Ricardo de Souza Vieira

Pediatric Dentitry, Federal University of Santa Catarina, Florianópolis, Santa Catarina, Brazil

Correspondence to: Mariane Cardoso, Federal University of Santa Catarina, Centro de Ciências da Saúde, Campus Universitários, Trindade, Florianópolis, SC - Brazil - 88040-900
Tel.: 55 48 37219929
Fax: 55 48 32348776
e-mail: mariane_cardoso@hotmail.com

Accepted 16 April, 2010

Abstract – This study describes the case of an 8-year-old boy who fractured his left maxillary central incisor, exposing the pulp. The trauma also resulted in a cut on his mentum. Radiographic examination revealed the fractured tooth fragment embedded in the lower lip. The fractured tooth, with incomplete root formation, was treated endodontically and received a temporary restoration. After 15 days, the temporary restoration was removed and the fractured tooth fragment was etched with 37% phosphoric acid. A bonding system was then applied to the etched-fractured tooth surface without polymerization. The same bonding procedure was carried out on the tooth fragment. A layer of flowable resin composite was applied to the fragment, which was positioned on the remaining tooth. The resin composite was then polymerized, finished, and polished.

A significant number of children and adolescents are increasingly involved in different types of accidents, many of which affect the dental arches and/or support structures and soft tissues (1, 2). Trauma in children and adolescents requires greater attention due to the physical and emotional characteristics of both the patient and family alike (3). This is particularly true when front teeth are involved, as the patient's facial esthetics can be temporarily affected (2).

The incisors, especially when fractured, are often the cause of laceration to the soft tissues, which may be cut or perforated by the injured tooth. Thus, careful inspection of the soft tissue injury is important to determine whether a tooth fragment is embedded in it (2). When a fragment is encountered, the most conservative treatment option for a crown fracture is the bonding of the fragment to the fractured tooth (4). This technique produces good, lasting esthetic results, as it maintains the original anatomic shape, color, and texture of the tooth (5).

This study reports the clinical case of fractured traumatized permanent upper central incisor treated with the bonding of the tooth fragment, which was found in the lacerated lower lip.

Case report

A male patient, 8 years of age, suffered a fall playing football and struck his chin on the ground, causing a cut on the mentum, laceration of the lower lip, and crown fracture with pulp exposure of the left upper central incisor. Due to the considerable pulp exposure, endodontic treatment was needed for the tooth, which had incomplete root formation. Two months after the trauma, a nodule was evident upon palpation of the lower lip. A radiograph of the soft tissues revealed that the fragment from the fractured tooth was embedded in the lower lip, which had completely healed, with no sign of secondary infection (Fig. 1). The patient was then sent to the Traumatized Patient Care Program of the Federal University of Santa Catarina (Florianópolis, Brazil).

Following anesthesia, incision, and separation of the soft tissues, the fragment was found enveloped in fibrous tissue and removed entirely (Fig. 2), which was confirmed by the radiograph of the soft tissues in the immediate postoperative period.

After 15 days, with the lower lip healed and the canal definitively filled, the bonding of the tooth fragment was initiated (Figs 3 and 4). The gutta percha was removed with a heated curette below the gingival line to avoid darkening the region, and a conventional glass ionomer cement (SS White®; Rio de Janeiro, Brazil) was applied. This cement was lightly pigmented in case the entrance to the canal needed to be located on a future date. Any residual pulp in the fragment was removed. Etching was performed with 37% phosphoric acid (Condac 37®; FGM, Joinville, Brazil) and the bonding system was applied (Single Bond®; 3M ESPE, St. Paul, MN, USA) without polymerization (Fig. 5). The same procedure was repeated on the tooth (Fig. 6). A layer of flowable resin composite (Oppalis®; FGM, Joinville, Brazil) was then applied to the

