

The Intruded Permanent Tooth: information for dentists

Normally a tooth is held in place by a network of fibers and cells called the periodontal ligament. These fibers were torn apart and many of the cells were crushed by the pressure of the pushed-up root during the accident.

Things that can cause this tooth to fail are:

- The depth the tooth has been pushed into the bone
- Infection that leads to rapid resorption of the root (months to a year)
- The tooth can become part of the bone and simply dissolve over time (years)
- As children grow, intruded teeth may remain in the same position. The tooth will appear to sink into the gingiva and have to be removed (years)
- The tooth can dissolve just below the crown and snap off...root must be extracted (years)

What do we know?

Teeth pushed up less than 3mm will likely come back to place by themselves and survive. Teeth pushed up between 3-6mm will likely need help to return to their location and may need root canal treatment within the next year. Teeth pushed up more than 6mm will need to be repositioned and will need immediate root canal treatment. Dentists can prevent infection by completing root canal treatment in less than two weeks.

Responsibilities of the dentist

Inform patient/parent/caregiver of the prospects/outcomes of this injury.
Attempt to reposition the tooth if the patient, parent, caregiver wishes.
Prevent or control infection.
Splint the tooth and remove splint at the appropriate time.
Begin and/or complete root canal treatment.

Responsibilities of the patient/parent/caregiver

Allow radiographs for diagnosis of damage
Approve treatment plan: surgical, active or passive repositioning
Cooperate for repositioning/splinting/root canal treatment
Comply with instructions if antibiotic therapy is required
Return for post-operative splint removal/radiographs at the appropriate times as recommended by the dentist. (Usually splint removal at 8 wks or 2 months depending upon option with radiographs at that time, 3 months, 6 months and then yearly)
Because of the high rate of complications associated with severe intrusions, patients and parents and the dentist should expect several visits during the first year.

Three types of intrusions

Tooth < 3mm intruded

Radiographs (2 size 0 periapicals*) at different angles using Rinn holder, at the time of injury. Observe for passive repositioning (movement into arch alignment) Examination/radiographs at 8wks, 6m, 12m.

Tooth 3-6mm intruded

Radiographs (2 size 0 periapicals*) at different angles at the time of injury. Splint adjacent teeth and begin active traction on intruded tooth immediately Recall weekly during active traction. Retain with splint for 6-8 weeks. Examination/radiographs at 8wks, 6m, 12m.

Tooth >6mm intruded

Radiographs (2 size 0 periapicals*) at different angles at the time of injury.
Remove tooth and proceed as in Scenario 3, for avulsions. Examination/radiographs at 6m, 12m.

*minimum number of radiographs indicated, additional views if required.

Outcomes

Survival of minimally-intruded (0-3mm) incisors is very good. Expect 40% to exhibit pulp canal obliteration, 40% to require root canal treatment, usually within the first year.

Survival of permanent teeth intruded 3-6 mm is very good as well. However survival is compromised by crown fracture with/without pulp exposure. If active traction is delayed, periodontal ligament healing will compromise the ability to move the tooth with high elastic forces. Expect 40% to exhibit pulp canal obliteration, 40% to require root canal treatment, usually within the first year.

Beyond 6mm intrusion survival is drastically reduced. If the patient has not attained full growth, ankylosis will lead to infraocclusion during the adolescent growth spurt. We remove such teeth surgically, complete endodontics and splint (as in replanted teeth). This controls infection and produces the expected outcome, ankylosis and replacement root resorption.

Malmgren B, Malmgren O. Rate of infraposition of reimplanted ankylosed incisors related to age and growth in children and adolescents. *Dent Traumatol* 2002;18:28-36

Kinirons MJ, Sutcliffe J. Traumatically intruded permanent incisors: a study of treatment and outcome. *Br Dent J* 1991;170(4):144-6

Humphrey JM, Kenny DJ, Barrett EJ: Clinical outcomes for permanent incisor luxations in a pediatric population: I. Intrusions. *Dent Traumatol* 2003;19:266-73

Albadri S, Zaitoun H, Kinirons MJ. Treatment of traumatically intruded permanent incisor teeth in children. BSPD reviewed guidelines August 2009. http://www.rcseng.ac.uk/fds/publications-clinical-guidelines/clinical_guidelines

Andreasen JO. The effect of pulp extirpation or root canal treatment on periodontal healing after replantation of permanent incisors in monkeys. *J Endod* 1981;7:245-252

Parry J, Barrett E, Kenny D. Characteristics of bacteria cultured from the sockets and transport media of avulsed permanent teeth of children. *Int J Paed Dent* 2003;13 (Suppl.1):49 (abstract)

The Toronto Dental Trauma Research Group

The Hospital for Sick Children & University of Toronto, Toronto, Canada 2011©. May be reproduced for patients/clinicians.