# Conservative Reattachment of a Pulpally Exposed Fractured Incisor **20 Years Later**

Since we are celebrating our 20th anniversary of LVI, I feel it would be interesting to highlight an interesting case I did 20 years ago. One of the most revolutionizing factors that have influenced dentistry in the past several decades is the ability to bond restorative materials to tooth structure. The ability to reliably and confidently bond to dentin has dramatically changed the conventional protocol and requirements of many procedures. The way we prep teeth, the materials we use, and the aesthetic ability to mimic natural tooth structure and even improve on what nature has given to many. Coupled with the conservative treatment of pulpal exposures, this article describes the reattachment of a fractured lateral incisor utilizing the principles of modern adhesive dentistry and the long term results.



Figure 1 Fractured lateral incisor (tooth #7) from traumatic injury. Pulpal exposure and carious lesion evident on fractured incisor.



Figure 2 Fractured piece of tooth.



Figure 3 Note small mesial caries.

#### **Case History**

In 1994, a 23 year old female presented with a fractured lateral incisor (#7), caused by a skiing accident. (fig 1) The fractured portion of the tooth, representing 1/2 of the exposed coronal portion, had been out of the mouth for three hours. (fig 2) The fractured piece was found in the snow immediately after the accident and placed in milk per the suggestion of a ski instructor. Pretty smart as it kept the tooth hydrated. The patient was not in much pain, even though a pulpal exposure was evident. The fracture had occurred between a small carious lesion on the mesial surface off the tooth. (fig 3) The patient was worried that she was going to have to have the tooth crowned, at which time the possibility of a more conservative treatment, the reattachment of the fractured piece, was proposed.

The patient was anesthetized and a rubber dam was placed. The small carious lesions were removed with a small round bur, both in the remaining tooth portion and the fractured tooth portion. (fig 4) There would have been no preparation necessary if there was not the presence of this decay.



Figure 4 Etched tooth with small indentation where caries were removed.

Figure 7

Placement of fractured portion on

intact portion of tooth.



Figure 5 Phosphoric acid etching of avulsed portion.



Figure 8 One week post-op (close up) of treated tooth with undetectable results.

**Figure 6** Bonding agent placed on fractured portion of tooth.



**Figure 9** One week post-op (full arch view).

The remaining portion of the tooth was scrubbed with the chlorahexidine rinse for thirty seconds and the fractured portion of the tooth was placed in a chlorahexidine rinse (Consepsis, Ultradent).

Using the principles of the total etch technique, the avulsed tooth portion and the remaining tooth portion, were etched for 15 seconds. (fig 5) The pulp was avoided, but not for fear of the effects of the acid on the exposed pulpal tissue. Since the purpose of the acid is to demineralize the dentinal surface for the hybrid formation, and since their is no dentin over the exposed pulp, there is no reason to place the acid on the exposed pulp. This author believes, however, that no harm would occur if placement of the acid on the exposed pulp did occur. 35% Phosphoric acid was the ethcant of choice since studies at the time showed it's superior results on both enamel and dentin.

A anti-inflamatory agent (Baush and Lomb Dexymethasone) was placed as a wetting agent, followed by Tublicid Red for its antibacterial properties. The surface was left damp, but not puddled, on both portions of the tooth. Optibond Primer was placed in several layers for 30 seconds on both tooth portions, and lightly dried for 15 seconds to evaporate the residual alcohol. After drying, the dentin surface was checked to insure a shiny appearance.

Optibond's dual curing, fluoride releasing, filled bonding resin was mixed and placed on both pieces of the tooth. (fig 6) Dual Cement (Vivadent), a fluoride releasing, microfilled luting cement, was mixed and placed into the small preparations created by the removal of the carious lesion. This was only placed into the preparations, and care was taken not to excessively overfill. This was NOT used to lute the two pieces together and if it wasn't for the small preparations it would not have been used.

The avulsed portion of the tooth was then placed back onto the remaining intact portion (fig 7), and the fracture site was spot tacked for 20 seconds with a 2mm light tip. The excess bonding resin and Dual Cement were removed using a dry brush. To prevent an oxygen inhibition layer from forming, a glycerin gel (DeOx, Ultradent) was placed on the surface of the restored tooth. The resin was cured for two minutes with two lights to insure adequate polymerization. Light finishing the interproximal, as well as the facial and lingual surfaces, was performed to remove any excess bonding resin and Dual Cement. Occlusal adjustments were made to relieve the tooth from any contact, and the surface was polished with Vivadent's polishing cups and polishing paste. Due to a slight dehydration of the avulsed tooth, a slight demarcation between pieces was evident. (fig 8, 9, 10) Once the rehydration occurred this was eliminated.

# **20 Years Later**

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**Figure 10** Smile after treatment, 20 years ago.



**Figure 11** Smile today, 20 years later.



Figure 12 Close up of tooth after 20 years.

## Follow-up

It has now been 20 years since the tooth was reattached and the patient is asymptomatic with a vital healthy tooth. The tooth is not only still intact, but determination of fracture site is difficult. The patient called me to tell me she was in town, that she thought about me all the time because of what I did and wanted to know if I wanted to see the tooth. Of course I did and had her come in to take pictures of this amazing case. (fig 11-12)

### Discussion

Due to the progress made in the last several decades, there are alternatives to conventional treatment of the fractured tooth. Using proper bonding principles and tooth sterilization techniques, reattachment of avulsed tooth parts is possible. The most difficult esthetic challenge in dentistry is the matching of the single anterior tooth. With this technique, the esthetic delimma is eliminated by the reattachment of the avulsed portion of the fractured tooth.

Reattachment of the fractured tooth structure provided the most esthetic, natural result achievable.