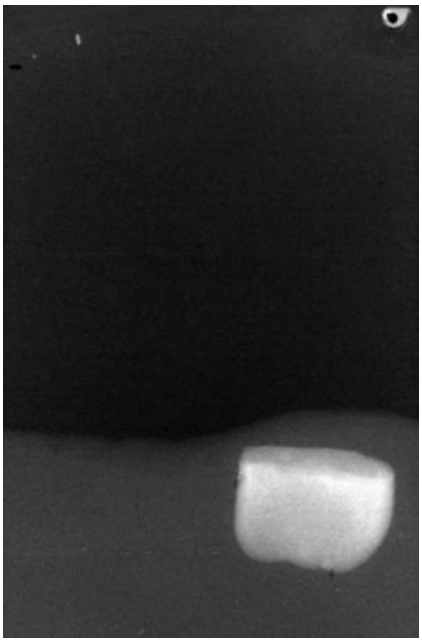

Fig. 1. Radiograph of fragment in lower lip.

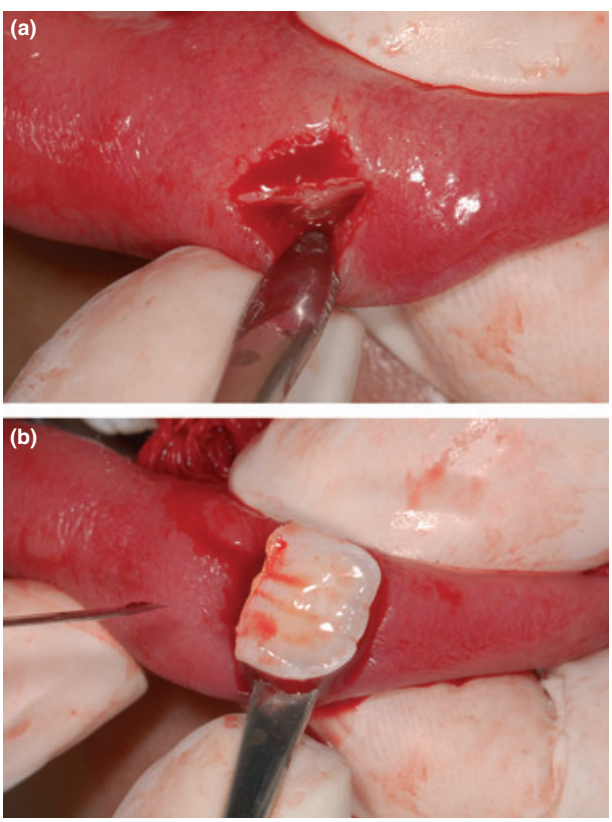

Fig. 2. Incision and localization of tooth fragment in lower lip (a) and fragment following removal (b).

fragment. After positioning it on the tooth, the excess composite resin was removed. The resin composite was then polymerized, finished, and polished (Figs 7 and 8). At the same visit, an impression was taken and a mouth guard was constructed to avoid further trauma.

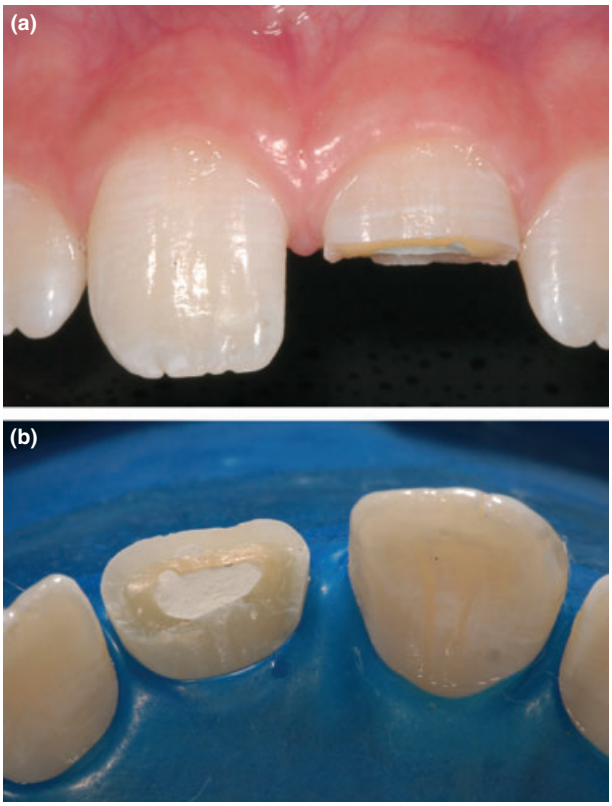

Fig. 3. Clinical aspect following endodontic treatment (a and b).

