

REATTACHMENT OF EMBEDDED TOOTH FRAGMENT: A CASE REPORT

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ABSTRACT

Soft tissue injuries are relatively common following traumatic dental injuries in children. This report describes a case of a nine year old girl who had a foreign body embedded in the lower lip due to fall, while playing. Thorough clinical examination followed by soft tissue radiographs confirmed the presence of a fractured incisal fragment, which was surgically retrieved under local anesthesia. The fragment was then reattached using a dentin bonding agent. Fragment reattachment is a realistic alternative to resin composite buildup for restoring esthetics and function of the traumatized dentition. The natural fragments can be used to ensure the restoration "ad integrum" of the dental crown by simple bonding. With expected improved bonding technology in the future, these fragments may serve for many years.

KEYWORDS: Fracture, Fragment reattachment, Bonding

INTRODUCTION

Tooth injuries constitute an integral part of clinical odontology. Dental trauma within the foreseeable future will probably exceed dental caries and periodontal disease as the most significant threat to dental health among youth and will be accompanied by significant economic consequences.¹

Complicated crown fractures involve the enamel, dentin and pulp². Symptoms such as pain, sensitivity to thermal changes and mastication, are indicative of pulp exposure and if not treated leads to pulpal necrosis and periapical changes. Physical trauma is aggravated by the esthetic disfiguration which is a major concern for both the children and their parents.²

Epidemiological studies suggest that the prevalence of fractured incisors varies among different population and at various ages. It has been estimated that 20%-22% of the populations under the age of 18 years sustain traumatic injury in the form of anterior crown fracture.^{3,4}

Fractures of anterior teeth are quite common and about 8 % of all injuries to permanent anterior teeth are complicated crown fractures⁵

Efficient diagnosis and management of dental injuries in children is an important component in the comprehensive practice of Pediatric dentistry. Dental related trauma in the pediatric population can be physically and emotionally stressful for the child and family.⁶ Occasionally, part of fractured

tooth may enter and be retained in the lip. When a patient has a swollen lip associated with trauma to the anterior dentition, one should always suspect embedded tooth fragments. A radiograph of the involved lip, taken from a profile view should be obtained to evaluate the possibility of penetration and retention of a piece of fractured tooth⁷. A soft tissue radiograph can well be an occlusal view or radiograph film placed between lips and dental arch with low exposure.

Esthetic, biological and functional restoration of a fractured incisor presents a great clinical challenge. The clinician treating a young patient with an incisal crown fracture often faces restorative difficulties stemming from the less than ideal results, in terms of contour, colour match and incisal translucency.⁸

The introduction of the acid-etch technique in combination with the advances in the bonding technology⁹ have made the restoration of fractured incisor teeth possible, with little or no additional tooth preparation. However despite improvements in material sciences with respect to fracture resistance, wear resistance, and esthetics it is true that a superior result may be obtained if the retrieved fractured tooth fragment can be reattached. If intact tooth fragment is present after trauma, the incisal edge reattachment procedure presents a conservative, simple and esthetic treatment.¹⁰

Clinical trials and long term follow up have reported that reattachment using modern dentine bonding agents or adhesive luting systems may achieve functional and esthetic success up to 7 years.¹⁰

The use of such a reattachment technique may offer several advantages over the conventional acid-etch composite restoration as follows.¹¹

1. Better aesthetics, as the shade match and translucency will be perfect;
2. More predictable long term appearance: since only a minimal amount of restorative material is exposed on the labial surface along the fracture line, the long-term esthetics will be better when compared to a large composite restoration with its potential for some discoloration with time;
3. The incisal edge will wear at a similar rate to adjacent teeth;
4. Replacement of the fractured portion may be less time consuming than the placement of a large restoration.

This case report describes a traumatic amputation of anterior crown with incisal fragment being embedded in the lower lip, its surgical retrieval and subsequent reattachment.

Case report

A 10 year old girl reported to the Department of Pedodontics and Preventive Dentistry, Bapuji Dental College and Hospital, Davangere, Karnataka, with a chief complaint of broken lower left front tooth due to fall, during play. The patient had reported one week following the traumatic episode. She was unaware of the whereabouts of the fractured fragment of the lower or upper front tooth (Fig.1), when enquired.

On inspection, soft tissue laceration was seen on the inner aspect of the lower lip that was healing. A firm consolidated palpable mass measuring 1cm in diameter in the same region was located. Intra-oral examination revealed enamel dentin fracture [S 02.51- uncomplicated crown fracture] in relation to 21 [upper permanent left central incisor] and complicated crown fracture [S 02.52] in relation to 31 [lower permanent left central incisor]¹². The 31 was tender on percussion, with absence of mobility. All the anteriors responded promptly to pulp tests except for 31. Intra-oral periapical radiograph of

mandibular central incisors showed no root fractures, but widening of periodontal ligament space in the apical region. A radiopaque artifact was seen floating above the level of fracture incisor (Fig.2) on the radiograph. Confirmation of an embedded foreign body in the lower lip was done using soft tissue cephalogram (Fig.3), whose radiographic features were suggestive of an incisal fragment.

Treatment of the complicated crown fractures was planned in 2 stages:

- a. Surgical retrieval of foreign body [incisal fragment?] and treatment of the pulp and periapical pathology.
- b. Esthetic restoration of the fractured tooth.

