INTRODUCTION

Crown-root fracture is defined as a fracture involving enamel, dentin and cementum and is classified as complicated or uncomplicated, according to the pulpal involvement and comprises 5% of the traumatic injuries affecting the permanent dentition.¹ The teeth most susceptible to fractures caused by trauma are maxillary incisors. Traumatized incisors usually show fracture line proceeding in an oblique direction extending from labial to lingual surface. These fractures subsequently lead to esthetic, functional and phonetic problems causing a severe impact on the social and psychological well-being of the patient.² One of the options for managing coronal tooth fractures is the reattachment of the crown fragment when it is available. The reattachment of the fractured tooth fragment has advantages including the preservation of the remaining tooth structure, reproducibility of the tooth contour and natural colors, and the most well-preserved incisal translucency.¹³⁴ This article reports a case of complicated crown-root fracture of maxillary lateral incisor treated by reattachment of the fractured coronal segment.

CASE REPORT

A 25 years old male patient reported to the clinic with the chief complaint of broken upper right front tooth due to an accidental blow to the face two days ago. His medical and dental history was non-contributory. Clinical examination revealed fracture in the cervical third of the maxillary right lateral incisor, exposing the pulp (Figure 1). The fracture line was oblique extending in apical direction from the labial to palatal surface. The fractured fragment was loosely attached to the root. The margin on the palatal surface was located 2 mm subgingivally. Upon probing, it was found that the biological width was being encroached on the palatal aspect. It was determined that the biological...
width was only minimally invaded and crown lengthening alone in the palatal aspect would be sufficient for access and isolation during the reattachment procedure. Periapical radiograph revealed an intact periodontal ligament space, without any horizontal root fracture.

Of the various treatment options explained to the patient, he preferred to retain the fractured fragment. The fractured tooth fragment (Figure 2) was removed and stored in physiologic saline to be used at a later stage. Isolation was achieved using cheek retractor, cotton rolls and saliva ejector. Crown lengthening was done using electro cautery and 2 mm of palatal tissue was excised (Figure 3). Single visit root canal treatment was done (Figure 4). Post space was prepared and a prefabricated metal post was tried in the canal (Figure 5). A groove was made on the fragment to provide space for the post to fit (Figure 6). The metal post was luted using type IX glass ionomer cement (Figure 7). The coronal fragment was filled with the same cement and it was repositioned correctly and was held in position till the initial set of glass ionomer cement. Excess cement on the fracture site was removed. After the tooth fragment was attached, 1 mm depth chamfer was placed in the fracture line on the buccal surface with a diamond round bur. After the superficial etching and bonding, a layer of resin composite was applied to the chamfer surface and light cured for 40 seconds. Later, the repaired surface was finished, polished and the esthetic result was obtained (Figure 8). The occlusion was carefully checked and adjusted. Instructions were given as to avoid heavy forces on the tooth and to follow regular oral hygiene practices. The patient returned after 1 week for follow-up, and restorative treatments remained clinically and aesthetically acceptable, long-term follow-up is awaited.

**DISCUSSION**

Traumatic injuries involving the tooth fracture can be treated by reattachment to provide what is considered to be the most conservative form of restoration. Survival rates for such restoration have shown to be good with failure often resulting from subsequent trauma. Factors influencing the extent and feasibility of such repair include the site of fracture, size of fractured remnants, periodontal status, pulpal involvement, maturity of root formation, biological width invasion, occlusion, time and resources of the patient. If the fracture involves two-third or more
of the crown a post reattachment is more commonly used. The use of posts increases retention and distributes stress along the root. The advantages of using the original tooth fragment over other materials include better color match, morphology, translucency, physiochemical characteristics, patient acceptance and economical status. Other treatment options possess limitations like multiple visits, stabilization and are less conservative in nature. The psychological trauma caused to the individual due to loss of aesthetics can be managed by this procedure successfully.

The treatment of complicated crown-root fractures in many cases is compromised by fracture margin that are well below the gingival margin or bone. Presently, numbers of different approaches are available from which to choose when treating fractured teeth, depending on the location of the fracture. If the fracture line is supragingival, the procedure for reattachment will be straightforward. However, when the fracture site is subgingival or intraosseous, orthodontic extrusion with a post-retained crown may be necessary. Alternatively, surgical techniques such as electrosurgery, elevation of a tissue flap, clinical crown-lengthening surgery with removal of alveolar bone and removal of gingival overgrowth for access to the fractured site are all viable methods.

If the extra-oral time of the fractured fragment increases, dehydration of the fragment can occur. Therefore, in order to prevent this case, it is recommended that the fragment be kept in a medium such as physiologic saline. According to Toshihiro and Rintaro, if the fractured fragment that was reattached is dehydrated, the fragment recovers its original color and translucency without any negative changes. It is generally expected that fragment dehydration and discoloration will not have a significant impact on the final reattachment outcome.

The clinical importance of an intact biological width is in the maintenance of periodontal health. Once the biologic width is compromised due to fracture, surgical correction must be performed to restitute the area. In this case, fracture line invaded biologic width on the palatal aspect but this was supraosseous. Hence, crown lengthening by electro cautery was done to achieve isolation and better marginal finish.

Type IX glass ionomer cement was chosen for reattaching fractured fragment. The biocompatibility of glass ionomer cement is attributed to their excellent biological response when applied to cavities with invasion of the biologic width, which decreases bacterial penetration. It has the added advantages of having an antibacterial effect, chemical adhesion to the tooth structure, adequate sealing ability and promoting epithelial and connective tissue attachment.

**CONCLUSION**

Reattachment technique is the most conservative and biological method for restoring a fractured anterior tooth. Reattaching a tooth fragment may be successfully used to restore fractured teeth with adequate strength. This procedure helps us to preserve maximal natural tooth structure. Patient cooperation and understanding of the limitations of the treatment is of utmost importance for good prognosis. Long-term follow up is necessary in order to predict the durability of the tooth-adhesive fragment complex.

**REFERENCES**