Fig. 4. Radiographic aspect following endodontic treatment.

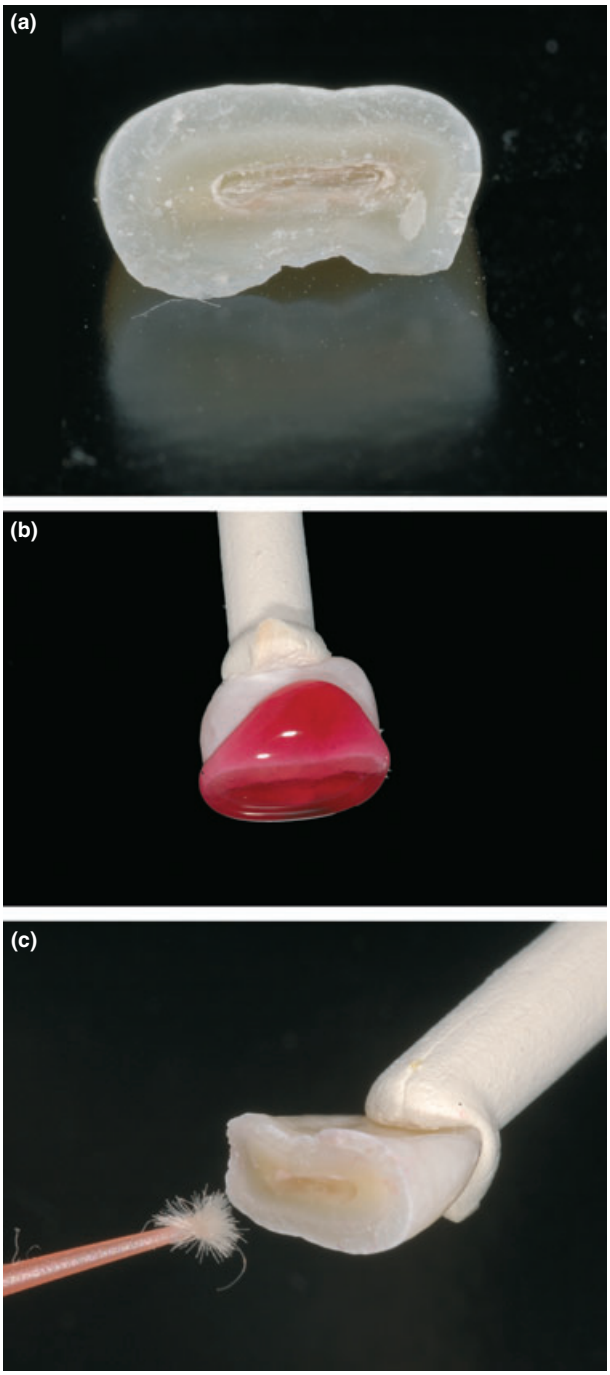

Fig. 5. Preparation of fragment (a) with 37% phosphoric acid, (b) and bonding system (c).

