Decision Trees for Management of an Avulsed Permanent Tooth

Management of an Avulsed Permanent Incisor with an Open Apex (Apex ≥1 mm)*

Assess medical history and rule out any neurologic and nondental injuries.
Diagnostic tests:
• Rule out alveolar fracture.
• 3 radiographs angulated differently to rule out root fractures.
• Pulp vitality test maxillary and mandibular anteriors.

OR:
Immediately replanted at the accident site.
Extraoral dry storage time <20 minutes and tooth was transported in Hank’s Balanced Salt Solution (HBSS) or milk for 20 minutes to 6 hours.

OR:
If tooth was kept moist (in water, saliva or other non-physiologic media) for 20 to 60 minutes.

20 to 60 minutes extraoral dry time/storage.

>60 minutes extraoral dry time/storage.

Debride with soft pumice prophylaxis, gauze, gentle scaling/root planing, or 3% citric acid for 3 minutes, and rinse well to remove periodontal ligament.

Place in 1.23% sodium fluoride (e.g., acidulated phosphate fluoride) for 5 to 20 minutes.

Soak in doxycycline or Arestin™ solution for 5 minutes.

Change transport to HBSS. If HBSS is not available, place in cold milk.

• Replant and/or reposition.
• Obtain periapical radiographs to verify position.
• Place flexible splint for approximately 2 weeks; 4 weeks for dry time >60 minutes.
• Rx: Antibiotics (e.g., doxycycline or penicillin V potassium for non-allergic patients) for 7 days; Chlorhexidine rinse for 1 week.
• Assess tetanus vaccination: if needed, get booster within 48 hours.
• Provide post-operative instructions; inform of prognosis.
• Follow up in 7 to 10 days.

• Monitor every 4 weeks + pulp test + radiographs.
• Ideal outcome: revascularization and/or apexogenesis occurs over the next 12 to 18 months.
• Alternative outcomes:
  – Initiate apexification with mineral trioxide aggregate (MTA) or calcium hydroxide or root canal therapy if clinical and/or radiographic pathology presents.
  – Consider decoronation procedure when clinical infraposition of the tooth appears and/or clinical and radiographic findings of ankylosis manifest.
• Follow-up: 1 week, 1 month, 3 months, 6 months, 12 months, and annually for 5 years.

* Adapted with permission from: McIntyre J, Lee J, Trope M, Vann WJ. Permanent tooth replantation following avulsion: Using a decision tree to achieve the best outcome. Pediatr Dent 2009;31(2):137-44.
Management of an Avulsed Permanent Incisor with an Closed Apex (Apex <1 mm)*

Assess medical history and rule out any neurologic and nondental injuries.
Diagnostic tests:
- Rule out alveolar fracture.
- 3 radiographs angulated differently to rule out root fractures.
- Pulp vitality test maxillary and mandibular anteriors.

OR:

Extraoral dry storage time was <20 minutes and tooth was transported in Hank’s Balanced Salt Solution (HBSS) or milk for 20 minutes to 6 hours.

OR:

If tooth was kept moist (in water, saliva or other non-physiologic media) for 20 to 60 minutes.

OR:

20 to 60 minutes extraoral dry time/storage.

OR:

>60 minutes extraoral dry time/storage.

Debride with soft pumice prophylaxis, gauze, gentle scaling/root planing, or 3% citric acid for 3 minutes, and rinse well to remove periodontal ligament.

Change transport to HBSS. If HBSS is not available, place in cold milk.

Place in 1.23% sodium fluoride (eg, acidulated phosphate fluoride) for 5 to 20 minutes.

- Replant and/or reposition.
- Obtain periapical radiographs to verify position.
- Place flexible splint for approximately 2 weeks; 4 weeks for dry time >60 minutes.
- Rx: Antibiotics (eg, doxycycline or penicillin V potassium for non-allergic patients) for 7 days; Chlorhexidine rinse for 1 week.
- Assess tetanus vaccination: if needed, get booster within 48 hours.
- Provide post-operative instructions; inform of prognosis.
- Follow up in 7 to 10 days.
- Initiate pulpectomy/debridement on all teeth within 7 to 10 days.

If root canal therapy was initiated, complete within 1 month.

OR:

If patient does not present until >2 weeks after trauma and/or if radiographic resorption is present:
- Pulpectomy/debridement as soon as possible.
- Long-term calcium hydroxide therapy/slurry and change every 3 months.
- Complete root canal therapy when periodontal ligament/lamina dura is observed/healthy.

Follow-up: 1 week, 1 month, 3 months, 6 months, 12 months, and annually for 5 years.

* Adapted with permission from: McIntyre J, Lee J, Trope M, Vann WJ. Permanent tooth replantation following avulsion: Using a decision tree to achieve the best outcome. Pediatr Dent 2009;31(2):137-44.