CASE REPORT

Conservative Reattachment of Complicated Crown Root Fracture- A Case Report
Sakshma Misra¹, A P Tikku², Anil Chandra³, Pragya Pandey⁴

¹JR, Department of Conservative Dentistry and Endodotics, KGDU, Lucknow. ²Professor and head, Department of Conservative Dentistry and Endodotics, KGDU, Lucknow. ³Professor, Department of Conservative Dentistry and Endodotics, KGDU, Lucknow. ⁴Asst Professor, Department of Conservative Dentistry and Endodotics, KGDU, Lucknow. 

Corresponding author: Sakshma Misra. Add: Room no 304 b gautam buddha hostel, king george medical university, lucknow. Mob: 7839016674. E-mail: drsakshma@gmail.com.

Abstract

Fractures of anterior teeth mainly affecting maxillary incisors are common form of traumatic dental injuries. Reattachment of fractured coronal fragment is a conservative treatment that should be considered for young patients with crown-root fractures if the subgingival fracture can be exposed to provide isolation. In this article, we have described a case of reattachment and restoration of maxillary central incisors with crown root fracture using a conservative technique with the help of self-cure dental adhesive.

Keywords
Fracture reattachment, Traumatic dental injury, Crown-root fracture, Superbond C&B.

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Introduction

Dental trauma is commonly seen in association with facial injury. Maxillary incisors are involved in almost 70% cases due to their peculiar location and direction of impact.(1) A crown-root fracture affects enamel, dentin and cementum and may or may not involve pulp. Diagnosis and treatment planning includes intraoral examination, mobility test, percussion test, pulp sensibility test and intraoral periapical x-rays along with extra oral radiographs to rule out alveolar fractures. In cases of subgingival fractures, surgical exposure of the fracture line by gingivectomy and osteotomy becomes necessary. Fracture reattachment is advantageous for the patient since functional and esthetic restoration is completed soon after injury using the original fragment.(2) Reattachment of fractured segment of tooth offers better short- and medium-term results rather than restoring with resin composite restorations.(3) This case report describes a case of complicated fracture of maxillary central incisors that were reattached and restored using a self-cure dental adhesive (Super Bond C&B, Sun Medical Co. Ltd. Japan).

Case report

A 22 year old girl reported to the Department of Conservative Dentistry and Endodontics with fractured maxillary incisors due to road traffic accident two days back. The patient had visited a general dentist immediately after trauma, who had stabilized the fractured fragments using resin composite and referred the patient to Department of Conservative Dentistry and Endodontics, King George’s Medical University for further management (Fig 1). No significant finding was noted on extra-oral examination. Intraorally, maxillary central incisors had complicated horizontally oblique fracture in buccal-palatal direction, extending below the gingival margin palatally with mobility of retained coronal fragments. Orthopantamograph done ruled out alveolar bone fracture and it revealed crown-root
fracture of teeth 11 and 21, involving of pulp (Fig 2).

Reattachment of fractured segments and endodontic therapy of fractured incisors was planned since the fragments were in good condition with reasonably well fit on the fractured tooth but with pulp involvement. Written informed consent of the patient was taken and local anaesthesia administered. The fractured coronal fragments were carefully detached (Fig 3 and 4) and stored in 0.9% saline solution to prevent dehydration.

Endodontic therapy was initiated with respect to teeth 11 and 21, and completed at single sitting. Canal cleaning and shaping was completed using 3% sodium hypochlorite (Septodent, France) along with 15% EDTA (Glyde, Denstply, Tulsa, USA) and rotary file system Revo S (Micro-Mega, France). Obturation was done by cold lateral compaction of gutta-percha.

To gain access to the subgingival fracture line, a palatal flap was raised and self-cure dental adhesive (Super Bond C&B, Sun Medical Co. Ltd. Japan) was used to bond the tooth structures to one another as per manufacturer’s instructions. First a coating of Green Activator (10% citric acid and 3% ferric chloride) was applied on the apical and coronal fragments for 10 seconds and were then rinsed and dried. Then the mixture of monomer and catalyst (ratio 4:1) was applied on the surfaces to be bonded using brush. Fragment for tooth 12 was aligned with remaining tooth structure and restored followed by fragment for tooth 21 which was also positioned and adjusted. The margins were properly finished with diamond burs and polishing paste. Pulp sensibility test revealed tooth number 12 to be vital and its incisal build up was done using resin composite Filtek Z350 XT (3M ESPE, USA).

Occlusion was evaluated and patient was advised not to exert too much load on these teeth and to maintain proper oral hygiene (Fig 5).

At one month recall, periodontal tissues were healthy with no periodontal pocket on palatal aspect of central incisors (Fig6). Crown preparation was done on the reattached crowns and full coverage all ceramic crowns were delivered. Patient was symptom-free at 1 year recall (Fig 7).

**Discussion**

Treatment modality of fractured teeth depends upon the condition of tooth, type of fracture, availability of fractured segments, associated soft and hard tissue injury, fracture line location, mobility of teeth, patient compliance and treatment cost.(4)

Traditional approaches using cast post or prefabricated post followed by core build up have been common in the past but it is more detrimental to radicular dentin. The restored tooth is subjected to various disadvantages like excessive forces on root, thinning of dentinal walls around post, weakened coronal fragment due to extending post. Moreover, the procedure is time consuming, technique sensitive and costly.

With new advancement in field of adhesive dentistry, it is now possible to achieve excellent results with reattachment of fractured tooth fragments as the fragments helps to achieve same translucency, opalescence, fluorescence, characterizations and texture of the tooth surface.(5)(6) Other factors which favour the reattachment of fragments include lesser wear of opposing teeth, perfect matching of contour and shape, maintenance of alveolar bone and less chairside time.(7) In cases of subgingival fracture biological width consideration should be considered in treatment planning.(8)
Super-Bond C&B is self-cure dental adhesive resin cement based on MMA (methyl methacrylate) with adhesive monomer 4-META (4-methacryloyloxyethyl trimellitate anhydride) and a catalyst TBB (tri-n-butylborane). 4-META demonstrates high affinity with tooth structure and promotes monomer impregnation into both enamel and dentin. After impregnation, it polymerizes in situ, forming “hybrid layer”. In traditional adhesives, moisture and oxygen inhibit polymerization, but catalyst TBB, reacts with oxygen and water present on dentin surface to trigger polymerization. On reacting with oxygen and water, a peroxide is formed. The peroxide further decomposes, forming radicals which then initiate the polymerization of MMA. Super-Bond C&B in the past has been used for bonding of fixed partial dentures and porcelain veneers with long-term clinical success.

Fracture reattachment using fiber-reinforced post and Superbond C&B has been reported earlier but this case report has novel approach of reattachment without a post.

**Conclusion**

Traumatic injuries leading to fracture of anterior teeth are very common due to their location and direction of impact force. Injury can lead to fracture ranging from uncomplicated crown fracture to complicated fracture involving pulp. Conservative approaches must be used to save the teeth as natural teeth best restores the arch. Use of self-cure dental adhesive is a conservative method to reattach fractured teeth segments and maintain their functional anatomy along with saving precious chair side time.

**References**