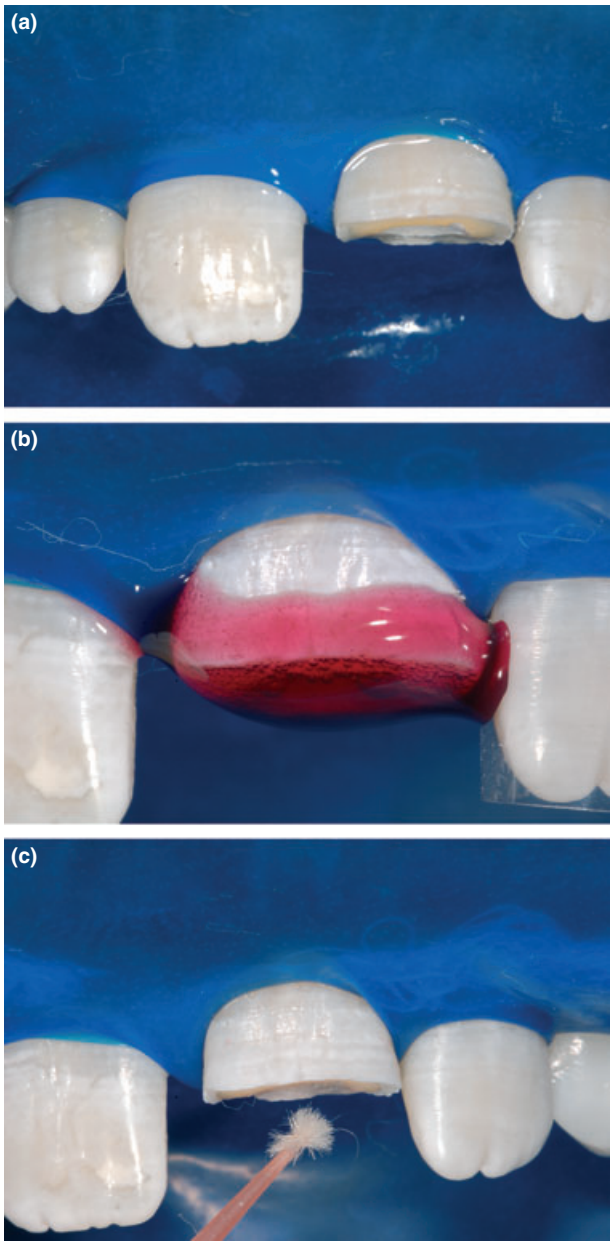

Fig. 6. Preparation of tooth (a) with 37% phosphoric acid, (b) and bonding system (c).

At the 1-year follow up, the success of the endodontic treatment was indicated by the absence of abnormalities in the periapical tissues in the radiographic examination. The bonding of the fragment also proved satisfactory. A slight fibrousness was seen on the lower lip, but caused no esthetic or psychological discomfort to the patient.

Discussion

Damage to soft tissues caused by fractured incisors is a common finding. In such cases, considerable care must be taken to find all tooth fragments resulting from the accident (2). It is not rare to find these fragments in the soft tissues. However, detection is hampered by a number of factors, such as lacerations, hemorrhaging, and swelling, which can mask the fragments during the palpation examination (2, 6). In such cases, a simple radiograph of the soft tissues (as performed in the case reported here) offers conclusive results.

Tooth fragments in the lower lip are subjected to constant movement due to the contraction of the orbicular muscle of the lip. Thus, fragments can end up in sites that are distant from the point at which the lip was perforated (7). Radiographic analysis of the soft structures is therefore of fundamental importance

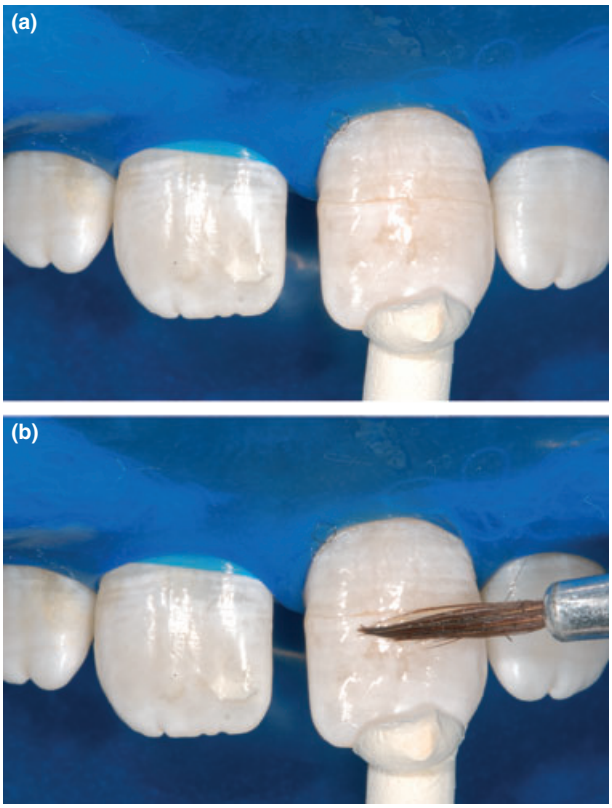

Fig. 7. Positioning of fragment (a) and removal of excess flow resin (b).

