

Avulsed Tooth Treatment Recommendations

| Category | Considerations | Treatment Recommendations |
|--|--|---|
| Mature apex, less than 15 min extraoral | | Rinse in physiologic solution and replant. |
| Mature apex, 15 min to 24 hrs extraoral in reconstituting storage medium | PDL cells physiologically and metabolically enhanced | Replant. |
| Mature apex 15 to 360 min extraoral in non-reconstituting wet storage medium | PDL cells morphologically and physiologically compromised | Soak in reconstituting solution for 30 min and replant. |
| Mature apex, up to 120 min dry extraoral time | PDL cells metabolically and physiologically compromised | Soak in reconstituting solution for 30 min and replant. |
| Mature apex, more than 120 min dry extraoral time | PDL cells necrotic | Scrape off periodontal ligament with curette or soak in sodium hypochlorite for 30 min. Clean and shape root canal in the hand. Soak tooth in saturated citric acid solution for 3 min, rinse with physiologic solution, soak in 1% SnF ₂ solution for 5 min, and soak in 1 mg /20 ml doxycycline solution for 5 min. Dry canal, obturate with gutta-percha, and restore access. Replant and splint. |
| Immature apex, less than 15 min extraoral | PDL cells viable but probably contaminated by bacteria | Soak in 1mg /20 ml doxycycline solution for 5 min. Replant and monitor clinically and radiographically weekly. If pulpal degeneration or root resorption is evident, extirpate pulp and perform apexification. |
| Immature apex, 15 min to 24 hrs extraoral in reconstituting storage solution | PDL cells viable, but pulp may be infected at apex | Soak in 1mg /20 ml doxycycline solution for 5 min. Replant and monitor clinically and radiographically weekly. If pulpal degeneration or root resorption is evident, extirpate pulp and perform apexification. |
| Immature apex, 15 to 360 min extraoral in non-physiologic wet storage medium | PDL cells compromised | Soak in reconstituting solution for 30 min and 1mg / 20 ml doxycycline solution for 5 min. Replant and monitor clinically and radiographically weekly. If pulpal degeneration or root resorption is evident, extirpate pulp and perform apexification. |
| Immature apex, less than 120 min dry extraoral time | PDL cells physiologically and functionally compromised | Soak in reconstituting solution for 30 min and 1mg / 20 ml doxycycline solution for 5 min. Replant and monitor clinically and radiographically weekly. If pulpal degeneration or root resorption is evident, extirpate pulp and perform apexification. |
| Immature apex, more than 120 min extraoral time | PDL cells necrotic, minimal likelihood of pulp revascularization | Scrape off periodontal ligament with curette or soak in sodium hypochlorite for 30 min. Clean and shape root canal in the hand. Soak tooth in saturated citric acid sol'n for 3 min, rinse with physiologic solution, soaking 1% SnF ₂ solution for 5 min, and soak in 1mg /20 ml doxycycline solution for 5 min. Dry canal and obturate with gutta-percha and restore access. Replant and splint. |

The critical factor for success of the replanted avulsed tooth is not the length of extraoral time, but the physiologic status of the PDL cells on the root surface.

General handling tips: Handle tooth by crown at all times, never touch periodontal ligament. To remove debris, soak in Hank's solution.

General replanting tips: If resistance is felt, exert only very gentle apical pressure until tooth sets in place. If tooth fails to seat after several minutes of pressure, remove and place in Hank's solution. Modify the socket (the socket and it's PDL have been shown to be irrelevant to the success of a replantation) and reinsert tooth. Never amputate the root to accommodate incomplete seating.

- Physiologic solution or reconstituting solution: 0.9% normal saline
- Non-reconstituting wet storage medium or non-physiologic wet storage medium: milk, saline, saliva, water
- 1mg /20 ml doxycycline solution is made by mixing 1/4 of a 100 mg doxycycline capsule with 6 ounces of sterile water
- citric acid (Ellman Dental)
- Colgate Gel-Kam 0.9% stannous fluoride solution is suitable for the SnF₂ soak

**Paul R. Krasner, DDS (D)
Henry J. Rankow, DDS (D)**

prepared by Kenneth S. Serota, DDS, MMSc