ABSTRACT
Coronal fractures of the anterior teeth are a common form of dental trauma that mainly affects children and adolescents. If the original tooth fragment is retained following fracture, reattachment of the fractured fragment to the remaining tooth can provide better and long-lasting aesthetics along with improved function. This report describes a case of fragment reattachment in an 18-year-old male patient following trauma to the maxillary central incisor, with 1 and 6-month follow-up.

KEYWORDS: Coronal fracture, Dental trauma, Reattachment, Aesthetics, Resin composite

INTRODUCTION
Trauma to the permanent teeth is rather a common event among school children and adolescents. Every dental professional must be prepared to assess and treat when necessary. It may not only damage the dentition, but also affect the patient psychologically[1]. The teeth that are most commonly involved in trauma are the maxillary central incisors, as they occupy a more vulnerable position in the arch. Factors that influence the management of coronal tooth fractures include the site of fracture, size of fractured fragments, periodontal status, pulpal involvement, root maturation, biological width invasion, occlusion and time.

One of the options for managing coronal tooth fractures, especially when there is minimal or no violation of the biological width and the fractured fragment is retained, is the reattachment of the dental fragment. Reattachment of a fragment to the fractured tooth can provide good and long-lasting aesthetics because the tooth’s original anatomic form, colour and surface texture are maintained. Additionally, it generates a positive psychological response and is a reasonably simple procedure that provides a more predictable long-term wear than when a direct composite is used.

A number of techniques have been developed to restore the fractured crown. Earlier techniques include stainless steel crowns, basket crowns, orthodontic bands, pin-retained resin, porcelain-bonded crown and composite resin[2,3]. The concept of reattachment began in 1964 when Chosack and Eidelman[4] used a cast post and conventional cement to reattach an anterior crown segment. Recent developments in restorative materials, placement techniques and adhesive protocols allow reattachment using resin-based composites. The purpose of this article is to discuss the considerations for dental fragment reattachment technique and to report a case of tooth fragment reattachment.

CASE HISTORY
An 18-year-old male reported to our unit following traumatic fracture of the maxillary right central incisor (Figure 1). Clinical and radiographic examination
revealed that the fractured portion of the tooth was intact and there was no evidence of mobility, root fracture or soft tissue damage. The tooth showed no vitality for pulp tests (Figure 2). Examination of the tooth fragment revealed no fragmentation of the edges (Figures 3 and 4). The fractured portion of the tooth was recovered and the fragment was washed thoroughly under running water and stored in normal saline to prevent dehydration and discoloration. The potential ramifications of dental trauma were discussed, and the benefits and disadvantages of the composite resin build up and reattachment alternatives were explained. A decision was made by the parents and the clinician to preserve the natural tooth structure and utilise the patient’s fragment for biological restoration.

The adaptation of the fragment was checked. Root canal treatment was carried out with both the fractured incisors. In the right central incisor, the gutta-percha points were removed to the level of cement-enamel junction and the canal orifice was sealed with glass ionomer cement. A small portion of the internal dentin surface of the fragment was removed to accommodate the resin cement, taking care to preserve the peripheral margin. The fragment was placed in a 0.12% chlorhexidine solution for disinfection. After isolation of the fractured tooth, acid etching of both the remaining tooth surface and the fragment was carried out for 15 s using 37% orthophosphoric acid (Scotchbond, Etchant Phosphoric Acid from 3M ESPE, St. Paul, MN, USA), rinsed and blot dried with paper points. Next, the primer and the adhesive (Scotchbond, 3M ESPE, St. Paul, MN, USA) were applied on the etched surfaces. Then, the resin cement (Esthet X, Dentsply, Switzerland) was manipulated according to the manufacturer’s instructions and applied to the fragment and the tooth surface. Later, the restored surface was finished and polished (Sof-Lex™ disks 3M ESPE, St. Paul, MN, USA). Occlusion was checked and post-operative instructions were given to the patient. Follow-up examinations were carried out at 1 and 6 months interval (Figures 5 and 6). The tooth remained normal in aesthetics and function.

DISCUSSION

Fracture of the teeth may be the most traumatic incident for a young patient. The majority of dental injuries involves the anterior teeth, especially the maxillary incisors (because of its position in the arch), whereas the mandibular central incisors and the maxillary lateral incisors are less frequently involved. The incidence of anterior teeth crown fractures in permanent dentition is about 26-76%[5]. The psychological trauma caused to an individual due to loss of aesthetics can be managed by this procedure successfully when the intact tooth fragment is available. The reattachment of a normal tooth fragment can eliminate the problems of wear and unmatched shades associated with different restorative materials and techniques. The use of a moist bonding procedure using fourth- or fifth-generation dentine bonding agents without additional retention features (such as internal or external preparation) has been shown to provide clinical restorative success. Research through laboratory findings and clinical observations show debonding failures when rapid loading is applied, as the bonded interface is undeniably susceptible to the effects of cyclic fatigue and hydrolytic degradation over time (simulating trauma to the reattached fragment); yet, current adhesive agents provide sufficient bonding strengths to withstand slow loading from masticatory stresses[5,6]. The remarkable advancement of adhesive systems and resin composites has made reattachment of tooth fragments a procedure that is no longer a provisional restoration but rather a restorative treatment, offering a favourable prognosis. Fabrication of a mouth guard and patient education about treatment limitations may enhance clinical success, as reattachment failures may occur with new trauma or parafunctional habits[7,8,9]. Despite these factors, case reports and multicentre studies have described functional and aesthetic successes for over 7 years now.
Figure 1: Preoperative intraoral view

Figure 2: Preoperative radiograph of the fractured tooth.

Figure 3: Removal of broken crown fragment.

Figure 4: Crown fragment.

Figure 5: Postoperative view after reattachment of the fractured tooth.

Figure 6: Postoperative radiograph
CONCLUSION
Tooth fragment reattachment procedure offers ultraconservative, cost-effective, safe, fast and aesthetically pleasing results when the fragment is available. Progress in adhesive technology and composite resin materials allows not only for the creation of aesthetic restorations, but also for the preservation and reinforcement of tooth structure, as has been demonstrated herein.

REFERENCES