Fig. 8. Final aspect of tooth after bonding of fragment.

to finding and completely removing tooth fragments (2, 6, 8).

The restorative procedures carried out in this study proved successful throughout the follow-up period (9). According to Macedo et al. (10), even with moderate loss of the tooth structure between the crown and remaining tooth fragments, a bonding system and resin composite maintain adequate resistance to rupture forces. Reis et al. (11) found that preparation techniques such as beveling together with the use of a bonding system and resin composite increase the resistance to breaks in the bonded region.

The construction of a mouth guard after the bonding of the fragments was carried out to protect the dental tissue from possible recurrence of trauma, as the patient stated he would practice sports, which are etiological factors of dental trauma. According to Macedo et al. (12), a mouth guard acts as a barrier for the absorption and diffusion of impact forces that strikes or falls cause to oral tissues, thereby cushioning the localized force. With this, the preventive element of the treatment is added, which is often overlooked by oral healthcare professionals.

Conclusion

This study stresses the importance of patient history, clinical exam, and radiographic evaluation of dental trauma patients. This management strategy is especially important in cases in which dental trauma occurs concomitantly with injury to the adjacent soft tissues, especially when tooth fragments are not immediately located.

Acknowledgements

The authors wish to thank Paulo Henrique Ferreira, DDS, for his help with the endodontic treatment.

References

1. Andreasen JO. Lesiones traumaticas de los dientes, 3rd edn. Barcelona: Labor; 1984. p. 478.
2. Silva AC, Moraes M, Bastos EG, Moreira RWF, Passeri LA. Tooth fragments embedded in the lower lip after dental trauma: case reports. Dent Traumatol 2005;21:115–20.
3. Clarck JC, Jones JE. Tooth fragments embedded in soft tissue: a diagnostic consideration. Quintessence Int 1987;18:653–4.
4. Baratieri LN, Ritter AV, Junior SM, Filho JCM. Tooth fragment reattachment: an alternative for restoration of fractured anterior teeth. Pract Periodontics Aesthet Dent 1998;10:115–27.
5. Reis A, Loguercio AD, Kraul A, Matson E. Reattachment of fractured teeth: a review of literature regarding techniques and materials. Oper Dent 2004;29:226–33.
6. Roth JS, Walczyk JS. Occult tooth fragments spontaneously extruded after six months. Cutis 1994;54:253–4.
7. Taran A, Har-Shai Y, Ullmann Y, Laufer D, Peled IJ. Traumatic self-inflicted bite with embedded tooth fragments in the lower lip. Ann Plast Surg 1994;32:431–2.
8. Snawder KD, Bastawi AE, O'Toole TJ. Tooth fragments lodged in unexpected areas. JAMA 1976;236:1378–9.
9. Farik B, Munksgaard EC, Andreasen JO. Impact strengthof teeth restored by fragment-bonding. Dent Traumatol 2000;16:151–3.
10. Macedo GV, Diaz PI, De O Fernandes CA, Ritter AV. Reattachmentof anterior teeth fragments: a conservative approach. J Esthet Restot Dent 2008;20:5–18, 9–20.
11. Reis A, Kraul A, Francci C, De Assis TG, Crivelli DD, Oda M et al. Re-attachment of anterior fractured teeth: fracture strength using different materials. Oper Dent 2002;27:621–7.
12. Macedo GV, Ritter AV. Essentials of rebonding tooth fragments for the best functional and esthetic outcomes. Pediatr Dent 2009;31:110–6.