Case Report

Rehydration of crown fragment 1 year after reattachment: a case report

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Abstract – The reattachment of the crown fragment to a fractured tooth is a conservative treatment that should be considered for patients with crown fractures of anterior teeth. This case report describes the reattachment of crown fragment that is discolored because of dehydration. After 1 month, the fragment had regained some of the original color and translucency. After 1 year, the reattachment of the crown fragment should be done even if the crown fragment is discolored.

Complicated crown fracture is a fracture involving enamel, dentin, and exposing the pulp (1). The treatment of a complicated crown fracture is the same as that of uncomplicated crown fracture except for complicated crown fracture requires the treatment of the pulp; pulp capping, pulpotomy, or pulpectomy. The traditional conservative treatment of crown fractures has been restorations with composite resin and a dental bonding system. If the crown fragment is retrieved at the time of injury, its reattachment provides several advantages over the other forms of restorations. It results in the exact restoration of the crown is form and surface morphology in a material that wears at the same rate as adjacent teeth. Besides, chair time required for reattachment is less than that required for composite resin restoration (2).

The purpose of this report is to describe the reattachment of a crown fragment that became discolored because of dehydration, as well as present the 1 year follow-up and considerable rehydration.

Case report

A 12-year-old boy was referred to our clinic because of a traumatic injury resulting from falling down during skating 5 days before. The extra-oral

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examination had no significant abnormality. The intra-oral examination revealed neither lacerations nor evidence of alveolar bone fracture. The incisal one-third of the right maxillary central incisor was fractured but the tooth presented with normal mobility and slightly sensitive to cold (Fig. 1). The pulp was exposed and hyperplastic pulp tissue was seen (Fig. 2). The fractured tooth responded to the electric pulp tester and had a normal sound to percussion test. The radiograph indicated the completion of root formation and a closed apex (Fig. 3). The crown fragment was retrieved but the patient did not bring it at the first visit.

Local anesthesia was administered and the tooth was isolated with rubber dam. The pulp was amputated to a depth about 1 mm apical to the exposure site using high-speed turbine. The amputated pulp was carefully cleaned with NaOCl and H_2O_2 . After complete arrest of bleeding, calcium hydroxide was placed over the amputated pulp. The cavity was sealed with Unifil Flow (GC Co., Tokyo, Japan) using Superbond D-liner II bonding system (Sun Medical, Kyoto, Japan).

After 1 week, the patient brought the crown fragment at the second visit. The pulp amputated tooth had no clinical problem and symptom. The fractured surface of the crown fragment was



Fig. 1. Frontal view of the complicated crown fracture at the initial visit (5 day after the injury).



Fig. 2. The incisal view of the fractured right maxillary central incisor. The pulp was exposed and hyperplastic pulp tissue was seen.

prepared using a round diamond cutting bur to allow the correct adaptation of the fragment to the tooth. The adjusted surface of the crown fragment and the surface of fractured tooth were etched for 30 s. The etched surface was rinsed with distilled water for 15 s, and dried with oil-free compresses air for 15 s. Both etched surfaces were covered with a creamy mixture of Super bond C & B (Sun Medical). The crown fragment was carefully repositioned to the fractured tooth with firm finger pressure until full curing of the Super bond C & B. After curing of the resin, a round diamond cutting bur was used to prepare a double chamfer margin around the fracture line. The chamfer margin was filled with Unifil S (GC Co.) using Superbond D-liner II bonding system. The color difference between the crown fragment and the fractured tooth was remarkable. The crown fragment was much more white than the fractured tooth because of dehydration that the fragment was kept dry for 12 days (Fig. 4).

After 1 month, the color difference between the crown fragment and the fractured tooth was dramatically decreased (Fig. 5). The reattached tooth had no clinical problem and symptoms. The reattached tooth still responded to the electric pulp tester. The radiograph showed that the attached fragment seemed to be misaligned with the fractured tooth (Fig. 6).

After 1 year, the color difference between the crown fragment and the fractured tooth was decreased more and showed more satisfying esthetic results (Fig. 7). The reattached tooth also had no clinical problem and symptoms. The reattached tooth responded to the electric pulp tester. The radiograph did not show apical periodontitis (Fig. 8).



Fig. 3. The radiograph of the fractured right maxillary.



Fig. 4. Frontal view of the reattachment of the discolored crown fragment to a fractured tooth.

Rehydration of crown fragment 1 year after reattachment



Fig. 5. After 1 month, the color difference between the crown fragment and the fractured tooth was dramatically decreased. The fragment had regained some of the original color and translucency.



Fig. 7. After 1 year, the fragment was continued original color and translucency.



Fig. 6. After 1 month, the radiograph showed that the attached fragment seemed to be misaligned with the fractured tooth.

Discussion

The radiograph revealed that the attached fragment was breaking the continuity of tooth profile; therefore the attached fragment seemed to be misaligned with the fractured tooth. In this case, before the reattachment procedure, the fractured surface was filled with low viscosity resin because of prevention against the pulpal infection; consequently the reattachment of crown fragment was done with the interposition of the resin. This might be the cause of breaking the continuity of tooth profile.

The mechanism of root fracture is usually because of a frontal impact, which creates



Fig. 8. After 1 year, the radiograph did not show apical periodontitis.

compression zones labially and lingually. The resulting shearing stress zone then dictates the plane of fracture. The majority of dental injuries involve the anterior teeth, especially the maxillary central incisors (1).

It is beneficial to quickly restore the function and the esthetics of the fractured tooth. The reattachment of the crown fragment to a fractured tooth can be considered as a most conservative treatment and is first choice for crown fractures of anterior teeth. The successful reattachment of the crown fragment is dependent upon the crown fragment retrieval at the time of injury. The discoloration of the crown fragment is presumably because of dehydration of

Toshihiro & Rintaro

the underlying dentin (3). In this case, the crown fragment was kept dry condition for 12 days, so it was a mat white color. It was so difficult to mask the color disharmony between the fractured tooth and the reattached fragment with composite resin. Composite resin filled the double chamfer margin to the fracture line was only done to reinforcement of bonding site. The color of the discolored crown fragment was return to original color, because the crown fragment probably absorbed water in the mouth. Simonsen (4) reported the reattachment of the discolored crown fragment kept dry condition for 1 week has regained some of the original color and translucency after 8 days. In this case, the reattachment of discolored crown fragment was regained some original color and translucency after 1 month and it has continued after 1 year. These results suggested that the reattachment of the crown fragment should be done even if the crown fragment is discolored.

Cavalleri and Zermann (5) reported the reattachment of the crown fragment appeared to have a better long-term prognosis than composite resin restoration. Andreasen et al (2) indicated the reattachment of the crown fragment using of dentin bonding system in combination with enamel acid etching may possibly provide protection against the pulpal infection, thereby reducing the pulpal complications. However, it was necessary to regularly follow-up to confirm the esthetics and the pulp vitality.

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