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Use of a crown fragment to establish favorable temporary crown

CASE REPORT

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Abstract – This case describes the esthetic management of a fractured tooth at first visit and its subsequent treatments to restore the esthetics and function. Patients expect adequate esthetics immediately after the first appointment. In addition, they require that esthetics is maintained throughout the definitive treatment phase as well. After the use of the fractured crown fragment as a temporary crown, a root canal treatment was undertaken in a conventional manner. The rehabilitation of the fractured tooth was performed with a post-core-supported prosthetic restoration. Examination at 18 months after treatment revealed good esthetics and normal function.

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Endodontically treated teeth may undergo crown, crown-root, or root fractures (1). Endodontically treated teeth are usually weak as a result of loss of tooth material due to caries and access cavities. The treatment of fractured teeth can be changed depending on the level of the fracture line and the amount of remaining root (2). In cases where the fracture line extends down along the long axis of the root, extraction of the tooth is indicated. If the fracture involves the coronal third of the root and the remaining root structure is long enough to support the subsequently applied restoration, only the fractured portion is extracted and root canal therapy is performed for prosthetic restorations (3).

This case report describes an immediate esthetic treatment of the fractured tooth and the achievement of periodontal health, function, and an acceptable esthetic resolution.

Case report

A 35-year-old man was referred for treatment of his maxillary right lateral incisor (tooth 12). The medical history was non-contributory. The patient reported a fractured accident during biting hard food three days ago. Clinical examination revealed a discolored crown of maxillary lateral incisor and a labial swelling over the lateral incisor (Fig. 1). The fracture line was located 2 mm supragingivally on the palatal aspect (Fig. 2). Although the tooth fragment was mobile, it was still in place. Radiographic examination demonstrated the horizontal fracture lines clearly on both the proximal sites and obvious space between the apical aspects of the gutta-percha and the apical constriction (Fig. 3). The tooth was treatment-planned for conventional root canal retreatment and a porcelain crown retained by a post and core.

Following local anesthesia, the horizontal fractured crown was separated from the remaining tooth (Figs 4 and 5). After extraction of the coronal fragment, the fracture extending subgingivally on the labial aspect was noticeable (Fig. 6). Electrosurgery was performed to re-establish the gingival margin and to convert the subgingival fracture site to a supragingival one. During the first appointment, a temporary crown was fabricated using a post and the natural fractured crown (Fig. 7). A hole was made in the coronal fragment to receive the head of the post. After etching of the coronal fragment with a 37% phosphoric acid gel for 20 s, dentine adhesive was applied according to the manufacturer's instructions and the hole was filled with a composite resin and placed over the post. Then, the temporary crown was fitted against the fractured surface. Excess was removed and resin was light-cured for 40 s buccally and lingually. The old gutta-percha was partially removed and the temporary crown was placed in the remaining root (Fig. 8).

Fig. 1. Preoperative view of the maxillary lateral incisor. Note that the fracture is not evident from the labial aspect and localized swelling.

Fig. 2. The line of fracture is apparent from the palatal view.

Endodontic treatment was performed in a conventional manner 1 week later. The existing gutta-percha was removed and the working length was established. Chemomechanical preparation was performed with 2.6% sodium hypochlorite solution as irrigant. Two weeks later, the root was symptom-free and was obturated with gutta-percha and zinc oxide-eugenol sealer (Canals, Showa Yakuhin, Tokyo, Japan) using the lateral condensation method. A postoperative radiograph was taken (Fig. 9). Three months later the root was prepared for a cast paradium post and core, and porcelain crown that was cemented with glass-ionomer cement. The patient was recalled for periodic check-ups and healing was uneventful. The recall examination after 18 months revealed asymptomatic and healthy periodontal conditions (Figs 10–12).

Discussion

By using the original tooth fragment to restore a fractured tooth, it is possible to achieve a very good esthetics with original tooth contours and function. Reattachments of the coronal fragment present advantages over resin composite restorations by offering good

Fig. 3. Preoperative radiograph showing two horizontal fractures and inadequate root filling.

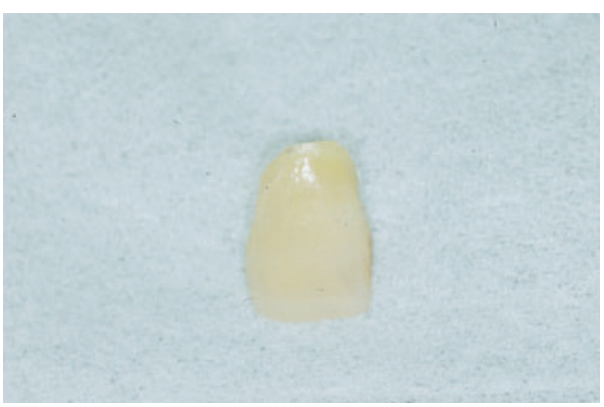

Fig. 4. Labial view of the extracted crown.

short- (4) and long-term (5) results. However, in the present situation, several conditions must be taken into consideration to determine the final treatment. First, the tooth was weakened by the dehydration of dentin and the removal of tooth structure after endodontic therapy (6). Second, the discolored coronal fragment could not allow an esthetic satisfaction. Therefore, the coronal fragment served as a short-term provisional crown until the root received a permanent restoration. During this period, the root canal retreatment was performed for long-term success of endodontic treatment in the endodontically treated tooth. Before setting the post porcelain crown, it was considered necessary to replace the inadequate root canal filling.

Fig. 5. Lingual view of the extracted crown.

Fig. 6. Clinical view immediately after the removal of the fractured crown.

Fig. 7. Temporary crown after light curing.

In this case, there was no need to extrude the tooth any more as the subgingivally involved fracture site was only at the labial aspect of the tooth. Gingivectomy with electrosurgery was achieved easily only at this site. After this procedure, it allowed the movement of the fracture line supragingivally and then optimized the marginal sealing (2). The main advantage of utilizing electrosurgery for gingivectomy is the hemorrhage control, which can be established easily soon after injury (7).

Fig. 8. Temporary crown was placed in the remained root.

Fig. 9. Radiograph immediately after obturation of root canal.

The temporary crown using a fractured crown fragment was selected to facilitate prosthetic restoration and restore the physiological periodontal attachment. In addition, it provides immediate esthetic and functional rehabilitation of the fractured teeth.

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Fig. 10. Clinical view of the permanent fixed crown, revealing satisfactory esthetics.

Fig. 11. Palatal view of the permanent fixed crown.

Fig. 12. Eighteen months follow-up radiograph of the maxillary lateral incisor.

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