

REPLANTATION, MULTIPLE TRAUMAS, FISTULA, APEXIFICATION AND APEXOGENESIS, AND INTERNAL BLEACHING

Jason's Tooth

*Every now and then a case comes along
that could serve as a postgraduate course in dentistry.*

Jason's tooth was such a case.

*Here we have a replanted immature tooth,
complicated by a delay in endodontic treatment
and a fistulous tract, followed by root canal therapy,
a second traumatic injury to the same tooth,
orthodontic treatment and, finally,
nonvital bleaching of the replanted tooth for esthetic purposes.
All of this took place over a period of 6½ years,
and seemingly against all odds,
Jason ended up with all of his own teeth and a beautiful smile.*

Objectives of Treatment

- 1. Control the abscess.**
- 2. Prevent traumatic or idiopathic rejection.**
- 3. Attempt apexification and/or apexogenesis.**
- 4. Maintain the tooth until Jason is eighteen or older
when it is more favorable to consider another
treatment plan, such as an implant or a bridge,
if it becomes necessary.**

In April 1991, eight-year-old Jason's maxillary left central incisor (#9) was knocked out in a schoolyard scuffle. He found the tooth in the grass, and at the recommendation of a teacher, it was washed and replaced in the socket, all within about thirty minutes. Jason's mother came to school, picked him up, and brought him to an oral surgeon who gave him an analgesic for pain and stabilized the tooth with a bracket splint.

It should be noted that to achieve the highest rate of success, the avulsed tooth should be cleaned and replaced in the socket as soon as possible. Root canal therapy should be performed ten to fourteen days following replantation to control idiopathic rejection, discourage the complications of abscess formation, and encourage apexification and/or apexogenesis in incompletely formed teeth.

At the one-month follow-up visit, the surgeon noted a fistulous tract over tooth #9. After a series of referrals to several different specialists, none of which resulted in treatment of the abscess, Jason came to our clinic at Tufts in October 1991, about 6 months following replantation.

Our clinic staff noted the fistulous tract, and a radiograph was taken that showed an incompletely formed root, a wide-open apex and a large periapical lesion (J1). We also noted an opacity beyond the root, which we later learned was the separated apical tooth bud. The splint, which had been in place for six

months, was removed to determine if the tooth was firm, which it was. Since I was not in the clinic at the time, Jason was asked to return in two days so that I could evaluate the case.

I saw Jason for the first time on October 23, 1991. The case looked hopeless, and I told Jason's parents that the prognosis was not good. But never willing to give up hope, and always willing to accept a challenge, I suggested that we still try to save that tooth, and his parents consented.

Root canal therapy was performed by entering the tooth from the palatal aspect with a #4 round bur. The opening was then enlarged to make it easier to clean out the canal. Using a #110 file, a diagnostic radiograph was taken to determine the working length (J2). The canal was filed and cleansed and filled with Pulpdent TempCanal, temporary calcium hydroxide canal treatment paste.

To reduce the chances of traumatic rejection, it is best to continue the calcium hydroxide treatment for up to one year or longer, although I have often completed cases in six months or less when there is no sign of rejection radiographically.

The TempCanal dressing was changed in November and December 1991, at which time clinical examination revealed that the fistulous tract had healed and the tooth was firm. A radiograph was taken which showed periapical healing and calcification occurring at the apex (J3).



Figure J1
Radiograph reveals an incompletely formed root canal, wide-open apex and a large periapical lesion. Note the apical tooth bud that was separated from the tooth when the trauma occurred. (October 1991)



Figure J2
Diagnostic radiograph with #110 file in place. Note the radiopaque stop. (October 1991)



Figure J3
Shows periapical healing, apexification and apexogenesis of the detached apical root bud seven weeks after treatment with TempCanal. (December 1991)

Jason's Tooth

I was fascinated to see that apexogenesis was also occurring in the tooth bud that had been separated at the time of the accident in the schoolyard. Surprisingly, this was occurring just seven weeks following treatment with TempCanal.

We continued to change the TempCanal dressing on a regular basis, and we were confident that we would be successful saving Jason's tooth. However, in April 1992, Jason got hit in the face with a basketball and immediately came to see us with the bad news.

We could see that the replanted maxillary left central incisor had been traumatized again and was loose. His gingival tissue was inflamed and the tooth was elongated. I changed the TempCanal dressing and ground the incisal edge of tooth #9 so that it was the same length as the adjacent incisor and would not be in traumatic occlusion.