The patient was subjected to a surgical excision of the fragment under local anesthesia[#]. For this procedure 1.0 cc of lidocaine in 2% a solution of 1:80,000 epinephrine was infiltrated in the area of lip consolidation. The foreign body was surgically retrieved following placement of an incision and it was confirmed to be the fractured incisal fragment of 31 (Fig. 4), which was stored in normal saline for a reattachment procedure later. A 3-0 black silk was placed to re-approximate the tissues. Patient was prescribed Amoxicillin 250mg, tid for five days and Ibuprofen 200mg tid for three days. Uneventful and satisfactory healing was seen one week post-operatively. 31 was endodontically treated and observed for two weeks.

Reattachment of the incisal fragment was performed at the end of second week. The lower anterior teeth were isolated using a rubber dam. The fragment was cleaned and disinfected using mechanical and chemical techniques using polishing paste and 5.25% Sodium hypochlorite to remove the protein coating from the tooth fragment.

The fragment was attached to a plastic instrument using wax to stabilize it and aid in easy

[#] [Lignox 2%A, Indoco Remedies Ltd, Mumbai, India]



Fig.1. Soft tissue laceration associated with dental injuries due to trauma from fall.



Fig.2. Intra-oral periapical radiograph showing floating foreign body above the level of the fractured incisor which was embedded in the lower lip.



Fig.3. Soft tissue cephalogram confirming the position of the foreign body.



Fig. 4. Surgically retrieved incisal fragment



Fig. 5. Verifying the fit of the incisal fragment

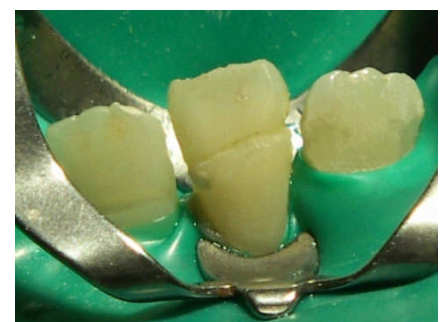


Fig. 6. Circumferential bevel placed along the site of union.



Fig.7. Esthetically and functionally restored 31

handling, and the fit of the fragment to the fractured tooth was checked (Fig. 5). Both the fragment and the fracture site of 31 were etched for 20 seconds using 37% phosphoric acid, followed by thorough rinsing with water for 20 seconds and then gently air dried, but not desiccated. Single Bond [3M dental product .USA] adhesive system was applied on the etched surface and the fragment was repositioned and held in position using digital pressure and light polymerized.

A circumferential bevel was placed along the site of union and a suitable anterior composite resin [shade A1, Z100, 3M ESPE dental products] was used to finish the fracture line (Fig. 6). The esthetic coalescence of the fragments and the occlusion were checked (Fig. 7). As the incisal fragment of 21 was not available, it was restored with anterior composite resin.

Discussion

Incisors, particularly when fractured, are quite often the cause of laceration of soft tissues at the time of trauma.^{13,14} The fracture of a tooth may be a highly traumatic incident for a young patient, but it has been found that there is a positive emotional and social response from the patient to the preservation of natural tooth structure⁹. Actual longevity of these restorations remains undetermined, previous reports and clinical trials suggest that such techniques can provide a functional restoration for several years.

Simonsen opined that the reattachment of an incisal fragment should have a good prognosis, and reported a case where the repaired tooth was subjected to orthodontic treatment without any untoward consequences¹⁴

In many instances of anterior tooth fracture, the incisal tooth fragment may not be available to the practitioner. In our case careful clinical observation and radiographic evaluation revealed the embedded tooth fragment in the lower lip. This was surgically retrieved and stored in normal saline to prevent dehydration of the fragment and subsequent loss of its vital lustre.²

Simonsen¹⁴ recommended the placement of a circumferential bevel on the fragment and the tooth prior to the reattachment procedure, as it removes the superficial and fractured enamel prisms, allows for a resin-enamel lap joint, forms a finishing line,

and orients the enamel prisms in an 'end-on' relation.

However, Davies, Roth and Levi¹⁵ suggested reattachment of the fragment prior to placing an external chamfer or bevel on the fracture line with a diamond round bur. They have recommended the use of the enamel chamfer when the fracture line was still evident after one week. Andreasen et al¹⁶ preferred a circumferential chamfer along the whole extent of fracture line, whereas Ries et al¹⁷ chamfered only the buccal surface. We placed a bevel after bonding the fractured fragment along the whole extent of the fractured line, as we presumed that the unaltered edges of the fragments would aid in better orientation and reapproximation, which would be lost in case beveling was done prior to bonding.

Critical consideration of factors like- Radiographic evidence of a closed apex and clinical evidence of pulp exposure to oral environment for one week, followed by microbial contamination of pulp resulting in apical periodontitis and confirmation of non vitality of 31, resulted in planning of pulpectomy and obturation with gutta-percha using lateral condensation technique.

With the advent of the acid etch technique, and continued improvements of resin restorative materials, reattachment of fractured tooth segments affords the practitioners a conservative and esthetic approach to the management of anterior tooth fractures¹⁸

A multicenter clinical study done by Andreasen FM et al concluded that the good fragment retention, acceptable esthetics, and pulp vitality indicated that reattachment of coronal fragment is a realistic alternative to placement of conventional resin composite restoration¹⁹

In spite of thorough education and motivation the patient and the parents did not report for further recall examination as the child's father had moved out of town, due to change in occupation. Hence an essential long term follow-up which is needed to know the prognosis and longevity of the restoration was not possible in our case.

CONCLUSION

This case report emphasizes the need for thorough clinical and radiographic examination in all cases of dental trauma esp., soft tissue injury accompanying dental trauma. Early diagnosis and surgical removal

of these fragments could prevent undesirable foreign body reaction and scarring. Retrieval of fractured tooth fragment may also make way for providing esthetic biologic restorations.

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