We followed Jason closely and changed the TempCanal dressing on a regular basis. The tooth became firm once again, and we were hopeful for success even after two traumatic injuries.

When Jason returned to the clinic in November 1992, a radiograph showed healing and closure of the apex and apexogenesis of the separated root tip (*J4*). The TempCanal dressing was removed and the canal was obturated with Pulpdent Root Canal Sealer using the Pressure Syringe with an 18-gauge needle. The tooth was restored with composite.

Jason returned again in February 1993, and we were pleased to see total healing (*J5*). The radiograph shows a well-sealed root canal and the formation of the separated apical root tip, which continued to develop.

As you can see from the radiograph, Jason is wearing braces. We were concerned that placing a bracket on the twice-traumatized tooth might cause root resorption due to the applied force and movement of the tooth. However, when we saw Jason more than 2½ years later in November 1995, the tooth looked great, and so did Jason (*J6 & J7*). We did note slight discoloration of the replanted tooth at this visit, which was most likely caused by the trauma, the breakdown of pulp tissue and the extravasation of blood into the dentin.

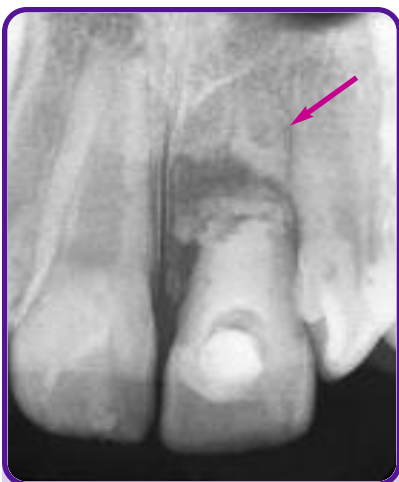


Figure J4
Shows healing and apexification. Note apexogenesis of the separated root tip. (November 1992)



Figure J5
Shows canal obturated with Pulpdent Root Canal Sealer, apexogenesis of the separated root tip and orthodontic brackets in place. (February 1993).



Figure J6
Radiograph taken over 2½ years following orthodontic treatment shows no sign of root resorption. Note that the separated tooth bud has fully developed into a mature apex and is probably vital. (November 1995)

In November 1997, after his braces had been removed, Jason returned to the clinic to see if we could bleach his discolored tooth. The tooth was reopened, all the restorative resin was removed, the root canal sealer was cut back to 2-3 mm below the cervical line of the tooth, and the tooth was thoroughly cleansed with sodium hypochlorite and dried. A hard base was placed over the root canal sealer to prevent idiopathic rejection from the bleaching procedure.

In a dappen dish, we made a mixture of 30% hydrogen peroxide solution and sodium perborate to form a thick bleaching paste, and placed it in the chamber. Heat was used to activate the bleaching material, so a damp cloth was placed over Jason's face for protection, and the unit light was placed close to the tooth. After ten minutes, the chamber was washed out, and a new mix of the bleaching paste was placed into the chamber and sealed with a hard setting cement. The tooth already appeared lighter.

Jason returned one week later, and we could see that the bleached tooth closely resembled the other central incisor. The tooth was reopened and the bleaching paste was cleaned out of the chamber.

In order to give the tooth a natural appearance and prevent it from darkening again, the chamber was etched, and DenTASTIC adhesive primer and unfilled resin bonding agent were applied and light cured. This created a life-like translucency and esthetic effect that blended with the adjacent central incisor. The tooth was then restored with a tooth shade composite.

Figure J8 is a photograph taken upon completion of the restoration, six years after we started this case. Jason looks great, and we were all thrilled with the results.

There was really no big secret to our success in this seemingly impossible case. Jason and his parents were committed and kept their appointments, and the TempCanal calcium hydroxide dressing did the rest. By continuing the calcium hydroxide treatment over a long period, we were able to heal the abscess, discourage traumatic or idiopathic resorption, stimulate apexification and apexogenesis, and save Jason's tooth.

As concerned as we were that orthodontic treatment would further complicate the case, there were no adverse affects, and we were fortunate to create such natural looking esthetics after multiple traumas, delayed root canal therapy, discoloration and internal bleaching.



Figure J7
Photograph shows slight discoloration of the reimplanted tooth. (November 1995)



Figure J8
Photograph taken 6½ years after the first traumatic injury shows a natural color blend between the restored tooth and the adjacent central incisor. The slight gingival irritation is from the rubber dam clamp. (November 1997)